



Final Study Report

Solomon Islands Health Study

Deliverable Item 4 (Phase 2)

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Approvals

This document requires the following approvals:

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Signed approval forms are filed in the Management section of the project file.

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Abbreviations/Definitions

Abbreviation	Description
ADF	Australian Defence Force
ADHREC	Australian Defence Human Research Ethics Committee
AHA	Annual Health Assessment
AIHW	Australian Institute of Health and Welfare
AIHW HREC	Australian Institute of Health and Welfare Human Research Ethics Committee
AUDIT	Alcohol Use Disorder Identification Test
BMI	Body Mass Index (calculated as weight (kg) / [height (m)] ²)
CDU	Charles Darwin University
CI	Confidence Interval
CIDI	Composite International Diagnostics Interview
CMR	Central Medical Record
CMVH	Centre for Military and Veterans' Health
CPHE	Comprehensive Preventive Health Examination
CRUfAD	Clinical Research Unit for Anxiety and Depression
DCO	Defence Community Organisation
DHSD	Defence Health Services Division
DHSP	Deployment Health Surveillance Program
DHSP O	Deployment Health Surveillance Program Office
DMAC	Data Management and Analysis Centre
DSM-IV	Diagnostic and Statisticians Manual Version 4.
DVA	Department of Veterans' Affairs
DVA HREC	Department of Veterans Affairs Human Research Ethics Committee
ESO	Ex Service Organisation
G6PD	Glucose-6-phosphate dehydrogenase deficiency
HEP-B	Hepatitis B
HEP-C	Hepatitis C
HIV	Human Immunodeficiency Virus
InterFET	International Force in East Timor
K10	Kessler Psychological Distress Scale
MEC	Medical Employment Classification
NCSC	National Cancer Statistics Clearing House
NDI	National Death Index
NHMRC	National Health and Medical Research Council
OH&S	Occupational Health and Safety
PCL-C	Post Traumatic Stress Disorder Check List - Civilian
PMB	Program Management Board
POPS	Post Operational Psychological Screen
PRTG	Psychology Research and Technology Group
PTSD	Post Traumatic Stress Disorder

Abbreviation	Description
RR	Relative Risk (ratio of risk of disease or death among the exposed to the risk among the unexposed)
RTAPS	Return to Australia Psychology Screen
SAC	Scientific Advisory Committee
SEAHA	Specialist Employment Stream Annual Health Assessment
SI	Solomon Islands
SMR	Standardised Mortality Ratio ((ratio of number of deaths observed to number expected in a population with the same specific rates) x 100)
SOP	Standard Operating Procedure
SRT	Scientific Research Team
TSES-R	Traumatic Stress Exposure Scale Revised
UA	University of Adelaide
UMR	Unit Medical Record
UQ	University of Queensland
UQ BSSERC	University of Queensland Behavioural & Social Sciences Ethical Review Committee

Executive Summary

Introduction

1. The Defence Deployed Solomon Islands Health Study (Solomon Islands Health Study) is the first study in a research program that aims to assess the health and well-being of Australian Defence Force (ADF) veterans who have deployed on operations overseas. It was conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP) and funded by the Department of Defence.

Study aims

2. The overall aim of the Solomon Islands Health Study was to examine whether the health of the veterans of Operation ANODE differs significantly from similar Defence Force personnel who were not deployed as part of Operation ANODE. The specific research questions were:

- a) Do Operation ANODE veterans have increased rates of mortality or cancer?
- b) Do Operation ANODE veterans have increased rates of post-traumatic stress syndrome?
- c) Do Operation ANODE veterans have more general health problems?
- d) Do Operation ANODE veterans have poorer lifestyle factors, for example tobacco smoking and alcohol consumption?

3. A secondary aim was to evaluate and comment on access to, completeness and quality of the various sources of data for the Solomon Islands Health Study, and more generally for the purposes of epidemiological research and long term health surveillance of Defence personnel.

Methods

4. The Solomon Islands Health Study Nominal Roll included 4089 individuals who had deployed to the Solomon Islands as part of Operation ANODE before 1 January 2006 and a comparison group of 4092 Australian Defence Force personnel frequency matched to the veteran group on sex, age group (based on year of birth: 1937-1966, 1967-1976 or 1977-1988), service (Navy, Army or Air Force) and service type (Permanent or Reserve) and randomly selected from PMKeyS, the Defence Force Personnel Management System. To conduct the research reported here, 500 veterans and 500 comparison individuals were randomly selected from these larger groups.

5. For the Solomon Islands Health Study, all individuals were asked to complete a general health questionnaire, and those who had deployed to the Solomon Islands as part of Operation ANODE were additionally asked to complete a questionnaire specific to this deployment. Written consent was requested from respondents to link questionnaire data to Defence health and psychology records.

6. The Central Medical Records (hard copy files) of all veterans and comparison individuals in the sample were requested from Defence records facilities for each Service and data were extracted from several routine health assessments. Electronic

records of Defence psychology data were obtained for consenting participants. Analysis was also conducted by Defence, at DHSP's request, for the records of those who did not provide consent.

7. Data was collected from Central Medical Records and from psychology records (non-identifiable summary data) for all participants. Linkage between data from different sources was conducted only with express permission.
8. Characteristics of Solomon Islands veterans and the comparison group were compared using the chi-square test for categorical measures and the t-test (or a non-parametric equivalent) for continuous measures. Key outcomes of interest were also compared between services, for serving versus ex-serving members and consenting participants versus non-participants (non-consenting and those who did not respond) where appropriate. Descriptive statistics were presented for other data where appropriate.
9. The study was overseen by a DHSP Program Management Board, a Scientific Advisory Committee and a Scientific Research Team.
10. Summary tables showing sample sizes and participation rates for different aspects of this research are available on page 23 at the end of Chapter 2.

Results

Data collection

11. It was possible to obtain health assessment documents from Central Medical Records (CMRs) for almost all the sample, but the process was time consuming and logistically challenging, taking 12 months and 32% of the budget. Around 80% of the files had an AHA and/or CPHE available for analysis. In contrast, pre-deployment medical checklist and post-deployment forms were unobtainable for 75% and 70% respectively of the sample who deployed to the Solomon Islands.
12. The majority of participating Solomon Islands veterans (60%) consented to linkage of their psychology data. Most (71%) of these had Return to Australia Psychological Screening (RtAPS) data, but a much smaller percentage (27%) had Post Operational Psychological Screening (POPS) data. Only 25% of Solomon Islands veterans who consented to linkage of their psychology data had both RtAPS and POPS records in the Psychology Research and Technology Group (PRTG) database. A further 27% had no screening records available. Similarly, in the analysis conducted by PRTG on all Solomon Islands veterans in the sample (irrespective of consent to linkage to data from other sources), only 28% had received both RtAPS and POPS and 36% had no screening records in the PRTG database. There may have been logistic explanations for these missing data. The psychological screens may have not been conducted for logistic reasons, or had been conducted but paper records were not sent to PRTG, or the paper records may have been received but not entered into the PRTG electronic database. On average, based on the analysis of Defence psychology records, most Solomon Islands veterans were not showing high levels of anxiety or distress, although there were some exceptions.
13. Response to the self-report health questionnaire was obtained from 44% of the living sample (5 were deceased) but 19% of individuals in the sample could not be located and contacted in the time available; the largest proportion of those who could

not be located were ex-serving members of the Australian Defence Force. An overall response rate of 54% was achieved for those who could be contacted.

Research Questions

a) Do OP ANODE veterans have increased rates of mortality or cancer?

14. Both the mortality study and the cancer incidence study included all 4089 ADF personnel who deployed to the Solomon Islands and 4092 personnel in the comparison group. The studies compared:

- a. the mortality/cancer rate for Solomon Islands veterans with that of the comparison group.
- b. the mortality/cancer rate for Solomon Islands veterans with the general Australian population.

15. The risk of death/cancer incidence in each group was calculated as the total number of deaths/new first cancers divided by the total person years of follow-up from the start of Operation ANODE to time of death or end of the study (31 December 2005).

16. The National Death Index (NDI) linkage identified seven deaths in the SI veterans and seven deaths in the comparison group. There were no differences in all-cause mortality between the deployed and the non-deployed comparison group [Rate Ratio 1.02 95% CI (0.30, 3.40)]. ADF personnel in the Solomon Islands study had a lower mortality level 57 % lower than can be expected in the general population [Standardised Mortality Ratio 0.43 95% CI (0.23 0.72)].

17. The National Cancer Statistics Clearing House linkage showed no difference between the Solomon Islands veterans (one new first cancer) and the comparison group (no new first cancers).

18. All comparisons were based on small numbers of incidents and a short follow up time and consequently lacked the statistical power to confidently detect differences between groups, if those differences existed.

b) Do OP ANODE veterans have increased rates of post-traumatic stress syndrome?

19. Data from the Defence Psychological Records and the Self-report questionnaire were used to address this research question.

20. Based on the analysis of Defence psychology records, most SI veterans were not showing high levels of PTSD symptoms or psychological distress, although there were some exceptions.

21. The data from the self-report questionnaire showed that there were no differences in the level of PTSD symptoms or psychological distress between the SI veterans and the comparison group.

22. However, higher rates of PTSD symptoms (SI veterans self report PCL-C ≥ 50 = 4%, N = 227) and psychological distress (SI veterans self report K10 ≥ 16 = 37%, N =227) were reported in the self-report questionnaire compared with the Defence psychology records (RtAPS PCL-C ≥ 50 = 0.3%, and K10 ≥ 16 = 25%, N =302). This may be due to factors such as a greater willingness to disclose outside the

Defence environment, or the development of symptoms over time, the questionnaire was completed more recently.

23. The most common stressor reported by SI veterans was double standards (70%) followed by leadership (60%), behaviour of others (59%) and the Australian military hierarchy (58%). Personal stressors included separation from family or friends (62%) and sorting out problems at home (58%).

c) Do OP ANODE veterans have more general health problems?

24. Data from the Defence medical records and the Self-report questionnaire were used to address this question. There were almost no differences in health outcomes between the SI veteran and comparison groups, including MEC classifications. However, statistical power was low to detect small differences between groups.

25. Similarly, data from the self-report questionnaire showed no significant differences between the groups on various general health measures including the reporting of various diseases and symptoms.

d) Do OP ANODE veterans have poorer lifestyle factors, for example tobacco smoking and alcohol consumption?

26. Data from both the defence medical records and the self-report questionnaire showed no significant differences between the groups.

27. The most consistent finding across all aspects of the questionnaire data was that there were no significant differences in outcomes between the Solomon Islands veterans and the comparison group, although there was only adequate statistical power to detect moderate to large differences between groups. On the self-report data one third of participants consume alcohol in excess of 'low risk' and one fifth (21%) are current smokers.

e) Additional findings

28. Participating Solomon Islands veterans reported a range of exposures in response to the deployment questionnaire. Over 80% of the SI veterans responding to the questionnaire were full-time ADF members, and over 80% had deployed only once to the Solomon Islands. A small number had deployed more than once, with around 10% having deployed twice and 5% three or more times. The median summed length of all deployments was 105 days.

29. Although there was a substantial amount of missing data, over half the participants reported having two to four different vaccinations as part of their deployment. Doxycycline was the most common antimalarial drug taken and over 60% reported taking primaquine on return to Australia.

30. The most common chemical and environmental exposures reported by veterans were loud noises (66%), insect bites (66%) and exposure to pesticide fogging or spraying (60%). Over 70% reported using an insect repellent and 51% wore clothing treated with pesticides (e.g. permethrin). Over half ate local foods and swam or bathed in local water sources.

31. Veterans also reported on organisational and psychological factors in their deployment(s), including level of morale. Although a proportion rated the level of morale in their unit as low (8%) or very low (3%), most rated morale as average

(33%), high (34%) or very high (8%) Over 60% rated their deployment experience as positive or very positive, while 10% said it was negative or very negative.

32. Self-reported exposure to traumatic stress was low. Most participants felt not greatly affected by the experience at the time. The most commonly reported stressor was double standards (70%). Other organisation stressors were leadership (60%), behaviour of others (59%) and the Australian military hierarchy (58%). Personal stressors included separation from family or friends (62%) and sorting out problems at home (58%).

33. BMI and smoking status appear to have good reliability (agreement) between Defence health data and self-report data, and thus data from either source would be suitable for monitoring these outcomes.

34. Alcohol consumption, PCL and K10 demonstrated substantial variation between the different sources of data, with higher risk levels reported in the self-report data relative to the Defence health data. The reliability and validity of Defence data for long term monitoring of these outcomes is of concern, especially as these data will not be routinely collected once personnel leave the ADF.

35. There were differences in some measures, such as self-reported major stressors, between Services. Some (such as living and working with the same people) may simply reflect differences in conditions across Services, but others (such as double standards or leadership) may warrant further investigation.

36. Mean self-reported measures of psychological distress were higher in the questionnaire self-report data than in the RtAPS and POPS data provided by PRTG. This may be due to factors such as a greater willingness to disclose outside the Defence environment, or the development of symptoms over time, as the questionnaire was completed more recently.

General Findings on Use of Defence Central Medical Records

37. There are advantages in collecting data from Defence Central Medical Records. First, it provides the largest collection of data for the most people. Second, potential recall bias is less of an issue for some of the items than with the self-report data. Third, vaccination information has the potential to be more accurate than that obtained by self-report, although this is not the case for vaccination information extracted from the Central Medical Record. Finally, because certain items of the data are collected by a medical or health practitioner, this has the potential to improve standardisation of data if training for this purpose were provided.

38. There are also disadvantages which are recognised problems when using any clinical or administrative data for research or surveillance purposes. First, Defence medical record data have limited use for health surveillance for personnel who have separated from the ADF. Second, variations over time in the type of forms used by Defence make comparisons over time difficult. Third, many of the data items able to be collected from the forms are actually self-report items. Fourth, although most Central Medical Records were made available by Defence records facilities, the process of obtaining and capturing data from paper records was both logistically complex and labour-intensive.

Strengths and limitations of the study

39. The frequency-matched comparison group design is a strength of the study. Further strengths are the opportunity to assess change over time in both Defence owned health and psychology data, and between Defence owned data and self-reported data. Nevertheless, the study was cross-sectional in that it captured information on health status at particular points in time and the deployments were relatively recent. Lead time, therefore, may be insufficient for development of some conditions.
40. The power of the study to detect differences between the veteran and comparison groups was greatest for Defence health record data, but was dependent on the availability of forms within the records and the suitability of the data for aggregated epidemiological analysis. There was only adequate power to detect moderate to large differences between groups for self-reported data measures, where those differences existed.
41. There may have been effects of other deployments which could not be accounted for. Data on other deployments were largely self-reported and these exposures and outcomes were not validated. Other studies such as the Australian Gulf War Study found that over-reporting was not a major factor, and it is arguable that it would be even less likely for the Solomon Islands deployment.
42. A potential limitation of the study was the potential response bias caused by missing data i.e. there may have been a systematic biasing effect if, for example, forms were missing from medical records for reasons related to recent medical need or disability, or if a high proportion of individuals with negative health outcomes did not respond to the survey questionnaire for reasons related to their health.

Health Specific Recommendations

- I. Longer-term monitoring is warranted as there has only been a short follow-up time between Solomon Islands deployment exposure and outcome assessment.
- II. There were differences in some measures between Services (e.g. stressors) that may suggest a need for further investigation.
- III. Measures of psychological distress on matched data for RtAPS and POPS records should be evaluated for the possibility that psychological distress may increase with time. This in turn may suggest a need for longer-term post-deployment psychological screening.

General Recommendations

- IV. The availability and validity of the data from different sources for health surveillance needs careful review.
- V. The process of self-report data collection should be streamlined for future studies, eliminating use of a mail house for sending hard copy invitations and study materials. Email approaches to potential participants should be investigated, given the popularity of online questionnaire completion.
- VI. Given difficulties in obtaining consent forms as hard copy consents for individuals who completed the questionnaire online, the option to provide consent on the internet should be included in future studies.

- VII. Improvements in some specific questions are needed, in particular those relating to smoking, oral health and reproductive health.
- VIII. The questionnaire should be reduced in length, particularly the demographic section, for subsequent studies. NB Recommendations 2 to 5 have been adopted for the Defence Health East Timor and Defence Health Bougainville studies.
- IX. It is important that future studies maintain the use of a standard core of questions to enable comparisons with other groups both within the ADF and with other military and civilian populations.
- X. As much data as possible should be collected and provided by Defence in electronic format to increase the efficiency and speed of usable information generation from these studies.
- XI. RtAPS and POPS are collected for clinical use and applications. To be useable for surveillance, consistency in the design and the use of the form and electronic capture of the data is essential.
- XII. Defence collected data are not available for personnel who have separated from the ADF. Consequently, Defence collected data should not be the only source of data.
- XIII. Important measures of health collected now form the baseline for future comparisons of outcomes. Therefore, data sources used for health surveillance should be monitored and assessed for ongoing suitability and consistency.

Chapter 1 - Introduction

Key Findings

- I. The Defence Deployed Solomon Islands Health Study is the first study in a research program that aims to assess the health and well-being of Australian Defence Force (ADF) veterans who have deployed on operations overseas. It was conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).
- II. This report presents data from Defence Health records, the self-report questionnaire and Defence Psychology records for the Solomon Islands Health Study and a summary of mortality and cancer incidence results.
- III. The overall aim of the Solomon Islands Health Study is to examine whether the health of the veterans of Operation ANODE differs significantly from similar Defence Force personnel who were not deployed as part of Operation ANODE.
- IV. A secondary aim of this report is to evaluate and comment on access to, completeness and quality of these various sources of data for the Solomon Islands Health Study, and more generally for the purposes of epidemiological research and long-term health surveillance of Defence personnel.

Background

43. The Defence Deployed Solomon Islands Health Study (hereafter referred to as the Solomon Islands Health Study) is the first study in a research program that aims to assess the health and well-being of Australian Defence Force (ADF) veterans who have deployed on operations overseas. It was conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).

44. The Solomon Islands Health Study includes data gathered from mortality and cancer incidence registries, a comprehensive self-reported health status questionnaire, a deployment experiences questionnaire, and health and psychology records retained by the ADF. The Solomon Islands Health Study is part of a health surveillance system which will provide comprehensive and longitudinal monitoring of ADF veterans to investigate any links between deployment and the subsequent development of adverse health effects.

45. This report presents data from Defence Health records, the self-report questionnaire and Defence Psychology records for the Solomon Islands Health Study.

Solomon Islands and Operation ANODE

46. The Solomon Islands is a Melanesian nation east of Papua New Guinea, consisting of a scattered archipelago of 992 islands extending 1770 kilometres southeast from Bougainville. The population of approximately 538,000 (July 2005 estimate) inhabits 347 of these islands. There are six major islands or groups of islands with numerous small islands and atolls: The major islands are Guadalcanal, Malaita, Choiseul, Santa Isabel, New Georgia and San Cristobal (Aregheore, 2006; Central Intelligence Agency, 2006).

47. In 2003, the Solomon Islands were in a political and security crisis, as a result of long-standing internal conflicts.

48. The Australian Defence Force (ADF) deployed Operation ANODE to the Solomon Islands in 2003 as part of the Regional Assistance Mission to the Solomon Islands (RAMSI). The overall RAMSI undertaking is known as operation HELPEM FREN. Operation ANODE commenced on July 24th 2003 and is still underway.

49. Operation ANODE was classified as a non-warlike operation. This is defined as an operation where there is a risk associated with the assigned tasks, where the application of force is limited to self-defence, and where casualties could occur but are not expected.

50. Although Operation ANODE was essentially a peacekeeping operation, ADF personnel deployed to the Solomon Islands faced a wide variety of exposures which were potentially hazardous to their health and wellbeing. These included operational and occupational hazards such as trained and armed militia groups, environmental hazards such as contaminated food and water and proliferation of disease vectors such as mosquitoes, and psychological harm such as fear of being harmed and witnessing distressing events. These hazards may have contributed to adverse health outcomes in personnel deployed to the Solomon Islands. For more detail, please refer to the Literature Review (see Annex A).

Study aims and objectives

Primary Aims

51. The overall aim of the Solomon Islands Health Study is to examine whether the health of the veterans of Operation ANODE differs significantly from similar Defence Force personnel who were not deployed as part of Operation ANODE.

52. Within this overall aim, the study has a number of specific questions relating to the health of Operation ANODE veterans (from Statistical Analysis Plan, Deliverable Item 2n, Phase 1b) relative to an appropriate comparison group of Defence personnel who did not deploy:

- a) Do Operation ANODE veterans have increased rates of mortality or cancer?
- b) Do Operation ANODE veterans have increased rates of post-traumatic stress syndrome?
- c) Do Operation ANODE veterans have more general health problems?
- d) Do Operation ANODE veterans have poorer lifestyle factors, for example tobacco smoking and alcohol consumption?

53. The Solomon Islands Health Study has involved:
- a) Generation of a Project Nominal Roll of Defence personnel who were deployed to the Solomon Islands as part of Operation ANODE between 24th July, 2003 and 31st December 2005 and selection of a comparison group of Defence personnel with a similar distribution of sex, age group, service type and status who did not deploy on Operation ANODE during this period (see Sample Generation Report - Annex B)
 - b) Conduct of a Mortality Study based on analysis of death data obtained from linkage of the Project Nominal Roll and the comparison group with the National Death Index (a database managed by the Australian Institute of Health and Welfare which includes all deaths occurring in Australia) (see SI Mortality Study Report – Annex C)
 - c) Conduct of a Cancer Incidence Study based on analysis of cancer data obtained from linkage of the Project Nominal Roll and the comparison group with the National Cancer Statistics Clearing House (data managed by the Australian Institute of Health and Welfare which includes information from all Australian State and Territory Cancer Registries) (see SI Cancer Incidence Study Report – Annex D)
 - d) Conduct of a study to obtain information on a sample of individuals from the Nominal Roll and comparison group using three data sources: self-report questionnaires, Defence Health records and Defence Psychology records.

54. The first three components of the Solomon Islands Health Study, the Generation of the Nominal Roll (Annex B), the Mortality Study (Annex C) and the Cancer Incidence Study (Annex D) have been reported previously. This report presents data from Defence Health records, the self-report questionnaire and Defence Psychology records for the Solomon Islands Health Study.

Secondary Aims

55. The Solomon Islands Health Study is dependent not only upon voluntary completion of self-report data by individuals selected in the study sample, but on Defence owned health records (Central Medical Records) and psychology data from the Psychology Research and Technology Group (PRTG) within Defence. These records are collected for clinical purposes and some components are entered into internal Defence databases maintained by various sections within Defence for internal purposes.

56. A secondary aim of this report is to evaluate and comment on access to, completeness and quality of these various sources of data for the Solomon Islands Health Study, and more generally for the purposes of epidemiological research and long term health surveillance of Defence personnel.

Study hypotheses

57. Several hypotheses have been identified a priori as being of importance for the Solomon Islands Health Study. These hypotheses are planned comparisons. Other hypotheses, referred to as post hoc comparisons, may be generated at a later date due to new concerns in veteran health or associations found in the data. The a priori hypotheses are:

- a) Mortality will be higher in the deployed group compared to the Australian population and non-deployed group (see Annex C);
- b) The total number of cancers (all types) will be higher in the deployed group compared to the Australian population and non-deployed group (see Annex D);
- c) The prevalence of PTSD (as defined by the PCL-C) will be higher in the deployed group compared to the non-deployed group;
- d) The level of alcohol use (as defined by the AUDIT score) will be higher in the deployed group compared to the non-deployed group;
- e) Pack years of smoking will be higher in the deployed group compared to the non-deployed group;
- f) Oral health will be worse in the deployed group compared to the non-deployed group;
- g) Reproductive health will be poorer in the deployed group compared to the non-deployed group;
- h) The number of recent hospitalisations will be higher amongst the deployed compared to the non-deployed;
- i) The rates of malaria and other infectious diseases will be higher amongst the deployed compared to the non-deployed; and,
- j) There will be a clustering of health symptoms and diagnosed conditions in the deployed group but not in the non-deployed.

Chapter 2 – General Methods

Key Findings

- I. The Solomon Islands Health Study Nominal Roll included 4089 individuals who had deployed to the Solomon Islands as part of Operation ANODE between July 24, 2003 and December 31, 2005. A comparison group of 4092 Defence personnel who had not deployed as part of Operation ANODE, frequency matched to the veteran group on sex, age group (based on year of birth: 1937-1966, 1967-1976 or 1977-1988), service (Navy, Army or Air Force) and service type (Permanent or Reserve) were randomly selected from PMKeyS, the Defence Force Personnel Management System.
- II. Five hundred veterans and 500 comparison individuals were selected from these larger groups for inclusion in the Solomon Islands Health Study.
- III. The Central Medical Records of all veterans and comparison individuals in the sample were requested and data extracted from several routine health assessment forms.
- IV. All individuals were asked to complete a general health questionnaire, and those who had deployed to the Solomon Islands as part of Operation ANODE were additionally asked to complete a questionnaire specific to this deployment.

Introduction

58. This Chapter provides a brief overview of the data collection methods. These have been described in detail in the Completion of Defence Owned Data Collection Report and the Completed Self Reported Data Collection Stage Report (Annexes E & F). More information on the data collection and statistical methods for each of the three data sources (Defence Health data, Chapter 3; Defence Psychology data, Chapter 4; and self-report questionnaire data, Chapter 5) are provided in the relevant chapters.

Study sample

59. The Solomon Islands Health Study Nominal Roll included 4089 individuals who had deployed to the Solomon Islands as part of Operation ANODE between July 24, 2003 and December 31, 2005. A comparison group of 4092 Defence personnel who had not deployed as part of Operation ANODE, frequency matched to the veteran group on sex, age group (based on year of birth: 1937-1966, 1967-1976 or 1977-1988), service (Navy, Army or Air Force) and service type (Permanent or

Reserve) were randomly selected from PMKeyS, the Defence Force Personnel Management System.

60. Five hundred veterans and 500 comparison individuals were selected from these larger groups for inclusion in the Solomon Islands Health Study. This number was based on budgetary restrictions rather than scientific requirements. Individuals were selected from each list using stratified random sampling, with strata based on sex, age group, service and service type as described above. Proportional allocation was used to determine the number of individuals selected from each stratum.

Defence owned Health data

61. The Defence owned data component of the study involved the collection of both health and psychology records from the Department of Defence. Selected health assessment documents such as the Annual Health Assessment (AHA), Comprehensive Preventive Health Assessment (CPHE), Pre-Deployment Medical Checklist and the Post-Deployment Health Screen were collected from the Central Medical Record (CMR) for individuals in the Solomon Islands Health Study. All records were de-identified before the information was captured and analysed.

Defence owned Psychology data

62. Defence psychology data included data from the Return to Australia Psychological Screen (RtAPS), completed on leaving theatre, along with individual interviews and Post Operational Psychology Screen (POPS) completed within three to six months after return from theatre. These were sourced from the electronic files managed by the Psychology Research and Technology Group (PRTG), who are the custodians of the electronic database containing the RtAPS and POPS data.

Self-report data

63. The self-reported data component of the study involved the completion of a questionnaire by individuals in the study sample. A two-stage approach for contacting potential participants and obtaining self-reported study data was used. The first contact (the invitation package) provided an introduction to the study, informed individuals about the study and invited them to participate, and requested information on preferred mode of completion of the questionnaire (mail, internet, telephone interview or face-to-face interview) and deployment history. The second stage involved provision of the questionnaire to participants via their indicated preferred mode of delivery.

64. All individuals were asked to complete a general health questionnaire, and those who had deployed to the Solomon Islands as part of Operation ANODE were additionally asked to complete a questionnaire specific to this deployment. Reminder cards and second invitation packages were sent to individuals who had not responded to the invitation within a specified time frame. Follow-up calls were then made to individuals who had not yet responded, or to those who had returned their consent form but had not yet completed the questionnaire.

65. In the Solomon Islands Health Study consent form, participants were asked to provide separate consent to several items :

1. Completing the Defence Health Study Questionnaire;
2. Being contacted periodically for follow-up studies;

3. Allowing linkage of information contained in their Defence Health records;
4. Allowing linkage of information contained in their Defence Psychology records.

Statistical methods

66. Exploratory data analysis was undertaken to check for out-of-range and missing values. Scales were generated from individual items and categorised where appropriate, as described in the methods section of each of the data chapters. Where there are different methods of combining or categorising variables, the method used by Defence health or psychology staff are used (unless otherwise stated).

67. Frequency distributions of all data items, including the number and percentage of observations with missing data, are presented in appendices for all participants combined. Primary outcomes of interest only are included in the body of the report.

68. Relevant response data are reported in each chapter, including information on the number and percentage of individuals with Defence Health, Defence Psychology and self-report data, and the method of completion of the questionnaire. Characteristics of individuals with and without the different types of data (for example those with RtAPS with and without POPS, and those who have and have not completed the self-report data) are compared using the Chi-squared test (or Fisher's Exact Test if relevant) for categorical variables and the t-test or a non-parametric equivalent for continuous variables.

69. For categorical outcomes, the number and percentage of individuals in each category is reported separately for Solomon Islands veterans and the comparison group, and the chi-squared test used to compare distributions across deployment groups. For all chi-squared tests 'not available' categories are not included in the analyses. The relative risk of self-reported symptoms and diagnosed or treated medical conditions in the veteran group relative to the comparison group is presented with 95% confidence intervals for the 15 most frequent symptoms and conditions.

70. For continuous outcomes summary statistics, including mean, standard deviation, median and quartiles are reported separately for each deployment group and distributions compared between groups using the t-test or a non-parametric equivalent as appropriate.

71. The number and percentage of observations with missing data are provided in tables, but these observations are not included in statistical analyses.

72. For key variables of interest, and where sample size permits, summary measures are presented and compared across the three service group (Navy, Army, Air Force) using the chi-squared test (or Fisher's Exact Test if relevant) for categorical variables and analysis of variance or a non-parametric equivalent for continuous measures. A significance level of 5% was used for all analyses.

Statistical Power

73. The sample size for the Solomon Island Health Study (500 individuals selected in each of the veteran and comparison groups) was based on budgetary constraints, rather than formal sample size requirements to test all hypotheses of interest. Based on a response of 45%, the Solomon Islands Health Study had 80% power (with 5%

significance level) to detect an absolute difference between veterans and comparison of:

- a. thirteen percent for an outcome which is common (fifty percent) in the comparison group, e.g. fatigue
- b. twelve percent for an outcome which is moderately common (twenty percent) in the comparison group, e.g. alcohol intake
- c. nine percent for an outcome which is uncommon (ten percent) in the comparison group, e.g. anxiety or depression
- d. eight percent for an outcome which is rare (five percent) in the comparison group, e.g. PTSD
- e. 0.27 standard deviations for continuous outcomes; e.g. PCL-C

74. Assuming the response rate to the questionnaire is 45% (450 responders) and taking example 'a' above where the outcome was prevalent in 50% of the comparison group; if we observed the same outcome in 63% (50+13) of the Solomon Islands veterans, we would have 80% power to detect a significant difference at the 5% level.

Study oversight and Ethics approvals

75. The study was overseen by a Program Management Board (PMB), a Scientific Advisory Committee which advised the PMB, and a Scientific Research Team.

76. A Scientific Advisory Committee, chaired by Professor Tony McMichael, advised the Program Management Board, chaired by CDRE Robyn Walker, on the study. A Scientific Research Team, chaired by Professor Annette Dobson, also reviewed the design and conduct of the study.

PMB Membership at June 28 2007

CDRE Robyn Walker (RAN)	DGSHPP (Chair)
Mr Adam Luckhurst	DVA
Prof Niki Ellis	Director, CMVH
Mr Tony Hewson	DGPERS-AF
LTCOL Sue Smith	DGPERS-A
Col Len Brennan	HQ JOC
CAPT Timothy Maddern (RAN)	DGNPT

Scientific Advisory Committee core member

Prof A J McMichael	Director, National Centre for Epidemiology & Population Health, Australian National University
Prof Scott Henderson	Psychiatrist
Prof Neil Pearce	Director, Centre for Public Health Research, Massey University New Zealand
Prof Michael Moore	Director, National Research Centre for Environmental Toxicology

Scientific Research Team core members

Prof Annette Dobson	Chair
Prof Konrad Jamrozik	Deputy Chair
Prof Catherine D'Este	Principal Investigator, Solomon islands Defence Deployed Health Study, University of Newcastle
Prof AlexanderMcFarlane	Principal Investigator, Middle East Area of Operations Defence Deployed Health Study, CMVH, University of Adelaide
A/Prof Susan Treloar	Principal Investigator, East Timor and Bougainville Defence Deployed Health Studies, CMVH
Professor Niki Ellis	Director, CMVH
LTCOL (Dr) Peter Nasveld	Research Manager, CMVH
Dr Christine McClintock	Program Manager, DHSP, CMVH
Professor Phil Ryan	Director, Data Management and Analysis Centre, University of Adelaide

77. Approval was received for the data collection stage of the study from ADHREC (#450/06), DVA HREC and UQ BSSERC (#2006000641). Several minor modifications to study protocols were required as the study was implemented, and every change was considered and approved by each of the ethics committees.

Sample Summary Tables

78. As the sample size for the various analyses differs depending on eligibility, consent of participants and/or the availability of data, Table 2.1 provides a summary of the number of observations available for different data sources and analyses. Figures 2.1 and 2.2 show the number of people included from the self-report, Defence health data and psychology records and the overlap between these data sources. The overlap between the data sources is based on consent to linkage provided by participants in the self-report questionnaire. Accordingly, there may be more overlap between sources than indicated in Figures 2.1 and 2.2.

Table 2.1: Sample size for each data source in the Solomon Islands study.

<i>Data Source</i>	<i>SI veterans</i>		<i>Comparison group</i>	
	<i>eligible</i>	<i>data available</i>	<i>eligible</i>	<i>data available</i>
<i>Defence Owned Data (Chapter 3)</i>	500	n (%)	500	n (%)
<i>Most recent AHA/CPHE after 31 December 2005</i>	500	298 (60)	500	280 (56)
<i>AHA (Total)</i>	500	408 (82)	500	386 (77)
<i>CPHE (Total)</i>	500	404 (81)	500	402 (80)
<i>Pre deployment check ANODE</i>	500	130 (26)	N/A	
<i>Post deployment check ANODE</i>	500	148 (30)	N/A	
<i>Defence Psychology Data (Chapter 4)</i>				
<i>RtAPS</i>	500	302 (60)	N/A	
<i>POPS</i>	500	155 (31)	N/A	
<i>Self-Report Data (Chapter 5)</i>				
<i>Health and Demographics</i>	500	227 (45)	500	208 (42)
<i>Deployment Questionnaire</i>	500	228 (46)	N/A	

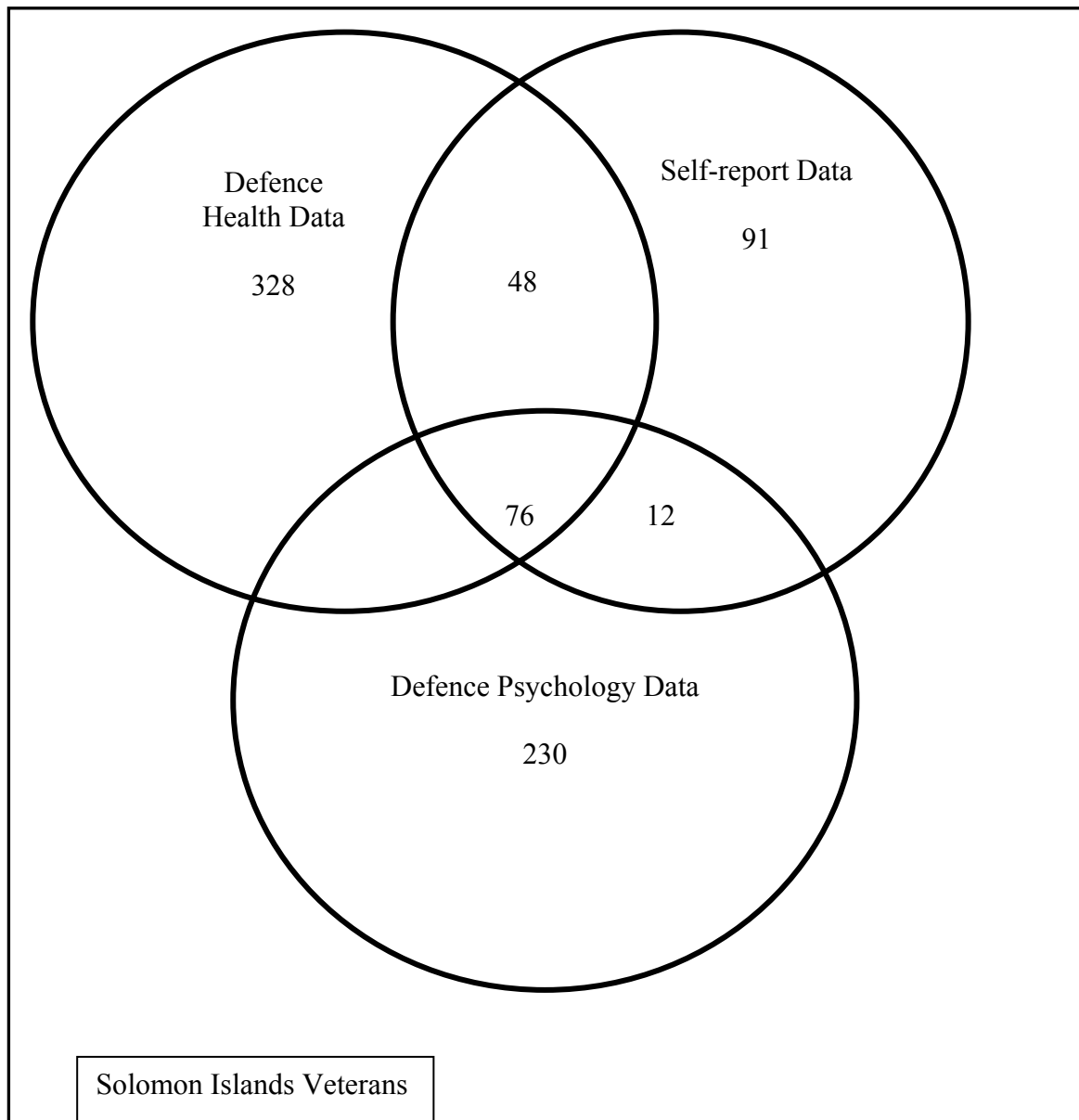


Figure 2.1: Breakdown of data sources for the Solomon Islands veterans. Overlap between Defence health and psychology data is not shown

79. In the Solomon Islands veterans group, self-report data were collected for 227 out of a possible 500. Psychology data were obtained for 318 people and 452 Defence health data records were collected. Data were collected from all three data sources with consent to link the different sources for 76 (15%) participants. Eleven people who did not complete the self-report questionnaire gave consent to link records with their psychology data. Similarly, 16 people who did not complete the questionnaire consented to linkage with Defence health data.

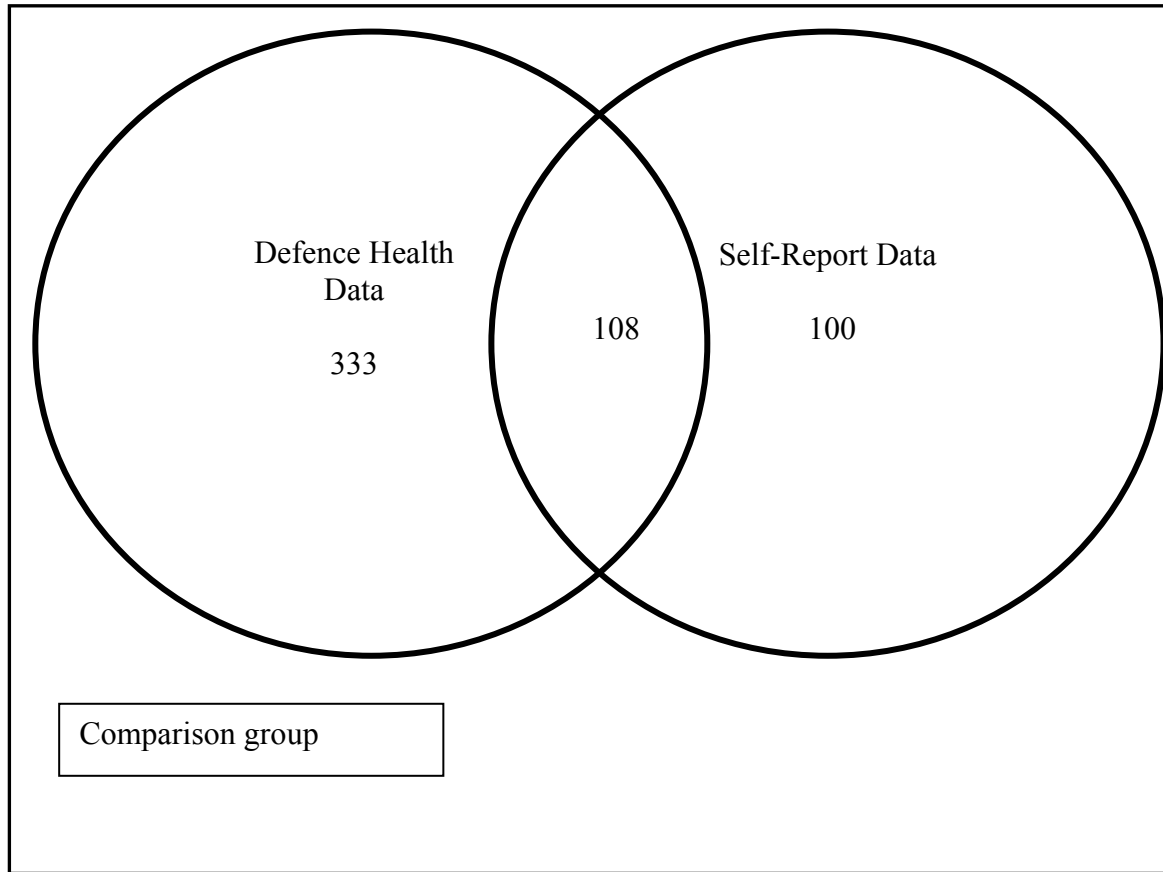


Figure 2.2: Breakdown of data sources for the Solomon Islands comparison group.

80. Among the Solomon Islands comparison group, self-report data was collected for 208 out of a possible 500, and 441 Defence health data records were collected. Psychology data was not included for Solomon Islands comparisons as the RtAPS and POPS data relates to specific deployments. Data was collected from the self-report and Defence health data with consent to link the different sources for 108 (21%) participants.

Chapter 3 – Defence Health Records

Key Findings

Data collection

- I. It was possible to obtain health assessment documents from CMRs for almost all of the Solomon Islands veterans and the comparison group. Obtaining health records from the RAAF took substantially longer than for other Services because the flow from the RAAF organisation was slower.
- II. On average 89% of the sample had an AHA and/or CPHE available for analysis.
- III. In contrast, pre-deployment medical checklists and post-deployment health screens were unobtainable for 74% and 70% respectively of the sample who deployed to the Solomon Islands.
- IV. Obtaining the data from CMRs, de-identifying and imaging selected forms, abstracting and coding selected items from the forms was a time-consuming and expensive process, taking 12 months and 32% of the initial budget for the study.

Data analysis

- V. Distributions of AUDIT scores, MEC classifications, cigarette smoking, BMI and stress were very similar between the Solomon Islands veterans and the comparison group.
- VI. There were almost no differences in health outcomes between the Solomon Islands veteran and comparison groups, although statistical power was low to detect small differences between groups.
- VII. In contrast, there were significantly more people with a MEC 3 or 4, a higher AUDIT score, and higher levels of stress on their most recent CPHE, who are now ex-serving members of the Defence Force.

Usefulness of Defence Health data

- VIII. The advantages in collecting the Defence Health records include:
 - a. The largest collection of data for the most people of any source.
 - b. Potential recall bias is less of an issue for some of the items than with the self-report data as data may be collected in closer proximity to events of interest.
 - c. Certain items of the data on the medical records are collected by a medical health practitioner who, as long as training is provided, has the potential to improve standardisation of data.
- IX. However, there are limitations with the use of Defence Health data in some circumstances. These include:
 - a. Defence Health data have limited use for health surveillance for personnel who have separated from the ADF. By definition, ex-serving members no longer have routine health assessments within Defence and their last available medical form will be their discharge CPHE.

- b. Variations in the way an item is recorded on a particular form affect interpretations of the outcomes. For example, changing recording of the G6PD from positive/ negative to normal/deficient.
- c. Vaccination information as recorded in the AHA and CPHE is difficult to draw useful interpretations and conclusions from. However, the vaccination record contained in the Unit Medical Record (UMR), the yellow book, may be more useful. This will need to be evaluated.

Introduction

81. Defence routinely conducts and documents various health assessment activities for individuals. These health assessments provide sources of data with potential for health surveillance.

82. This section describes the collection and analysis of Defence Health data for the Solomon Islands Health Study.

Methods

Methods of Data Collection

83. Selected health assessment documents were obtained from the Central Medical Records (CMRs) for individuals in the Solomon Islands Health Study. These documents were:

- Annual Health Assessment (AHA) (AD146) (Annex H) – conducted annually;
- Five Yearly Comprehensive Preventive Health Examination (CPHE) (AD147) (Annex I) – a more detailed assessment which replaces the AHA every 5 years and is performed on exception for Separation Health Examinations and Occupational and Environmental medicals in accordance with single service instructions;
- Medical Board (MB) (PM005, PM085, PM128) – similar to and predating the AHA. They may also have been referred to as Periodic Health Examinations by the Navy (Annex J);
- Specialist Employment Stream Annual Health Assessment (SESAHA) (AD146-1) – an AHA for those in specialist categories such as divers etc (Annex K);
- Pre-Deployment Medical Checklist (AD359) (Annex L);
- Post-Deployment Health Screen (AD369) (Annex M); and,
- Health/Medical Insert Slips (AD367) (Annex N).

84. The CMR was requested for each of the 1000 individuals selected for the sample (including five individuals later found to have died). The most recent CPHE and AHA (or SESAHA) was collected for each individual. For those in the sample who had deployed to the Solomon Islands, the Pre-Deployment Medical Checklist, Health Insert Slip and Post-Deployment Health Screen forms for Operation ANODE were also collected. For more detail on the collection of Defence Health records see Annex E – Completion of Defence Owned Data Collection.

85. Two hundred and forty-eight Navy CMRs, 600 Army CMRs and 14 RAAF CMRs were requested from the Central Medical Records storage facilities. The remaining 138 RAAF records were sourced from the RAAF Health Records Recovery Project. CMRs were unavailable for five Navy, 73 Army and 24 RAAF members.

86. Files containing paper records were retrieved from their respective storage or archive locations. The location and the protocols for sending materials to CMVH varied between Services. The retrieval and re-shelving procedure was most costly in terms of Defence staff time, and future projects will require increased resourcing to enable Health Record Facilities to carry out this process. Paper records were requested by CMVH, they were retrieved by staff at the relevant facility, and then they were sent by courier in boxes to CMVH for digital photographic imaging of the relevant forms. Records varied in size, but in general were very large; each box held, on average, two and a half records.

87. At CMVH relevant forms were located within the CMR, de-identified and provided with a specific study number generated for Defence Health data. This number was different from the identification numbers used for self-reported questionnaire data and for the psychology data, but with consent, linkable to these sources using a key held at CMVH. The de-identified form was converted to a PDF file and transferred to the Data Management Analysis Centre (DMAC) at the University of Adelaide using secure transfer processes: either personal delivery or via registered post person-to-person, as per the protocols approved by the appropriate ethics committees including ADHREC.

88. DMAC entered the de-identified data from the forms into a database specifically constructed for the Defence Health data in the DHSP studies, as per the approved protocols. The database was originally created for the InterFET pilot project. It contains de-identified information in tabular format and provides DHSP with the means to securely store and retrieve information for statistical analysis.

Methods of Analysis

Health Forms

89. The majority of the analysis reported in the current chapter is that based on data from the AHA and the CPHE. Both forms have been updated and changed by Defence. Consequently, a large part of early analysis included mapping data items from an earlier to a later version of a form, where there were equivalent data items. Differences between forms are noted where appropriate in the results section.

90. The protocol for the Solomon Islands Health Study stated that the most recent AHA and the most recent CPHE were to be collected from the health records. Some data items are contained on only the AHA or only the CPHE; other items are contained on both forms.

91. Data for the entire sample (both Solomon Islands veterans and the comparison group) were summarised for the variables of interest, including the number and percentage of observations with missing data. This summary data is contained in this chapter where appropriate or in Appendix 3.1.

92. In order to assess the impact of deployment to OP ANODE and to compare outcomes between the Solomon Islands veterans and the comparison group, only measures taken after deployment were appropriate for inclusion in analyses. As

information was not available on the end of deployment dates for all Solomon Islands veterans, data were only included for health assessments which were conducted after 31 December 2005, the end of deployments eligible for inclusion in the Solomon Islands Health Study. Thus, individuals who discharged prior to 31 December 2005 were not included in analyses, as their final health assessment would have been prior to the cut-off date, and we could not determine which of these were undertaken prior to deployment. While this criterion excludes some individuals it is a conservative approach, as including data from health assessments conducted prior to deployment could potentially reduce any actual deployment effect. In order to ensure that there is no differential bias in inclusion criteria between Solomon Islands veterans and comparisons (which were frequency matched and not individually matched), data were also only included for individuals in the comparison group who had a health assessment after the end of the deployment period on December 31st 2005. While it could be argued that this analysis may only include a “healthier” or younger subgroup that were all still in Defence after 31st December 2005, including outcome data obtained prior to deployment is likely to be more problematic and potentially introduce bias.

93. Accordingly, the data were taken from the most recent AHA or CPHE that was collected after December 2005 (the deployment date criterion) to ensure that the items analysed occurred after the exposure of interest and that the measurement for the comparison group was equivalent. Data that did not meet this were excluded from the analysis.

94. A subset of analyses comparing health outcomes for serving versus ex-serving personnel is also included in the current chapter. For these comparisons data collected from the CPHE is used. The CPHE is used as the final health assessment form for those leaving the service. Therefore, for someone who is leaving the Defence Force a CPHE will be the most recent health assessment form on their file. In order to ensure that the data is equivalent for currently serving and ex-serving individuals the most recent CPHE is used. An update from PMKeyS on service status, among other details, was provided to DHSP in the middle of 2007. These data were used to define current service status. Table 3.1 shows the items and their source.

Table 3.1: Defence Health data items and source.

<i>Item</i>	<i>Source</i>		<i>Item Type</i>
	<i>AHA</i>	<i>CPHE</i>	
<i>AUDIT</i>	No	Yes	<i>Self-report</i>
<i>MEC (Recommended at the conclusion of the screen)</i>	Yes	Yes	<i>Medical personnel</i>
<i>BMI</i>	Yes	Yes	<i>Medical personnel</i>
<i>Smoking</i>	Yes	Yes	<i>Self-report</i>
<i>Stress questions</i>	Yes	Yes	<i>Self-report</i>
<i>Current Illness</i>	Yes	No	<i>Self-report</i>
<i>General Health Questions</i>	No	Yes	<i>Self-report</i>
<i>HIV</i>	Yes	Yes	<i>Medical personnel</i>
<i>HEP-B</i>	Yes	Yes	<i>Medical personnel</i>
<i>HEP-C</i>	Yes	Yes	<i>Medical personnel</i>
<i>G6PD</i>	Yes	Yes	<i>Medical personnel</i>
<i>Vaccination</i>	No	Yes	<i>Medical personnel</i>

The Alcohol Use Disorders Identification Tests (AUDIT)

95. The AUDIT screening test was developed by the World Health Organisation (WHO) as a method of screening for hazardous and harmful alcohol use and assisting in the formulation of brief interventions.

96. The AUDIT consists of ten scored questions and two additional non-scored questions which provide an indication of readiness to change, and are designed to assist in determining the levels of intervention.

- A. Questions 1-3 ask about frequency and quantity of drinking.
- B. Questions 4-6 ask about impairment of control over drinking, salience of drinking and morning drinking.
- C. Questions 7-10 ask about feelings of guilt, blackouts, injury and concern by others.

97. Each question has a score assigned to the different responses, and scores are summed to provide an overall score between 0 and 40. Individuals scoring 0-7 on AUDIT are considered low risk drinkers, those scoring 8-15 are consuming alcohol in excess of low risk guidelines and scores between 16-19 indicate hazardous and harmful levels of alcohol consumption. A score in excess of 20 indicates the person is in a high risk category of alcohol-related harm.

Results

Defence Health Records

Health Assessment Forms

98. Table 3.2 shows the number of medical records requested and the availability of forms within those records. In general, a high percentage of each type of form was held in the retrieved files, with the exception footnoted for RAAF records, due to the slowness of record retrieval. Record availability was highest in Navy.

Table 3.2: AHAs and CPHEs available

	<i>CMR requested</i>	<i>CMRs available n (%)</i>	<i>AHA available in CMR n (%)*</i>	<i>CPHE available in CMR n (%)*</i>
<i>Navy</i>	248	243 (98)	227 (92)	221 (89)
<i>Army</i>	600	527 (88)	465 (78)	480 (80)
<i>RAAF</i>	152	128 (84)	102 (80)	105 (82)
<i>Total</i>	1000	898 (90)	794 (79)	806 (81)

*Denominator = CMR requested

Pre- and Post- Deployment Forms

99. Table 3.3 shows that pre- and post-deployment forms were not present in substantial numbers of health files. While a full set of deployment forms should mean that each individual had one each of Pre-Deployment Medical Checklist and Post-Deployment Health Screen, individuals were just as likely to have any single form, combinations of forms, or no forms at all.

Table 3.3: Number of deployment forms collected from the Health Records

	<i>Number in sample who deployed to the Solomon Islands#</i>	<i>No Forms Available n (%)</i>	<i>Forms Available n (%)</i>	<i>Pre- Deployment Medical Checklist n (%)</i>	<i>Post- Deployment Health Screen n (%)</i>
<i>Navy</i>	124	43 (35)	81 (65)	49 (40)	49 (40)
<i>Army</i>	300	169 (56)	131 (43)	65 (21)	83 (28)
<i>RAAF</i>	76	52 (20)	24 (10)	16 (21)	16 (21)
<i>Total</i>	500	264 (53)	236 (47)	130 (26)	148 (30)

This forms the denominator for each row, e.g. if all Army personnel who deployed to the Solomon Islands had a Post Deployment Health Screen then 300 Post Deployment Health Screens would have been collected.

Defence Health Analysis

AUDIT

100. Included in Appendix 3.1 is summary data for all forms collected. The data in Table 3.4 are restricted to the most recent CPHE collected after 31 December 2005 in order to that the statistical comparison is valid. This is explained thoroughly in paragraphs 93 and 94 of this chapter. Table 3.4 shows that the pattern of alcohol consumption for the Solomon Islands veterans and the comparison group is similar. There is no significant difference in the drinking patterns between Solomon Islands veterans and comparisons ($\chi^2_{(1)} = 1.27$, $p = 0.26$).

Table 3.4: AUDIT category scores for Solomon Islands veterans and the comparison group*

<i>AUDIT Score</i>	<i>SI veterans</i>		<i>Comparisons</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Category 1 (0 – 7)</i>	127	(82)	112	(81)
<i>Category 2 (8 – 15)</i>	17	(11)	21	(15)
<i>Category 3 (16 – 19)</i>	0	(0)	2	(1.4)
<i>Category 4 (20 – 40)</i>	1	(0.6)	1	(0.7)
<i>Not available</i>	9	(5.8)	7	(4.9)
<i>Total</i>	154		143	

*Results restricted to most recent Health Form collected after 31 December 2005, see paragraph 93 and 94 for an explanation.

101. Table 3.5 presents the distribution of AUDIT scores by the employee status. Overall, the personnel recorded as currently serving had a lower AUDIT score on the most recent CPHE than those who had subsequently terminated ($\chi^2_{(2)} = 26.9$, $p < 0.001$).

Table 3.5: Currently serving versus ex-serving AUDIT categories*

AUDIT Score	Currently Serving	Ex-serving
	n (%)	n (%)
Category 1 (0 – 7)	571 (82)	71 (67)
Category 2 (8 – 15)	95 (14)	24 (23)
Category 3 (16 – 19)	1 (0.1)	5 (4.7)
Category 4 (20 – 40)	3 (0.4)	1 (0.9)
Not available	30 (4.3)	5 (4.7)
Total	700	106

*Results drawn only from the CPHE as described in paragraph 95

MEC Classification

102. Table 3.6 shows that the distribution of most recent MEC classifications (from the AHA or CPHE) were very similar between the Solomon Islands veterans and comparisons (using categories MEC1, MEC2 and combining the other classifications ($\chi^2_{(2)} = 0.83$, $p = 0.66$). The other category includes codes such as G1 and S1 which were used by the RAAF. These other codes were not included in the chi-square test.

Table 3.6: Solomon Islands veterans and comparisons recommended MEC classification*

	SI veterans	Comparisons
	n (%)	n (%)
MEC1	211 (71)	186 (66)
MEC2	51 (17)	54 (19)
MEC3	18 (6.0)	15 (5.4)
MEC4	4 (1.3)	6 (2.1)
Other	1 (0.3)	3 (1.1)
Not Available	13 (4.4)	16 (5.7)
Total	298	280

* Results restricted to most recent Health Form collected after 31 December 2005 as described in paragraphs 93 and 94

103. Table 3.7 shows that 95% of personnel recorded as currently serving had a recommended MEC1 or MEC2 on their most recent CPHE. This percentage was only 62% in those who had subsequently discharged. Comparing MEC1 and MEC2 with MEC3 and MEC4 combined, the difference between the currently serving and ex-serving groups was marked ($\chi^2_{(1)} = 83.4$, $p < 0.001$). Seventeen out of 21 people who had a MEC4 on the most recent CPHE, subsequently discharged. This is to be expected as the CPHE is used at the discharge medical and some members may

discharge due to ill health. As in Table 3.6 the ‘Other’ category includes codes used by the RAAF and was not included in the statistical analysis.

Table 3.7: Currently serving versus ex-serving recommended MEC classification*

	<i>Currently serving</i>		<i>Ex-serving</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>MEC1</i>	522	(75)	59	(56)
<i>MEC2</i>	110	(16)	6	(5.7)
<i>MEC3</i>	24	(3.4)	12	(11)
<i>MEC4</i>	4	(0.6)	17	(16)
<i>Other</i>	4	(0.6)	5	(4.7)
<i>Not Available</i>	36	(5.1)	7	(6.6)
<i>Total</i>	700		106	

* Results drawn only from the CPHE as described in paragraph 95

Smoking

104. Table 3.8 shows that approximately 30 % from both groups are current smokers, but indicates that the proportion of current smokers was similar in the Solomon Islands veterans and comparisons ($\chi^2_{(1)} = 0.01$, $p = 0.94$).

Table 3.8: Current smokers in the Solomon Islands veterans and the comparison group*

	<i>SI veterans</i>		<i>Comparisons</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>No</i>	208	(70)	197	(70)
<i>Yes</i>	78	(26)	75	(27)
<i>Missing</i>	12	(4.0)	8	(3.8)
<i>Total</i>	298		208	

* Results restricted to most recent Health Form collected after 31 December 2005; refer to paragraphs 93 to 94

105. Similarly the frequency of cigarettes smoked per week, by current smokers, was similar between the exposure groups ($\chi^2_{(4)} = 2.15$, $p = 0.71$), as shown in Table 3.9. More than one in 10 people reported smoking more than 20 cigarettes per day.

Table 3.9: Solomon Islands veterans and comparison group cigarette consumption per week for current smokers*

<i>Number of cigarettes smoked per day</i>	<i>SI veterans</i>	<i>Comparisons</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>0 to 5</i>	14 (18)	14 (19)
<i>6 to 10</i>	22 (28)	18 (24)
<i>11 to 15</i>	21 (27)	16 (21)
<i>16 to 20</i>	9 (12)	14 (19)
<i>More than 20</i>	9 (12)	10 (13)
<i>Missing</i>	3 (3.8)	3 (4.0)
<i>Total</i>	78	75

BMI

106. Table 3.10 demonstrates that there was no clear difference in the distribution of BMI categories between the Solomon Islands veterans and comparisons (grouping the two lowest BMI categories $\chi^2_{(2)} = 0.80$, $p = 0.67$). It should be noted that BMI is only moderately correlated with fatness and very muscular individuals may have a high BMI. Accordingly, few conclusions on obesity levels in the Defence Force should be made.

Table 3.10: Solomon Islands veterans and comparison group BMI scores by category*

	<i>SI veterans</i>	<i>Comparisons</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>< 18.5</i>	0 (0)	2 (0.7)
<i>18.5-24.9</i>	104 (35)	87 (31)
<i>25-29.9</i>	148 (50)	145 (52)
<i>30+</i>	43 (14)	45 (16)
<i>Not available</i>	3 (1.0)	1 (0.4)
<i>Total</i>	298	280

* Results restricted to most recent Health Form collected after 31 December 2005; refer to paragraph 93 and 94

107. Similarly there was no difference in the mean level of BMI between the exposure groups ($t_{(572)} = 0.36$, $p = 0.72$). See Table 3.11 below.

Table 3.11: Solomon Islands veterans and comparison group BMI distribution*

	<i>SI veterans</i>	<i>Comparisons</i>
<i>n</i>	295	279
<i>Mean</i>	26.2	26.3
<i>Std</i>	3.19	3.36
<i>Median</i>	26.0	26.0
<i>Q1</i>	24.1	24.2
<i>Q3</i>	28.4	28.7
<i>Min</i>	19	17
<i>Max</i>	36	35

* Results restricted to most recent Health Form collected after 31 December 2005; refer to paragraphs 93 to 94 for further explanation

Other items from AHA and CPHE

Stress

108. Two questions were asked on stress:

- How often do you feel that your lifestyle is putting you under too much stress? (Frequency of stress question)
- During the past two weeks how much stress have you experienced? (Quantity of stress question).

109. Table 3.12 shows that the frequency of ‘*too much stress*’ was broadly similar between the Solomon Islands veterans and comparisons ($\chi^2_{(3)} = 2.85$, $p = 0.42$), with more than 50% of all participants experiencing ‘*too much stress*’ seldom or never and 7% experiencing ‘*too much stress*’ often.

Table 3.12: Solomon Islands veterans and comparison group frequency of stress question by category*

<i>‘too much stress’</i>	<i>SI veterans</i>	<i>Comparisons</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>Often</i>	20 (6.7)	19 (6.8)
<i>Sometimes</i>	93 (31)	105 (38)
<i>Seldom</i>	115 (39)	106 (38)
<i>Never</i>	63 (21)	48 (17)
<i>Not available</i>	7 (2.3)	2 (0.7)
<i>Total</i>	298	280

* Results restricted to most recent Health Form collected after 31 December 2005 as described in paragraph 93 and 94.

110. Table 3.13 shows that there were some differences in the quantity of stress recorded in the two exposure groups. There were more in the comparison group who reported a ‘*moderate amount of stress*’ ($\chi^2_{(3)} = 12.93$, $p = 0.005$). However, the

pattern of comparisons reporting more stress was not consistent across all responses categories; for example, slightly fewer in the comparison group reported “a lot of stress”.

Table 3.13: Solomon Islands veterans and comparison group quantity of stress question by category*

'in the last two weeks...'	<i>SI veterans</i>		<i>Comparisons</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>A lot of stress</i>	25	(8.4)	16	(5.7)
<i>A moderate amount of stress</i>	68	(23)	100	(36)
<i>Relatively little stress</i>	107	(36)	100	(36)
<i>Almost no stress at all</i>	89	(30)	62	(22)
<i>Not available</i>	9	(3.0)	2	(0.7)
<i>Total</i>	298		280	

* Results restricted to most recent Health Form collected after 31 December 2005 as described in paragraph 93 and 94

111. Table 3.14 shows the frequency personnel experienced ‘too much stress’ split by current and ex-serving. Sixteen percent of personnel who are now recorded as ex-serving experienced too much stress ‘often’ on their most recent CPHE. However, only six percent responded ‘often’ in the currently serving group was 6%. The distribution of responses differed significantly between the serving and ex-serving group ($\chi^2_{(3)} = 22.5$, $p < 0.001$).

Table 3.14: Current and ex-serving group frequency of stress question by category*

'too much stress'	<i>Currently-serving</i>		<i>Ex-serving</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Often</i>	40	(5.7)	17	(16)
<i>Sometimes</i>	207	(30)	40	(38)
<i>Seldom</i>	293	(42)	35	(33)
<i>Never</i>	151	(22)	12	(11)
<i>Not available</i>	9	(1.3)	2	(1.9)
<i>Total</i>	700		106	

* Results drawn only from the CPHE as described in paragraph 95

112. Table 3.15 shows the frequency of ‘stress in the last two weeks’ split by current and ex-serving. Fourteen percent of the group who are now ex-serving experienced a lot of stress in the past two weeks on their most recent CPHE. This was three times as high as in the currently-serving group (5%). The distribution of responses between current and ex-serving was different ($\chi^2_{(3)} = 17.6$, $p < 0.001$), with the ex-serving group more likely to record more stress on the most recent CPHE.

Table 3.15: Current and ex-serving group quantity of stress question by category*

'in the last two weeks...'	Currently-serving	Ex-serving
	n (%)	n (%)
<i>A lot of stress</i>	35 (5.0)	16 (15)
<i>A moderate amount of stress</i>	186 (27)	30 (28)
<i>Relatively little stress</i>	270 (39)	37 (35)
<i>Almost no stress at all</i>	197 (28)	21 (20)
<i>Not available</i>	12 (1.7)	2 (1.9)
<i>Total</i>	700	106

* Results drawn only from the CPHE as described in paragraph 95

113. Table 3.16 summarises some of the current illnesses reported on the AHA. Of the total sample (N = 794), 61 (7.7%) personnel reported that they had a current illness. The most common illnesses nominated were cold and flu-like conditions. Only illnesses listed by two or more people are reported in the table below.

Table 3.16: Details of current illnesses (AHA)

Condition	n (%)
<i>Colds/flu</i>	27 (44)
<i>Bowel disorders</i>	3 (4.9)
<i>Depression</i>	3 (4.9)
<i>Asthma</i>	3 (4.9)
<i>Arthritis</i>	3 (4.9)
<i>Allergies</i>	2 (3.3)
<i>Hypertension</i>	2 (3.3)
<i>Total</i>	43

114. Conducting a comparison of reported current illnesses between the Solomon Islands veterans and the comparison group showed that 13 (6.5%) of Solomon Islands veterans compared with 19 (10.3%) of the comparison group indicated that they had a current illness. The difference was not statistically significant ($\chi^2(1) = 1.79, p = 0.18$). This data has not been presented in tabular format as there were no health conditions with a frequency greater than one when working with the restricted number of forms.

115. Table 3.17 below details the frequency and percent of responses by Defence personnel to a series of self-report general health questions on the CPHE. The unadjusted relative risk is also included in the table. For only a single items is there any difference between the Solomon Islands veterans and the comparison group; 'significant weight change' which was more common in the comparison group.

Table 3.17: Frequency of responses to general health questions on the CPHE.

<i>General Health</i>	<i>Solomon Islands veterans</i>	<i>Comparisons</i>	<i>Unadjusted Relative risk (95% CI)</i>
<i>Frequency (%)</i>			
<i>Operative procedures since last medical</i>	29 (19)	41 (29)	0.66 (0.44, 1.00)
<i>Current illnesses or injuries</i>	34 (23)	35 (25)	0.91 (0.60, 1.38)
<i>Problems with hearing</i>	19 (12)	28 (20)	0.63 (0.37, 1.08)
<i>Back or joint pain</i>	6 (9.0)	12 (18)	0.57 (0.23, 1.45)
<i>Menstrual problems</i>	1 (3.8)	3 (13)	0.29 (0.03, 2.64)
<i>Problems with vision</i>	21 (14)	20 (14)	0.98 (0.56, 1.73)
<i>Skin problems</i>	2 (3.0)	8 (19)	0.25 (0.06, 1.13)
<i>Medical care outside ADF since last medical</i>	14 (9.4)	15 (11)	0.87 (0.44, 1.74)
<i>Significant weight change</i>	6 (3.9)	17 (12)	0.33 (0.13, 0.81)
<i>Migraines or severe headaches</i>	7 (46)	12 (8.4)	0.55 (0.22, 1.35)
<i>Problems sleeping</i>	13 (8.5)	13 (9.1)	0.93 (0.45, 1.95)
<i>Passed blood with bowel motions</i>	5 (3.3)	12 (8.5)	0.39 (0.14, 1.07)
<i>Muscular pain or weakness</i>	8 (5.2)	12 (8.6)	0.61 (0.26, 1.45)
<i>Indigestion</i>	7 (4.6)	9 (6.3)	0.73 (0.28, 1.90)
<i>Persistent cough</i>	11 (7.2)	6 (4.2)	1.71 (0.65, 4.51)
<i>Shortness of breath</i>	3 (2.0)	6 (4.2)	0.47 (0.12, 1.83)
<i>Chest pains</i>	9 (5.9)	4 (2.8)	2.09 (0.66, 6.63)
<i>Abdominal pains</i>	3 (2.0)	4 (2.8)	0.70 (0.16, 3.06)
<i>Change of bowel habits</i>	4 (2.6)	6 (4.2)	0.62 (0.18, 2.15)
<i>Pain or swelling in the scrotum</i>	4 (3.0)	5 (4.2)	0.70 (0.19, 2.54)
<i>Dizzy spells, fits and fainting</i>	0 (0)	5 (3.5)	-
<i>Special diet</i>	1 (0.7)	2 (1.4)	0.46 (0.04, 5.06)
<i>Changes in passing urine</i>	0 (0)	3 (2.1)	-

116. The following five tables show results collected from both the AHA and the CPHE for all participants. DHSP is aware that the outcomes as displayed in these tables have no surveillance validity and could not be used to inform Defence about current states of health on these measures. However, they demonstrate that while data and systems may perform well for the clinical functions for which they were designed, they may not perform equally well when used for entirely different purposes, such as surveillance.

117. Data in these forms are extracted from the AHA and CPHE. The staff involved in extraction does not evaluate each entry on each form for their accuracy. It is only at the point of data analysis that discrepancies may be noted. At that time only the PDF of the specific form may be reviewed and it is not possible to return to the medical file and clarify an outcome by reviewing the pathology or other appropriate documents. Consequently, while a clinical review of the data for an individual would present no problem for interpretation, the same can not be said for the data presented immediately below.

118. Tables 3.18 and 3.19 show the HIV and HEP-C results collected from both the AHA and the CPHE. Most data are either negative or missing and this suggests that either the results have not been transferred to each form from the initial pathology findings or that a test has not been conducted. It is not possible to determine which is the case.

Table 3.18: HIV Results from AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Positive</i>	1	(0.1)	1	(0.1)
<i>Negative</i>	720	(91)	738	(92)
<i>Missing</i>	73	(9.2)	67	(8)
<i>Total</i>	794		806	

Table 3.19: HEP-C results from AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Positive</i>	1	(0.1)	3	(0.4)
<i>Negative</i>	726	(91)	743	(92)
<i>Missing</i>	67	(8.4)	60	(7.4)
<i>Total</i>	794		806	

119. The data in Table 3.20 again are difficult to interpret. The denominator is larger as some people have two tests, antigen and antibody. If the purpose of the testing were screening, then Hep B surface antigen would be used. Alternatively if the purpose was to test vaccination immunity, then Hep B surface antibody would be used. Hence, it is vital to know the purpose of testing. This is not recorded on either the AHA or the CPHE; only a tick or cross is placed in a box marked positive or

negative. Again, without access to the original pathology result and without the type of test being recorded on either the AHA or the CPHE, it is unclear which test has been used, and interpreting the outcome is difficult for health surveillance purposes.

Table 3.20: HEP-B Results for AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Positive</i>	28	(3.2)	15	(1.8)
<i>Negative</i>	695	(80)	682	(82)
<i>Missing</i>	143	(17)	139	(7.4)
<i>Total</i>	866		836	

120. The data in Table 3.21 represent the results from the G6PD (Glucose 6 phosphate dehydrogenase) test which is performed only once. The options of the form have changed across different versions of the AHA and the CPHE, making it difficult to interpret the “positive/negative” and “normal/deficient” responses. For example, on the AHA AD146 Revised December 2004, the tick options are positive and negative. On the CPHE AD 147 Revised Feb 2007, the tick options are ‘Normal’ or ‘Deficient’. DHSP is only able to present the data as it is extracted from the forms as explained above. In this case the data do not make sense from a clinical perspective with the positive and negative results being well outside expected population norms while the normal and deficit results are closer to the expected.

Table 3.21: G6PD results from the AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Positive</i>	198	(25)	8	(1.0)
<i>Negative</i>	160	(20)	25	(3.1)
<i>Normal</i>	351	(44)	289	(36)
<i>Deficient</i>	0	(0)	5	(0.6)
<i>Missing</i>	85	(11)	479	(59)
<i>Total</i>	794		806	

121. The data in Table 3.22 include details of the vaccination records drawn from the CPHE. On this form there is a list of vaccinations next to which a date is recorded. The batch number of any vaccination is not recorded nor is any further detail. Hence, when there is no date of vaccination, it is unclear whether a vaccination has ever been performed, or whether the date of vaccination is missing. Further, it is not possible to tell from this data whether there has never been a need for a particular vaccination in the past or is likely to be in the future. It is also difficult to determine whether, or for how much longer, the vaccine would remain effective. Again, DHSP acknowledges that the same difficulties do not exist for the clinician who is able to access the

individuals' vaccination records (yellow book) and other details in the file. The vaccination record is not available in the CMR.

Table 3.22: Vaccination data from CPHE (date recorded)

<i>Date Recorded</i>	<i>Yes</i>	<i>%</i>	<i>No</i>	<i>%</i>	<i>Total</i>
<i>Hep B</i>	283	(35)	523	(65)	806
<i>Meningococcal C</i>	8	(1.0)	798	(99)	806
<i>MMR</i>	734	(91)	72	(8.9)	806
<i>Hep A</i>	271	(34)	535	(66)	806
<i>Hep A and Hep B</i>	536	(67)	270	(33)	806
<i>Sabin</i>	749	(93)	57	(7.1)	806
<i>ADT</i>	749	(93)	57	(7.1)	806
<i>Typhoid</i>	744	(92)	62	(7.7)	806
<i>Mantoux</i>	597	(74)	209	(26)	806
<i>JEV</i>	450	(56)	356	(44)	806
<i>Menecevacx</i>	573	(71)	233	(29)	806
<i>Influenza</i>	166	(21)	640	(79)	806

Data from the Pre-deployment Checklist

122. Table 3.23 summarises the data from the pre-deployment checklist. As shown in Table 3.3, the number of pre-deployment checklists available from each service was relatively small. Further, the pre-deployment checklist is only relevant to those who deployed to the Solomon Islands. In Table 3.23, 'Not available' refers to personnel who have a pre-deployment form entered into the database but for whom there is no relevant data on the form.

Table 3.23: Summary of Pre-deployment checklist

<i>Question</i>	<i>Yes</i>	<i>(%)</i>	<i>No</i>	<i>(%)</i>	<i>Not available</i>	<i>(%)</i>	<i>Total</i>
<i>Has a previous Primaquine course been completed?</i>	39	(30)	38	(29)	53	(41)	130
<i>Does the member wear glasses?</i>	28	(22)	90	(69)	12	(9)	130
<i>Is the member in possession of spare spectacles and corrective refraction inserts for NBC masks?</i>	14	(11)	38	(29)	78	(60)	130
<i>Does the member wear contact lenses?</i>	7	(5.4)	58	(45)	65	(50)	130
<i>Has pre-deployment operational stress management training been completed?</i>	34	(26)	36	(28)	60	(46)	130
<i>Has a dental check been completed?</i>	73	(56)	6	(4.6)	51	(39)	130
<i>Is the member fit to be deployed?</i>	119	(92)	1	(0.8)	10	(7.7)	130
<i>Is a waiver required?</i>	1		104		25	(19)	130

* Not all pre-deployment checklists were available for analysis.

Data from the Post-Deployment Health Screen

123. Table 3.24 shows response on the Post-Deployment Health Screen. This form is not deployment-specific and some exposures will not be experienced on some deployments. The hazardous situations that most members who deployed to the Solomon Islands noted were: Exposure to diesel exhaust fumes; Excessive noise and vibration; Pesticides and herbicides; and Fuels. There have been some changes to the Post-Deployment Health Screen over time, hence the large number of 'not available' responses to "Entering or being in close proximity to recently destroyed military vehicles or structures.

Table 3.24: Hazardous situations from Post-Deployment Health Screen

<i>Hazardous situation</i>	<i>Yes</i>	<i>(%)</i>	<i>No</i>	<i>(%)</i>	<i>Not available</i>	<i>(%)</i>	<i>Total</i>
<i>Entering or being in close proximity to recently destroyed military vehicles or structures</i>	0	(0)	8	(5.4)	140	(95)	148
<i>Entry to industrial/chemical manufacturing/storage sites</i>	9	(6.1)	121	(82)	18	(12)	148
<i>Oil fire smoke/ smoke from waste incineration</i>	0	(0)	9	(6.1)	139	(94)	148
<i>Exposure to diesel exhaust fumes</i>	85	(57)	47	(32)	16	(11)	148
<i>Fuels (aviation, marine or automotive)</i>	65	(44)	68	(46)	15	(10)	148
<i>Solvents (e.g. thinners, glues, sealants) or paints</i>	51	(35)	81	(55)	16	(11)	148
<i>Pesticides/ Herbicides</i>	67	(45)	65	(44)	16	(11)	148
<i>Dusts or Fibres</i>	59	(40)	68	(46)	21	(14)	148
<i>Non-ionising radiation (e.g. radar or microwave transmitters)</i>	28	(19)	97	(66)	23	(16)	148
<i>Excessive noise and vibration</i>	79	(53)	53	(36)	16	(11)	148
<i>Lasers</i>	2	(1.4)	126	(85)	20	(14)	148
<i>Ionising radiation or radioactive materials</i>	5	(3.4)	119	(80)	24	(16)	148
<i>Potentially contaminated water – either through drinking or swimming</i>	53	(36)	64	(43)	31	(21)	148
<i>Other incidents/concerns</i>	17	(11)	99	(67)	32	(22)	148

Discussion

Data Collection

124. Data obtained from the CMRs show snapshots at particular points in time. The data analysed were from the most recent AHA and CPHE and showed no appreciable difference in pattern between these sources for the variables shown, the details comparing outcomes on the AHA and CPHE are in Appendix 3.1.

125. Collecting the CMRs and transferring them to CMVH for data extraction was time consuming and hence expensive, logistically complex to manage and required significant negotiation with various stakeholders. Throughout the process, alternative means of sourcing the same data were investigated. For instance, the bottom of the Post-Deployment Health Screen (AD392) suggests that there are three copies of the form made. One copy is filed on the UMR, one on the CMR and the third is sent to Defence Health Service Branch, Operational Health Surveillance.

126. Investigations were conducted into sourcing the Post-Deployment Health Screen from the Operational Health Surveillance team. DHSP was informed that the forms

are entered into the NOTICAS database but that this database would be difficult to interrogate for the nature of data collection required for this program. Further, while around 2000 forms had been entered for the MEAO deployments, only a limited number of deployments forms for other deployments were entered and the rest were stored in boxes, if they were received by the section.

127. A second challenge associated with Post-Deployment Health Screens from the Operational Health Surveillance relates to missing data. If no data were available for an individual it was difficult to know whether the screen was: conducted but not sent to the unit; conducted but not entered into the database; or, never conducted. Consequently, sourcing the forms from the CMR is the most practical option.

128. The distinction between the use of data for clinical versus health surveillance purposes is fundamental to the research that DHSP is conducting. When collecting information for clinical purposes the information is important and relevant to individual X. For surveillance, quantifying availability and 'missingness' is important so no biases are introduced; it is important to know as much as possible about those for whom no data were collected.

129. Similarly, DHSP is aware of medical databases such as MIMI and Health Keys. The difficulty with using MIMI for surveillance purposes, as reported by Director General Defence Health Services, is that data are not collected on an individual basis. Further, there are periods in which the data from various health facilities were either not collected or are missing and it is difficult to aggregate data across multiple sites. Similarly, Health Keys is available in some health facilities and not in others, so Health Keys does not provide a consistent source of data; it holds some of the data for some of the people, for some of the time. Health Keys' role has been to provide healthcare performance metrics to health managers as a previous generation health information system. It does not have the functionality to perform as an electronic health record in its current format.

Data analysis

130. This report contains only a subset of the data available on the Defence health assessment forms. Included in Appendix 3.1 is a breakdown of data available on the AHA compared with the CPHE.

131. When the same data were collected on the AHA and the CPHE, they appeared to be very consistent, although it should be noted that the data were not matched across individuals.

132. When comparing outcomes between the Solomon Islands veterans and the comparison group, the most frequent finding was that there were no differences. In the cases where there were differences, it was the comparison group that appeared to have more negative outcomes (Tables 3.12, 3.13 and 3.17).

133. There were also differences on the most recent CPHE between now ex-serving and currently serving members. Namely, a higher proportion of ex-serving members had higher AUDIT and stress scores and were coded in the non-deployable MEC categories more frequently. For those whom we know to be now ex-serving members, to be coded more frequently as MEC3 and 4 is to be expected as the MEC4 category is related to medical discharges (Tables 3.5, 3.7, 3.14, and 3.15).

Considerations of the utility of Defence Health data

134. There are several issues worth noting in terms of the long-term usefulness of collecting Defence Health data. It should be noted that many of the issues described in the current chapter are common to the use of clinical and administrative data for research and surveillance purposes. Close work between the researchers and the collectors of the data can improve the outcomes for all parties concerned.

135. It has limited use for health surveillance for those who have left Defence, while still providing a baseline measure of their health while serving members, and a platform for assessing change within the population who remains in the Service over a longer window.

136. It is difficult and logistically complex to collect and extract the data in its current paper format. In contrast, a large number of forms from a high percentage of people in the sample were able to be collected.

137. Variations over time in the type of forms used by Defence make comparing with baseline measures particularly difficult. Further, there are many examples of medical personnel completing an AHA or CPHE using a long outdated form because, one assumes, that was the form that was available in their particular facility. Similarly, some facilities use electronic data storage and others do not. In order to convert each form into data it must be compared and mapped against all other forms on which similar data are collected. This type of problem could be relatively easily addressed by weighing the costs and benefits of changes against the consequences for surveillance data.

138. CMVH was unable to obtain CMRs for some personnel. It is unknown why this was the case. It is plausible that at least some of these files were held in other locations because the individual was using the record to make some form of compensation claim or it was needed for some alternative reason.

139. Interpreting some of the items collected by medical staff is problematic due to changes in the design of the Health forms or ambiguity in the form of the data collected. Further, reading, interpreting and coding free text items on forms such as the AHA or CPHE is problematic, particularly when trying to standardise the data for entry into health databases.

140. Despite these difficulties there are advantages in collecting the Defence Health records:

- i. The largest collection of data for the most people of any source.
- ii. Potential recall bias is less of an issue for some of the items than with the self-report data as data may be collected in closer proximity to events of interest.
- iii. Certain items of the data on the medical records are collected by a medical health practitioner who, as long as training is provided, has the potential to improve standardisation of data.
- iv. Data are collected for as long as the individual remains within Defence.

Recommendations

3.1 We recommend that alternative electronic means of health record input and storage be considered, as reliance on retrieval of data from paper medical records for health surveillance for the active Force is associated with some problems. Well designed and managed electronic database storage of health information improves opportunities for research, reduces costs associated with data storage and ultimately may enable timely analysis and responses to health issues of current concern.

3.2 Items of health data need to be entered in formats suitable for surveillance analysis as well as for individual clinical purposes and maintained consistently.

Chapter 4 – Defence Psychology Records

Key Findings

- I. Of the 500 veterans of the Solomon Islands in DHSP's sample, only 60% had Return to Australia Psychological Screening (RtAPS) records and only 31% had Post Operational Psychological Screening (POPS) records on the PRTG database. According to PRTG records, a further 36% had no screening recorded and only 28% had received both RtAPS and POPS.
- II. One hundred and thirty-six Solomon Islands veterans (60%) consented to linkage of their psychology data; however, only 71% of these had RtAPS and 27% had POPS data.
- III. For those who had received both RtAPS and POPS, the median time between the screens was six months.
- IV. RtAPS and POPS data have both clinical and surveillance applications. In order to best suit both applications, consistency in the design and the use of the form is essential.

Introduction

141. The Solomon Islands Health Study includes the collection of psychological screening tests routinely conducted by Defence for those who deploy on operations; specifically, the Return to Australia Psychological Screen (RtAPS) and the Post Operational Psychology Screen (POPS). Both RtAPS and POPS include mental health screening inventories and individual screening interviews.

142. This chapter describes the collection and analysis of the RtAPS and POPS Defence Psychology Data.

143. The findings are only relevant for Solomon Islands veterans.

Methods

144. Defence Psychology Data were sourced from the electronic files managed by the Psychology Research and Technology Group (PRTG). PRTG, as part of the Defence Health Services Division (DHSD), is the custodian of the electronic database containing the RtAPS and POPS data. For the Solomon Islands Health Study, a process was established for the management and transfer of the relevant RtAPS and POPS data (see Annex G).

145. Data were supplied to DHSP in two ways. In the Solomon Islands Health Study consent form, participants were asked to provide separate consent to several items

including permission to link information contained in their Defence Psychology records.

146. PRTG provided to DHSP the RtAPS and POPS data for those participants who specifically consented to the linkage of their RtAPS and POPS with their self-reported data. For participants who had not provided explicit consent, including those who were unable to be contacted for this study, PRTG conducted analysis designed and requested by DHSP and provided the results of these analyses.

147. The outcomes on various measures for all Solomon Islands veterans will be presented first. A subset data on those who consented to linkage will then be presented. This data will also form part of the analysis conducted in Chapter 6. Additionally, some comparisons between those who consented, refused consent and were unable to be contacted for this study will be conducted. This will allow potential bias to be evaluated.

148. The data presented in this chapter are for veterans of Solomon Islands and are only the RtAPS and POPS data for the Solomon Islands deployment. These individuals may, or may not, have additional RtAPS and POPS data relating to other deployments.

149. Data collected from PRTG were de-identified and assigned a unique study number that was different from both the Defence health data and the self-reported data study numbers. With the participants' consent, these study numbers, and hence the data, are able to be linked.

Description of RtAPS and POPS

150. The RtAPS is usually completed just prior to re-deployment to Australia. It is used to collect a number of demographic details including Service, rank, unit and gender and then asks a series of questions about the deployment experience. The RtAPS questionnaire contains the following psychological scales and instruments:

- Kessler Psychological Distress Scale – 10 (K10)
- Post-traumatic Stress Disorder Check List – Civilian (PCL-C)
- Traumatic Stress Exposure Scale - Revised - TSES-R
- Major Stressors Checklist

151. The POPS is usually completed within three to six months of return from theatre. It is also used to collect some demographic information, the K10, PCL-C and the Alcohol Use Disorder Identification Test (AUDIT) scales.

152. Documentation of the K10, PCL-C and the AUDIT is detailed in the Defence Health Bulletin No 9/2003 (Department of Defence, 2003) and summarised in the next section.

Psychological Scales

Kessler Psychological Distress Scale-10

153. The K10 is a scale measuring non-specific psychological distress. It consists of ten questions and aims to measure the level of anxiety and depressive symptoms a person may have experienced in the four weeks prior to questionnaire completion. The scores for each question are added to produce a score between 10 and 50.

154. A set of cut-off scores for the K10 was developed by the Clinical Research Unit for Anxiety and Depression (CRUfAD), School of Psychiatry, University of New South Wales to determine the prevalence of anxiety and depressive disorders (Health Directives No. 222, Health Requirements for Deployed Australian Defence Personnel, (Department of Defence Health, 2005).

- A. People who score 10-15 report a low level of psychological distress. They have one quarter the population risk of meeting criteria for an anxiety or depressive disorder as identified by the Composite International Diagnostics Interview (CIDI). There is a remote chance of these individuals reporting a suicide attempt in their lifetime.
- B. People who score 16-29 report a medium level of psychological distress. They have a one in four chance (three times the population risk) of having a current anxiety or depressive disorder. They have a one percent chance (three times the population risk) of ever having made a suicide attempt.
- C. People who score 30-50 report a high level of psychological distress. They have a three out of four chance (20 times the population risk) of ever having made a suicide attempt.

Post-traumatic Stress Disorder Check List

155. The Post-traumatic Stress Disorder Check List (PCL) is a self-report rating scale for assessing the 17 Diagnostic and Statistical Manual Version 4 (DSM-IV) symptoms of PTSD. The version of the PCL used in RtAPS is the PCL-C, a general civilian version that is not linked to a specific event with questions referring to a stressful experience from the past.

156. The PCL is a 17 item scale that has 5 response categories for each item. The total score is calculated by adding the scores on the 17 items and ranges from 17 to 85. In the Vietnam Veterans' Health Study (Health Bulletin No 9/2003 – Australian Defence Force Mental Health Screen (Department of Defence, 2003)), a cut-off of 50 on the PCL was found to be a good predictor of a PTSD diagnosis.

157. However, some research (Dobie et al., 2002; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002) has used a cut-off as low as 30 for the PCL, in order to increase the sensitivity of the screen. This lower cut-off has been chosen for analysis here, however the number scoring above 50 will also be described.

The Traumatic Stress Exposure Scale - Revised - TSES-R

158. The Traumatic Stress Exposure Scale is designed to measure the frequency and severity of traumatic events. Twelve events are presented. For each of the events people are asked 'How often did you experience the event?'. Then people are asked 'How did it affect you at the time?' and 'How does it affect you now?' (Swann & Hodson, 2002).

159. Three scales are computed from the above questions relating to the 'frequency of the events', 'the fear and horror experienced then' and 'the fear and horror experienced now'.

160. The first of these three scales (“How much did you experience the event?”) is coded by assigning the following values to each of the responses: 0 – “Never”, 1 – “Rarely”, 2 – “Occasionally”, 3 – “Often”; and 5 – “Very Often” (Swann & Hodson, 2002). However, PRTG have used the value 4 rather than 5 for the response of “Very Often”. The second (“How did it affect you at the time?”) and third (“How does it affect you now?”) scales are scored as follows: 0 – “Not at all”, 1 – “A little”, 2 – “A moderate amount”; and 3 – “A great deal”. The TSES-R score is calculated by summing the values of the three scales for each of the twelve questions, with higher scores indicating more exposure to traumatic events for scale 1, more distress at the time for scale 2 and more distress currently for scale 3.

Major Stressors

161. The Major Stressors section in the RtAPS is a list of 36 potentially stressful factors. People are asked to rate each factor on a 5-point Likert scale ranging from “No Stress = 0” to “Extreme Stress = 4”. Possible scores range from 0 to 144. The ADF typically reports results on the Major Stressors by listing the most frequently recorded stressful events and those which were recorded with the highest stress level.

Alcohol Use Disorders Identification Test

162. Scoring and interpretation of the AUDIT screening test was discussed in the methods section of Chapter 3, Defence Health Records. It is administered in POPS but not RtAPS.

Results

Data availability and completeness

163. The tables below summarise the Defence Psychology Data collected. PRTG provided summary data for all veterans of the Solomon Islands deployment in the sample. Additionally, they provided the raw data for participants from the Solomon Islands Health Study who consented to linkage.

164. The RtAPS and POPS records for Solomon Islands veterans, who deployed between 24 July 2003 and 31st December 2005, are presented in this report. Five hundred individuals in the sample of 1000 deployed to the Solomon Islands.

165. Of the 436 people who participated in the self-report questionnaire (Chapter 5) 272 (62%) participants consented to linkage of their psychology data with self-report data. However, a number of those who consented to linkage were from the comparison group and consequently did not have RtAPS and POPS records for Operation ANODE. One hundred and thirty-six veterans (60%) of Operation ANODE in the defined period consented to linkage of their data.

166. The raw data from PRTG were provided to DHSP in Excel format and the quantity of missing data was low. Details of missing data on particular variables are available in Appendices 4.1 (RtAPS summary) and 4.2 (POPS summary). There were a few variables relating to follow-up interviews that had poor completion; fewer than six percent had responses in this field. However, prior to receiving the data, the PRTG had highlighted that the use of this field by the clinicians administering the screens was unreliable and not used consistently as the response options available were problematic and not suited to their needs.

167. Throughout the analysis below, no assumptions have been made about missing data, so that when a response to an item in a scale was missing, no scale score for that individual was calculated. Also provided with the data was Health Bulletin No 9/2003 – Australian Defence Force Mental Health Screen (Department of Defence, 2003) the aim of which is to “outline the content of the ADF Mental Health Screen and describe its administration, scoring and interpretation.”

168. Figure 4.1 below details the availability of the RtAPS and POPS data relating to Operation ANODE of all veterans of Solomon Islands in the sample. Of the 500 Solomon Islands veterans, there were 302 RtAPS and 155 POPS entered in PRTG’s database. One hundred and thirty-nine veterans had both RtAPS and POPS records and 184 had no record of psychological screening on the PRTG database.

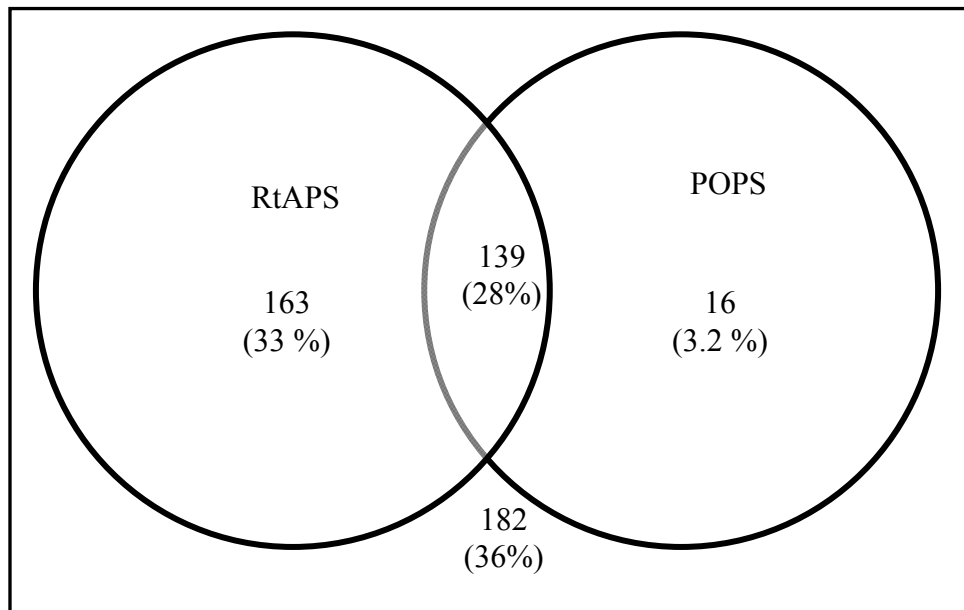


Figure 4.1: Completed psychological screening for all Solomon Islands veterans (n=500).

169. For those who had received both RtAPS and POPS, the median time between the screens was 185 days (see Table 4.1 below). The expected time between the screens is approximately three to six months (90 to 180 days). Implicit within the Defence policy is the suggestion that a POPS should be conducted for every deployment.

Table 4.1: Days between RtAPS and POPS (where both dates are available)

<i>All SI veterans</i>	
<i>N</i>	136
<i>Mean</i>	229
<i>Median</i>	185
<i>Std Dev</i>	95
<i>Lower Quartile</i>	155
<i>Upper Quartile</i>	263
<i>Min</i>	49
<i>Max</i>	774

Comparison of characteristics of those with RtAPS only versus RtAPS and POPS

170. Figure 4.1 above displays the number of people who received both RtAPS and POPS linked to a deployment to the Solomon Islands, as is expected practice. As only 28% of Solomon Islands veterans in the sample had both an RtAPS and POPS recorded on the PRTG database, it is important to compare the characteristics, as reported in the RtAPS and POPS, of those who received RtAPS only with those who received both RtAPS and POPS.

171. Tables 4.2 to 4.5 below summarise the general demographic characteristics of those with RtAPS data, with and without POPS data. Those in the Navy were less likely to receive both RtAPS and POPS than any other service. Reservists were also less likely to receive both RtAPS and POPS.

172. The general demographic data relevant to RtAPS only and POPS only, for those who provided consent, may be seen in Appendices 4.1 (RtAPS summary) and 4.2 (POPS summary).

Table 4.2: Gender for RtAPS records with and without POPS

<i>Gender</i>	<i>All SI veterans</i>	
	<i>RtAPS and POPS</i> <i>n (%)</i>	<i>RtAPS only</i> <i>n (%)</i>
<i>Male</i>	122 (88)	149 (91)
<i>Female</i>	17 (12)	14 (8.6)
<i>Total</i>	139	163

$$\chi_1^2 = 1.08, p = 0.30$$

Table 4.3: Service for RtAPS records with and without POPS

Service	<i>RtAPS and POPS</i>	<i>RtAPS only</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>Navy</i>	3 (10)	26 (90)
<i>Army</i>	122 (51)	117 (49)
<i>Air force</i>	14 (41)	20 (59)
<i>Total</i>	139	163

$$\chi^2_2 = 17.61, p < 0.001$$

Table 4.4: Service Type for RtAPS records with and without POPS

Service Type	<i>RtAPS and</i>	
	<i>POPS</i>	<i>RtAPS only</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>Permanent</i>	136 (48)	146 (52)
<i>Reserve</i>	3 (15)	17 (85)
<i>Total</i>	139	163

$$\chi^2_1 = 8.30, p = 0.004$$

Table 4.5: Rank for RtAPS records with and without POPS

Rank	<i>RtAPS and POPS</i>	<i>RtAPS only</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>Junior NCO*</i>	93(48)	102 (52)
<i>Senior NCO</i>	25 (48)	27 (52)
<i>Officer</i>	18 (38)	29 (62)
<i>Total</i>	136	158

$$\chi^2_2 = 1.43, p = 0.49$$

NCO = Non-commissioned Officer

173. Tables 4.6 to 4.8 below show the scores from the RtAPS screen on the K10, PCL and TSES-R (How often did you experience the event?) scales for those who received the RtAPS screen only and those who received both the RtAPS and POPS screens. While the tables show that those who went on to receive POPS had slightly lower mean scores on all three scales, none of these differences were statistically significant. The relevant statistics are included below in each table.

Table 4.6: K10 scores for RtAPS records with and without POPS

		<i>All SI veterans</i>	
		<i>RtAPS and POPS</i>	<i>RtAPS only</i>
<i>K10 total</i>	<i>N</i>	139	163
	<i>Mean</i>	13.80	14.18
	<i>SD</i>	4.90	4.24
	<i>Median</i>	13	13
	<i>Lower Quartile</i>	11	11
	<i>Upper Quartile</i>	15	16
	<i>Min</i>	10	10
	<i>Max</i>	50	30

*Wilcoxon Mann-Whitney U test for difference between medians $z = -0.96$, $p = 0.34$
Range of scores = 10 to 50*

Table 4.7: PCL scores for RtAPS records with and without POPS

		<i>All SI veterans</i>	
		<i>RtAPS and POPS</i>	<i>RtAPS only</i>
<i>PCL total</i>	<i>N</i>	139	161
	<i>Mean</i>	19.19	20.22
	<i>SD</i>	2.96	5.39
	<i>Median</i>	18	18
	<i>Lower Quartile</i>	17	17
	<i>Upper Quartile</i>	21	21
	<i>Min</i>	17	17
	<i>Max</i>	36	52

*Wilcoxon Mann-Whitney U test for difference between medians $z = -0.75$, $p = 0.45$
Range of scores = 17 to 85*

Table 4.8: TSES-R scores for RtAPS records with and without POPS

		<i>All SI veterans</i>	
		<i>RtAPS and POPS</i>	<i>RtAPS only</i>
<i>TSES - How often...?</i>	<i>N</i>	139	160
<i>Total</i>	<i>Mean</i>	1.01	1.01
	<i>SD</i>	1.56	1.67
	<i>Median</i>	0	0
	<i>Lower Quartile</i>	0	0
	<i>Upper Quartile</i>	2	2
	<i>Min</i>	0	0
	<i>Max</i>	8	11

*Wilcoxon Mann-Whitney U test for difference between medians $z = -0.07$, $p = 0.95$
Range of scores = 0 to 48*

174. Some research (Dobie et al., 2002; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002) has used a PCL cut-off as low as 30 for identifying individuals at risk of PTSD. Tables 4.9 and 4.10 below explore POPS screening received by those potentially 'at risk' based on PCL and K10 (high and medium categories collapsed) and suggest that they were unlikely, within this sample, to receive further screening. However, these results should be interpreted with caution as only 11 people scored above 30 on PCL-C. Only one subject scored above 50 (this person was in the 'POPS not recorded at PRTG group').

Table 4.9: PCL-C category by POPS completion

<i>PCL-C category</i>	<i>POPS completed POPS not recorded at PRTG</i>	
	<i>n (%)</i>	<i>n (%)</i>
<i>PCL-C score 0-29 (lower risk)</i>	137 (47)	152 (53)
<i>PCL-C score 30 and above</i>	2 (18)	9 (82)

$\chi^2_1 = 3.64$, $p = 0.06$

Table 4.10: K10 category by POPS completion

<i>K10 category</i>	<i>POPS completed</i>	<i>POPS not recorded at PRTG</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>10-15 Low-level of psychological distress</i>	113 (50)	113(50)
<i>16-29 Medium-level of psychological distress*</i>	24 (33)	49 (67)
<i>30-50 High level of psychological distress*</i>	2 (67)	1 (33)

$$\chi_1^2 = 5.71, p = 0.02$$

* Due to small numbers the medium and high levels of psychological distress categories have been collapsed for the statistical test.

Analysis of RtAPS

175. Table 4.11 summarises K10 scores by categories from RtAPS for Solomon Islands veterans. The categories chosen are those documented in Health Bulletin No 9/2003 – Australian Defence Force Mental Health Screen (Department of Defence, 2003). On average more than 75% of individuals showed a low level of distress at the end of the deployment and 1% of individuals showed a high level of distress. There was no statistical difference between those who consented to linkage and those who did not. Table 4.12 provides further information on the distribution of K10 scores.

Table 4.11: K10 scores by category on RtAPS

<i>K10 categories</i>	<i>SI veterans who did not consent to linkage or did not respond</i>	<i>Consenting SI veterans</i>	<i>All SI veterans</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
<i>10-15 Low level of psychological distress</i>	158 (77)	68 (71)	226 (75)
<i>16-29 Medium level of psychological distress</i>	45 (22)	28 (29)	73 (24)
<i>30-50 High level of psychological distress</i>	3 (1.5)	0 (0)	3 (1.0)
<i>All</i>	206	96	302

$$\chi_1^2 = 1.20, p = 0.27$$

Table 4.12: K10 distribution on RtAPS

<i>Total K10 score</i>	<i>Did not respond to survey</i>	<i>Did not provide consent</i>	<i>Consenting SI veterans</i>	<i>All SI veterans</i>
<i>N</i>	143	62	96	302
<i>Mean</i>	13.65	14.19	14.42	14.00
<i>SD</i>	4.69	4.56	4.36	4.55
<i>Median</i>	13	13	14	13
<i>Lower Quartile</i>	11	10	11	11
<i>Upper Quartile</i>	15	16	16	16
<i>Min</i>	10	10	10	10
<i>Max</i>	50	30	29	50

176. Tables 4.13 and 4.14 below detail the range and distribution of PCL scores calculated from the RtAPS of Solomon Islands veterans. Of note is that only a single individual scored above 50 (the individual was in the group that provided consent to linkage of their data). Table 4.14 displays various cut-off options that have been used in research. A comparison of those who consented to linkage of data with those who did not provide consent or did not respond to the survey showed that a higher proportion of those who provided consent had higher PCL scores. The chi square test was conducted using high and low PCL scores and a cut-off option of 30 as shown in Table 4.14.

Table 4.13: PCL distribution on RtAPS

<i>Total PCL-C score</i>	<i>Did not respond to survey</i>	<i>Did not provide consent</i>	<i>Consenting SI veterans</i>	<i>All SI veterans</i>
<i>N</i>	142	61	96	300
<i>Missing</i>	1	1	0	2
<i>Mean</i>	19.06	19.34	21.05	19.75
<i>SD</i>	3.76	3.30	5.66	4.46
<i>Median</i>	18	19	19	18
<i>Lower Quartile</i>	17.00	17.00	17.00	17.00
<i>Upper Quartile</i>	19.25	21.00	22.00	21.00
<i>Min</i>	17	17	17	17
<i>Max</i>	48	37	52	52

Table 4.14: PCL scores on RtAPS

Total PCL Score	<i>SI veterans who did not consent to linkage or did not respond to the survey</i>		<i>Consenting SI veterans</i>		<i>All SI veterans</i>	
	<i>n (%)</i>	<i>Cumulative Percentage</i>	<i>n (%)</i>	<i>Cumulative Percentage</i>	<i>n (%)</i>	<i>Cumulative Percentage</i>
17	88 (42)	43	29 (30)	30	117 (39)	39
18	32 (16)	58	9 (9.4)	40	41 (14)	53
19	28 (14)	72	13 (14)	53	41 (14)	66
20	11 (5.3)	77	7 (7.3)	60	18 (6.0)	72
21	14 (6.8)	84	7 (7.3)	68	21 (7.0)	79
22	12 (5.8)	90	8 (8.3)	76	20 (6.6)	86
23	4 (1.9)	92	4 (4.2)	80	8 (2.6)	89
24	4 (2.0)	94	5 (5.2)	85	9 (3.0)	92
25	2 (1.0)	95	3 (3.1)	89	5 (1.7)	93
26	4 (2.0)	97	2 (2.1)	91	6 (2.0)	95
27	1 (0.5)	97	1 (1.0)	92	2 (0.7)	96
<i>Cut-off option 1</i> 29	0 (0)	97	1 (1.0)	93	1 (0.3)	96
31	1 (0.5)	98	1 (1.0)	94	2 (0.7)	97
33	0 (0)	98	3 (3.1)	97	3 (1.0)	98
36	1 (0.5)	98	0 (0)	97	1 (0.3)	98
37	1 (0.5)	99	0 (0)	97	1 (0.3)	99
<i>Cut-off option 2</i> 39	0 (0)	99	1 (1.0)	98	1 (0.3)	99
<i>Cut-off option 3</i> 40	0 (0)	99	1 (1.0)	99	1 (0.3)	99
48	1 (0.5)	99	0 (0)	99	1 (0.3)	100
52	0 (0)	99	1 (1.0)	100	1 (0.3)	100
<i>Missing</i>	2 (1.0)				2 (0.7)	
<i>Total</i>	206		96		302	

$\chi^2_1 = 5.25, p = 0.02$

177. TSES-R comprises three separate scales. If a person was not exposed to a particular traumatic event it is not possible for that event to affect them either at the time (column two) or now (column three) and their scores for the effect of the event should be zero. Consequently, scores on scales two and three should be lower than on scale one. Further, as the Solomon Islands deployment was a peacekeeping operation without open armed hostility it would be expected that scores on these scales would be low. This is reflected in Tables 4.15 to 4.17 below.

Table 4.15: Summary of TSES-R 1 scores on RtAPS (How often did you experience the event?)

<i>Total TSES-R 1</i>	<i>N</i>	299
	<i>Mean</i>	1.01
	<i>SD</i>	1.62
	<i>Median</i>	0
	<i>Lower Quartile</i>	0
	<i>Upper Quartile</i>	2
	<i>Min</i>	0
	<i>Max</i>	11
	<i>Missing</i>	3
	<i>Range</i>	0 to 48

Table 4.16: Summary of TSES-R 2 scores on RtAPS (How did it affect you at the time?)

<i>Total TSES-R 2</i>	<i>N</i>	295
	<i>Mean</i>	0.49
	<i>SD</i>	0.62
	<i>Median</i>	0
	<i>Lower Quartile</i>	0
	<i>Upper Quartile</i>	1
	<i>Min</i>	0
	<i>Max</i>	7
	<i>Missing</i>	7
	<i>Range</i>	0 to 36

Table 4.17: Summary of TSES-R 3 scores on RtAPS (How does it affect you now?)

<i>Total TSES-R 3</i>	<i>N</i>	295
	<i>Mean</i>	0.17
	<i>SD</i>	0.50
	<i>Median</i>	0
	<i>Lower Quartile</i>	0
	<i>Upper Quartile</i>	0
	<i>Min</i>	0
	<i>Max</i>	3
	<i>Missing</i>	7
	<i>Range</i>	0 to 36

178. The final measure included in RtAPS is the Major Stressors Scale. Tables 4.18 and 4.19 demonstrate that the issues that cause distress to the greatest number of people are similar to, but not the same as, the issues that cause the most distress.

Table 4.18: Major Stressors - 5 most common

Stressor	Frequency (%)
<i>Double Standards</i>	195 (65)
<i>Leadership</i>	160 (53)
<i>Deployment rules and regulations</i>	159 (53)
<i>Separation from family friends</i>	159 (53)
<i>Behaviour of others</i>	156 (52)

Table 4.19: Mean Stressors – 5 highest scores

Stressor	Mean	SD
<i>Double Standards</i>	2.17	1.15
<i>Leadership</i>	1.89	1.05
<i>Deployment Rules and regulations</i>	1.88	1.03
<i>Australian military hierarchy</i>	1.86	1.06
<i>Behaviour of others</i>	1.72	0.83

Analysis of POPS

179. The POPS data for Solomon Islands veterans are summarised in the tables below. Table 4.20 summarises K10 scores by categories. More than 80% of individuals scored in the low level of distress category and Table 4.21 provides further information on the distribution of K10 scores.

Table 4.20: K10 scores by category on POPS

<i>K10 categories</i>	<i>n (%)</i>
<i>10-15 Low-level of psychological distress</i>	129 (83)
<i>16-29 Medium-level of psychological distress</i>	24 (16)
<i>30-50 High-level of psychological distress</i>	2 (1.3)
<i>Total</i>	155

Table 4.21: K10 distribution on POPS

<i>Total K10 score</i>	<i>N</i>	155
	<i>Mean</i>	13.30
	<i>SD</i>	4.89
	<i>Median</i>	12.00
	<i>Lower Quartile</i>	10.00
	<i>Upper Quartile</i>	14.00
	<i>Min</i>	10
	<i>Max</i>	42

180. Tables 4.22 and 4.23 below detail the scale scores on the PCL at the time of the POPS screen. Two individuals scored above the suggested cut-off of 50, one of these had the highest score possible. PRTG experience has been that individuals who report

the ‘highest score possible’ may have misinterpreted the stem and completed the instrument incorrectly (PRTG personal communication). PRTG noted also that individuals who score highly on one screening instrument are also likely to score highly on other instruments in the RtAPS, and this score would also likely be noted on an individual’s psychology record (Personal communication, Psychology Research and Technology Group, 2008). Twelve members had a PLC above 30 (7.8%), compared with only 3.6% on the larger RtAPS dataset (this is not a within person comparison).

Table 4.22: PCL distribution on POPS

<i>Total PCL-C score</i>	<i>N</i>	154
	<i>Mean</i>	20.90
	<i>SD</i>	8.06
	<i>Median</i>	18.00
	<i>Lower Quartile</i>	17.00
	<i>Upper Quartile</i>	22.00
	<i>Min</i>	17
	<i>Max</i>	85

Table 4.23: PCL scores on POPS

Total PCL Score	<i>n</i> (%)
17	68 (44)
18	17 (11)
19	15 (10)
20	6 (3.9)
21	4 (2.6)
22	10 (6.5)
23	7 (4.5)
24	4 (2.6)
25	7 (4.5)
26	1 (0.6)
27	2 (1.3)
28	1 (0.6)
31	1 (0.6)
32	2 (1.3)
33	2 (1.3)
34	1 (0.6)
35	2 (1.3)
45	1 (0.6)
56	2 (1.3)
85	1 (0.6)
<i>Total</i>	154 (100)

181. Tables 4.24 and 4.25 detail the scores from AUDIT, which is included on the POPS screen but not on the RtAPS. According to Health Bulletin No 9/2003 – Australian Defence Force Mental Health Screen (Department of Defence, 2003), AUDIT scores may be broken into four categories. Category 1 indicates a “low risk drinker”; Category 2 indicates “Consuming alcohol in excess of low risk guidelines”; Category 3 indicates “hazardous or harmful levels of alcohol consumption”; and, Category 4 indicates “High risk of alcohol related harm”. The majority of those completing the AUDIT on POPS are low risk drinkers.

Table 4.24: AUDIT category scores on POPS

	<i>n (%)</i>
<i>Category 1 (0 – 7)</i>	98 (65)
<i>Category 2 (8 – 15)</i>	50 (33)
<i>Category 3 (16 – 19)</i>	2 (1.3)
<i>Category 4 (20 – 40)</i>	1 (0.6)
<i>Total</i>	151

Category 1 (0-7) = low risk drinker
Category 2 (8-15) = consuming alcohol in excess of low risk guidelines
Category 3 (16-19) = hazardous or harmful levels of alcohol consumption
Category 4 (>19) = high risk of alcohol-related harm

Table 4.25: AUDIT distribution on POPS

<i>AUDIT</i>	<i>N</i>	151
<i>Mean</i>		6.41
<i>SD</i>		3.79
<i>Median</i>		5.00
<i>Lower Quartile</i>		4.00
<i>Upper Quartile</i>		9.00
<i>Min</i>		0
<i>Max</i>		22

Discussion

182. Of the 500 veterans of the Solomon Islands whose RtAPS and POPS records were analysed by PRTG, only 60% had RtAPS and 31% had POPS. A further 36% had no screening records available at all (Figure 4.1). It is unclear from the data available whether these health screens were not conducted or were conducted but the data have not yet been entered into the electronic database. It is not possible to determine which of these is the cause of the missing data.

183. One hundred and thirty-six veterans (60%) of Solomon Islands who participated in the self-report questionnaire also consented to linkage of their psychology data. A subset of data has been included in the current chapter for this group. While there was no statistical difference between those who consented to linkage and those who did not on K10 scores, there was a difference between those who consented and those who did not when analysing the distribution of PCL scores using the conservative cut-off of 30. Consenting veterans tended to score slightly higher on the PCL scale.

184. Overall, the analyses validate assumptions made by both PRTG and DHSP that the number of deployed personnel who received both RtAPS and POPS, particularly in earlier deployments, is comparatively low (28%) (Table 4.1).

185. There were some demographic differences between those who received RtAPS only and those who received both the RtAPS and POPS screens, as recorded at PRTG; namely, Navy personnel and reservists were the least likely to receive both screens (Table 4.3 and 4.4). Further, those showing more distress were slightly less likely to

receive follow-up screening (Table 4.9 and 4.10). However, it is difficult to know why this may be the case.

186. Overall, for the records of consenting participants that were available, the raw data supplied by PRTG was of high quality and had little missing data. The health and psychological scales could be calculated from the RtAPS and POPS for all forms analysed, without needing to make any assumptions about missing values.

187. At face value it would appear that, as a group, Solomon Islands veterans did not display high levels of distress at the time of RtAPS, as measured by K10 (Tables 4.11 and 4.12). Although, as many as 29% may have been recommended for further assessment based on the guidance on follow up in Health Bulletin No 9/2003 – Australian Defence Force Mental Health Screen (Department of Defence, 2003). Scores on the PCL measuring PTSD symptoms were comparatively low, with only a few exceptions (Tables 4.13 and 4.14). These results relate to and are reflected in the low number of traumatic events experienced as measured by TSES-R.

188. On the Major Stressors scales, “Double standards” caused the most people the most distress. Similarly, “Leadership” and “Deployment rules and regulations” were also stressors for those who deployed to the Solomon Islands (Tables 4.18 and 4.19). It is worth noting that many of these stressors may also be applicable to those who do not deploy.

189. As measured by AUDIT, approximately one third of veterans of the Solomon Islands deployment consumed alcohol in excess of the low risk definition (Table 4.24). Again, it is difficult to draw any conclusions from this finding as AUDIT is measured only at POPS and therefore this calculation is based on a smaller number of observations. Chapter 6 synthesises some of this information and compares outcomes from different sources.

190. There were too few POPS records available from the participants who gave consent to link their psychological data to make valid comparisons of the K10 and PCL measures from RtAPS and POPS. A simple review of the means shows that there is little difference in the means for K10 (Tables 4.12 and 4.21), but a slight difference (PCL mean higher in POPS data) between the RtAPS and POPS means for the PCL-C score (Tables 4.13 and 4.22). However, there was also greater variability in the measures taken at POPS and this must be considered in the context of significant differences in categories of distress for those who received RtAPS only and those who received both the RtAPS and POPS screens (Tables 4.9 and 4.10).

191. The final section of the Discussion relates to how RtAPS and POPS are used somewhat differently by mental health professionals in the field and those analysing the resulting data. As described in Defence policy documents and by review of the instruments themselves, both the RtAPS and POPS are screening instruments from which analysable data are collected. As such, the use of an appropriate cut-off on various instruments is fundamental to the instrument’s use as a screening tool. However, during a number of discussions with Defence psychologists, who have been responsible for administering both RtAPS and POPS, it is apparent that these instruments are not used as screening tools in such a strict sense. That is, the usual purpose of a psychological screening instrument is to ascertain who should receive a clinical interview.

192. More frequently the Defence mental health professional responsible for the process uses the screening instrument to guide the clinical process – not as a filtering

tool. For example, if on the TSES-R scale a person indicated that a loved one had died during the deployment, that might be investigated irrespective of any other response on the entire RtAPS instrument.

193. A discussion of why the particular variables relating to follow-up interviews were not usually completed on the screening instruments highlights this point. The data box options that are part of the design of the RtAPS form are no longer relevant to the clinical psychologist. Instead, a summary write-up completed at the end of the RtAPS process concludes with the recommendation for follow-up, which tends to contain options such as immediate referral, referral before three months or within the normal routine 3-6 months timing for POPS. The recording of data in this way has important implications for health surveillance.

194. Accordingly, the RtAPS and POPS screens have multiple purposes. First, they are a tool used to aid the clinical assessment and treatment of individuals. Second, they are a means of data collection to assess the overall mental health of members of the Defence Force who have deployed on operations. The data completion, storage, consistency and accuracy needs for each purpose differ but are not mutually exclusive.

195. When interpreting outcomes as measured by RtAPS and POPS it is reasonable to anticipate that, in the military environment, there is a bias towards under-reporting of symptoms, particularly as the setting is one where identity is not anonymous and outcomes may be perceived as influencing later career progression. Consequently, it is difficult to establish appropriate screening cut-off points (Dobie et al., 2002; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002). Further, information gained from community samples and non-occupational settings has a reasonable probability of being invalid when used in a military setting. However, given the small sample sizes where receipt of RtAPS and POPS is documented, it is difficult to draw any conclusions.

196. As the DHSP collects data from multiple sources (Defence health records, Defence RtAPS and POPS and DHSP self-report data) they are well placed to assist Defence to evaluate the psychological screening processes. The DHSP research allows individuals, both with and without disorders, to be tracked longitudinally to monitor outcomes.

Recommendations

4.1 Research should be conducted in a Defence setting to validate the instruments used at RtAPS and POPS against structured diagnostic interviews.

4.2 Defence should consider utilising lower cut-off scores for the PCL in order to minimise the possibility of false negative results. The value of identifying the additional at risk individuals, who might benefit from further intervention or follow-up, must be balanced against inefficiencies of following up a larger number of false positives.

4.3 DHSP supports recent changes to policy requiring commanders ensure their personnel attend operation mental health screening and any follow-up appointments. Nonetheless, further work should be undertaken to ascertain the reasons for the missing POPS data for Solomon Islands veterans.

4.4 RtAPS and POPS data have both clinical and surveillance applications. In order to best suit both applications, the form should be adjusted so that recommendations for follow-up are applicable to the clinical psychologist's use and also able to be used for ongoing surveillance.

4.5 Improvements through revisions to the RtAPS and POPS forms should be carefully weighed against the impact upon reducing the comparability of the data across time.

Chapter 5 – Self-Report Data

Key Findings

- I. The most consistent finding across all aspects of the questionnaire data was that there was no difference in outcomes between the Solomon Islands veterans and the comparison group, although there was only adequate statistical power to detect moderate to large differences between groups. For examples see Tables 5.4, 5.5 and 5.6.
- II. One third of participants consume alcohol in excess of ‘low risk’ (Table 5.15) and just under one fifth (19%) are current smokers (Table 5.18).
- III. Although Body Mass Index (BMI) scores suggested that only 31% of the Solomon Islands veterans and 23% of the comparison group were in the healthy weight range and most were above, this finding should be interpreted with caution as BMI is affected by muscle mass. Alternative measures of overweight may be more appropriate in this group, who may be likely to have more muscle than the general population for which the norms are defined (See Table 5.13).
- IV. More than one third of all participants were at some risk for having negative psychological outcomes as they were in the medium or high categories for psychological distress, but only 4% fell into the high range (Table 5.23). This finding suggests the need for strategies to identify and manage mental health issues.
- V. The self-reported data collected for both Solomon Islands veterans and comparisons provide sound baseline measures of the following items:
 - General Health (SF-36 general health scale)
 - Symptoms Checklist
 - BMI
 - Alcohol Use (AUDIT)
 - Smoking
 - PCL-C
 - Psychological Distress (K10)
- VI. The process of self-report data collection should be streamlined for future studies, eliminating use of a mail house for sending hard copy invitations and study materials. Email approaches to potential participants should be investigated, given the popularity of online questionnaire completion.
- VII. Given difficulties in obtaining hard copy consents for individuals who completed the questionnaire online, the option to provide consent on the internet should be included in future studies.
- VIII. Ex-serving participants were particularly difficult to locate. Accordingly, sufficient time must be allowed for data collection (Tables 5.1 and 5.2).
- IX. Some parts of the questionnaire were too long. Consideration should be given to reducing the length of the questionnaire, particularly in the

demographic section. Further, improvement of some specific questions was indicated, in particular those relating to smoking, oral health and reproductive health.

- X. It is important that future studies maintain the use of standard questions to enable comparisons with other groups both within the ADF and with other military and civilian populations.
- XI. Recommendations V to VII were implemented for the East Timor and Bougainville Health Studies.

Introduction

197. This chapter describes the collection and analysis of the self-report data for the Solomon Islands Health Study.

Methods

Sample selection

198. Prior to any contact by the study team, details of the 1000 individuals selected to be included in the study sample were linked to the National Death Index and a list of Defence personnel known to have died, and any individuals identified as having died were excluded from the study, in order to avoid upsetting families of deceased personnel. This list was monitored and updated regularly throughout the study. All remaining individuals in the study sample were contacted by mail and invited to participate in the Solomon Islands Health Study.

Recruitment

199. Full details of the recruitment process have been reported in the SI Completed Self Reported Data Collection Stage Report (see Annex F). The approach chosen used multiple methods of contact, support for the research by perceived figures of authority, positive regard for the respondents, and language supporting the importance of and reasons for the research (Dillman, 2000). Data from potential participants were collected in two stages:

- The invitation package was sent to all sampled individuals informing them about the study, inviting them to participate and requesting information on their preferred mode of completion of the questionnaire (mail, internet, phone interview or face-to-face interview) and a brief questionnaire on deployment history.
- The questionnaire was then provided via the preferred mode of delivery.

200. A sample of the invitation package mailed to potential participants is included at Appendix 5.1. The following items were included in the package:

- A letter of invitation from the First Chief Investigator;

- A Letter of Support from the Chief of the Defence Force and the Repatriation Commissioner;
- A Study Information Sheet, including a 1800 (free-call) telephone number and login details for the online questionnaire;
- A Consent Form, including consent to the following study components:
 - Self-report questionnaire
 - Being contacted periodically for follow-up studies
 - Linkage of Defence health data
 - Linkage of Defence psychology data;
- A Contact details and brief deployment history questionnaire;
- Reply paid envelope.

201. For serving personnel, the invitation package was sent to their unit address. Ex-serving members and reservists were contacted via their residential address. All address data were obtained from PMKeyS. Once participants returned their completed forms, the questionnaire was provided to them in their nominated mode of delivery.

202. All participants were asked to complete a Health Questionnaire, and those who had deployed to the Solomon Islands were asked to complete a Solomon Islands Deployment Questionnaire. Both these questionnaires were available online.

Follow-up of non-respondents

203. Individuals who did not return consent forms and/or questionnaires were sent reminder cards and, if this did not elicit a response, followed up by telephone. Where individuals were unable to be contacted, updated address details were sought via PMKeyS, the Australian Electoral Roll and/or the Department of Veterans' Affairs. These processes have been described in the SI Completed Self Reported Data Collection Stage Report (see Annex F).

Communications strategy

204. A communication and media strategy was designed and implemented prior to contact with potential study participants and at various times during the recruitment and data collection process. The aims of this strategy were to alert individuals to the study with the aim of increasing response rates. The communication and media strategy involved:

- advertisements and editorials in various Defence and ex-Serving publications (a list is provided at Appendix 5.2)
- editorials in non-Defence media
- media releases
- distribution of posters to selected Regimental Aid Posts and Frontline stores.

Survey methods

Health Questionnaire

205. The Health questionnaire was given to both the veteran and the comparison groups. It was divided into several sections and further details on these sections are provided below. The Health Questionnaire can be found in Appendix 5.3.

General Health

Health in General (Q2)

206. The General Health question from the SF-36 Quality of Life Instrument is a single question that asks “In general, would you say that your health is?”...Excellent, Very good, Good, Fair or Poor. This question is an important, commonly used and well-recognised measure of general health and well-being. It allows comparison with national and international data, including from military populations.

Recent Health Symptoms (Q1)

207. The 63 item self-report symptom list was used to ask about the occurrence of symptoms in the past month, and whether the severity of those symptoms was “mild”, “moderate”, or “severe”. This list of items, taken from the Australian Gulf War Study, is an expanded version of the 50 item Op TELIC study of UK Gulf War Veterans, which was based on the Hopkins Symptom Checklist. The items are analysed by the frequency of symptoms and the total number of symptoms.

Diagnosed or treated medical conditions (Q40)

208. The 58 item medical condition questionnaire was used to ask about problems or conditions that had been diagnosed or treated by a medical doctor, and the year in which the condition was first diagnosed. The medical questionnaire was based on one used by Unwin and colleagues (Unwin et al., 1999), but included additional items considered relevant to Australian veterans.

Hospitalisations (Q42)

209. The questions relating to hospitalisation were based on those used in studies of Australian Gulf War veterans and US Gulf War veterans (Kang, Mahan, Lee, Magee, & Murphy, 2000). Participants were asked whether they had been hospitalised overnight or longer because of illness or injury during the past 12 months, and if so, the duration and reason for the hospitalisation.

Medications (Q43)

210. This item was taken from the Australian Gulf War Study to provide an indication of health need and of certain conditions. It can be used to compare total number of medications, new medication since deployment and medication for specific outcomes of interest e.g. anti-depressants.

Height, weight, BMI (Q32-33, Background details)

211. Height and weight are used to determine Body Mass Index (BMI). BMI is associated with numerous health outcomes.

Work impairment (Q 22-25)

212. The self-reported questionnaire included four questions about work loss days and work cutback days, and the responses are used to define work impairment for purposes of this analysis. The questions were taken from US National Comorbidity Survey on disability. Variations of these questions have been used in both the National Survey of Mental Health and Wellbeing, conducted by the Australian Bureau of Statistics (ABS) in 1997, and the Canadian Community Health Survey - Canadian Forces Supplement (2002). They are generally analysed as four separate items.

Health Risk Behaviours

Alcohol Use Disorders Identification Test (AUDIT) (Q49-58)

213. The AUDIT screening test was developed by the World Health Organisation (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) (WHO) as a method of screening for hazardous and harmful alcohol use and assisting in the formulation of brief interventions. There were slight differences in the response options provided to participants for the first question on the AUDIT which asks “How often do you have a drink containing alcohol?”. The WHO version includes the options, “Monthly or less”, “2 to 4 times a month”, “2 to 3 times a week” and “4 or more times a week”. The version used in the Solomon Islands Health Study includes the response options, “Less than once a month”, “Monthly”, “Weekly”, “Daily or almost daily”. Scoring of this question was adjusted to align most closely with the standard response options. A description of the AUDIT is included in Chapter 3 – Defence Health Records (see page 30). When calculating individuals’ AUDIT scores, if the answer to the question “How often do you drink?” was ‘never’, the individual’s total AUDIT score was assumed to be zero.

Smoking (Q45-48)

214. This section, obtained from the Australian Gulf War Study, measured smoking status (current, ex, never), pack years of smoking and change in smoking status since deployment. The information on years of smoking and average number of cigarettes daily was used to calculate the total number of cigarettes smoked and this was expressed in pack-years.

PCL-C & K-10 (Q59-60, Q12-21)

215. These psychological scales are described in the methods section of Chapter 4 – Defence Psychology Records. For the purposes of this report a cautious approach was taken. If any one of the 10 questions that form the K-10 was missed by a participant, no K-10 total score was calculated.

Aggression Scale (Q8-11)

216. Aggression was measured using the four item AG21 scale, developed by the US Military. Responses for individual items were combined to obtain one summary measure.

Oral Health (Q26-39)

217. The Oral Health Impact Profile (OHIP-14) was used to assess dental health. The 14 questions cover six conceptually formulated dimensions namely: functional limitation, physical pain, psychological discomfort, physical disability, social disability, psychological disability and handicap (Locker, 1988). Responses were

recorded using the following scale: 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, 4 = very often.

218. Responses for individual items were combined to obtain one summary measure with a range of 0 to 56, with higher scores indicating poorer oral health related quality of life.

Reproductive Health (Q61-64)

219. This section was included to investigate any associations between deployment exposures and attempted or actual pregnancies for female veterans or male veterans' partners. The items were used to compare presence of abnormal reproductive outcomes (live birth, miscarriage, etc) or congenital abnormalities.

220. The questions are similar to those from the Australian Gulf War Study, although they are not identical.

Deployment Questionnaire

221. In addition to completing the Health Questionnaire, those participants who had deployed to the Solomon Islands between 24 July, 2003 and 31 December, 2005 were also asked to complete the Solomon Islands Deployment Questionnaire. This questionnaire was also divided into sections and details of those sections are provided below. The Solomon Islands Deployment Questionnaire can be found at Appendix 5.4.

Deployment Details (Q3-11)

222. These questions were taken from the Australian Gulf War Study, and have been modified to be relevant to the Solomon Islands location.

223. Questions cover dates and length of deployment, main duties, Service status and rank, and reason for leaving the ADF (if applicable). They also include details of deployment locations as exposures may vary with location.

Vaccinations and Medications (Q14-17)

224. These questions were used to describe vaccination history; they have been modified from the Australian Gulf War Study, with expansion of the questions associated with malaria medication.

225. The questions associated with malaria medication were based on occurrences in East Timor, where a resistant strain of malaria was noted and the doses of Primaquine were increased.

Chemical and Environmental Exposures (Q20-22)

226. This section included general exposures to food, water, insects and pests, and other chemical and environmental hazards identified by hazard reports and the literature review to be potential exposures. Because of concern about malaria, there were also questions on the use of protection measures such as fogging and pesticides. The questions were modified from the Australian Gulf War Study.

Deployment Experience (Q24-39)

227. Most of the questions in this section were drawn from the RtAPS. The scales and methods for TSES-R and the Major Stressors Scale are described in Chapter 4. They are generally used for descriptive analysis. The questionnaire aimed to measure

positive as well as negative aspects of deployments. It should be noted that item 4 (“You saw dead bodies”) was absent from the TSES-R scale on the Deployment Questionnaire. Further, DHSP has coded responses to the TSES-R in accordance with the methods described by Swann and Hodson (2002). For any of the questions in this scale, if someone experienced an event ‘very often’ the value assigned was five. Very Often”. However, PRTG used the value 4 rather than 5 for the response of “Very Often”.

228. The deployment experiences section (Q38) was based on items used in the Australian Gulf War Study.

Results

Participation

229. The SI Completed Self Reported Data Collection Stage Report (see Annex F) provided details on the overall responses to the various contacts, methods of completion of the questionnaire and participation rates. Process measures were also reported, including recruitment activities, details of contacts made and response to different recruitment and follow-up strategies.

230. Three individuals known to have died and two other persons who were not approached for logistical reasons (i.e. one had emigrated and one had no contact details recorded on the PMKeyS database) were excluded from the denominator for the calculation of participation rates. All others unable to be contacted during the study period were included in the denominator. As a sensitivity analysis, participation rates were also calculated excluding non-contactable individuals.

231. Table 5.1 summarises responses of those invited to take part in the study. The final participation rate for all eligible individuals was 44 percent. However, excluding those who were unable to be contacted, the participation rate increased to 54 percent. One hundred and twenty-four individuals in the sample were no longer serving ADF members and almost half (43%) of these individuals were unable to be contacted. In comparison contact was made with 85% of serving members. This difference was statistically significant ($\chi^2_{(3)} = 60.2, p < 0.001$). As a consequence of the small number of ex-serving personnel who participated in the survey (31) there is insufficient power to conduct further analysis comparing different outcomes for serving versus ex-serving members.

Table 5.1: Self-reported data: Response categories by employment status

	<i>Active</i> <i>N=871</i>	<i>Ex-</i> <i>serving</i> <i>N=124</i>	<i>Total</i> <i>approached</i> <i>N=995</i>	χ^2	df	p
	n (%)	n (%)	n (%)			
<i>Responded:</i>						
<i>Questionnaire received</i>	404 (46)	31 (25)	435 (44)			
<i>Refused questionnaire*</i>	158 (18)	23 (19)	181 (18)			
<i>Did not respond:</i>						
<i>Contacted but never participated**</i>	180 (21)	17 (14)	197 (20)			
<i>Unable to be contacted</i>	129 (15)	53 (43)	182 (18)	60.2	3	<0.001

* 27 of those who declined to do the questionnaire provided consent for data linkage.

** 61 of those who did not participate were serving ADF members currently on deployment as confirmed via either a family member or colleague.

Note: These may figures differ slightly from those reported in the SI Completed Self Reported Data Collection Stage Report due to decisions made regarding missing data.

232. Table 5.2 shows the demographic characteristics of participants. The distribution of demographics is similar between the veteran and comparison groups. The main difference noted are a slightly higher proportion in the comparison group who completed the questionnaire by interview compared to veterans (22% versus 15%, $p = 0.15$).

Table 5.2: Participant characteristics for SI veterans and comparisons

<i>Characteristic</i>	<i>SI veterans</i>	<i>Comparisons</i>	<i>Test statistic</i>		
	<i>N=227</i>	<i>N=208</i>	χ^2	df	p
<u><i>Sex</i></u>	n (%)	n (%)			
<i>Male</i>	196 (86)	180 (87)			
<i>Female</i>	31 (14)	28 (13)	0.004	1	0.95
<u><i>Age group</i></u>					
<i>20-29</i>	85 (37)	68 (33)			
<i>30-39</i>	91 (40)	85 (41)			
<i>40+</i>	51 (22)	55 (26)	1.42	2	0.49
<u><i>Service</i></u>					
<i>NAVY</i>	51 (22)	50 (24)			
<i>ARMY</i>	131 (58)	125 (60)			
<i>RAAF</i>	45 (20)	33 (16)	1.17	2	0.56
<u><i>Employee status</i></u>					
<i>Active</i>	214 (94)	190 (91)			
<i>Ex-serving</i>	13 (6)	18 (9)	1.41	1	0.24
<u><i>Service Type</i></u>					
<i>Regular/Permanent</i>	204 (90)	185 (89)			
<i>Reserve</i>	23 (10)	23 (11)	0.10	1	0.75
<u><i>Questionnaire method</i></u>					
<i>Mail</i>	80 (35)	66 (32)			
<i>Web</i>	114 (50)	99 (47)			
<i>Interview</i>	33 (15)	43 (21)	2.89	2	0.24

233. Table 5.3 shows the characteristics of participants by the time period during which their data were collected. The proportions of veteran versus comparison group and males versus females were similar across the three time categories. Those participants who were older tended to respond earlier, although this difference was not statistically significant. A significantly higher proportion of RAAF members participated in the earlier time periods and more Navy members in the later time periods. The level of participation among ex-serving members and reservists was low initially but increased through subsequent follow-up. The proportion of ex-serving members and reservists participating increased through subsequent follow-up. While these differences were statistically significant, they are likely to reflect the greater difficulties experienced in contacting these participants rather than any inherent response bias.

Table 5.3: Participant characteristics by time of data collection

<i>Characteristic</i>	<i>Early*</i>	<i>Mid**</i>	<i>Late***</i>	<i>Test statistic</i>		
	<i>N=102</i>	<i>N=159</i>	<i>N=174</i>	χ^2	df	p
	n (%)	n (%)	n (%)			
<u><i>Exposure</i></u>						
<i>SI Veteran</i>	56 (55)	85 (53)	86 (49)	0.9363	2	0.626
<i>SI Comparison</i>	46 (45)	74 (47)	88 (51)			
<u><i>Sex</i></u>						
<i>Male</i>	88 (86)	131 (82)	157 (90)	4.3588	2	0.113
<i>Female</i>	14 (14)	28 (18)	17 (10)			
<u><i>Age group</i></u>						
<i>20-29</i>	26 (25)	53 (33)	74 (43)	8.7878	4	0.067
<i>30-39</i>	46 (45)	66 (42)	64 (37)			
<i>40+</i>	30 (29)	40 (25)	36 (21)			
<u><i>Service</i></u>						
<i>NAVY</i>	16 (16)	37 (23)	48 (28)	14.4524	4	0.006
<i>ARMY</i>	60 (59)	88 (55)	108 (62)			
<i>RAAF</i>	26 (25)	34 (21)	18 (10)			
<u><i>Employee status</i></u>						
<i>Active</i>	101 (99)	147 (92)	156 (90)	8.5870	2	0.014
<i>Ex-serving</i>	1 (1)	12 (8)	18 (10)			
<u><i>Service Type</i></u>						
<i>Regular/Permanent</i>	96 (94)	144 (91)	149 (86)	5.2411	2	0.073
<i>Reserve</i>	6 (6)	15 (9)	25 (14)			

* March to June 2007

** July to September 2007

*** October / November 2007

Self-report Health Questionnaire Results

234. Data presented below summarise responses to the self-report questionnaire. Most data are presented as percentages and scale scores. Additional tables for some questions are included in Appendix 5.5.

Health Questionnaire

General Health

Health in General

235. Table 5.4 shows the response categories to Question 2 the general health question from SF-36. The proportions of veteran and comparison participants responding in each category were similar ($\chi^2_{(4)} = 5.20$, $p = 0.27$).

Table 5.4: Response categories to general health question

<i>In general, would you say that your health is?</i>	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>Excellent</i>	30 (13)	27 (13)
<i>Very good</i>	83 (37)	83 (40)
<i>Good</i>	71 (31)	67 (32)
<i>Fair</i>	29 (13)	23 (11)
<i>Poor</i>	5 (2.2)	0 (0)
<i>Missing</i>	9 (4.0)	8 (3.9)
<i>Total</i>	227	208

236. Table 5.5 shows the response categories to the same question grouped by Service, combining the Solomon Islands veteran and comparison groups. Again, the proportions of Army, Navy and RAAF personnel responding in each category is similar ($\chi^2_{(8)} = 6.64, p = 0.58$).

Table 5.5: Response categories to general health question by Service.

	<i>ARMY n (%)</i>	<i>NAVY n (%)</i>	<i>RAAF n (%)</i>
<i>Excellent</i>	33 (13)	15 (15)	9 (12)
<i>Very good</i>	94 (37)	37 (37)	35 (45)
<i>Good</i>	79 (31)	32 (32)	27 (35)
<i>Fair</i>	32 (13)	14 (14)	6 (7.7)
<i>Poor</i>	5 (2.0)	0 (0)	0 (0)
<i>Missing</i>	13 (5.1)	3 (3.0)	1 (1.3)
<i>Total</i>	256	101	78

Symptoms Checklist

237. The frequency (%) of Solomon Islands study participants answering Yes (Mild, Moderate or Severe) to each of the 61 questions about symptoms in the self-report health questionnaire is shown in Figure 5.1. Frequencies of symptoms in the Solomon Islands veterans and the comparison group are shown ranked from highest to lowest.

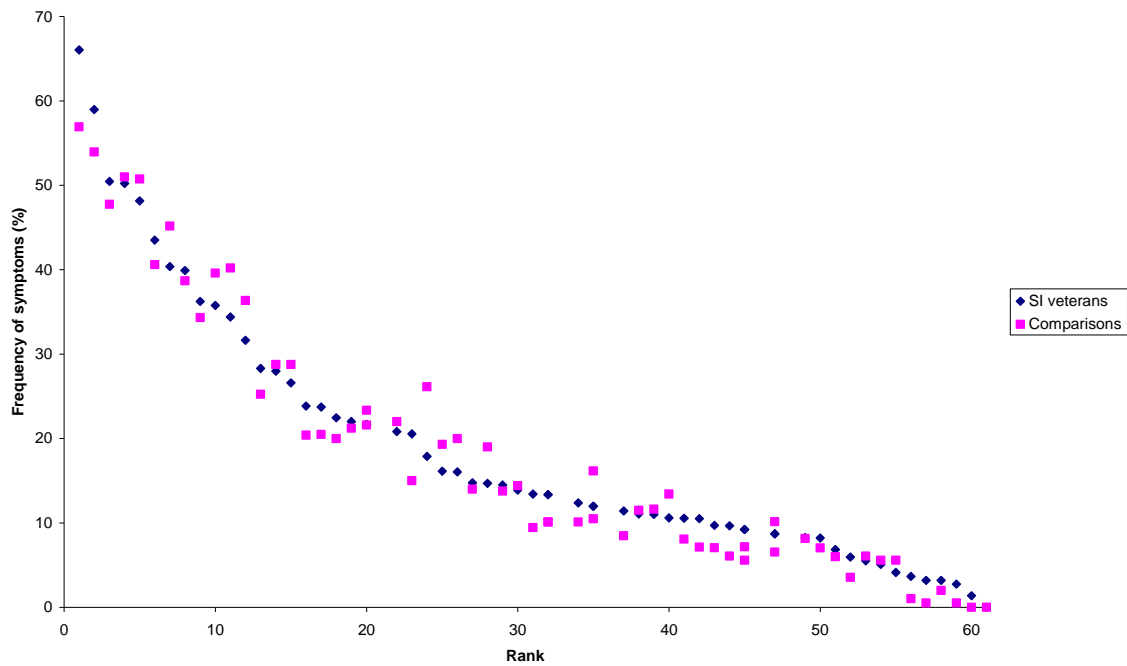


Figure 5.1: Frequency of common symptoms in Solomon Islands veterans and in the comparison group who did not deploy.

238. The data in Figure 5.1 indicate that deployment to the Solomon Islands was not associated with an increase in the overall prevalence of recent health symptoms in the self-report questionnaire.

239. The 15 most frequently reported symptoms are presented in Table 5.6 with the unadjusted relative risk. In each of the symptoms, there was no significant difference in the distribution from the mild, moderate and severe categories by exposure status.

Table 5.6: Most frequently self-reported symptoms by exposure group

<i>Symptom</i>	<i>SI veterans</i> %	<i>Comparisons</i> %	<i>Unadjusted Relative Risk (95% CI)</i>
<i>Fatigue</i>	142 (66)	115 (57)	1.16 (1.00, 1.35)
<i>Feeling unrefreshed after sleep</i>	128 (59)	109 (54)	1.09 (0.87, 1.29)
<i>Sleeping difficulties</i>	109 (51)	96 (48)	1.06 (0.87, 1.29)
<i>Headaches</i>	109 (50)	103 (51)	0.99 (0.82, 1.19)
<i>Low back pain</i>	105 (48)	100 (51)	0.94 (0.78, 1.15)
<i>Irritability or outbursts of anger</i>	94 (44)	82 (41)	1.07 (0.86, 1.34)
<i>Muscle pain</i>	88 (40)	89 (45)	0.89 (0.71, 1.12)
<i>Forgetfulness</i>	87 (40)	77 (39)	1.03 (0.81, 1.31)
<i>Loss of concentration</i>	79 (36)	68 (34)	1.06 (0.81, 1.37)
<i>Difficulty finding the right word</i>	78 (36)	78 (40)	0.90 (0.71, 1.16)
<i>Flatulence or burping</i>	75 (34)	80 (40)	0.86 (0.67, 1.10)
<i>Stiffness in several joints</i>	69 (32)	72 (36)	0.87 (0.97, 1.14)
<i>Feeling distant or cut-off from others</i>	62 (28)	50 (25)	1.12 (0.81, 1.54)
<i>Avoiding doing things or situations</i>	61 (28)	57 (29)	0.97 (0.72, 1.32)
<i>Ringling in ears</i>	58 (27)	57 (29)	0.92 (0.68, 1.26)

240. The greatest difference between the Solomon Islands veteran and comparison groups was for Fatigue (RR = 1.16 (1.00, 1.35)). However, none of the 15 symptoms presented was statistically significantly associated with deployment to the Solomon Islands.

241. When comparing the total number of symptoms reported by each participant, there were no significant differences between the exposure groups ($t_{(422)} = 0.61$, $p = 0.54$). These results are displayed in Table 5.7.

Table 5.7: Total number of symptoms by exposure group

	<i>SI veterans</i>	<i>Comparisons</i>
<i>N</i>	219	205
<i>Mean number of symptoms</i>	11.49	10.92
<i>Median</i>	10	9
<i>Std Dev</i>	10.09	9.17
<i>Lower CI</i>	10.15	9.66
<i>Upper CI</i>	12.84	12.19
<i>Lower Quartile</i>	4	4
<i>Upper Quartile</i>	17	17
<i>Min</i>	0	0
<i>Max</i>	51	40

Diagnosed or treated medical conditions

242. Table 5.8 shows the 15 most frequently diagnosed or treated medical conditions ordered by the most frequently reported in the veteran group. There was little difference in either the frequency or the order of diagnosed or treated medical conditions. A large percentage from both groups, around 40%, reported being diagnosed with back or neck problems.

Table 5.8: Most frequently diagnosed or treated medical conditions.

<i>Diagnosed or treated medical conditions</i>	<i>SI veterans</i>	<i>Comparisons</i>	<i>Unadjusted Relative Risk (95% CI)</i>
	<i>n (%)</i>	<i>n (%)</i>	
<i>Back or neck problems</i>	79 (39)	75 (43)	0.90 (0.70, 1.05)
<i>Joint problems</i>	52 (26)	58 (34)	0.76 (0.56, 1.28)
<i>Anxiety, stress and depression</i>	32 (16)	33 (19)	0.82 (0.53, 1.28)
<i>Hearing loss</i>	36 (17)	31 (18)	0.98 (0.63, 1.51)
<i>Hay fever</i>	31 (15)	31 (18)	0.84 (0.53, 1.32)
<i>Any other skin problem</i>	26 (13)	24 (14)	0.92 (0.55, 1.55)
<i>Sinus problems</i>	24 (12)	24 (14)	0.85 (0.50, 1.45)
<i>Eye or vision problems</i>	23 (11)	22 (13)	0.89 (0.51, 1.53)
<i>Ear infection</i>	22 (11)	20 (12)	0.94 (0.53, 1.66)
<i>Migraine</i>	20 (9.7)	20 (11)	0.86 (0.48, 1.54)
<i>Any other kind of cancer</i>	17 (8.5)	19 (11)	0.77 (0.41, 1.43)
<i>High blood pressure</i>	14 (6.8)	18 (10)	0.66 (0.34, 1.30)
<i>Bowel disorder</i>	15 (7.3)	16 (9.2)	0.79 (0.40, 1.56)
<i>Bronchitis</i>	18 (8.7)	13 (7.4)	1.18 (0.60, 2.35)
<i>Other skin cancer</i>	16 (7.9)	14 (8.1)	0.97 (0.49, 1.93)

Hospitalisations

243. Table 5.9 shows that the number of hospital admissions in the last 12 months did not differ between the veteran and comparison groups ($\chi^2_{(1)} = 0.002$, $p = 0.96$). Table 5.10 shows the reported reasons for the hospitalisations. The most common reason for hospitalisation in both groups was for a surgical procedure. Percentages were similar for the Solomon Islands veterans and the comparison group. Back injuries were the second highest reason for hospitalisation in Solomon Islands veterans, although this condition was ranked fifth highest for hospitalisation in the comparison group.

Table 5.9: Hospitalisations in the last 12 months

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons</i> <i>n (%)</i>
<i>No</i>	170 (75)	147 (71)
<i>Yes</i>	27 (12)	23 (11)
<i>Missing</i>	30 (13)	38 (18)
<i>Total</i>	227	208

Table 5.10: Reason for hospitalisation

<i>Reason for hospitalisation</i>	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>Surgery</i>	15 (6.6)	13 (6.3)
<i>Back injury</i>	5 (2.2)	1 (0.5)
<i>Gout</i>	4 (1.8)	0 (0)
<i>Infection</i>	1 (0.4)	2 (1.0)
<i>Depression/Anxiety</i>	0 (0)	3 (1.4)
<i>Others</i>	7 (3.1)	7 (3.4)
<i>Total</i>	32 (14)	26 (13)

Based on 227 SI veterans and 208 comparisons- more than one hospitalisation per person was possible.

Medications

244. Table 5.11 shows the number and percentage of participants reporting use of any medications - one in four (25.6%) Solomon Islands veterans and slightly more comparison participants (29.8%) - but this difference was not significant ($\chi^2_{(1)} = 1.63$, $p = 0.20$). There was a 15% non-response to this question.

Table 5.11: Frequency of Medication use

	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>No</i>	138 (61)	111 (53)
<i>Yes</i>	58 (26)	62 (30)
<i>Missing</i>	31 (14)	35 (17)
<i>Total</i>	227	208

245. Table 5.12 displays the most frequent names of the medications listed by participants when asked the question: "Are you currently taking any medicines including tablets, creams, inhalers, or other drug?". The most frequently used medications were Glucosamine and vitamins of various types. Half of the 12 most commonly used medications related to pain relief and joint conditions. Other medications included drugs used to treat high cholesterol and insomnia.

Table 5.12: Most frequent Medications named (combined for SI veterans and comparisons)

<i>Medication</i>	<i>Frequency</i>
<i>Glucosamine</i>	10
<i>Single component analgesic (e.g. paracetamol)</i>	8
<i>Vitamins (various)</i>	8
<i>Ventolin</i>	6
<i>Voltaren</i>	6
<i>Birth control pill</i>	5
<i>Combined analgesic (e.g. Panadeine Forte)</i>	5
<i>Ibuprofen (bugesic, nurofen)</i>	4
<i>Osteoease</i>	4
<i>Lipatol</i>	4
<i>Diprosone</i>	3
<i>Naprosan</i>	3

Body Mass Index (BMI)

246. BMI score was calculated from reported height and weight. Table 5.13 shows that using standard BMI categories, only 31% of the Solomon Islands veterans and 23% of the comparison group were in the healthy weight range. Data were missing for 17% of the sample. However, caution should be used when interpreting BMI findings as the suitability of these current population-based BMI categories for muscular males is questionable. Using the categories <24.9, 25-29.9 and 30+, there was no significant difference in the distribution of BMI groups between the SI veterans and comparisons ($\chi^2_{(2)} = 1.98, p = 0.37$).

Table 5.13: BMI distribution

<i>BMI</i>	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
Less than 18.5	0 (0)	2 (1.0)
18.5 – 24.9	71 (31)	47 (23)
25-29.9	99 (44)	95 (46)
30+	26 (12)	22 (11)
Missing	31 (14)	42 (20)
Total	227	208

>18.5 = *underweight*

18.5-24.9 = *healthy weight range*

25-29.9 = *overweight*

30+ = *obese*

247. Table 5.14 shows BMI scores according to Service. There was a greater proportion of Army than Navy or RAAF personnel in the healthy weight category, however this was not statistically significant ($\chi^2_{(4)} = 6.62, p = 0.16$).

Table 5.14: BMI categories by Service

<i>BMI</i>	<i>NAVY</i> <i>n (%)</i>	<i>ARMY</i> <i>n (%)</i>	<i>RAAF</i> <i>n (%)</i>
<i>Less than 18.5</i>	1 (1.0)	1 (0.4)	0 (0)
<i>18.5 – 24.9</i>	25 (25)	76 (30)	17 (22)
<i>25-29.9</i>	51 (51)	100 (39)	43 (55)
<i>30+</i>	8 (7.9)	30 (12)	10 (13)
<i>Missing</i>	16 (16)	49 (19)	8 (10)
<i>Total</i>	85	207	70

>18.5 = underweight

18.5-24.9 = healthy weight range

25-29.9 = overweight

30+ = obese

Health Risk Behaviours

Alcohol Use Disorders Identification Test (AUDIT)

248. The AUDIT score for alcohol consumption risk was similar in both groups with the exception of those with an AUDIT score of 8-15 (Category 2: Consuming alcohol in excess of low risk guidelines). Nearly 28% of Solomon Islands veterans were in this category compared with slightly fewer than 20% of the comparison group. After collapsing the 16-19 and the 20 + groups (due to small numbers), there was no statistically significant difference between the two groups ($\chi^2_{(2)} = 2.61, p = 0.27$). This information is displayed in Table 5.15. Table 5.16 shows that the mean, median scores and quartile scores for alcohol consumption risk were similar for both groups (Mann-Whitney U-test $z = -1.54, p = 0.12$).

Table 5.15: Frequency of categorised AUDIT scores

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons</i> <i>n (%)</i>
<i>Category 1 (0 – 7)</i>	146 (64)	124 (61)
<i>Category 2 (8 – 15)</i>	45 (20)	40 (19)
<i>Category 3 (16 – 19)</i>	4 (1.8)	7 (3.4)
<i>Category 4 (20 – 40)</i>	3 (1.3)	6 (2.9)
<i>Missing</i>	29 (13)	29 (14)
<i>Total</i>	227	208

Category 1 (0-7) = low risk drinker

Category 2 (8-15) = consuming alcohol in excess of low risk guidelines

Category 3 (16-19) = hazardous or harmful levels of alcohol consumption

Category 4 (>19) = high risk of alcohol-related harm

Table 5.16: Summary statistics for total AUDIT scores by exposure group

	<i>SI veterans</i>	<i>Comparisons</i>
<i>N</i>	198	179
<i>Mean</i>	6.20	5.94
<i>Std Dev</i>	4.53	5.10
<i>Median</i>	5	5
<i>Lower Quartile</i>	4	3
<i>Upper Quartile</i>	8	8

249. Table 5.17 shows the proportion of participants in each category of the AUDIT by Service. RAAF had the largest percentage in the ‘low risk category’ although the chi-squared test only indicated a borderline difference in AUDIT categories between the services (using the category 16 + because of small numbers in the 20 + category, $\chi^2_{(4)} = 9.1$, $p = 0.06$).

Table 5.17: Frequency of categorised AUDIT scores by Service

	<i>NAVY</i> <i>n (%)</i>	<i>ARMY</i> <i>n (%)</i>	<i>RAAF</i> <i>n (%)</i>
<i>Category 1 (0 – 7)</i>	58 (57)	156 (61)	58 (74)
<i>Category 2 (8 – 15)</i>	27 (27)	50 (20)	8 (10)
<i>Category 3 (16 – 19)</i>	5 (5.0)	5 (2.0)	1 (1.3)
<i>Category 4 (20 – 40)</i>	1 (1.0)	7 (2.7)	1 (1.3)
<i>Missing</i>	10 (9.9)	38 (15)	10 (13)
<i>Total</i>	101	256	78

Category 1 (0-7) = low risk drinker

Category 2 (8-15) = consuming alcohol in excess of low risk guidelines

Category 3 (16-19) = hazardous or harmful levels of alcohol consumption

Category 4 (>19) = high risk of alcohol-related harm

Smoking

250. Data in Table 5.18 summarise several questions on smoking. Using methodology from the Australian Gulf War Study, ‘Current smokers’ had smoked at least 100 cigarettes in their lifetime and currently smoked at least one cigarette per day, ‘Former smokers’ had smoked at least 100 cigarettes in their life-time but did not currently smoke at least one cigarette per day and ‘Never/occasional smokers’ had never smoked as much as one cigarette per day. More than 40% of the sample for whom smoking status could be determined were or had been smokers at some time in their lives. There was no significant difference in the distribution of smokers between the exposure groups ($\chi^2 (2) = 3.7, p = 0.16$).

Table 5.18: Smoking status of Solomon Islands veterans and the comparison group

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons</i> <i>n (%)</i>
<i>Current smoker</i>	48 (21)	34 (16)
<i>Former smoker</i>	39 (17)	49 (24)
<i>Never/occasional smoker</i>	120 (53)	104 (50)
<i>Missing</i>	20 (8.8)	21 (10)
<i>Total</i>	227	208

251. Data in Table 5.19 show the proportion of current, former and never smokers in each of the Services. A slightly higher proportion of RAAF personnel have never smoked ($\chi^2 (4) = 9.6, p = 0.05$).

Table 5.19: Proportions of current, former and never smokers by Service

	<i>NAVY</i> <i>n (%)</i>	<i>ARMY</i> <i>n (%)</i>	<i>RAAF</i> <i>n (%)</i>
<i>Current smoker</i>	25 (25)	51 (20)	6 (7.7)
<i>Former smoker</i>	19 (19)	53 (21)	16 (21)
<i>Never/occasional smoker</i>	49 (49)	126 (49)	49 (63)
<i>Missing</i>	8 (7.9)	26 (10)	7 (9.0)
<i>Total</i>	101	256	78

252. Changes in smoking patterns among smokers who have been deployed are shown in Table 5.20. Both the Solomon Islands veterans and the comparison group reported that their smoking increased while on deployment. Members of the comparison group may have deployed on other Operations.

Table 5.20: Smoking patterns before and during deployment

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons*</i> <i>n (%)</i>
<i>Smoked more than usual</i>	55 (24)	40 (19)
<i>Smoked the same amount on deployment</i>	9 (4.0)	9 (4.3)
<i>Smoked less than usual</i>	8 (3.5)	4 (1.9)
<i>Did not smoke on deployment</i>	10 (4.4)	14 (6.7)
<i>Missing</i>	145 (64)	141 (68)
<i>Total</i>	227	208

* Comparison group members did not deploy on Operation ANODE but may have deployed on other operations.

Psychological Measures

PCL-C

253. Table 5.21 shows the PCL-C scores for both participant groups. Highlighted in the table are three alternative screening cut-off scores. As discussed in Chapter 4, different cut-offs for screening have been suggested by different researchers (Dobie et al., 2002; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002). There were no notable differences in the percentage of either Solomon Island veterans or the comparison group at any of the cut-off points. A cut-off option of 30 was chosen for statistical comparisons of the proportions of participants in any group, as it represents high sensitivity for the scale. There were no statistical differences in the proportions of participants in any group ($\chi^2_{(1)} = 0.01$, $p = 0.92$). Table 5.21 also shows that a relatively small percentage scored above the cut-off of 50 points which is commonly used by the ADF (PCL-C min = 17, max = 85). Summary data for each of the individual questions are available in Appendix 5.5.

Table 5.21: PCL-C scores according to exposure group

PCL-C Score	<i>SI veterans</i>		<i>Comparisons</i>		
	<i>n (%)</i>	<i>Cumulative %</i>	<i>n (%)</i>	<i>Cumulative %</i>	
17	53 (23)	23	42 (20)	20	
18	14(6.2)	30	18 (8.7)	29	
19	8 (3.5)	33	14 (6.7)	36	
20	13 (5.7)	39	9 (4.3)	40	
21	14 (6.2)	45	11 (5.3)	45	
22	12 (5.3)	50	8 (3.8)	49	
23	9 (4.0)	54	6 (2.9)	52	
24	7 (3.1)	57	10 (4.8)	57	
25	4 (1.8)	59	2 (1.0)	58	
26	4 (1.8)	61	7 (3.4)	61	
27	9 (4.0)	65	5 (2.4)	64	
Cut-off option 1	28	1 (0.4)	65	4 (1.9)	65
	29	4 (1.8)	67	2 (1.0)	66
	30	4 (1.8)	69	2 (1.0)	67
	31	7 (3.1)	72	1 (0.5)	68
	32	1 (0.4)	72	1 (0.5)	68
	33	4 (1.8)	74	3 (1.4)	70
	34	2 (0.9)	75	5 (2.4)	72
	35	3 (1.3)	76	3 (1.4)	74
	36	5 (2.2)	79	4 (1.9)	76
	37	3 (1.3)	80	4 (1.9)	77
Cut-off option 2	38	0 (0)	80	3 (1.4)	79
	39	1 (0.4)	80	1 (0.5)	79
	41	0 (0)	80	2 (1.0)	80
	43	2 (0.9)	81	1 (0.5)	81
	44	0 (0)	81	1 (0.5)	81
	45	1 (0.4)	82	0 (0)	81
	46	1 (0.4)	82	1 (0.5)	82
Cut-off option 3	48	0 (0)	82	1 (0.5)	82
	49	0 (0)	82	2 (1.0)	83
	51	2 (0.9)	83	0 (0)	83
	52	0 (0)	83	1 (0.5)	84
	54	1 (0.4)	83	1 (0.5)	84
	55	1 (0.4)	84	0 (0)	84
	56	1 (0.4)	84	0 (0)	84
	60	0 (0)	84	1 (0.5)	85
	61	2 (0.9)	85	0 (0)	85
	62	0 (0)	85	1 (0.5)	85
	63	1 (0.4)	85	0 (0)	85
	65	0 (0)	85	1 (0.5)	86
	74	1 (0.4)	86	0 (0)	86
Missing	32 (14)		30 (14)		
Total	227	100	208	100	

254. Table 5.22 shows the proportions of participants scoring at or above and below score 40 on the PCL-C by Service group. There were no statistical differences between the services ($\chi^2_{(2)} = 4.6, p = 0.10$).

Table 5.22: PLC-C score below and above 40 according to Service group

<i>Categorised PCL-C Score</i>	<i>NAVY n (%)</i>	<i>ARMY n (%)</i>	<i>RAAF n (%)</i>
<i>PCL-C 17-29</i>	68 (67)	162 (63)	60 (76)
<i>PCL-C 30-85</i>	19 (19)	55 (21)	9 (12)
<i>Missing</i>	14 (14)	39 (15)	9 (12)
<i>Total</i>	101	256	78

Kessler Psychological Distress Scale – 10

255. Table 5.23 shows the frequency participants in each category of the K10. Similar proportions of SI veterans and the comparison group were in each category ($\chi^2_{(2)} = 1.15, p = 0.56$). However, it should be noted that over one third of the sample were in the medium or high categories for psychological distress and those in the medium category may be considered ‘at risk’ for having negative psychological outcomes.

Table 5.23: Frequency of K10 levels by exposure group

<i>Level of psychological distress</i>	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>10-15 Low-level of psychological distress</i>	123 (54)	95 (46)
<i>16-29 Medium-level of psychological distress</i>	75 (33)	66 (32)
<i>30-50 High-level of psychological distress</i>	8 (3.5)	10 (4.8)
<i>Missing</i>	21 (9.3)	37 (18)
<i>Total</i>	227	208

256. Table 5.24 show the same information for the Solomon Islands veteran and comparison groups combined and categorised by Service. The RAAF have the highest proportion of people in the low distress category. However, these data should be interpreted cautiously due to the comparatively smaller total from the RAAF Service (collapsing 16-29 and 30-50 categories due to small numbers, $\chi^2_{(2)} = 5.69, p = 0.06$).

Table 5.24: Frequency of each K-10 level by Service group

<i>Level of psychological distress</i>	<i>NAVY n (%)</i>	<i>ARMY n (%)</i>	<i>RAAF n (%)</i>
<i>10-15 Low-level of psychological distress</i>	57 (56)	113 (44)	48 (62)
<i>16-29 Medium-level of psychological distress</i>	28 (28)	87 (34)	26 (33)
<i>30-50 High-level of psychological distress</i>	3 (3.0)	15 (5.9)	0 (0)
<i>Missing</i>	13 (13)	41 (16)	4 (5.1)
<i>Total</i>	101	256	78

Oral Health

257. Table 5.25 shows the distribution data for the Solomon Islands veterans and comparison group on the OHIP. Overall it would appear that most participants have good oral health (low scores are indicative of good oral health). The mean scores were similar between the exposure groups (Mann Whitney U-test $z = 1.55$ $p = 0.12$).

Table 5.25: Summary data for OHIP scores by exposure group

	<i>SI veterans</i>	<i>Comparisons</i>
<i>N</i>	186	155
<i>Mean</i>	2.68	2.91
<i>Std Dev</i>	6.30	4.68
<i>Median</i>	1.00	1.00
<i>Lower Quartile</i>	0.00	0.00
<i>Upper Quartile</i>	3.00	4.00

Reproductive Health

258. Table 5.26 shows that the percentages of pregnancies that had resulted in miscarriages or stillbirths was similar for both groups ($\chi^2_{(1)} = 0.49$, $p = 0.48$).

Table 5.26: Proportion of pregnancies resulting in miscarriage or stillbirth by exposure group

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons</i> <i>n (%)</i>
<i>No Miscarriage or still birth</i>	77 (34)	83 (40)
<i>Miscarriage or still birth</i>	23 (10)	20 (9.6)
<i>Missing</i>	127 (56)	105 (50.5)
<i>Total</i>	227	208

259. Table 5.27 shows that the percentages of birth defects were similar for the Solomon Islands veteran and comparison groups ($\chi^2_{(1)} = 0.58$, $p = 0.45$). There is also no real difference between the groups in the reported rates of chromosomal abnormalities shown in Table 5.28 (Fisher's exact test, $p = 0.68$).

Table 5.27: Proportion of pregnancies with birth defects according to exposure group

	<i>SI veterans</i> <i>n (%)</i>	<i>Comparisons</i> <i>n (%)</i>
<i>No birth defect</i>	90 (40)	97 (47)
<i>Birth defect</i>	13 (5.7)	10 (4.8)
<i>Missing</i>	124 (55)	101 (49)
<i>Total</i>	227	208

Table 5.28: Proportions of pregnancies resulting in chromosomal abnormalities according to exposure group

	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>No chromosomal abnormality</i>	100 (44)	105 (51)
<i>Chromosomal abnormality</i>	3 (1.3)	2 (1.0)
<i>Missing</i>	124 (55)	101 (49)
<i>Total</i>	227	208

260. Additionally, six (2.6%) Solomon Islands veterans and nine (4.3%) participants in the comparison group reported they had a child who had died, had cancer or other serious health problem. Thirteen (5.7%) Solomon Islands veterans and 14 (6.7%) participants from the comparison group indicated that they or their partners had been unable to get pregnant after trying for 12 months.

Background Details

261. Over 80% of the participants were born in Australia. A further 10% did not respond to this question and the remaining participants were born in the United Kingdom (12), New Zealand (5), Malaysia (3), and a variety of other countries (6).

262. Table 5.29 shows marital status, Table 5.30 educational qualifications and Table 5.31 the hours worked by participants. More than half of all participants were currently married or in a defacto relationship and relatively few respondents were divorced or separated. Approximately half of all participants had completed some formal education after leaving school and most people worked on average between 40 and 50 hours per week.

Table 5.29: Marital status by exposure group

	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>Married or defacto relationship</i>	121 (53)	128 (62)
<i>Divorced or separated</i>	8 (3.5)	7 (3.4)
<i>Single, never married</i>	50 (22)	27 (13)
<i>Other</i>	4 (1.8)	2 (1.0)
<i>Missing</i>	44 (19)	44 (21)
<i>Total</i>	227	208

Table 5.30: Educational level by exposure group

<i>Educational Level</i>	<i>SI veterans n (%)</i>	<i>Comparisons n (%)</i>
<i>Post-graduate qualification</i>	29 (13)	22 (11)
<i>Bachelor degree</i>	12 (5.3)	15 (7.2)
<i>Diploma (associate, undergraduate)</i>	28 (12)	26 (13)
<i>Certificate (trade, apprenticeship, technicians etc)</i>	51 (23)	35 (17)
<i>Secondary school grades 11-12</i>	50 (22)	62 (30)
<i>Secondary school up to grade 10</i>	22 (9.7)	17 (8.2)
<i>Other</i>	1 (0.4)	1 (0.5)
<i>Missing</i>	34 (15)	30 (14)
<i>Total</i>	227	208

Table 5.31: Summary statistics for hours worked by exposure group

	<i>SI veterans</i>	<i>Comparisons</i>
<i>N</i>	190	166
<i>Mean</i>	44.7	45.5
<i>Std Dev</i>	13.5	16.6
<i>Median</i>	41.0	41.0
<i>Lower Quartile</i>	40.0	40.0
<i>Upper Quartile</i>	50.0	50.0

Solomon Islands Deployment Questionnaire

Deployment Details

263. This questionnaire was provided only to the veterans of the Solomon Islands deployment. There were 228 participants who completed the Deployment Questionnaire; all except one of these participants also completed the Health Questionnaire.

264. One hundred and eighty-six (82%) Solomon Islands veterans were full-time members and 12 (5.3%) were reservists on full-time service. Data were missing for the remainder of the sample (30, 13%).

265. Very few Solomon Islands veterans required a medical waiver in order to deploy: five (2.2%) were given medical waivers, four (1.8%) were unsure whether they had received a waiver or not, and data were missing for 30 (13%) participants.

266. Thirteen percent of participants had deployed more than once to the Solomon Islands, as shown in Table 5.32. Three participants in the SI veteran sample ticked that they had not deployed to the Solomon Islands. Deployment details for participants in the Solomon Islands veterans sample were established through multiple sources (see Annex B). However, it is plausible that while the sources indicate that an individual officially deployed, participants may have believed that they did not deploy for enough time or under such conditions or circumstances as to define it as a deployment. Alternatively it is possible that there was an error in one of the data sources. This could occur for example if an individual was scheduled for deployment but was withdrawn immediately prior to departure.

Table 5.32: Number of Deployments to the Solomon Islands (SI veterans)

<i>Number of Deployments to Solomon Islands</i>	<i>n (%)</i>
<i>Nil</i>	3 (1.6)
<i>One</i>	156 (84)
<i>Two</i>	18 (9.7)
<i>Three</i>	6 (3.2)
<i>Six</i>	1 (0.5)
<i>Eight</i>	1 (0.5)
<i>Total</i>	185

267. Table 5.33 shows that on average people deployed to the Solomon Islands for a little more than three months. The period of deployment ranged from 7 to 426 days, the number of days included all deployments to the Solomon Islands.

Table 5.33: Summary statistics for total days on deployment to the Solomon Islands

<i>N</i>	196
<i>Mean</i>	103.91
<i>Std</i>	60.37
<i>Median</i>	105.31
<i>Lower Quartile</i>	60.88
<i>Upper Quartile</i>	135.75

268. Approximately half (98) of those who deployed knew the length of their deployment before departure. A similar number (96) did not know the period of deployment. Data were unavailable for 31 participants.

269. Figure 5.2 shows participants' preferred length of deployment to the Solomon Islands, with both three and six months being the most popular choices, as may be expected from normal deployment cycles.

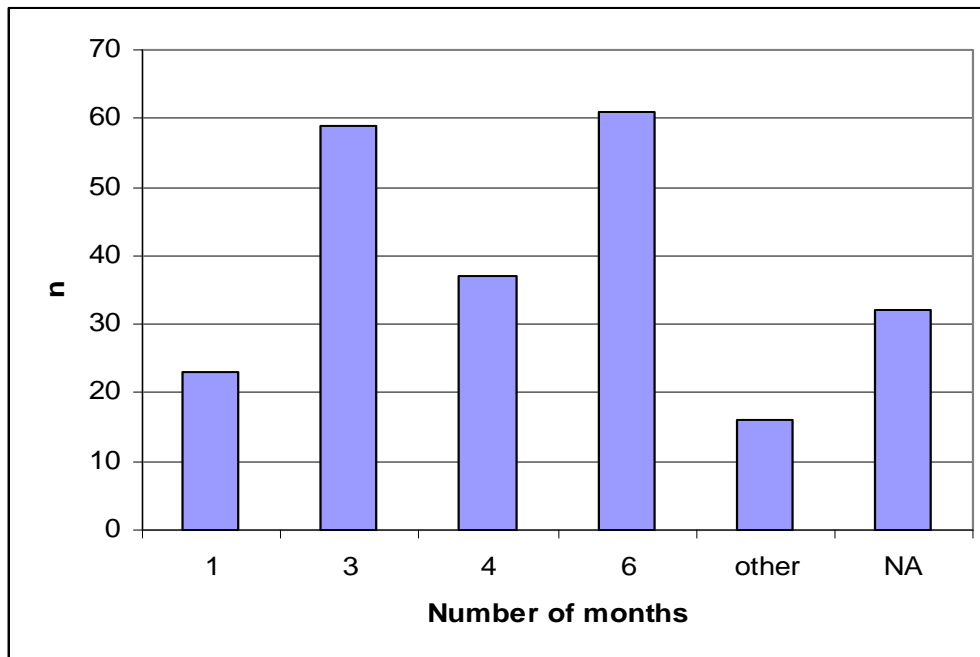


Figure 5.2: Preferred deployment length.

270. Three-quarters of the sample ($n = 175$) reported that they left the Solomon Islands because it was the end of their deployment. Four people had routine postings to another unit, two respondents indicated compassionate reasons for their departure and another two cited return to civilian employment. Eight Solomon Islands veterans gave other reasons for their departure and data were missing for 37 respondents.

Vaccination and medications

271. The number of vaccinations reported by Solomon Islands veterans is shown in Figure 5.3. Although 35 (15%) respondents reported that they had no vaccinations as part of this deployment, 120 (53%) reported between two and four different vaccinations. Data were missing for 49 (22%) respondents.

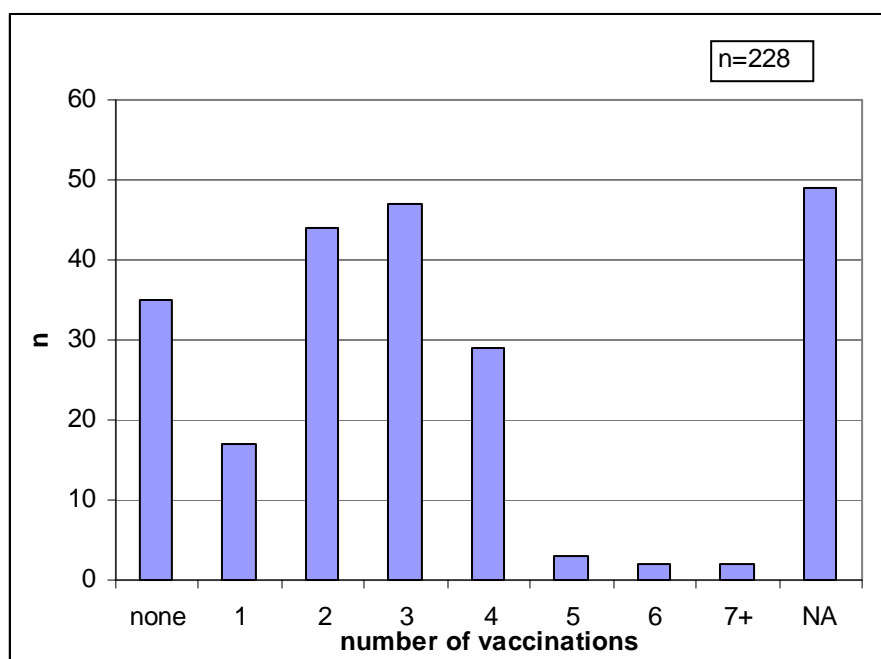


Figure 5.3: Number of reported vaccinations for all deployments to the Solomon Islands

272. Seventeen (7.5%) Solomon Islands veterans reported that they had not taken antimalarial tablets, while 181 (79%) indicated that they had. Doxycycline was the antimalarial drug taken by 161(71%) respondents, with only one person reporting Mefloquine as the drug most often used. Data were missing for 60 (26%) individuals. One hundred and forty-two (62%) participants reported taking Primaquine on their return to Australia.

Chemical and Environmental Exposures

273. The section on Chemical and Environmental exposures began with a list of potential exposures. Participants who believed they had been exposed to a particular contaminant reported the level of exposure (Daily, At least once a week, At least once a month, and Less than monthly). A table with full response details is available in Appendix 5.5. Table 5.34 summarises these data, which are ordered by the most frequent contaminant exposures. The top three were exposures to loud noises, insect bites and pesticides.

Table 5.34: Reported frequency (%) of exposure to chemical and environmental contaminants

<i>During your deployment to the Solomon Islands</i>	<i>No</i>	<i>Don't know</i>	<i>Yes</i>	<i>Missing</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
<i>Were you close to loud noises?</i>	43 (19)	4 (1.8)	151 (66)	30 (13)
<i>Were you bitten by flies, sand flies, fleas, mosquitoes or other insects?</i>	32 (14)	16 (7.0)	151 (66)	29 (13)
<i>Did you live or work in an area that had been recently sprayed or fogged with a pesticide?</i>	41 (18)	20 (8.8)	136 (60)	31 (14)
<i>Did you eat locally sourced food?</i>	44 (19)	21 (9.2)	131 (57)	32 (14)
<i>Did you swim or bathe in local lakes, rivers or the sea?</i>	69 (30)	3 (1.3)	125 (55)	31 (14)
<i>Was your clothing or uniforms treated with pesticides (e.g. permethrin)?</i>	61 (27)	21 (9.2)	116 (51)	30 (13)
<i>Did you do any refuelling?</i>	92 (40)	1 (0.4)	105 (46)	30 (13)
<i>Did you use solvents/degreasing agents, e.g. from cleaning, painting or hand washing?</i>	89 (39)	5 (2.2)	103 (45)	31 (14)
<i>Was your tent or mosquito net treated with pesticides?</i>	72 (32)	22 (9.7)	103 (45)	31 (14)
<i>Were you exposed to engine exhaust so that it irritated your eyes?</i>	103 (45)	8 (3.5)	87 (38)	30 (13)
<i>Did you enter buildings or areas that might have contained asbestos?</i>	33 (14)	84 (37)	82 (36)	29 (13)
<i>Did you use high pressure sprayers?</i>	135 (59)	7 (3.1)	56 (25)	30 (13)
<i>Were you exposed to intense smoke e.g. from forest fires or burning oil?</i>	138 (61)	10 (4.4)	49 (21)	31 (14)
<i>Was your sleeping bag (Bivi bag) treated with pesticides?</i>	138 (61)	12 (5.3)	43 (19)	35 (15)
<i>Were you exposed to dust storms?</i>	154 (68)	15 (6.6)	30 (13)	29 (13)
<i>Were you involved in the cleanup of any chemicals?</i>	158 (69)	10 (4.4)	30 (13)	30 (13)
<i>Were you stung or bitten by spiders, scorpions or other "bugs"?</i>	146 (64)	30 (13)	21 (9.2)	31 (14)
<i>Did you drink water from local taps or wells?</i>	169 (74)	10 (4.4)	20 (8.8)	29 (12.7)
<i>Were you in contact with or did you use heavy metals such as lead paints and mercury?</i>	120 (53)	60 (26)	18 (7.9)	30 (13)
<i>Did you shower in water with fuel in it (evident by visible oil film, smell or stinging eyes)?</i>	155 (68)	38 (17)	6 (2.6)	29 (13)

274. Table 5.35 shows the number of those who deployed who reported using a personal insect repellent. Table 5.36 describes the frequency of usage according to the type of repellents used. Most participants who responded to these items appeared to use some form of repellent daily.

Table 5.35: Percentage of participants using an insect repellent

	<i>n (%)</i>
<i>No</i>	30 (13)
<i>Yes</i>	160 (71)
<i>Don't know</i>	5 (2.2)
<i>Missing</i>	33 (15)
<i>Total</i>	228

Table 5.36: Insect repellent usage by issue type

	<i>ADF issue repellent n (%)</i>	<i>Commercial product issued n (%)</i>	<i>Non-ADF military issue repellent n (%)</i>	<i>Your own repellent n (%)</i>
<i>No</i>	48 (21)	66 (29)	67 (29)	67 (29)
<i>Don't know</i>	4 (1.8)	7 (3.1)	6 (2.6)	6 (2.6)
<i>Daily</i>	50 (22)	42 (19)	27 (12)	27 (12)
<i>At least once a week</i>	26 (11)	10 (4.4)	16 (7.0)	16 (7.0)
<i>At least once a month</i>	7 (3.1)	1 (0.4)	1 (0.4)	1 (0.4)
<i>Less than monthly</i>	4 (1.8)	0 (0)	1 (0.4)	1 (0.4)
<i>Missing</i>	89 (39)	102 (45)	110 (48)	110 (48)
<i>Total</i>	228	228	228	228

275. Table 5.37 shows that the majority of people did not apply pesticides by spraying fogging or laying bait.

Table 5.37: Application of other pesticides - excluding use of other repellents

<i>Pesticides</i>	<i>n (%)</i>
<i>No</i>	168 (74)
<i>Yes</i>	24 (11)
<i>Don't know</i>	6 (2.6)
<i>Missing</i>	30 (13)
<i>Total</i>	228

Deployment Experience

276. In the first question in the Deployment Experience section Solomon Islands veterans were asked to rate the level of morale in their unit during the deployment. As may be seen from Table 5.38 the majority of respondents rated morale as average or above.

Table 5.38: Level of morale in section

	<i>n (%)</i>
<i>Very low</i>	7 (3.1)
<i>Low</i>	18 (7.9)
<i>Average</i>	75 (33)
<i>High</i>	78 (34)
<i>Very high</i>	18 (7.9)
<i>Missing</i>	32 (14)
<i>Total</i>	228

277. Table 5.39 shows Solomon Islands veterans' ratings of their deployment experience in the Solomon Islands. While almost 10% of participants rated their experience negatively, the majority believed they had a positive deployment.

Table 5.39: Rating of deployment experience

	<i>n (%)</i>
<i>Very negative</i>	5 (2.2)
<i>Negative</i>	17 (7.5)
<i>Neither Negative or Positive</i>	31 (14)
<i>Positive</i>	93 (41)
<i>Very Positive</i>	51 (22)
<i>Missing</i>	31 (14)
<i>Total</i>	228

278. Tables 5.40 to 5.42 summarise the scores on the Traumatic Stress Exposure Scale – Revised (TSES-R). The mean level of exposure was quite low, participants were not, on average, greatly affected by it at the time, and most were not affected by the events at the time of the survey.

Table 5.40: Summary of TSES-R 1 scores (How often did you experience the event? Never to Very Often)

<i>Total TSES-R 1*</i>	<i>N</i>	
		187
	<i>Mean</i>	2.63
	<i>SD</i>	3.26
	<i>Median</i>	2
	<i>Lower Quartile</i>	0
	<i>Upper Quartile</i>	4
	<i>Min</i>	0
	<i>Max</i>	18

*Total scores range from 0 to 60

Table 5.41: Summary of TSES-R 2 scores (How did it affect you at the time? Not at all to A great deal)

<i>Total TSES-R 2*</i>	<i>N</i>	
		177
	<i>Mean</i>	1.69
	<i>SD</i>	2.63
	<i>Median</i>	0
	<i>Q1</i>	0
	<i>Q3</i>	3
	<i>Min</i>	0
	<i>Max</i>	13

*Total scores range from 0 to 36

Table 5.42: Summary of TSES-R 3 (How does it affect you now? Not at all to A great deal)

<i>Total TSES-R 3*</i>	<i>N</i>	
		178
	<i>Mean</i>	0.78
	<i>SD</i>	2.17
	<i>Median</i>	0
	<i>Q1</i>	0
	<i>Q3</i>	0
	<i>Min</i>	0
	<i>Max</i>	18

*Total scores range from 0 to 36

279. Tables 5.43 and 5.44 summarise the factors that those deploying to the Solomon Islands found to be stressful. Over 70% of those responding that double standards

caused them stress and over 60% reporting that separation from family and friends was stressful.

Table 5.43: Major stressors - 5 most common

Stressor	n (%)	Total N
Double standards	136 (70)	193
Separation from family or friends	119 (62)	191
Leadership	115(60)	193
Behavior of others	113(59)	192
Australian military hierarchy	112(58)	193
Sorting out problems at home	112 (58)	193*

*NB – The sixth item in this table was in equal fifth place

Table 5.44: Five highest mean stressor scores

Stressor	Mean stress score	Standard Deviation
Double standards	2.47	1.31
Leadership	2.12	1.19
Australian military hierarchy	2.03	1.12
Deployment rules and regulations	1.93	1.09
Sorting out problems at home	1.93	0.98

280. Tables 5.45 to 5.47 below present the top five most frequent stressors by Service group. A comparison of the data demonstrates that while each service is bothered by similar issues, there are distinct service differences. For instance, Double Standards was the most common stressor for the Army, not a top 5 stressor for the Navy and the fourth most common stressor for RAAF participants.

Table 5.45: Major stressors - 5 most common - NAVY

Stressor	n (%)	Total N
Separation from family or friends	27 (64)	42
Behavior of others	25 (60)	42
Living and working with the same people	25 (60)	42
Overload of work	25 (60)	42
Sorting out problems at home	24 (57)	42

Table 5.46: Major Stressors - 5 most common - ARMY

Stressor	n (%)	Total
Double Standards	90 (82)	110
Leadership	74 (67)	110
Australian military hierarchy	70 (64)	110
Deployment rules and regulations	68 (62)	110
Separation from family or friends	65 (60)	108

Table 5.47: Major Stressors - 5 most common - RAAF

Stressor	n (%)	Total
Sorting out problems at home	27 (64)	42
Separation from family or friends	27 (64)	42
Living Conditions	25 (61)	41
Double Standards	24 (59)	41
Behavior of others	24 (59)	41
Isolation from Australia	24 (59)	41

Discussion

Data collection

281. Participation in the Solomon Islands Health Study questionnaire exceeded early expectations, reaching 44%. Response was higher among certain groups (older participants, serving and regular personnel), which accords with both expectations and other similar research. During the process of data collection several logistical hurdles were overcome. Key issues raised in the Self-Reported Data Collection Stage Report (see Annex F) are highlighted immediately below.

282. Initial mail out contact with participants was problematic. During follow-up, many potential participants requested information, including consent and information packages, to be emailed to them. Protocols for the Solomon Islands Health Study required that a hard copy of the consent form be obtained. Completing the questionnaire online was the preferred choice of most participants. However, as these participants could not also consent online, often significant effort was required to complete the consent process with these participants. This process has been improved for the Bougainville and East Timor Health Studies by allowing respondents to consent online.

283. Contacting ex-serving personnel was problematic. Defence is amongst Australia's most mobile population. The Solomon Islands Health Study experience showed that, particularly for ex-serving members, an individual's last known address did not necessarily bear any relationship to the State in which they were now living. Considerable effort and resources were required to trace these participants. Increasing the time available for data collection to allow for these follow-up and tracking processes could potentially improve participation rates.

Questionnaire analysis – Health Questionnaire

284. The most consistent finding across all aspects of the questionnaire was that there was no difference in outcomes between the Solomon Islands veterans and the comparison group. There are several plausible explanations for this finding.

285. First, those deploying to the Solomon Islands on average suffered no ill consequences as a result of their deployment.

286. Second, there may not have been sufficient power in the statistical tests to detect any true difference. However, comparison of the effect sizes reported for these comparisons demonstrates that in most cases the difference between the groups was too small and unlikely to be of clinical or other importance.

287. Third, members of the Australian Defence Force who are eligible to deploy overseas are, by definition, fit and healthy. Consequently, any deterioration in their health may be relatively small.

288. Fourth, the time from deployment to the Solomon Islands to the date of data collection is relatively short. Therefore, there may not have been sufficient time for any negative outcomes to manifest.

289. Fifth, the Solomon Islands deployment was a peacekeeping operation and perhaps, in comparison with other deployments, relatively low risk.

290. The comparison group consists of people who have not deployed on Operation ANODE during this particular time period but may have had other deployments that have affected them. Similarly, the Solomon Islands veterans may have deployed elsewhere. Consequently, the effects of the Solomon Islands deployment over and above other deployments may be minimal.

291. In response to the symptom checklist, a large number of participants reported a variety of symptoms, the most common being fatigue, lack of sleep, sleeping difficulties and headaches. It is possible that the prevalence of symptoms is comparatively higher due to the current operational tempo of the Australian Defence Force.

292. A high proportion of participants were found to be overweight or obese according to the BMI scale, which measures height and weight. However, because muscle weighs more than fat, well-muscled people tend to have a relatively higher BMI score. Therefore BMI is not necessarily the most reliable indicator of a weight problem. More reliable measures such as the waist hip ratio require specific measurement by a trained operator.

293. The proportion of participants reporting high levels of alcohol consumption was relatively small. More than half of all participants were low risk drinkers.

294. More than half of the sample had never smoked or were only occasional smokers. Those who did smoke and had deployed appeared to smoke more while on deployment. Again, this observation should be interpreted cautiously as the question was ambiguous, resulting in a large number of participants being unable to complete the question. There was a large amount of missing data. This may have occurred for two reasons: the respondent had never smoked (Solomon Islands veterans and comparison group), or, had never been deployed (comparison group).

295. There were no differences between those who had deployed to the Solomon Islands and the comparison group in psychological and mental health outcomes. On

average the levels of distress (K-10) and scores on the PCL-C were relatively low. More than one third of all participants were at some risk for having negative psychological outcomes as they were in the medium or high categories for psychological distress, but only 4% fell into the high range. This finding suggests the need for strategies to identify and manage mental health issues, and that this is not necessarily confined to deployed personnel only.

Questionnaire analysis – Deployment Questionnaire

296. Most who deployed to the Solomon Islands were deploying to that location for the first time, they deployed on average for just over 100 days, and left when their deployment finished.

297. Most deploying were vaccinated before departure, took Doxycycline as an antimalarial drug, were exposed to loud noises, insect bites and pesticides, and used personal insect repellents.

298. The majority found their deployment to be a positive experience and rated the morale in their section as average or above. Some, though not many, experienced traumatic events while on deployment.

299. The most common stressors experienced by those deploying were double standards (a number specifically mentioning inequalities amongst various forces), separation from family and friends and leadership.

300. The most common stressors were perceived slightly differently by members of the different Services: Navy personnel finding separation from family and friends the most difficult, for Army double standards, and RAAF sorting out problems at home were the most difficult.

301. Comparable data on stressors were not available for the comparison group but the types of common stressors identified are not all specific to deployment situations and could be more generic military stressors. For example, separation from family is not specific to deployment, particularly in the Navy.

Questionnaire content

302. Other general observations include that some questions appeared to be more problematic than others for participants to complete. Not all participants completed the entire questionnaire and consequent issues with unavailable data may be reduced by shortening the questionnaire in future.

303. In particular, the following sections were problematic either for the participants or in the analysis and interpretation of the results:

- a. Smoking section – it was clear that it was difficult for participants to complete this section as appropriate skip patterns were not always followed. Further, the data were difficult to analyse and do not conform to the standard questions on the use of tobacco among adults as described in the National Health Data Dictionary (Australian Institute of Health and Welfare).
- b. The Oral Health section was long and most people reported few oral health problems.
- c. The Reproductive Health section was long and detailed but produced relatively little useable data.

- d. Various demographic questions were long and unnecessarily complicated. These included questions on country of birth and language spoken at home.

Comparison between Services for self-report data

304. Comparisons were made on the prevalence of selected risk factors between the Services. Where data were missing they were excluded from the analysis.

305. These data should also be interpreted with caution due to the comparatively smaller total from the RAAF Service.

AUDIT

306. Although it was not significant, RAAF personnel in this study had higher representation in the low risk alcohol consumption category (85%) compared with Army (72%) and Navy (64%).

BMI

307. Although it did not reach a level of significance, there were slightly more Army personnel in the healthy weight range (53%) compared with Navy (36%) and RAAF (27%). However this finding should be interpreted with caution as BMI is affected by muscle mass. Alternative measures of overweight may be more appropriate in this group, who are likely to have more muscle than the general population for which the norms are defined.

Smoking

308. Differences in smoking behaviour between the Services were significant ($\chi^2_{(4)} = 9.6, p = 0.05$). RAAF personnel were less likely to be current smokers (8%) compared with 27% (Navy) and 22% (Army). They were also more likely to have never smoked.

Stress questions

309. There were no differences detected between Services in PCL-C scores <40 and 40 and above.

310. Although it did not reach a level of significance, ($\chi^2_{(2)} = 5.69, p = 0.06$), the K10 data for the Services showed some possible differences. No RAAF personnel reported levels indicating high stress (30-50) and there were fewer Army personnel reporting low level of stress (47%) compared with Navy (65%) and RAAF (64%).

Self-reported health

311. Self-reported health assessments have been found to be a strong predictor of future health care use and mortality that is independent of other behavioural and psychosocial risk factors (Community Indicators Project Team, 2006). Findings for Solomon Islands veterans and the comparison group were similar to those found in a recent survey of the Australian population (Australian Bureau of Statistics, 2007b). Over 80% of respondents reported that their health was good to excellent.

Recommendations

- 5.1. Email approaches to potential participants should be investigated.

- 5.2. The option to consent on the internet should be included in future studies.
- 5.3. Time for data collection should be increased to allow difficult to contact participant, such as ex-serving members, to be reached and respond.
- 5.4. Some parts of the questionnaire were too long. Consideration should be given to reducing the length of the questionnaire particularly in the demographic section.
- 5.5. Alternative questions to examine outcomes relating to Smoking and Reproductive Health should be explored.
- 5.6. The suitability of using the current categories of BMI for fit, muscular males should be questioned since current Defence Force policy allows for some flexibility to accept recruits with BMIs up to 33.
- 5.7. Strategies to identify and manage mental health issues may be needed because of the proportion of the sample at some psychological risk, but such strategies do not need to be targeted only to those who deployed
- 5.8. It is important that future studies maintain the use of these questions to enable comparisons with other groups both within the ADF and with other military and civilian populations. However, in line with Recommendation 5.4, an alternative measure of smoking levels should be investigated.

Chapter 6 – Synthesis of Results and Discussion

Key Findings

- I. There were no statistically significant differences in outcomes between the Solomon Islands veterans and comparison group, although there was inadequate statistical power to detect small differences between groups.
- II. There has only been a short lag time between exposure and outcome assessment, so longer term monitoring is warranted.
- III. There were differences in some measures between Services. While this may reflect differences in exposures and characteristics of individuals across Services, this warrants further investigation.
- IV. BMI and smoking status appear to have good reliability (agreement) between Defence Health data and self-report data, and thus data from either source would be suitable for monitoring of these outcomes.
- V. Alcohol consumption, PCL and K10 demonstrated substantial variation between the different sources of data, with higher risk levels reported in the self-report data relative to the Defence Health data.
- VI. The reliability (repeatability or precision) and validity (accuracy or lack of bias) of Defence data for long term monitoring of these outcomes is of concern especially as they will not be available once personnel leave the ADF. For these measures, we recommend using only self-report data or data from both sources.

Introduction

312. This chapter provides a synthesis of results from the previous chapters, compares results from the same instrument across different data sources, discusses the results in the context of other relevant studies and highlights any issues for consideration in interpretation of results and the use of these data for long term surveillance and monitoring of the health of Defence personnel.

Outcome measures from multiple data sources

313. Five outcome measures are available from more than one data source: the K10; PCL-C; smoking status; BMI and the AUDIT. The data sources for these measures are detailed in Table 6.1.

Table 6.1: Data sources for questions and instruments

	<i>Defence Health data</i>	<i>Defence Psychology data*</i>	<i>Self-report data</i>
<i>K10</i>		√	√
<i>PCL-C</i>		√	√
<i>AUDIT</i>	√	√	√
<i>Smoking</i>	√		√
<i>BMI</i>	√		√

**AUDIT* only available from POPS; *K10* and *PCL* available from RtAPS

314. Table 6.2 provides summary measures for the five outcomes from the applicable data source. It highlights frequencies of responses that fall above a commonly applied cut-off point. It is important to note that the sample size (N) varies for each outcome, and within outcome varies across the three data courses. When comparing data within the table it is also important to note that individuals are not matched across the data sources and hence, there may be different individuals reporting different outcomes.

315. As may be seen from Table 6.2, the percentage of K10 scores above 15 was higher in the self-reported data compared with the Defence Psychology data. Similarly, there was variability in the percentage of AUDIT scores above seven from each of the sources, with the lowest percentage in the Defence Health data and the highest in the Defence Psychology data.

Table 6.2: Data for all individuals from multiple data sources

	<i>Defence Health data</i>		<i>Defence Psychology data*</i>		<i>Self-report data</i>	
	<i>N</i>	<i>n (%)</i>	<i>N</i>	<i>n (%)</i>	<i>N</i>	<i>n (%)</i>
<i>K10 score > 15^a</i>			302	76 (25)	377	159 (42)
<i>PCL-C score > 30^b</i>			302	12 (4)	373	77 (21)
<i>AUDIT score > 7^{c, d}</i>	280	42 (15)	151	53 (35)	377	105 (28)
<i>Smoking – current smokers</i>	506	144 (28)			394	82 (21)
<i>BMI > 24.9^e</i>	574	381 (66)			362	242 (67)

* *Includes only Solomon Islands veterans who additionally consented to linkage of their self-report data with their psychology data as discussed in Chapter 4.*

a K10 score falling into either the medium or high probability of psychological distress categories.

b Low cut-off screening score for PCL

c AUDIT is only available from POPS, consequently the sample size is very small

d alcohol consumption in excess of low risk

e BMI above the healthy weight range category (overweight or obese)

316. Table 6.3 includes a subset of data from the table above. It examines data from Solomon Islands veterans only. Again, differences are noted between self-report, the Defence Health and the Defence Psychology data. Similar to the table above, a higher percentage of AUDIT scores were in categories at or above the “consumption in excess of low risk” category in the self-report data and the psychology data collection

at the POPS. Further, the self-report data also revealed higher levels of psychological distress (K10) and symptoms associated with post traumatic stress (PCL-C) than were found in the Defence Psychology data.

Table 6.3: Data for Solomon Islands veterans only*

	<i>Defence Health Data</i>		<i>Defence Psychology data</i>		<i>Self-report data</i>	
	<i>N</i>	<i>n (%)</i>	<i>N</i>	<i>n (%)</i>	<i>N</i>	<i>n (%)</i>
<i>K10 score > 15^a</i>			302	76 (25)	206	83 (40)
<i>PCL-C score > 30^b</i>			302	12 (4)	195	39 (20)
<i>AUDIT score > 7^{c, d}</i>	145	18 (12)	151	53 (35)	198	52 (26)
<i>Smoking – current smokers</i>	286	78 (27)			207	48 (23)
<i>BMI > 24.9^e</i>	295	191 (65)			196	125 (64)

* Calculations are based on samples where data missing or not available have been excluded.

a K10 score falling into either the medium or high probability of psychological distress categories.

b Low cut-off screening score for PCL

c AUDIT is only available from POPS, consequently the sample size is very small

d Alcohol consumption in excess of low risk

e BMI above the healthy weight range category (overweight or obese)

317. Tables 6.2 and 6.3 above have shown both similarities and differences in outcome measures dependant upon the data source. First, it should be noted that the proportions of people reporting that they are current smokers and/or as having a BMI above the healthy weight range category are stable. However, there are apparent differences in measures of psychological outcomes and alcohol consumption.

318. There are several plausible reasons for these differences:

- a. The differences in the environment in which the data are collected. For example, participants may have felt inclined to be more open in their responses to the self-report questionnaire because they were able to complete it in a more private environment. Further, the fact that the survey was being conducted by an organisation external to the military, CMVH, may also have contributed to greater openness and ‘admissions’ of distress.
- b. Data collected as part of the RtAPS process were, by the location and circumstance of data collection, explicitly linked to the particular deployment. In responding to the self-report questionnaire, this link was more tenuous and participants may have considered issues that caused them distress that occurred outside a military environment.
- c. The variations in the timing of the data collections and the possibility that time (e.g. opportunity for impact to develop) or events since the collection of the Defence owned data, have exacerbated, or mitigated, the outcomes.
- d. The Defence environment may have changed in recent times, for example, an increase in operational tempo may have had an impact on these measures.

- e. Personnel may have deployed to other locations on operations and, either factors on the other deployments, or multiple deployments, may have had an effect.
- f. Some individuals may have changed their status since the Defence data were collected; current outcomes may reflect factors associated with ex-serving rather than serving status.

319. However, what remains unclear from the data presented in the tables above are differences that exist at the level of the individual. Accordingly, the tables and figures below compare outcomes from individuals across the different measures, where consent to linkage has been provided and the measures are equivalent.

320. The data in Tables 6.4 and 6.5 are from Solomon Islands veterans only as the comparison group did not have relevant RtAPS data, as noted in Chapter 4. The kappa statistic reported below is used to assess the agreement adjusted for that expected by chance.

321. Table 6.4 shows that 61% of participants scored in the same K10 category (grey cells) in both the RtAPS and the self-report questionnaire. The blue cells show that 7.5% of participants had recorded a higher category of psychological distress at RtAPS than on the self-report questionnaire. Finally, the yellow cells show that 31% scored in a higher K10 category on the self-report questionnaire than at the RtAPS assessment.

Table 6.4: K10 scores from RtAPS and from the self-report questionnaire.

<i>K10 from SI questionnaire</i>	<i>K10 from RTAPS</i>			<i>Total</i>
	<i>10-15</i>	<i>16-29</i>	<i>30-50</i>	
<i>10-15</i>	35*	6	0	41
<i>16-29</i>	19	14	0	33
<i>30-50</i>	1	5	0	6
<i>Total</i>	55	25	0	80

Percentage agreement (in the grey diagonal) = 61%

Kappa statistic of agreement = 0.25 (values of 0.21- 0.40 reflect fair agreement)

(Bland & Altman, 1986; Brennan & Silman, 1992)

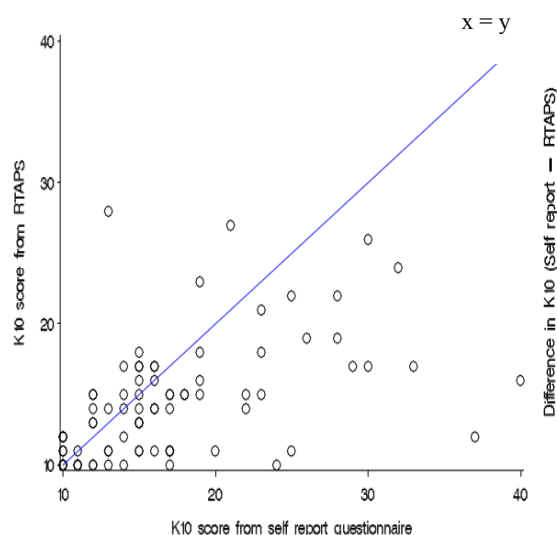


Figure 6.1

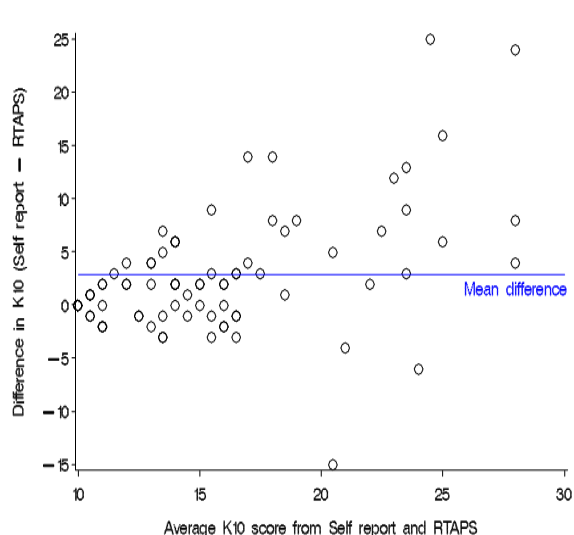


Figure 6.2

Figure 6.1: Scatterplot comparing K10 scores from the self-report questionnaire with those from the RtAPS assessment.

Figure 6.2: Bland-Altman plot of K10 difference by K10 mean score.

322. Figure 6.1 shows the relationship between the K10 scores graphically. There is evidence to suggest that participants tended to score higher levels of psychological distress in the self-report questionnaire than in their RtAPS data. The Bland-Altman plot (Figure 6.2) indicates that people who had a high K10 mean score were more likely to have a larger difference between the two K10 readings. On average personnel scored 2.83 points higher on the self-report version of the K10 than the RtAPS version.

323. Table 6.5 shows that 77% (grey cells) of participants scored in the same PCL-C group on both the RtAPS and the self-report questionnaire. The blue cells show that only one (1.3%) participant had recorded a higher PCL-C category on the self-report questionnaire than at RtAPS. Finally, the yellow cells show that 22% had scored in a higher PCL category on the self-report questionnaire than at the RtAPS.

Table 6.5: PCL-C scores from RtAPS and from the self-report questionnaire.

PCL from SI questionnaire	PCL from RtAPS			Total
	17-29	30-39	40-85	
17-29	56	0	0	56
30-39	11	2	1	14
40-85	3	3	1	7
Total	70	5	2	77

Percentage agreement (in the grey diagonal) = 77%

Kappa statistic of agreement = 0.28 (values of 0.21- 0.40 reflect fair agreement)

(Bland & Altman, 1986; Brennan & Silman, 1992)

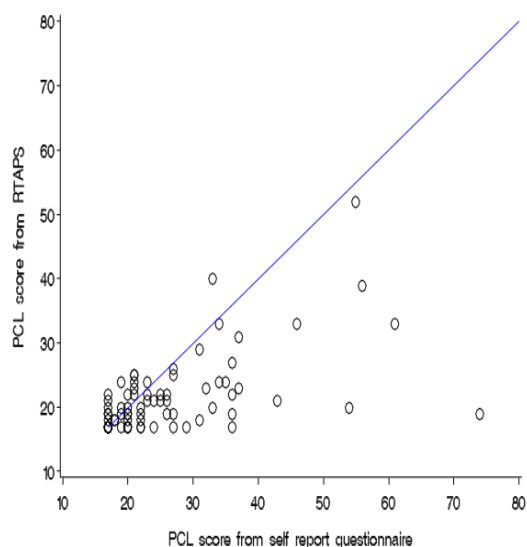


Figure 6.3

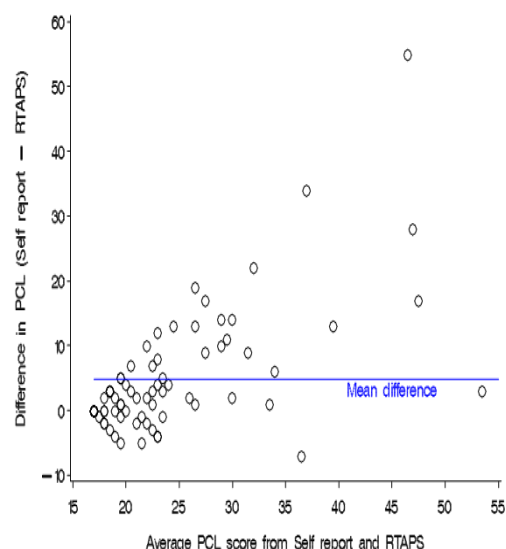


Figure 6.4

Figure 6.3: Scatterplot comparing PCL scores from the self-report questionnaire with those from the RtAPS assessment.

Figure 6.4: Bland-Altman plot of PCL difference by PCL mean score.

324. Figure 6.3 shows the relationship between the PCL-C scores graphically. There is evidence to suggest that participants tended to score higher on the PCL-C in the self-report questionnaire than in their RtAPS data. The plot of the difference in PCL-C scores by the average (Figure 6.4) reveals that those with a larger mean PCL-C score had larger differences in scores between the two sources. On average personnel scored 4.79 points higher on the self-report version of the PCL-C than the RtAPS version.

325. Table 6.6 includes data from all participants consenting to linkage of their Defence Health Records with their self-report questionnaire. Sixty-nine percent scored in the same AUDIT category on both the CPHE and the self-report questionnaire (grey cells). Only three participants (1.8%) scored in a higher AUDIT category on the CPHE. Finally, 24% of participants had recorded a higher category of AUDIT on the self-report questionnaire than on the CPHE.

Table 6.6: AUDIT category scores from CPHE and from the self-report questionnaire.

AUDIT from SI questionnaire	AUDIT from CPHE				Total
	0-7	8-15	16-19	20+	
0-7	113	2	0	1	116
8-15	29	10	0	0	39
16-19	5	2	0	0	7
20+	3	1	0	0	4
Total	150	15	0	1	166

Percentage agreement (in the grey diagonal) = 74%

Kappa statistic of agreement = 0.25 (values of 0.21- 0.40 reflect fair agreement)(Brennan & Silman, 1992)

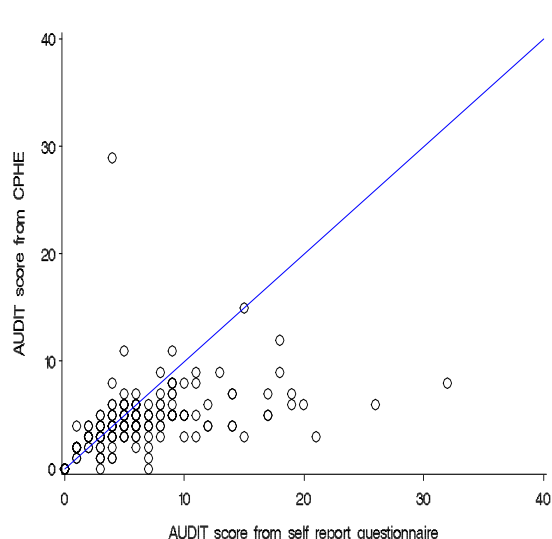


Figure 6.5

Figure 6.5: Scatterplot comparing AUDIT scores from the self-report questionnaire with those from the CPHE assessment.

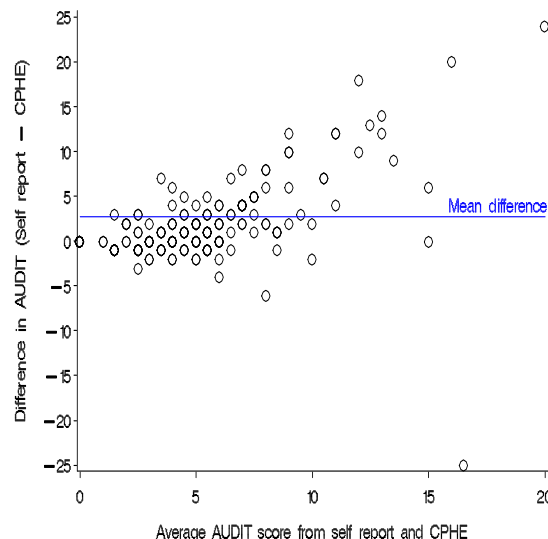


Figure 6.6

Figure 6.6: Bland-Altman plot of AUDIT difference by AUDIT mean score.

326. Figure 6.5 shows graphically the relationship between the AUDIT scores; the pattern of responses is very similar to the K10 and PCL Figures. It should be noted that the first question on AUDIT uses different categories to assess drinking frequency in the self-report questionnaire compared with the CPHE. The first question on the AUDIT asks “How often do you have a drink containing alcohol?”, The CPHE version includes the options, “Monthly or less”, “2 to 4 times a month”, “2 to 3 times a week” and “4 or more times a week”. The version used in the self-report questionnaire includes the response options, “Less than once a month”, “Monthly”, “Weekly”, “Daily or almost daily”. Responses to the self-report question were coded so as to be most similar to the CPHE response. However, this is not a direct

comparison and the differences mean that there is a slight tendency for scores to be higher on the self-report questionnaire than on the CPHE. The Bland-Altman plot (Figure 6.6) suggests that those with a high average AUDIT scores are more likely to have a larger difference in the different AUDIT reading than those who had lower scores. On average personnel scored 1.27 points higher on the self-report version of the AUDIT than the CPHE version.

Comparison of responders and non-responders of the self-report questionnaire

327. Some specific Defence health outcomes were compared between responders and non-responders to the self report questionnaire to assess potential bias between these two groups. The AUDIT scale, recommended MEC and the stress questions from a subjects' most recent CPHE were compared.

328. In Table 6.7 responders to the self-report questionnaire were more likely to have a lower AUDIT score than the non-responders ($\chi^2_{(2)} = 9.60$, $p = 0.008$).

Table 6.7: AUDIT category scores from CPHE by response to self report questionnaire

<i>AUDIT from most recent CPHE</i>	<i>Responder n (%)</i>	<i>Non-responder n (%)</i>
0-7	289 (88)	353 (79)
8-15	36 (11)	83 (19)
16-19	1 (0.3)	5 (1.1)
20+	2 (0.6)	2 (0.5)
<i>Not available</i>	107	122
<i>Total</i>	435	565

329. In Table 6.8 non-responders to the self report questionnaire were more likely to have had a recommended MEC of 3 or 4 on the most recent CPHE than those who completed the survey. The proportion of subjects 'fit to deploy' (MEC 1 or 2) on the last CPHE was higher in the responders (95%) relative to the non-responders (90%) ($\chi^2_{(2)} = 9.63$, $p = 0.008$).

Table 6.8: Recommended MEC from CPHE by response to self report questionnaire

<i>Recommended MEC from most recent CPHE</i>	<i>Responder n (%)</i>	<i>Non-responder n (%)</i>
<i>MEC1</i>	254 (77)	327 (75)
<i>MEC2</i>	57 (17)	59 (14)
<i>MEC3</i>	7 (2.1)	29 (6.7)
<i>MEC4</i>	8 (2.4)	13 (3.0)
<i>Other*</i>	2 (0.6)	7 (1.6)
<i>Not available</i>	107	130
<i>Total</i>	435	565

*Not included in chi-squared test

330. Tables 6.9 and 6.10 present data from the stress questions from the CPHE for responders and the non-responders. The frequency distribution of responses to the question about 'too much stress' was very similar between the two groups ($\chi^2_{(3)} = 1.14, p = 0.77$) and similarly there was no clear difference in answers to the question about stress 'in the last two weeks' ($\chi^2_{(3)} = 3.35, p = 0.34$).

Table 6.9: Frequency of stress from CPHE by response to self report questionnaire

<i>'too much stress'</i>	<i>Responder n (%)</i>	<i>Non-responder n (%)</i>
<i>Often</i>	21 (6.2)	36 (7.9)
<i>Sometimes</i>	105 (31)	142 (31)
<i>Seldom</i>	144 (43)	182 (40)
<i>Never</i>	67 (20)	96 (21)
<i>Not available</i>	98	107
<i>Total</i>	435	565

Table 6.10: Quantity of stress from CPHE by response to self report questionnaire

<i>'in the last two weeks'</i>	<i>Responder n (%)</i>	<i>Non-responder n (%)</i>
<i>A lot of stress</i>	20 (6.0)	31 (6.8)
<i>A moderate amount of stress</i>	98 (29)	118 (26)
<i>Relatively little stress</i>	135 (40)	172 (38)
<i>Almost no stress at all</i>	82 (24)	136 (30)
<i>Not available</i>	100	108
<i>Total</i>	435	565

331. The difference in the distribution of AUDIT scores and recommended MEC from the CPHE between responders and non responders suggest that those who completed the survey may have been healthier than those who did not. This difference maybe due in part to the comparatively low response rate among defence personnel who had discharged from the ADF (25%). There is no indication that this bias is differential between the Solomon Islands veterans and Comparisons.

Comparison of responses to the self-report questionnaire with the Australian population

332. Rates of psychological distress, current smoking and self-reported general health observed in the Solomon Islands study were compared with rates observed in the Australian population for the same age and sex groups. The results were aggregated to form overall ratios (Table 6.11).

333. Participants in the Solomon Islands study did not differ significantly from the Australian population on any of the measures presented. The number of Defence personnel who reported their health as 'Fair' or 'Poor' was slightly higher in the Solomon Islands study than that reported in similar population age and sex groups. Similarly, the number of participants who reported very high levels of psychological distress (K10 between 30 and 50) was slightly higher in the Solomon Islands participants compared with the Australian population, though this non-significant result was based on a small number of observed events. Finally, the prevalence of current smokers in the Solomon Islands study was nine percent lower in the Solomon Islands study than the rates observed in the same age and sex groups in the Australian population.

Table 6.1: Comparison of responses to the self-report questionnaire with rates observed in the Australian Population

<i>Outcome</i>	<i>Observed</i>	<i>Expected</i>	<i>Standardised Ratio</i>
<i>General Health (Fair or Poor)</i>	57	49.1 ^a	1.16 (0.88, 1.51)
<i>K10 (≥ 30)</i>	18	11.9 ^b	1.51 (0.92, 2.33)
<i>Current Smokers</i>	82	89.7 ^c	0.91 (0.73, 1.13)

a. *National Health Survey 2004-2005 (Australian Bureau of Statistics, 2007a)*

b. *Australia's Health (Australian Institute of Health and Welfare, 2006)*

c. *2007 National Drug Strategy and Household Survey: first results. (Australian Institute of Health and Welfare, 2008)*

Synthesis

334. There were no statistically significant differences in outcomes between the Solomon Islands veterans and comparison group, although the study only had statistical power to detect moderate to large differences between groups. This does not reduce the importance of long term surveillance, as lack of differences may be due to the short lag time between exposure and the conduct of the Solomon Islands Health Study, and/or the relatively young and healthy nature of the sample, and/or confounding due to multiple deployments.

335. Comparisons between the Services on prevalence of selected risk factors were conducted, but the outcomes should be interpreted with caution, particularly in view of the smaller sample size from the RAAF. Smoking behaviour was the only factor where significant differences were detected. RAAF personnel were less likely to be current smokers and more likely to have never smoked. Of interest (although not reaching the level of significance) were results across the services that showed that RAAF personnel had a higher representation in the low risk category for alcohol consumption and were not represented in categories indicating high stress (30-50 as

recorded on the K10 instrument). Army personnel recorded the highest proportion in the healthy weight range (BMI 18.5-24.9). While the differences identified reflect differences in exposures and characteristics of individuals across Services, this warrants further investigation. It will be interesting to verify whether these patterns of results are replicated in the East Timor and Bougainville Defence Health Studies.

336. BMI and smoking status appear to have good reliability (agreement) between Defence Health data and self-report data, and thus Defence Health data may be a reasonable source of data for monitoring of these outcomes.

337. The findings on BMI showed a large proportion of personnel in higher categories of the BMI, typically labelled overweight and obese. However, BMI is not a measure of body fat in well-muscled young men. It is well known that muscle weighs approximately twice as much as fat, and therefore young healthy personnel may be miscategorised as overweight or obese in the BMI scale. Therefore, it may be appropriate for Defence to consider additional measurements, such as the ratio of waist and hip circumference, when assessing body fat.

338. Alcohol consumption, PCL and K10 demonstrated substantial variation between the different sources of data. Reviewing all three comparisons of individuals across data sources, there appears to be a consistent trend towards either lower levels of reporting during collection of data by Defence sources compared with higher levels of reporting on the self-report questionnaire.

339. In the collection of the self-report data, assurances were offered to those participating that there would be no impact upon their career or ability to apply for compensation. Alternatively, when reporting to Defence professionals there is a clear possibility that they may perceive that their responses could influence their career. A number of possibilities for these differences were outlined in paragraph 319 the current chapter. Analysing the data by comparing results from individuals was unable to verify the reasons for changes in outcomes between the various sources of data collection. Consequently, there may be a variety of issues worthy of further consideration before the reliability and validity of the items described above are assured. Reliability refers to the repeatability or precision of a measure, while validity refers to the accuracy of a measure. A particular item or instrument may be valid (i.e. correctly measures what it is supposed to), but still have low reliability (i.e. high variability). Alternatively, an item or instrument may have good reliability, but poor validity. Lack of validity can result in biased results.

Sources of data collection

340. Each of the data sources has strengths and limitations which need to be considered when planning future studies. The issues associated with the use of clinical and administrative data for research and surveillance purposes are well recognised. Data and systems which may perform very well for the functions for which they were designed, may not be adequate in the current form, for an entirely different purpose. These issues are certainly not specific to Defence health or psychology data and are common to clinical and administrative data across a variety of settings, including hospital medical records, emergency and outpatient data, general practice and physician data and are relevant to both paper based and electronic systems. Difficulties include the variable nature and format of data collected within and between different settings, institutions and individuals. For example different

hospitals (or in the case of Defence, different Bases) may have developed different systems, definitions or protocols and /or varying interpretations of the same protocols. In addition, the format of both paper and electronic data can vary over time. This can be in response to changing needs, new developments or evidence of more efficient, valid or reliable methods, and is thus entirely appropriate. However it increases the difficulty of working with such data. There is also often a large amount of missing information associated with clinical and administrative data. For example, information which may not be relevant or of interest for a specific patient encounter may not be included in the patient notes, however the absence of information about a particular condition in a database, does not necessarily equate to absence of that particular condition for the patient.

341. The great advantage of routinely collected clinical and administrative information is that they are systems in place for regular collection of data, they generally have high ascertainment (i.e. most people generally have a record) and they do not require individual consent (although consent to access and use the data is a different issues). Often data custodians are not aware of problems and difficulties with the data until it is investigated for other purposes, such as research and / or surveillance, and identification of these problems has led to improvements in the quality of the original data sources. Potential strategies for improving the quality and utility of data include the development and implementation of more detailed and usable protocols, better training of staff collecting and entering data and quality control and audit processes.

342. The Defence Health records provided health data for the largest proportion of those in the sample. However, the problems associated with the use of clinical data for surveillance and monitoring highlighted above are also relevant to Defence data. Due to the nature of collection of the Defence owned data, the data are collected by a variety of people, at various locations and at different time points and suffer issues of standardisation as a consequence. Further, no Defence data are collected after personnel separate from Defence.

343. Moving to electronic collection and storage of all health and psychology data at the individual level may improve the utility of these data for long term epidemiological research on currently serving personnel. In addition, consideration could be given to other strategies employed in different (for example civilian) settings, where investigation of the use of clinical or administrative data for research or surveillance has led to improvements in data quality.

344. Collecting Defence Health records was associated with significant cost and complexity. The Central Medical Record was collected for most personnel. Currently a trial of the intricacies of collecting Unit Medical Records is underway. The potential advantages of the Unit Medical Records are that they are likely to hold both more information (for example yellow vaccination records) and more current health assessments.

345. The psychology data provided by the PRTG contained little missing data except in the areas that related to clinical follow-up. The data itself provided a good snapshot of mental health immediately after deployment. However, the disadvantages were that POPS records were only able to be obtained for a very small number of records. Further, as discussed in the current Chapter it is plausible that the responses of personnel may be affected by their surroundings. The standard use of the RtAPS and POPS as clinical tools competes, at times, with its use as a method of

surveillance. As the RtAPS and POPS data are only collected on those who have deployed it is only possible to make within person comparisons,

346. The self-report data has the advantage of being designed specifically for epidemiological research and to answer pre-defined health questions. However, one disadvantage is that it relies on being able to contact individuals and in turn the individual choosing to respond. Its advantage lies in that the same questions may be repeated and compared over time and may also be asked of both serving and ex-serving personnel.

347. Many of the findings and outcomes of the conduct of the Solomon Islands Defence will need to be considered for decisions about future research in the Deployment Health Surveillance Program, particularly where exposures and hazards may differ from those experienced during Operation ANODE.

Conclusions

348. While the Solomon Islands Health study did not demonstrate any major differences between the deployed and comparison group, possibly for reasons which include the nature of the deployment, the short time between the end of deployment and the conduct of the study, the study has highlighted several important issues for surveillance of the health of Defence personnel. These include the usefulness of the Internet for obtaining health data from participants, the importance of accurate contact information and follow up procedures. As with all routinely collected clinical and administrative data, there is good potential for improvements in data processes and quality which increase the viability of use of Defence health and psychology data for research and surveillance. While response rates were not as high as initially anticipated, they are consistent with similar studies in Defence personnel and the general population.

Appendices

- 3.1 – Additional Defence Health Data Tables
- 4.1 – RtAPS Summary
- 4.2 – POPS Summary
- 5.1 – Solomon Islands Invitation Package
- 5.2 – Media summary
- 5.3 – Health Questionnaire
- 5.4 – Solomon Islands Deployment Questionnaire
- 5.5 – Additional Self-Report Data Tables

Annexes (on CD)

- Annex A – SI Literature Review (Deliverable Item 2p, Phase 1b)
- Annex B – SI Sample Generation Report (Deliverable Item 1, Phase 2)
- Annex C – SI Mortality Study Report (Deliverable Item 2, Phase 2)
- Annex D – SI Cancer Incidence Study Report (Deliverable Item 2, Phase 2)
- Annex E – SI Completion of Defence Owned Data Collection Report (Deliverable Item 4, Phase 2)
- Annex F – SI Completed Self Reported Data Collection Stage Report (Deliverable Item 3, Phase 2)
- Annex G – Process for the management and transfer of relevant RtAPS and POPS data
- Annex H – Annual Health Assessment (AHA)
- Annex I – Five Yearly Comprehensive Preventive Health Examination (CPHE)
- Annex J – Medical Board (MB)
- Annex K – Specialist Employment Stream Annual Health Assessment (SESAHA)
- Annex L – Pre-deployment Medical Checklist
- Annex M – Post-deployment Health Screen
- Annex N – Health/Medical Insert Slips

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Final Study Report – Appendices

Solomon Islands Health Study

Deliverable Item 4 (Phase 2)

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Appendix 3.1 - Additional Defence Health Data Tables

1. Table 1 shows that three-quarters of the sample recorded low risk drinking behaviour. Slightly more than 17% recorded drinking patterns considered in excess of low risk guidelines. Few individuals were reported as having hazardous, harmful or high risk levels. The AUDIT score could be calculated for 94% of people with a CPHE record.

Table 1: AUDIT scores on CPHE

<i>AUDIT Score</i>	<i>n (%)</i>
<i>Category 1 (0 – 7)</i>	628 (73)
<i>Category 2 (8 – 15)</i>	119 (15)
<i>Category 3 (16 – 19)</i>	6 (0.7)
<i>Category 4 (20 – 40)</i>	4 (0.5)
<i>Not available</i>	49 (6.1)
<i>Total</i>	806 (100)

Category 1 (0-7) = low risk drinker

Category 2 (8-15) = consuming alcohol in excess of low risk guidelines

Category 3 (16-19) = hazardous or harmful levels of alcohol consumption

Category 4 (>19) = high risk of alcohol-related harm

2. Table 2 shows that the proportions in each MEC category were similar in AHAs and CPHEs. However, more MEC4 categories were recorded on the CPHE forms than the AHA. It is reasonable to expect that more MEC4 may be expected on the CPHE as they are used as discharge medicals and a number of people may be discharging due to ill health. Indeed, of the 21 MEC4 recorded on CPHE forms, nine were final or Discharge medicals (there was also one critical skills waiver).

Table 2: Recommended MEC classifications from AHA and CPHE

	<i>AHA</i>	<i>CPHE</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>MEC1</i>	595 (75)	581 (72)
<i>MEC2</i>	109 (14)	116 (14)
<i>MEC3</i>	39 (4.9)	36 (4.5)
<i>MEC4</i>	4 (0.5)	21 (2.6)
<i>Other</i>	2 (0.3)	9 (1.1)
<i>Not Available</i>	45 (5.7)	43 (5.3)
<i>Total</i>	794 (100)	806 (100)

**Other MEC classifications include A1 G1 21 which are codes used by the RAAF.*

3. Table 3 shows that the number of current smokers as recorded in both the AHA and CPHE was consistent, and the current rate of smoking was approximately 30% from both data sources.

Table 3: Current smokers as recorded in the AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>No</i>	555	(70)	538	(67)
<i>Yes</i>	223	(28)	220	(27)
<i>Missing</i>	16	(2.0)	48	(6.0)
<i>Total</i>	794	(100)	806	(100)

4. Table 4 shows that more than one in ten current smokers reported smoking more than 20 cigarettes per day on both the AHA and CPHE forms.

Table 4: Cigarette consumption per week for current smokers from AHA and CPHE

<i>Number of cigarettes smoked per day</i>	<i>AHA</i> <i>n (%)</i>	<i>CPHE</i> <i>n (%)</i>
<i>0 to 5</i>	27 (12)	39 (18)
<i>6 to 10</i>	55 (25)	58 (26)
<i>11 to 15</i>	54 (24)	51 (23)
<i>16 to 20</i>	37 (17)	41 (19)
<i>More than 20</i>	29 (13)	22 (10)
<i>Missing</i>	21 (9.4)	9 (4.1)
<i>Total</i>	223 (100)	220 (100)

5. Table 5 details the BMI scores obtained from the AHA and CPHE forms. The scores were consistent both in terms of the proportion in each weight category and the average scores. The mean BMI score was 26.1 from both the AHA and CPHE forms, as shown in Table 6. However, BMI is only moderately correlated with fatness or the amount of adipose tissue. Very muscular individuals may have a high BMI. Accordingly, limited inferences on obesity levels in the Defence Force should be drawn from the table below.

Table 5: BMI scores by category on AHA and CPHE

	<i>AHA</i>	<i>CPHE</i>
	<i>n (%)</i>	<i>n (%)</i>
<i>< 18.5</i>	3 (0.4)	3 (0.4)
<i>18.5-24.9</i>	283 (36)	295 (37)
<i>25-29.9</i>	404 (51)	388 (48)
<i>30+(</i>	100 (13)	112 (14)
<i>Not available</i>	4 (0.5)	8 (1.0)
<i>Total</i>	794 (100)	806 (100)

< 18.5 = underweight

18.5-24.9 = healthy weight

25-29.9 = overweight

30+ = obese

Table 6: BMI distribution on AHA and CPHE

	<i>AHA</i>	<i>CPHE</i>
	<i>BMI</i>	<i>BMI</i>
<i>n</i>	790	798
<i>Mean</i>	26.1	26.1
<i>Std</i>	3.17	3.37
<i>Median</i>	26.0	26.0
<i>Q1</i>	24.0	23.8
<i>Q3</i>	28.4	28.2
<i>Min</i>	17	18
<i>Max</i>	36	43

6. Table 7 shows that the patterns of response were similar across data sources. Approximately 7% reported experiencing too much stress ‘often’. However, the most common responses to this question from both sources were ‘seldom’ (approximately 40%) and never (approximately 20%), with almost 60% of the sample selecting one of these options.

Table 7: Response to frequency of stress question by category from AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
<i>'too much stress'</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>Often</i>	54	(6.8)	57	(7.1)
<i>Sometimes</i>	268	(34)	247	(31)
<i>Seldom</i>	312	(39)	328	(41)
<i>Never</i>	150	(19)	163	(20)
<i>Not available</i>	10	(1.3)	11	(1.4)
<i>Total</i>	794	(100)	806	(100)

7. Table 8 shows that the most frequent response to the level of stress experienced in the last two weeks was 'relatively little' (38%). From both data sources, 7% of those questioned encountered 'A lot of stress' in the previous fortnight.

Table 8: Response to quantity of stress question by category from AHA and CPHE

	<i>AHA</i>		<i>CPHE</i>	
<i>'in the last two weeks...'</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>A lot of stress</i>	54	(6.8)	57	(7.1)
<i>A moderate amount of stress</i>	240	(30)	247	(31)
<i>Relatively little stress</i>	299	(38)	328	(41)
<i>Almost no stress at all</i>	192	(24)	163	(20)
<i>Not available</i>	9	(1.1)	11	(1.4)
<i>Total</i>	794	(100)	806	(100)

Appendix 4.1 – RTAPS Summary Form

PERSONAL DETAILS

SERVICE:		RANK:	
ARA	51 (53%)	PTE/SMN/AC(W)	22 (23%)
Army Reserve – Full Time Service	4 (4%)	LCPL/AB/LAC(W)	12 (13%)
Army Reserve – Other	0	CPL/LS	15 (16%)
RAN	24 (25%)	SGT/SSGT/PO	18 (19%)
RAN Reserve	2 (2%)	WO2/CPO/FSGT	2 (2%)
RAAF	14 (15%)	WO1/WO/WOFF	2 (2%)
RAAF Active Reserve	1 (1%)	2LT/ASLT/PLTOFF	0
RAAF Special Reserve	0	LT/SBLT/FLGOFF	5 (5%)
Civilian Agency	0	CAPT/LEUT/FLTLT	9 (10%)
Total	96	MAJ/LCDR/SQNLDR	6 (6%)
		LTCOL/CMDR/WGDCR	2 (2%)
		COL/CAPT/GPCAPT and above	1 (1%)
		Missing	2
		Total	96

PMKeys EMPLOYEE ID:
AND/OR
SERVICE NUMBER
SURNAME
INITIALS

*Replaced with
DHSP psych
data study
number*

OPERATION ANODE 96
(100%)

UNIT ON DEPLOYMENT *Unit was recorded for all 96 individuals*

POSTED UNIT ON RETURN TO AUSTRALIA *This unit was recorded in 93 out of 96 records on RtAPS*

CONTACT TELEPHONE NUMBER IN AUSTRALIA

TRADE/MUSTERING /CATEGORY *This outcome was recorded in 95 out of 96 records on RtAPS*

GENDER	MALE	FEMALE
	84 (88%)	12 (13%)

AGE: Please indicate your age in years *Mean = 32.5 years At time of RtAPS
Standard Deviation = 8.0*

RELATIONSHIP STATUS (1 missing)	Married/Defacto (58%)	55	Partnered 10 (11%)	Separated/Divorced 6 (6%)	Single 24 (25%)	
DEPENDANTS (excluding spouse): 4 missing	0 46 (50%)	1 13 (14%)	2 21 (23%)	3 8 (9%)	4 3 (3%)	5 or more 1 (1%)

Office use only: Interview Code
Follow up: recommended by interviewer requested by member in-country n Australia

THE DEPLOYMENT

DATE TODAY *Date was recorded for 95 out of 96 individuals*

DATE DEPLOYED *Date was recorded for 95 out of 96 individuals*

DATE OF RETURN TO AUST *Date was recorded for 93 out of 96 individuals*

OPERATIONAL EXPERIENCE

1. Please indicate how many overseas operational deployments you had prior to this one:

0	1	2	3	4	5 or more
<i>45 (47%)</i>	<i>24 (25%)</i>	<i>15 (16%)</i>	<i>3 (3%)</i>	<i>4 (4%)</i>	<i>5 (5%)</i>

2. If you had more than one overseas operational deployment, what was the minimum time between deployments?

months years

Total Mean = 395 days. Standard Deviation = 359 days. Based on 34 responses

3. In the last 12 months, what is the total time spent away from home for service reasons (eg courses, exercises, deployments)?

days months

Total Mean = 165 days. Standard Deviation = 68 days. Based on 93 responses

2. Please indicate the number of years of service you have completed: *Mean = 10.3 Years*
Standard Deviation = 7.2

Based on 96 responses

3. In your opinion what was the level of morale in your section during the deployment?

Very low	Low	Average	High	Very High
<i>3 (3%)</i>	<i>15 (16%)</i>	<i>31 (32%)</i>	<i>43 (45%)</i>	<i>4 (4%)</i>

4. During the deployment, what would you consider to have been the major positive experiences?

20 out of 96 recorded positive comments

5. During the deployment, what would you consider to have been the major negative experiences?

20 out of 96 recorded negative comments

6. **Career intentions** – Please choose one response in each column:

	Prior to deployment my career intentions were:	My current career intentions are:
Long term service career	59 (68%)	45 (56%)
Serve out current engagement/ROSO	13 (15%)	16 (20%)
Seek Corps Transfer/Remuster/TOC	10 (11%)	10 (13%)
Seek discharge within the next 12 months	5 (6%)	6 (8%)
Seek discharge immediately		3 (4%)
Other (please state)		1 (1%)
Missing	9	15

7. **Do you anticipate any difficulties on your return home?**

	Yes	No	Uncertain
	14 (15%)	75 (78%)	7 (7%)

If yes, in which area (e.g. family, work)? *14 out of 96 recorded comments*

8. **Overall, how would you describe your deployment experience?**

Very Positive	Positive	Neither	Negative	Very Negative
13 (14%)	45 (47%)	22 (23%)	13 (14%)	3 (3%)

K10

The following questions inquire about how you have been feeling over the last four (4) weeks.

Please fill in the circle that best describes how you have been feeling.

	<i>All of the time</i>	<i>Most of the time</i>	<i>Some of the time</i>	<i>A little of the time</i>	<i>None of the time</i>
1. In the past four (4) weeks, about how often did you feel tired for no good reason?	0	11 (11%)	23 (24%)	28 (29%)	34 (35%)
2. In the past four (4) weeks, about how often did you feel nervous?	0	2 (2%)	6 (6%)	21 (22%)	67 (70%)
3. In the past four (4) weeks, about how often did you feel so nervous that nothing could calm you down?	0	0	1 (1%)	4 (4%)	91 (95%)
4. In the past four (4) weeks, about how often did you feel hopeless?	0	2 (2%)	5 (5%)	11 (11%)	78 (81%)
5. In the past four (4) weeks, about how often did you feel restless or fidgety?	0	4 (4%)	12 (13%)	31 (32%)	49 (51%)
6. In the past four (4) weeks, about how often did you feel so restless that you could not sit still?	0	3 (3%)	5 (5%)	13 (14%)	75 (78%)
7. In the past four (4) weeks, about how often did you feel depressed?	0	1 (1%)	10 (10%)	23 (24%)	62 (65%)
8. In the past four (4) weeks, about how often did you feel that everything was an effort?	0	1 (1%)	13 (14%)	28 (29%)	54 (56%)
9. In the past four (4) weeks, about how often did you feel so sad that nothing could cheer you up?	0	1 (1%)	5 (5%)	8 (8%)	82 (85%)
10. In the past four (4) weeks, about how often did you feel worthless?	0	2 (2%)	5 (5%)	6 (6%)	83 (86%)

TSES-R

The following questionnaire asks you about events that may have occurred during your deployment. Please indicate how often you experienced the event, how it affected you at the time and how it affects you now. For each question some examples are given, please indicate if you experienced these or similar experiences. It is important that you mark a response in each of the three

EVENT How often did the following occur...?	How often did you experience the event?					How did it affect you at the time? (felt fear, horror, or helplessness)				How does it affect you now? (feelings of fear, horror or helplessness)			
	Never	Rarely	On occasion (x2-5)	Often (x6-10)	Very often (x11+)	Not at all	A little	A moderate amount	A great deal	Not at all	A little	A moderate amount	A great deal
1. You were in danger of being killed e.g. combat, motor vehicle accident (MVA), assault, sexual assault, natural disaster, hostage situation	85 (89%)	8 (8%)	2 (2%)	1 (1%)	0	84 (92%) Missing =5	6 (7%)	1 (1%)	0	87 (96%) Missing=5	4 (4%)	0	0
2. You were in danger of being injured e.g. combat, MVA, assault, sexual assault, natural disaster, hostage situation	70 (73%)	21 (22%)	4 (4%)	1 (1%)	0	80 (88%) Missing =5	10 (11%)	1 (1%)	0	87 (96%) Missing=5	4 (4%)	0	0
3. You had to handle dead bodies e.g. disaster situation, temporary morgue, mass graves including any form of human remains	94 (98%)	0	1 (1%)	1 (1%)	0	88 (98%) Missing =6	2 (2%)	0	0	89 (99%) Missing=6	1 (1%)	0	0
4. You saw dead bodies e.g. disaster situation, temporary morgue, mass graves including any form of human remains	91 (95%)	3 (3%)	2 (2%)	0	0	86 (97%) Missing =7	2 (2%)	0	1 (1%)	87 (98%) Missing=7	1 (1%)	1 (1%)	0
5. You heard of a close friend or co-worker who had been injured or killed e.g. combat, MVA, disaster situation	93 (97%)	3 (3%)	0	0	0	87 (98%) Missing =7	2 (2%)	0	0	89 (100%) Missing =7	0	0	0
6. You were present when a close friend or co-worker was injured or killed e.g. combat, MVA, disaster situation	95 (99%)	1 (1%)	0	0	0	88 (99%) Missing =7	1 (1%)	0	0	89 (100%) Missing =7	0	0	0
7. You feared that you had been exposed to a contagious disease, toxic agent or injury e.g. radioactivity, HIV, chemical warfare	86 (90%)	5 (5%)	2 (2%)	1 (1%)	2 (2%)	82 (92%) Missing =7	7 (8%)	0	0	84 (94%) Missing =7	5 (6%)	0	0

EVENT	How often did you experience the event?					How did it affect you at the time? (felt fear, horror, or helplessness)				How does it affect you now? (feelings of fear, horror or helplessness)			
	Never	Rarely	On occasion (x2-5)	Often (x6- 10)	Very often (x11+)	Not at all	A little	A moderate amount	A great deal	Not at all	A little	A moderate amount	A great deal
8. You were witness to human degradation and misery on a large scale e.g. refugee camps, starvation	92 (96%)	3 (3%)	0	1 (1%)	0	86 (96%)	3 (3%)	0	0	87 (98%)	2 (2%)	0	0
						Missing =7				Missing =7			
9. You heard of a loved one who had been injured or killed	88 (92%)	7 (7%)	1 (1%)	0	0	81 (91%)	3 (3%)	5 (6%)	0	83 (93%)	6 (7%)	0	0
						Missing =7				Missing =7			
10. You were present when a loved one was injured or killed	96 (100%)	0	0	0	0	89 (100%)	0	0	0	89 (100%)	0	0	0
						Missing =7				Missing =7			
11. You believe your action or inaction resulted in someone being seriously injured e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	96 (100%)	0	0	0	0	89 (100%)	0	0	0	89 (100%)	0	0	0
						Missing =7				Missing =7			
12. You believe your actions or inaction resulted in someone being killed, e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	96 (100%)	0	0	0	0	89 (100%)	0	0	0	89 (100%)	0	0	0
						Missing =7				Missing =7			

13. Were there any events that you found to be traumatic but that are not listed above? Please specify below:

7 out of 96 recorded responses to this question

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences.

*Please read each one carefully and then indicate how much you have been bothered by that problem **in the past month**.*

	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing <i>memories, thoughts or images</i> of a stressful experience from the past?	75 (78%)	18 (19%)	2 (2%)	1 (1%)	0
2. Repeated, disturbing <i>dreams</i> of a stressful experience from the past?	87 (91%)	5 (5%)	3 (3%)	0	1 (1%)
3. Suddenly <i>acting or feeling</i> as if a stressful experience were happening again (as if you were reliving it)?	89 (93%)	6 (6%)	0	0	1 (1%)
4. Feeling <i>very upset</i> when <i>something reminded</i> you of a stressful experience from the past?	85 (89%)	10 (10%)	1 (1%)	0	0
5. Having <i>physical reactions</i> (eg heart pounding, trouble breathing, sweating) when <i>something reminded</i> you of a stressful experience from the past?	84 (88%)	11 (11%)	1 (1%)	0	0
6. Avoiding <i>thinking about</i> or <i>talking about</i> a stressful experience from the past or avoiding <i>having feelings</i> related to it?	84 (88%)	8 (8%)	3 (3%)	1 (1%)	0
7. Avoiding <i>activities</i> or <i>situations</i> because <i>they reminded</i> you of a stressful experience from the past?	88 (92%)	6 (6%)	1 (1%)	1 (1%)	0
8. Trouble <i>remembering important parts</i> of a stressful experience from the past?	93 (97%)	3 (3%)	0	0	0
9. Loss of <i>interest</i> in activities that you used to enjoy?	81 (84%)	14 (15%)	1 (1%)	0	0
10. Feeling <i>distant</i> or <i>cut off</i> from other people?	62 (65%)	22 (23%)	11 (11%)	1 (1%)	0
11. Feeling <i>emotionally numb</i> or being unable to have loving feelings for those close to you?	78 (81%)	12 (13%)	3 (3%)	3 (3%)	0
12. Feeling as if your <i>future</i> somehow will be <i>cut short</i> ?	91 (95%)	3 (3%)	2 (2%)	0	0
13. Trouble <i>falling</i> or <i>staying</i> asleep?	53 (55%)	27 (28%)	11 (11%)	1 (1%)	4 (4%)
14. Feeling <i>irritable</i> or having <i>angry</i> outbursts?	61 (64%)	27 (28%)	5 (5%)	3 (3%)	0
15. Having <i>difficulty concentrating</i> ?	61 (64%)	30 (31%)	4 (4%)	1 (1%)	0
16. Being <i>"super alert"</i> or watchful or on guard?	80 (83%)	11 (11%)	4 (4%)	1 (1%)	0
17. Feeling <i>jumpy</i> or easily startled?	87 (91%)	9 (9%)	0	0	0

MAJOR STRESSORS

Below is a list of factors that some people may find stressful. Read each one carefully, and colour the circle that best describes how much stress that factor caused you during your deployment.

	No stress	Slight stress	Moderate stress	A lot of stress	Extreme stress
1. Risk of unauthorised discharge (UD) of weapons (missing=2)	71 (75%)	19 (20%)	3 (3%)	2 (2%)	0
2. Risk of vehicle accidents (missing=1)	68 (72%)	22 (23%)	4 (4%)	1 (1%)	0
3. Living conditions (missing=1)	60 (63%)	27 (28%)	7 (7%)	1 (1%)	0
4. Isolation from Australia (missing=1)	51 (54%)	38 (40%)	6 (6%)	0	0
5. Isolation from other deployed members (missing=1)	85 (89%)	8 (8%)	2 (2%)	0	0
6. Personal privacy (missing=1)	59 (62%)	28 (29%)	7 (7%)	1 (1%)	0
7. Sorting out problems at home (missing=1)	41 (43%)	34 (36%)	16 (17%)	4 (4%)	0
8. Boredom (missing=2)	57 (61%)	29 (31%)	7 (7%)	1 (1%)	0
9. Living and working with the same people (missing=1)	46 (48%)	38 (40%)	10 (11%)	1 (1%)	0
10. Overload of work (missing=1)	62 (65%)	21 (22%)	4 (4%)	7 (7%)	1 (1%)
11. Periods of high activity then low or no activity (missing=2)	58 (62%)	29 (31%)	5 (5%)	2 (2%)	0
12. Health concerns (missing=1)	66 (69%)	20 (21%)	7 (7%)	2 (2%)	0
13. Behaviour of others (missing=1)	39 (41%)	34 (36%)	19 (20%)	3 (3%)	0
14. Living in a different culture (missing=1)	82 (86%)	13 (14%)	0	0	0
15. Separation from family and friends (missing=1)	36 (38%)	41 (43%)	18 (19%)	0	0
16. Threat of danger (missing=1)	81 (85%)	12 (13%)	1 (1%)	1 (1%)	0
17. Not getting on with others (missing=1)	63 (66%)	19 (20%)	12 (13%)	1 (1%)	0
18. Lack of opposite sex company (missing=1)	66 (69%)	21 (22%)	7 (7%)	1 (1%)	0
19. Language barriers (missing=1)	82 (86%)	11 (12%)	2 (2%)	0	0
20. Sorting out disagreements with others (missing=1)	51 (54%)	34 (36%)	8 (8%)	2 (2%)	0
21. Frustration generally (missing=2)	48 (51%)	28 (30%)	12 (13%)	5 (5%)	1 (1%)
22. Thinking about returning home (missing=1)	62 (65%)	28 (29%)	4 (4%)	1 (1%)	0
23. The overseas organisation (eg. UN, MFO) (missing=1)	79 (83%)	11 (12%)	4 (4%)	1 (1%)	0
24. Your role in the country (missing=1)	72 (76%)	13 (14%)	7 (7%)	2 (2%)	1 (1%)
25. Completing deployment's objectives (missing=2)	71 (76%)	17 (18%)	4 (4%)	2 (2%)	0
26. ADF's lack of concern with deployed troops/sailors/ airmen (missing=2)	60 (63%)	19 (20%)	9 (9%)	5 (5%)	2 (2%)

	No stress	Slight stress	Moderate stress	A lot of stress	Extreme stress
27. The Australian military hierarchy (missing=1)	47 (49%)	27 (28%)	10 (11%)	8 (8%)	3 (3%)
28. Leadership (missing=1)	36 (38%)	30 (32%)	22 (23%)	6 (6%)	1(1%)
29. The deployment's rules and regulations (missing=1)	44 (46%)	32 (34%)	13 (14%)	4 (4%)	2 (2%)
30. Double standards (missing=1)	34 (36%)	29 (31%)	21 (22%)	10 (11%)	1 (1%)
31. Contact with family/friends (missing=1)	64 (67%)	29 (31%)	1 (1%)	1 (1%)	0
32. Taking leave back in Australia (missing=2)	77 (82%)	10 (11%)	4 (4%)	3 (3%)	0
33. Taking leave other than in Australia (missing=3)	86 (92%)	7 (8%)	0	0	0
34. Mail service (missing=1)	71 (75%)	16 (17%)	6 (6%)	2 (2%)	0
35. Working with military of other countries (missing=1)	86 (91%)	7 (7%)	2 (2%)	0	0
36. Length of deployment (missing=1)	67 (71%)	19 (20%)	8 (8%)	0	1 (1%)
Please list any other stressful experiences and fill in which best describes how much stress it caused					
37. <i>16 of 96 people put a response in this section</i>					
38. <i>7 of 96 people put a response in this section</i>					

Appendix 4.2 – POPS Summary Form

PERSONAL DETAILS

SERVICE:		RANK:	
ARA	26 (70%)	PTE/SMN/AC(W)	13 (35%)
Army Reserve – Full Time Service	1 (1%)	LCPL/AB/LAC(W)	3 (8%)
Army Reserve – Other	0	CPL/LS	5 (14%)
RAN	2 (5%)	SGT/SSGT/PO	7 (19%)
RAN Reserve	0	WO2/CPO/FSGT	2 (5%)
RAAF	8 (21%)	WO1/WO/WOFF	2 (5%)
RAAF Active Reserve	0	2LT/ASLT/PLTOFF	0
RAAF Special Reserve	0	LT/SBLT/FLGOFF	0
Civilian Agency	0	CAPT/LEUT/FLTLT	3 (8%)
	Total	MAJ/LCDR/SQLDR	1 (3%)
		LTCOL/CMDR/WGDCR	1 (3%)
		COL/CAPT/GPCAPT and above	0
		Total	37

PMKeys EMPLOYEE ID:
AND/OR
SERVICE NUMBER
SURNAME
INITIALS

} *Replaced with DHSP psych data study number*

DATE OF BIRTH *Date of Birth was recorded for 34 out of 37 individuals*

OPERATION ANODE 37 (100%)

SHIP/ TG ON DEPLOYMENT *This was recorded for all 37 individuals*

TU ON DEPLOYMENT (if applicable) *TU on deployment was recorded for 11 out of 37 individuals*

SHIP UNIT ON RETURN TO AUSTRALIA *Unit on return to Australia was recorded for 37 out of 37 individuals*

DATE TODAY *Date was recorded for 37 out of 37 individuals*

DATE DEPLOYED *Date was recorded for 32 out of 37 individuals*

DATE OF RETURN TO AUST *Date was recorded for 33 out of 37 individuals*

Office use only: Interview Code *Not recorded for study*

Follow up: recommended by interviewer requested by member recommended by other

Follow-up Reasons related to deployment 33 missing other

The following questions inquire about how you have been feeling over the last four (4) weeks.

Please fill in the circle that best describes how you have been feeling.

	<i>All of the time</i>	<i>Most of the time</i>	<i>Some of the time</i>	<i>A little of the time</i>	<i>None of the time</i>
11. In the past four (4) weeks, about how often did you feel tired for no good reason?	0	0	10 (27%)	10 (27%)	17 (46%)
12. In the past four (4) weeks, about how often did you feel nervous?	0	0	2 (5%)	10 (27%)	25 (68%)
13. In the past four (4) weeks, about how often did you feel so nervous that nothing could calm you down?	0	0	0	0	37 (100%)
14. In the past four (4) weeks, about how often did you feel hopeless?	0	0	1 (3%)	4 (11%)	32 (86%)
15. In the past four (4) weeks, about how often did you feel restless or fidgety?	0	0	3 (8%)	12 (32%)	22 (59%)
16. In the past four (4) weeks, about how often did you feel so restless that you could not sit still?	0	0	0	5 (14%)	32 (86%)
17. In the past four (4) weeks, about how often did you feel depressed?	0	0	4 (11%)	5 (14%)	28 (76%)
18. In the past four (4) weeks, about how often did you feel that everything was an effort?	0	0	3 (8%)	9 (24%)	25 (68%)
19. In the past four (4) weeks, about how often did you feel so sad that nothing could cheer you up?	0	0	1 (3%)	1 (3%)	35 (95%)
20. In the past four (4) weeks, about how often did you feel worthless?	0	0	0	2 (5%)	35 (95%)

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences.

Please read each one carefully and then indicate how much you have been bothered by that problem **in the past month**.

	Not at all	A little bit	Moderately	Quite a bit	Extremely
18. Repeated, disturbing <i>memories, thoughts or images</i> of a stressful experience from the past?	33 (89%)	3 (8%)	1 (3%)	0	0
19. Repeated, disturbing <i>dreams</i> of a stressful experience from the past?	35 (95%)	2 (5%)	0	0	0
20. Suddenly <i>acting or feeling</i> as if a stressful experience were happening again (as if you were reliving it)?	37 (100%)	0	0	0	0
21. Feeling <i>very upset</i> when <i>something reminded</i> you of a stressful experience from the past?	35 (95%)	2 (5%)	0	0	0
22. Having <i>physical reactions</i> (eg heart pounding, trouble breathing, sweating) when <i>something reminded</i> you of a stressful experience from the past?	34 (92%)	1 (3%)	1 (3%)	1 (3%)	0
23. Avoiding <i>thinking about</i> or <i>talking about</i> a stressful experience from the past or avoiding <i>having feelings</i> related to it?	36 (97%)	1 (3%)	0	0	0
24. Avoiding <i>activities</i> or <i>situations</i> because <i>they reminded</i> you of a stressful experience from the past?	37 (100%)	0	0	0	0
25. Trouble <i>remembering important parts</i> of a stressful experience from the past?	36 (97%)	1 (3%)	0	0	0
26. Loss of <i>interest</i> in activities that you used to enjoy?	29 (78%)	5 (14%)	2 (5%)	1 (3%)	0
27. Feeling <i>distant</i> or <i>cut off</i> from other people?	30 (81%)	6 (16%)	1 (3%)	0	0
28. Feeling <i>emotionally numb</i> or being unable to have loving feelings for those close to you?	32 (86%)	4 (11%)	0	1 (3%)	0
29. Feeling as if your <i>future</i> somehow will be <i>cut short</i> ?	35 (95%)	2 (5%)	0	0	0
30. Trouble <i>falling</i> or <i>staying</i> asleep?	22 (59%)	10 (27%)	4 (11%)	1 (3%)	0
31. Feeling <i>irritable</i> or having <i>angry</i> outbursts?	22 (59%)	11 (30%)	2 (5%)	2 (5%)	0
32. Having <i>difficulty concentrating</i> ?	26 (70%)	9 (24%)	1 (3%)	1 (3%)	0
33. Being " <i>super alert</i> " or watchful or on guard?	36 (97%)	1 (3%)	0	0	0
34. Feeling <i>jumpy</i> or easily startled?	34 (92%)	3 (8%)	0	0	0

ALCOHOL QUESTIONNAIRE

In answering the following questions, please remember that a standard drink contains 10g of pure alcohol. Each of these is a standard drink: 1 Middy/Pot of Standard Beer – 1 Glass of Wine – 1 Glass of Sherry – 1 Nip of Spirits.

Please read each question carefully and then indicate, by filling in the circle, the response that best describes your behaviour.

	Never	Once a month or less	2 to 4 times a month	2 to 3 times a week	4 or more times a week
39. How often do you have a drink containing alcohol?	3 (8%)	3 (8%)	14 (38%)	11 (30%)	6 (16%)
	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
40. How many 'standard' drinks (see above) containing alcohol do you have on a typical day when you are drinking?	7 (19%)	16 (43%)	9 (24%)	5 (14%)	0
	Never	Less than once a month or less	Monthly	Weekly	Daily or almost daily
41. How often do you have six or more drinks on one occasion?	6 (16%)	15 (41%)	6 (16%)	9 (24%)	1 (3%)
42. How often during the last 12 months have you found that you were not able to stop drinking once you had started?	35 (95%)	1 (3%)	1 (3%)	0	0
43. How often during the last 12 months have you failed to do what was normally expected from you because of drinking?	37 (100%)	0	0	0	0
44. How often during the last 12 months have you had a feeling of guilt or remorse after drinking?	37 (100%)	0	0	0	0
45. How often during the last 12 months have you needed a drink in the morning to get yourself going after a heavy drinking session?	36 (97%)	1 (3%)	0	0	0
46. How often during the last 12 months have you been unable to remember what happened the night before because you had been drinking?	32 (86%)	4 (11%)	1 (3%)	0	0

	No	Yes, but not in the last 12 months	Yes, during the last 12 months
47. Have you or someone else been injured as a result of your drinking?	33 (89%)	4 (11%)	0
48. Has a relative, a friend, a doctor or other health professional been concerned about your drinking or suggested you cut down? (missing=1)	35 (97%)	1 (3%)	0

	No	Probably not	Unsure	Possibly	Definitely

A. Do you think you presently have a problem with drinking?	36 (97%)	1 (3%)	0	0	0
	Very Easy	Fairly easy	Neither difficult nor easy	Fairly difficult	Very difficult
B. In the next 3 months, how difficult would you find it to cut down or stop drinking?	29 (78%)	3 (8%)	3 (8%)	2 (5%)	0

Appendix 5.1 – Invitation Pack: Final



The Centre for Military and Veterans' Health

Invites you to participate in the Defence Health Study.

This study aims to determine whether the health status of Australia's Veterans differs from that of Australian Defence Force personnel who were not deployed. The Study is being undertaken by health researchers at the University of Queensland and funded by the Department of Defence.

In brief, participation in the Study involves completing a questionnaire about your Service experiences and your health. The questionnaire can be mailed to you, completed on the internet, completed over the phone with a researcher or a researcher can come and visit you at home: whichever you prefer.

This package contains:

- Letter of support from the Chief of Defence Force and the Repatriation Commissioner,
- An Information Sheet explaining the procedures and requirements related to participation in the Study, and
- A Study Consent Form that outlines your rights as a Study participant and the obligations of the Study Investigators.

Please read the enclosed information, particularly the Information Sheet and Consent Form. If you would like to ask any further questions, or register your refusal, please phone the Study Contact and Recruitment team on **1800 886 567**. If you would like to participate please sign the consent form, fill in the sections on *Contact Details* and *Deployments* and return the documents in the prepaid envelope provided.

Thank you for your consideration of this invitation. This study provides a rare opportunity to understand more fully the activities, experiences and associated health impacts of Australia's valued Veterans and Servicemen and Servicewomen. We look forward to including your experience soon.

Thanks

Associate Professor Catherine D'Este
Centre for Military and Veterans' Health
University of Queensland



Dear Participant

The health of members and ex-members of the Australian Defence Force (ADF) is of great importance to both the ADF and the Department of Veterans' Affairs (DVA). It is vital that the ADF possesses the best health deployment information available so that it can effectively monitor, prepare for and lessen any adverse effects of operational deployments on its people.

In order to gather this sort of information, the ADF has commissioned a study of the long-term health and future well-being of ADF personnel who have taken part in recent deployments in the Near North Area of Influence. The first stage of this study will focus on the effects of the deployment to the Solomon Islands, Operation ANODE.

You are therefore invited to participate in the Solomon Islands Health Study, which with your support will assist the ADF in understanding the various health effects of operational deployments, now and into the future. With that knowledge, the ADF will be able to better protect the health of ADF members preparing for and undertaking future deployments. Clearly, the greater the response rate to the study survey, the more useful the study's results will be to the ADF and DVA.

The study will be run by the Centre for Military and Veterans' Health, part of a consortium jointly supported by Defence and DVA and led by the University of Queensland. The study is aimed at members and ex-members who took part in Operation ANODE and, as a comparison group, members who were eligible to go to the Solomon Islands but did not deploy there.

Study participants' information will be used only for the purposes of the deployment studies and will be protected under the provisions of the Privacy Act 1988. Your response will not in any way affect your current status or future prospects within the ADF, or any pension, benefits or health services you are entitled to receive from the Department of Veterans' Affairs. Serving ADF members are encouraged to complete the survey within work time.

Thank you for your consideration of this important study.

Yours sincerely

Handwritten signature of Angus Houston.

Angus Houston, AO, AFC
Air Chief Marshal
Chief of the Defence Force

10 February 2007

Handwritten signature of Bill Rolfe.

Bill Rolfe
Brigadier (Ret'd)
Repatriation Commissioner

10 February 2007

INFORMATION SHEET AND CONSENT FORM

DEFENCE HEALTH STUDY

BRIEF DESCRIPTION OF STUDY

The aim of this study is to better understand the long term health of ADF personnel who have deployed on operations. This phase is the first step in what is anticipated to be a long term follow-up of the health of Defence personnel. In 1999, the Minister for Veterans' Affairs and Minister Assisting the Minister for Defence announced the Government's commitment to conduct health reviews on future overseas deployments. It was decided that this was to be a scientific process to assess the health effects of a service career. Thus, this study is just as important for current or Ex-Serving members who have not deployed.

The Centre for Military and Veterans' Health (CMVH) is a collaborative centre of the University of Queensland, University of Adelaide and Charles Darwin University. CMVH has been contracted by the Australian Defence Force Defence Health Services to conduct this study.

Your assistance is requested by participating in this Defence Health Study. This is one of several deployment health studies being undertaken by CMVH.

This study is a health review of personnel using a questionnaire and data from routine Defence health assessments. We can mail the questionnaire to you, you can complete it on the internet or we can phone you or visit you at home to assist in its completion.

We may need to contact you to clarify some of your responses to the questionnaire. The questionnaire responses will be collated and analysed to determine whether the health of Service personnel differs with regards to aspects of their military careers, in particular related to their deployments and the nature of those deployments. A second part of the study will access some of your Defence health records. These records are your latest Annual Health Assessment, your latest Comprehensive Preventive Medical Examination, and details of vaccinations and antimalarial drugs prescribed in the Defence Force. If you have been deployed we will also access your pre and post deployment health assessment, Return to Australia Psychological Screen (RtAPS) and your Post Operations Psychological Screen (POPS).

This will allow us to link your health now with those experiences during your Service career. You may choose to complete the questionnaire but not provide your consent for linkage to vaccination, medical and psychological records. Your Defence health and psychological data will be accessed in a de-identified form. If you do not consent to linkage of this information with your questionnaire data your Defence health and psychological data will be given a separate study number not linked to the questionnaire study number.

YOUR PART IN THE STUDY

Your participation in the Study is entirely voluntary. There is no obligation to take part in the study. If you are still serving in the Defence Force, or in receipt of a Service-related pension, a decision not to participate will not lead to any detriment to your career or future health care. If you have a claim for compensation or are in receipt of a pension from the Department of Veterans' Affairs, a decision not to participate will not in any way affect your pension or compensation. Your participation or non-participation will not be notified to the Department of Defence or the Department of Veterans' Affairs.

You may withdraw from the study at any time. If you are a Serving member, or in receipt of a Service-related pension, there will be no detriment to your career, pension or future health care should you choose to withdraw. If you have a claim for compensation or are in receipt of a pension from the Department of Veterans' Affairs, a decision to withdraw from the study will not in any way affect your pension or compensation.

If you agree to participate in the study, you will be asked to complete a questionnaire. We ask that you tick a box on the attached form to let us know how you would prefer to complete the questionnaire. If you want us to mail it to you we will send the questionnaire to you and include a reply paid envelope so that you can return it to the Deployed Health Study Team at the University of Queensland. If you would prefer to complete the questionnaire on the internet, you can log in to the website shown below, using the unique username and password provided. If you would like to complete the questionnaire over the phone or have a researcher come and visit you at home, someone will phone you and make an appointment for a day, time and place that suits you. If you would like, we can also send you a printed copy of the questionnaire to make it easier when we go through the questions with you.

It is anticipated that it will take you approximately 30 minutes to one hour to complete the study questionnaire. The amount of time taken will depend on how many of the relevant operations you have deployed on.

There will be no cost to you to be involved in the study. If you have any questions while you are completing the questionnaire, you can phone a Researcher on 1800 886 567 (a toll-free number).

The questionnaire may be mailed out every few years, if you agree to let us contact you again in the future. You can agree to all or any parts of the study.

BENEFITS OF PARTICIPATING

This knowledge may assist you or other Service personnel (current or former) in gaining recognition for Service-related ill-health. It may also assist the ADF in developing the most appropriate supportive and protective measures against future health threats. If you wish we will send you a summary of the results of the study.

RISKS OF PARTICIPATING

There is a theoretical risk involved in participating in this study related to the confidentiality of the information provided in the questionnaire. We have put in place many vigorous processes to prevent and guard against this risk. The handling of this information is discussed below in the section entitled "Your Privacy".

While your contact details have been obtained from the Department of Defence, they will not be aware of whether or not you agree to participate. Your details will not be forwarded to any other individual or agency. Your contact details obtained through this study will not be used for the conduct of any other study unless you provide your consent to be contacted for future health studies by the University of Queensland.

There may be questions you find distressing. Should you feel distressed, you may wish to discuss this with someone. A list of contacts is provided at the end of this invitation package.

Please phone **1800 886 567** to register your voluntary refusal. This has two purposes:

We will know that you have received the Study information package, and we will flag your record to prevent you receiving reminder notices about participation. This saves you aggravation, and saves us lots of time.

It is very important for the Study to know a little about those who decline to participate.

YOUR PRIVACY

All information provided by you will be treated confidentially. The information will not be passed to the Departments of Defence or Veterans' Affairs. Any reports or published articles resulting from the study will not include any personally identifying information and will preserve your anonymity. Any personal data collected will be used for the deployment health studies conducted by CMVH and no other, without your express permission. Data are accessed only by authorised personnel and will be stored on password protected computers and in secure storage facilities at the University of Queensland.

To ensure your privacy you have been given a study number. This is on the top right hand page of all of the documents.

Your study number is: XXXXXX

If you wish to complete the questionnaire over the Internet, you can log in to the following website:

Website address

Your username: XXXXXXXXXXXX
Your Password: XXXXXXXXXXXX

A copy of the Australian Defence Health Research Ethics Committee's *Guidelines for Volunteers* is included for your information regarding your rights in providing consent to volunteer.

The results of the study will be available on the Internet. Alternatively if you wish we can email or mail you a copy. Progress and results of the study, as well as information on future studies will also be available in Service and Ex-service journals and magazines.

PRINCIPAL INVESTIGATOR

Associate Professor Catherine D'Este
Centre for Military and Veterans' Health
Mayne Medical School Building
Herston Road
HERSTON QLD 4006
Contact telephone: 1800 886 567

This study has been cleared by the Australian Defence Human Research Ethics Committee (ADHREC), the Department of Veterans' Affairs Human Research Ethics Committee and the Behavioural and Social Sciences Ethical Review Committee of the University of Queensland in accordance with the National Health and Medical Research Council's guidelines. Should you have any questions, problems or concerns about the conduct of this project, please do not hesitate to contact the Principal Investigator, or you may prefer to contact any of the Ethics Committees at the following addresses.

The Australian Defence Human Research Ethics Committee:

Executive Secretary
Australian Defence Human Research Ethics Committee
CP2-7-66
Department of Defence
CANBERRA ACT 2600
Telephone: 02 6266 3837
Facsimile: 02 6266 4982
Email: ADHREC@defence.gov.au

The University of Queensland Medical Research Ethics Committee:

Executive Secretary
University of Queensland Human Experimental Ethical Review Committee
Office of Research and Post-graduate studies,
Cumbrae-Stewart Building
Research Rd.
University of Queensland
St. Lucia QLD 4072
T: 07 3365 3924
Email: humanethics@research.uq.edu.au

The Department of Veterans' Affairs Human Research Ethics Committee:

HREC Coordinator
Department of Veterans' Affairs Human Research Ethics Committee
Department of Veterans' Affairs
PO Box 21
Woden ACT 2606
T: 02 6289 6537
Email: ethics.committee@dva.gov.au

DEFENCE HEALTH STUDY

CONSENT

Igive my consent to (please tick all parts of the study you wish to consent to):

- Participate in the Defence Health Study questionnaire
- Be contacted periodically for follow-up studies
- Allow linkage of my ADF Medical Documents (Annual Health Assessment, Five Yearly Comprehensive Preventive Health Assessment, Pre-Deployment Medical Checklist, Post-Deployment Health Screen, Vaccination Records) for further information regarding my health during my Service in the ADF
- Allow linkage of my ADF Psychology Documents (RTAPS and POPS) for further information regarding my health during my Service in the ADF

My consent is provided on the following basis:

- I have read the information provide to me about the aims of this research, how it will be conducted and my role in it.
- I understand the risks involved as described above.
- I am cooperating in this project on condition that:
 - The information I provide will be kept confidential.
 - The information will be used only for the longitudinal health studies.
- I can discuss my participation at any time with the Principal Investigator, a Research Assistant or a representative of the one of the relevant Ethics Committees.

I understand that:

- There is no obligation to take part in this study.
- If I choose not to participate there will be no detriment to my career, future health care, service pension, DVA pension or compensation claims.
- I am free to withdraw from the study at any time with no detriment to my career, future health care, service pension, DVA pension or compensation claims.
- My answers will be completely confidential and any personal details, which may identify me in any way, will not be passed to the Department of Veterans' Affairs or the Department of Defence. My answers will not in any way affect my pension, benefits or any health services I am entitled to from DVA. If I wish, I can discontinue my participation in this study at any time.

I have kept a copy of the information / consent sheet, signed by me for my records.
I have also been given a copy of Australian Defence Health Research Ethics Committee's (ADHREC) *Guidelines for Volunteers*.

The study report will be made available to me at my request and any published reports of this study will preserve my anonymity.

- Please forward the report to my Email address
- Please mail the report to my home address

Signature of Volunteer

DATE

THIS PAGE WILL BE STORED SEPARATELY FROM ANY OTHER DETAILS YOU PROVIDE

DEFENCE HEALTH STUDY

CONSENT

Igive my consent to (please tick all parts of the study you wish to consent to):

- Participate in the Defence Health Study questionnaire
- Be contacted periodically for follow-up studies
- Allow linkage of my ADF Medical Documents (Annual Health Assessment, Five Yearly Comprehensive Preventive Health Assessment, Pre-Deployment Medical Checklist, Post-Deployment Health Screen, Vaccination Records) for further information regarding my health during my Service in the ADF
- Allow linkage of my ADF Psychology Documents (RTAPS and POPS) for further information regarding my health during my Service in the ADF

My consent is provided on the following basis:

- I have read the information provide to me about the aims of this research, how it will be conducted and my role in it.
- I understand the risks involved as described above.
- I am cooperating in this project on condition that:
 - The information I provide will be kept confidential.
 - The information will be used only for the longitudinal health studies.
- I can discuss my participation at any time with the Principal Investigator, a Research Assistant or a representative of the one of the relevant Ethics Committees

I understand that:

- There is no obligation to take part in this study.
- If I choose not to participate there will be no detriment to my career, future health care, service pension, DVA pension or compensation claims.
- I am free to withdraw from the study at any time with no detriment to my career, future health care, service pension, DVA pension or compensation claims.
- My answers will be completely confidential and any personal details, which may identify me in any way, will not be passed to the Department of Veterans' Affairs or the Department of Defence. My answers will not in any way affect my pension, benefits or any health services I am entitled to from DVA. If I wish, I can discontinue my participation in this study at any time.

I have kept a copy of the information / consent sheet, signed by me for my records. I have also been given a copy of Australian Defence Health Research Ethics Committee's (ADHREC) *Guidelines for Volunteers*.

The study report will be made available to me at my request and any published reports of this study will preserve my anonymity.

- Please forward the report to my Email address
- Please mail the report to my home address

Signature of Volunteer

DATE

PLEASE DETACH AND RETAIN FOR YOUR RECORDS

STUDY INVESTIGATORS:

Associate Professor Cate D'Este

CMVH, University of Queensland

Ph: (07) 3346 3904

Email: c.deste@uq.edu.au

Associate Professor Scott Kitchener

CMVH, University of Queensland

Ph: (07) 3346 4876

Email: s.kitchener@uq.edu.au

Professor Sandy McFarlane

CMVH, University of Adelaide

Ph: (08) 8303 5200

Email: alexander.mcfarlane@adelaide.edu.au

Dr Sonya Bennett

CMVH, University of Queensland

Ph: (07) 3346 4861

Email: Sonya.Bennett@uq.edu.au

Professor Annette Dobson

CMVH, University of Queensland

Ph: (07) 3365 5346

Email: a.dobson@sph.uq.edu.au

CONTACT DETAILS

To ensure that we have your current contact details, please provide your current residential address. Note: to ensure confidentiality of your information, these pages will be removed by the Study team and stored separately from the rest of the questionnaire. Your questionnaire will be identified by a unique study number only, which will be linked by a code stored securely and separately to the information.

Please fill in details of your current name

Surname

All given names
(underline preferred name)

Your Service Number

Your PMKeys Number

If you have ever changed your name, please provide details here

Previous surname

Given names if different
Years used (start / end)

Other previous surname

Other given names
Years used (start / end)

Please give your current address, contact numbers and Email address

Street number
or PO Box _____

Street _____

Suburb / Town _____

State _____ Postcode _____

Home phone number _____ Home Email _____

Work phone number _____ Work Email _____

Mobile phone number _____

I would prefer to complete the study questionnaire by (please rank your order of preference from 1 – most preferred to 4 – least preferred):

- Mail, to the address provided above.
- Internet
- Phone
- Face-to-face interview

The investigators will try to make sure that you are given the questionnaire in the way you most prefer, however in some cases this may not be possible.

In case you move and we lose contact with you, please give us the names of up to two relatives or friends who may be able to tell us where you are. These should be people who are at long term addresses but who are not living with you. We would only use these alternative contacts in the event that we could not contact you at the address you have provided on the previous page.

Surname

All given names
(underline preferred name)

Current address, contact numbers and Email address

Street number
or PO Box _____

Street _____

Suburb / Town _____

State _____ Postcode _____

Home phone number _____ Home Email _____
Work phone number _____ Work Email _____
Mobile phone number _____

Surname

All given names
(underline preferred name)

Current address, contact numbers and Email address

Street number
or PO Box _____

Street _____

Suburb / Town _____

State _____ Postcode _____

Home phone number _____ Home Email _____
Work phone number _____ Work Email _____
Mobile phone number _____

DEPLOYMENTS

Have you been on an ADF operational deployment (war-like, peacekeeping, peace-monitoring or humanitarian support).

YES

NO

If you have ever been deployed, please indicate where you were actively deployed in the table below.

INSTRUCTIONS: *From this list please mark the **YES** box for those active deployments which apply to you. Then, please write the year in which you were deployed, the approximate duration of your participation in that deployment and indicate whether you were ordered to serve on that deployment or whether you volunteered.*

Were you deployed to:	Yes	Year First Deployed	Duration (Choose the nearest period) (If you went more than once show the total time)				Were you ordered to deploy or did you want to deploy?
			Less than one week	One week to less than one month	One month to less than 6 months	More than 6 months	Ordered / Volunteered
Afghanistan 1991-, 2003 -	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Balkans 1947-,	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bougainville 1997-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cambodia 1993 -1999	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
East Timor 1999-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Former Rep of Yugoslavia 1997-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gulf of Oman 1999	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iraq 2003-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Korea 1953	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Were you deployed to:	Yes	Year First Deployed	Duration (Choose the nearest period) (If you went more than once show the total time)				Were you ordered to deploy or did you want to deploy?	
			Less than one week	One week to less than one month	One month to less than 6 months	More than 6 months	Ordered / Volunteered	
Kuwait 1998	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Middle East 1956-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mozambique 1994 - 2002	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Namibia 1989 - 1990	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Persian Gulf 1990-1991	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Persian Gulf <i>Excluding</i> 1990-1991	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rwanda 1994 -	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sinai 1982-1986, 1993-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solomon Islands 2000-, 2003-	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Somalia 1992-1994	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Special Forces	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vietnam 1962-1975	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Western Sahara 1991 -	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Have you been on any other deployments overseas, including deployments with other nations, please specify destination/s below. Do not include training exercises or goodwill visits (flying the flag).

Where you deployed to:	Who did you deploy with:	Year First Deployed	Duration (Choose the nearest period) (If you went more than once show the total time)				Were you ordered to serve or did you volunteer to serve?	
			Less than one week	One week to less than one month	One month to less than 6 months	More than 6 months	Ordered / Volunteered	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Support Organisations

There may be some questions in the survey which you find distressing. Should you feel distressed, you may wish to discuss this with someone. A list of organisations you may wish to contact is provided below.

Lifeline -

"Lifeline offers 24-hour telephone counselling services, by calling 13 11 14 for the cost of local call. There are also 42 Lifeline Centres across Australia, which can assist with face-to-face counselling services."

"Lifeline also has a "Just Ask" service on 1300 131114 for the cost of a local call. This is for people with mental health difficulties or friends, relatives, professionals, carers and others who look after people with mental health difficulties. "

Veterans' Affairs Network (VAN)

Phone 1300 55 1918 to call the nearest VAN office.
General inquiries number - 133 254 (which connects callers to the nearest DVA office switchboard)
1800 555 254 connects non-metropolitan callers to the nearest DVA office
1300 13 1945 connects callers to any DVA office by using voice prompts.

The directory for the DVA state offices can be found at...
<http://www.dva.gov.au/contacts/van.htm>

Department of Veterans' Affairs

General inquiries 133 254 (which connects callers to their nearest DVA state office)

National office for the Military Compensation and Rehabilitation Service

1300 550 461

Vietnam Veterans' Counselling Service

Call the Veterans' Line - 1800 011 046 from anywhere in Australia



GUIDELINES FOR VOLUNTEERS

AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS

COMMITTEE

Thank you for taking part in Defence Research. Your involvement is much appreciated. This pamphlet explains your rights as a volunteer.

What is ADHREC?

- ADHREC is the Australian Defence Human Research Ethics Committee. It was established in 1988, to make sure that Defence complied with accepted guidelines for research involving human beings.
- After World War II (WWII), there was concern around the world about human experimentation. The Declaration of Helsinki was made in 1964, which provided the basic principles to be followed wherever humans were used in research projects.
- The National Health and Medical Research Council (NHMRC) in Australia published the *National Statement on Ethical Conduct in Research Involving Humans* in 1999. This Statement describes how human research should be carried out.
- ADHREC follows both the Declaration of Helsinki and the NHMRC Statement.

What Australian Defence Human Research Ethics Committee approval means

- If you are told that the project has ADHREC approval, what that means is that ADHREC has reviewed the research proposal and has agreed that the research is ethical.
- ADHREC approval does not imply any obligation on commanders to order or encourage their service personnel to participate, or to release troops from their usual workplace to participate. Obviously, the use of any particular personnel must have clearance from their commanders but commanders should not use ADHREC approval to pressure personnel into volunteering.

Voluntary participation

- As you are a volunteer for this research project, you are under **no obligation** to participate or continue to participate. You may withdraw from the project **at any time** without detriment to your military career or to your medical care.
- At no time must you feel pressured to participate or to continue if you do not wish to do so.
- If you do not wish to continue, it would be useful to the researcher to know why, but you are under no obligation to give reasons for not wanting to continue.

Informed consent

- Before commencing the project you will have been given an information sheet which explains the project, your role in it and any risks to which you may be exposed.
- You must be sure that you understand the information given to you and that you ask the researchers about anything of which you are not sure.
- If you are satisfied that you understand the information sheet and agree to participate, you should initial every page of the information sheet and keep a copy.
- Before you participate in the project you should also have been given a consent form to sign. You must be happy that the consent form is easy to understand and spells out what you are agreeing to. Again, you should keep a copy of the signed consent form.

Tracing of research participants

- Media reports of human experimentation during times of conflict, eg WWII, Vietnam War, have raised the issue of being able to trace study participants, some time in the future, should any problems arise that may be related to the research conducted.
- To facilitate this, ADHREC requires that the researcher provide a nominal roll of study participants for safekeeping by ADHREC, where the study is a clinical trial (eg. When the researchers are trialling a new treatment or device). For trials conducted by large Defence institutions like the Defence Science and Technology Organisation (DSTO), the School of Underwater Medicine (SUMU), the Army Malaria Institute (AMI), the Institute of Aviation Medicine (AVMED), or the Centre for Military and Veterans' Health (CMVH), this role is kept by them on ADHREC's behalf. We need to know who you are, only so that we can find you in the future, if there is any suggestion that the research may have been associated with the development of any health problems. Please note that a health study is not a clinical trial, and as such does not require the researcher to provide ADHREC with a nominal roll.
- This is consistent with current Occupational Health and Safety and Health Surveillance practices, and is encouraged under the NHMRC Guidelines.
- All ADHREC protocol files are secured in a locked filing cabinet and only the Secretariat has access to these. ADHREC will not pass your contact information to a third party without your permission.
- These records will not be used to consider your medical employment standard or for compensation purposes.

Complaints

- If at any time during your participation in the project you are worried about how the project is being run or how you are being treated, then you should speak to the researchers.
- If you don't feel comfortable doing this, you can contact the Executive Secretary of ADHREC. Contact details are:

Executive Secretary
Australian Defence Human Research Ethics Committee
CP2-7-124
Department of Defence
CANBERRA ACT 2600
Telephone: (02) 6266 3837
Facsimile: (02) 6266 4068
Email: ADHREC@defence.gov.au

More information

- If you would like to read more about ADHREC, you can look up the following references:

Internet: <http://www.defence.gov.au/dpe/dhs/research/adhrec/i-adhrec.htm>

Intranet: <http://defweb2.cbr.defence.gov.au/dpedhs/infocentre/research/adhrec/default.htm>

Appendix 5.2 – Media Summary for Solomon Islands Health Study: Defence and Ex-Serving Publications

Publication	Date Published
Advertisements	
Australian Peacekeepers and Peacemakers Veterans' Association (APPVA) Magazine	Jan/Feb 2007 Jun 2007
Defence Today	29 Jan 2007
Service Newspapers (Army, Navy and Airforce News)	22 Feb 2007 8 Mar 2007 22 Mar 2007
Wings Magazine	Feb 2007
Editorials	
Australian Peacekeepers and Peacemakers Veterans' Association (APPVA) magazine	Jan/Feb 2007 Jun 2007
Defence Family Matters	Spring 2006 Spring 2007
Defence Today	Oct/Nov 2006 29 Jan 07
RSL NSW (Reveille)	Nov/Dec 2006
Service Newspapers (Army, Navy and Airforce News)	5 Oct 2006 8 Feb 2007 22 Feb 2007
Vetaffairs	Nov 2006

Appendix 5.3 – Questionnaire: Health and Demographics Section



The Centre for Military and Veterans' Health

Defence Health Questionnaire

Thank you for agreeing to participate in the Defence Health Study.

This Study aims to determine whether the health status of Australia's Veterans differs from that of Australian Defence Force personnel who were not deployed. The Study is being undertaken by medical researchers at the Centre for Military and Veterans' Health at the University of Queensland. If you have any questions about this study, or would like to talk with someone you can call our toll-free number **1800 886 567**.

Remember that your study number is on the top right hand corner of every page of the questionnaire.

There may be questions you find distressing. Should you feel distressed, you may wish to discuss this with someone. A list of contacts is provided at the end of this invitation package.

Thank you for your participation.

Associate Professor Catherine D'Este
Centre for Military and Veterans' Health
University of Queensland

Support Organisations

There may be some questions in the survey which you find distressing. Should you feel distressed, you may wish to discuss this with someone. A list of organisations you may wish to contact is provided below.

Lifeline -

"Lifeline offers 24-hour telephone counseling services, by calling 13 11 14 for the cost of local call. There are also 42 Lifeline Centres across Australia, which can assist with face-to-face counselling services."

"Lifeline also has a "Just Ask" service on 1300 131114 for the cost of a local call. This is for people with mental health difficulties or friends, relatives, professionals, carers and others who look after people with mental health difficulties. "

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The directory for the DVA state offices can be found at...

<http://www.dva.gov.au/contacts/van.htm>

Department of Veterans' Affairs

General inquiries 133 254 (which connects callers to their nearest DVA state office)

National office for the Military Compensation and Rehabilitation Service

1300 550 461

Vietnam Veterans' Counselling Service

Call the Veterans' Line - 1800 011 046 from anywhere in Australia

Health outcomes

RECENT HEALTH SYMPTOMS

1. We would like to know about your health in the **PAST MONTH**. Please indicate whether or not you have suffered any of the following symptoms in the **PAST MONTH**, and if so, please indicate whether your symptoms were mild, moderate or severe in nature.

In the past month have you suffered from	NO Not at all	Yes Mild	Yes Moderate	Yes Severe
Chest pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rapid or pounding heart beat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irritability / outbursts of anger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shortness of breath	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheezing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sleeping difficulties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling jumpy / easily startled	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling unrefreshed after sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fatigue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double vision	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intolerance to alcohol	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itchy or painful eyes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rash or skin irritation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skin infections e.g. boils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skin ulcers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tingling or burning sensation in hands or feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of sensation in hands or feet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling distant or cut off from others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constipation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flatulence or burping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stomach cramps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indigestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dry mouth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In the past month have you suffered from	NO Not at all	Yes Mild	Yes Moderate	Yes Severe
Pain in the face, jaw, in front of the ear, or in the ear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Persistent cough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sore throat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forgetfulness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dizziness, fainting or blackouts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seizures or convulsions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling disorientated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of concentration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty finding the right word	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain on passing urine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Passing urine more often	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of control over bladder or bowels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burning sensation in the sex organs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of interest in sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Problems with sexual functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased sensitivity to noise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased sensitivity to light	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased sensitivity to smells or odours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ringing in the ears	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avoiding doing things or situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pain, without swelling or redness, in several joints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiffness in several joints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General muscle aches or pains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of balance or coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty speaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low back pain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Night sweats which soak the bed sheets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling feverish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tender or painful swelling of lymph glands in neck, armpit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In the past month have you suffered from	NO Not at all	Yes Mild	Yes Moderate	Yes Severe
or groin				
Loss of, or decrease in, appetite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nausea	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vomiting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distressing dreams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unintended weight gain greater than 4kg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unintended weight loss greater than 4kg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

YOUR HEALTH IN GENERAL

2. In general, would you say that your health is?

- Excellent Very good Good Fair Poor

3. I see myself as someone who has high self-esteem.

- Strongly agree Agree Neither agree or disagree Disagree Strongly disagree

4. In general I consider myself a happy person.

- Strongly agree Agree Neither agree or disagree Disagree Strongly disagree

5. I generally believe my life will be valuable and productive.

- Strongly agree Agree Neither agree or disagree Disagree Strongly disagree

6. Even when things go right, I often fear that my future is not under my control.

- Strongly agree Agree Neither agree or disagree Disagree Strongly disagree

7. I confide my feelings to others to build up and maintain close relationships.

- Strongly agree Agree Neither agree or disagree Disagree Strongly disagree

8. How often over the last month did you get angry at someone and yell or shout at them?

- Never One time Two times Three or four times Five or more times

9. How often over the last month did you get angry with someone and kick or smash something, slam the door, punch the wall, etc.?

- Never One time Two times Three or four times Five or more times

10. How often over the last month did you get into a fight with someone and hit the person?

- Never One time Two times Three or four times Five or more times

11. How often over the last month did you threaten someone with physical violence?

- Never One time Two times Three or four times Five or more times

12. In the past month, about how often did you feel tired for no good reason?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

13. In the past month, about how often did you feel nervous?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

14. In the past month, about how often did you feel so nervous that nothing could calm you down?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

15. In the past month, about how often did you feel hopeless?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

16. In the past month, about how often did you feel restless or fidgety?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

17. In the past month, about how often did you feel so restless that you could not sit still?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

18. In the past month, about how often did you feel depressed?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

19. In the past month, about how often did you feel that everything was an effort?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

20. In the past month, about how often did you feel so sad that nothing could cheer you up?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

21. In the past month, about how often did you feel worthless?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| All of the Time | Most of the time | Some of the time | A little of the time | None of the time |

22. Beginning yesterday and going back one month, how many days out of the past month were you totally unable to work? _____ days

How many of these days were due to your emotions, nerves, mental health or your use of alcohol or other drugs? _____ days

23. Beginning yesterday and going back one month, how many days out of the past month were you able to work, but had to cut back on what you did, or did not get as much done as usual? _____ days

How many of these days were due to your emotions, nerves, mental health or your use of alcohol or other drugs? _____ days

24. Beginning yesterday and going back one month, how many days out of the past month were you totally unable to carry out your normal family and social activities? _____ days

How many of these days were due to your emotions, nerves, mental health or your use of alcohol or other drugs? _____ days

25. Beginning yesterday and going back one month, how many days out of the past month were you able to carry out your normal family and social activities, but had to cut back on what you did, or not get as much done as usual? _____ days

How many of these days were due to your emotions, nerves, mental health or your use of alcohol or other drugs? _____ days

DENTAL HEALTH SYMPTOMS

	Very often	Fairly often	Occasional	Hardly ever	Never	Don't know
26. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Have you had painful aching in your mouth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Have you been self-conscious because of your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Have you felt tense because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Have you had to interrupt meals because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Have you found it difficult to relax because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dental health symptoms	Very often	Fairly often	Occa sional ly	Hardly ever	Neve r	Don't know
35. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Have you been totally unable to function because of problems with your teeth, mouth or dentures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remember, the Study team is available on **1800 886 567** if you are unsure about how to complete any section of this questionnaire. Please call any time Monday to Friday during business hours.

DIAGNOSED OR TREATED MEDICAL CONDITIONS

*We would like to know whether a medical doctor has ever diagnosed you with, or treated you for, any of the following medical problems or conditions. If YES, please indicate the year you were first diagnosed, and whether you have been treated by a medical doctor for this condition in the **past year**.*

40. Has a medical doctor ever diagnosed you with, or treated you for any of the following medical problems or conditions?	NO	YES	If YES	
			Year first diagnosed	Has this condition been treated by a doctor in the past year?
High blood pressure	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Heart disease or condition	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Stroke	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Epilepsy	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Migraines	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Motor neurone disease	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Multiple sclerosis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Asthma	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Bronchitis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Pneumonia	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Tuberculosis (TB)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Other lung disease, e.g. emphysema	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Stomach or duodenal ulcers	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Colitis / Crohn's disease	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Hepatitis or yellow jaundice	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Cirrhosis of the liver	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Bowel disorder e.g. diarrhoea, constipation, bleeding	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Irritable bowel syndrome	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Kidney disease e.g. stones, infection, bleeding	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Bladder disease e.g. infection, bleeding	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Incontinence or difficulty passing urine	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES

Has a medical doctor ever diagnosed you with, or treated you for any of the following medical problems or conditions?	NO	YES	If YES	
			Year first diagnosed	Has this condition been treated by a doctor in the past year?
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
A thyroid problem	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Blood disorder	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Malaria	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Dengue	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Any significant infections	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Leishmaniasis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Filariasis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Arthritis or rheumatism	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Fibrositis or fibromyalgia	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Back or neck problems	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Joint problems	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Eye or vision problems eg glaucoma	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Sinus problems	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Ear infection	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Hearing loss	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Dermatitis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Eczema	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Psoriasis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Malignant melanoma	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Other skin cancer eg squamous cell or basal cell skin cancers	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Any other kind of cancer, tumour or malignancy (please specify type)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
More than 25 moles on your body	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Any other skin problem	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Any disease of the hair or scalp, including hair loss.	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES

Has a medical doctor ever diagnosed you with, or treated you for any of the following medical problems or conditions?	NO	YES	If YES	
			Year first diagnosed	Has this condition been treated by a doctor in the past year?
Chronic Fatigue Syndrome	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Alcohol abuse or dependency	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Drug abuse or dependency	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Anxiety, stress or depression	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Post traumatic Stress Disorder	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Other psychiatric or psychological condition needing treatment or counselling (please specify type)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Sleep apnoea	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Narcolepsy	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Hay fever	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
fungal disease or candidiasis	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Multiple chemical sensitivity or environmental illness	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Sick building syndrome	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Food allergy	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Any disease of the genital organs	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Sexual problems	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES

DIAGNOSED OR TREATED MEDICAL CONDITIONS - WOMEN ONLY:

			Year first diagnosed	Has this condition been treated by a doctor in the past year?
Premenstrual tension	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES
Period problems	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/> NO <input type="checkbox"/> YES

41. Apart from those listed in the table at question 40, are there any other medical problems or conditions which a medical doctor has diagnosed you with, or treated you for?

NO YES

If YES, please complete the following table indicating which condition/s, what year were you first diagnosed, and have you been treated for that condition by a medical doctor in the past year?

Which condition?	Year first diagnosed	Has this condition been treated by a doctor in the past year?
		<input type="checkbox"/> NO <input type="checkbox"/> YES
		<input type="checkbox"/> NO <input type="checkbox"/> YES
		<input type="checkbox"/> NO <input type="checkbox"/> YES
		<input type="checkbox"/> NO <input type="checkbox"/> YES

42. During the past year, have you been hospitalised overnight or longer because of illness or injury?

NO YES

If YES, please specify why and for how many days:

Hospitalisation in past year	Number of days	Reason for hospitalisation
1 st admission		
2 nd admission		
3 rd admission		
4 th admission		

MEDICATIONS

43. Are you CURRENTLY taking any medicines including tablets, creams, inhalers, or other drugs?

NO. YES

If YES, what kind:

Name of medication (*e.g. Zantac*)

FAMILY HISTORY

44. Has anyone in your immediate family (that is your parents, brothers, sisters or grandparents) had a history of

Asthma?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
A stroke when they were less than 65 years of age?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
A heart attack when they were less than 65 years of age?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Diabetes?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Cancer?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Melanoma?	<input type="checkbox"/> NO	<input type="checkbox"/> YES

SMOKING

45. Over your lifetime, would you have smoked as much as 100 cigarettes or a similar amount of tobacco?

YES

NO

If YES go to question 46

If NO go to question 49

46. Do you currently smoke as much as one cigarette per day (or 1 cigar per week or 1 gram of tobacco per month)?

YES

NO, go to question 47

If YES:

a. How old were you when you started smoking as much as one cigarette per day (or 1 cigar per week or 1 gram of tobacco per month)?

_____ Age in years

b. What is the average number of cigarettes per day, grams of tobacco per day and/or number of cigars per week that you currently smoke?

_____ Cigarettes per day

_____ Grams of tobacco per day (do not include tobacco from
Cigarettes or cigars)

_____ Cigars per week

Go to question 48.

47. Have you ever smoked as much as one cigarette per day (or 1 cigar per week or 1 gram of tobacco per month)?

YES

NO, go to question 48

If YES:

a. How old were you when you started smoking as much as one cigarette per day (or 1 cigar per week or 1 gram of tobacco per month)?

_____ Age in years

b. How old were you when you stopped smoking as much as one cigarette per day (or 1 cigar per week or 1 gram of tobacco per month)?

_____ Age in years

c. What was the average number of cigarettes per day, grams of tobacco per day and/or number of cigars per week that you smoked?

_____ Cigarettes per day

_____ Grams of tobacco per day (don't include tobacco from
cigarettes or cigars)

_____ Cigars per week

If YES, go to question 48.

48. Compared with before you deployed, was your smoking pattern different while on deployment?

I smoked more than usual while on deployment

I smoked the same amount on deployment as when not deployed

I smoked less than usual while on deployment

I did not smoke on deployment

If your smoking pattern changed during your deployment, what is the main reason? (please specify) _____

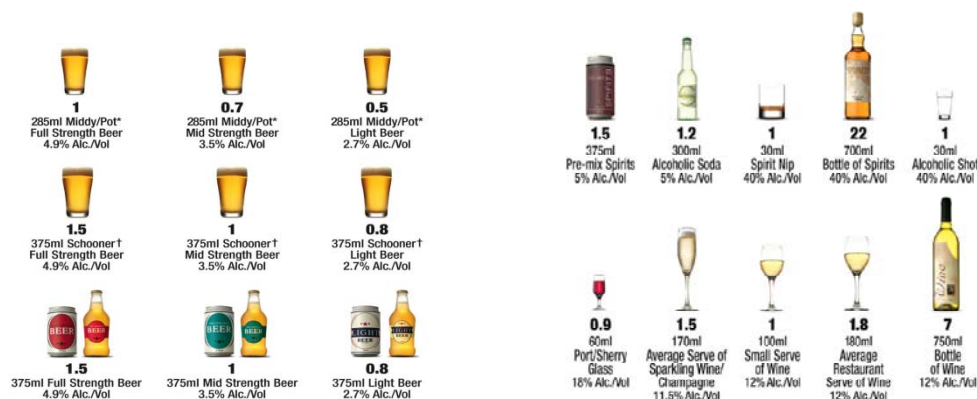
ALCOHOL

49. How often do you have a drink containing alcohol?

- Never
 Less than once a month
 Monthly
 Weekly
 Daily or almost daily

If NEVER, go to question 59

In answering the following questions, please remember that a standard drink contains 10g of pure alcohol



50. How many 'standard' drinks (see above) containing alcohol do you have on a typical day when you are drinking?

- 1 or 2
 3 or 4
 5 or 6
 7 to 9
 10 or more

51. How often do you have six or more drinks on one occasion?

- Never
 Less than once a month
 Monthly
 Weekly
 Daily or almost daily

52. How often during the last year have you found that you were not able to stop drinking once you had started?

- Never
 Less than once a month
 Monthly
 Weekly
 Daily or almost daily

53. How often during the last year have you failed to do what was normally expected from you because of drinking?

- Never
 Less than once a month
 Monthly
 Weekly
 Daily or almost daily

54. How often during the last year have you needed a drink in the morning to get yourself going after a heavy drinking session?

- Never
 Less than once a month
 Monthly
 Weekly
 Daily or almost daily

55. How often during the last year have you had a feeling of guilt or remorse after drinking?

- | | | | | |
|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never | Less than once
a month | Monthly | Weekly | Daily or almost
daily |

56. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

- | | | | | |
|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never | Less than once
a month | Monthly | Weekly | Daily or almost
daily |

57. Have you or someone else been injured as a result of your drinking?

- | | | |
|--------------------------|----------------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No | Yes, but not in
the last year | Yes, during the
last year |

58. Has a relative, a friend, a doctor or other health professional been concerned about your drinking or suggested you cut down?

- | | | |
|--------------------------|----------------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No | Yes, but not in
the last year | Yes, during the
last year |

LIFE EXPERIENCES

59. Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each question carefully and then indicate, the response that best describes how much you have been bothered by that problem **in the past month**.

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Repeated, disturbing <i>memories, thoughts or images</i> of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Repeated, disturbing <i>dreams</i> of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suddenly <i>acting or feeling</i> as if a stressful experience were happening again (as if you were reliving it)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling <i>very upset</i> when <i>something reminded</i> you of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having <i>physical reactions</i> (eg heart pounding, trouble breathing, sweating) when <i>something reminded</i> you of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avoiding <i>thinking about</i> or <i>talking about</i> a stressful experience from the past or avoiding <i>having feelings</i> related to it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avoiding <i>activities</i> or <i>situations</i> because <i>they reminded</i> you of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trouble <i>remembering important parts</i> of a stressful experience from the past?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of <i>interest</i> in activities that you used to enjoy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling <i>distant</i> or <i>cut off</i> from other people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling <i>emotionally numb</i> or being unable to have loving feelings for those close to you?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling as if your <i>future</i> somehow will be <i>cut short</i> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>How much you have been bothered by the following problem in the past month?</i>	Not at all	A little bit	Moderately	Quite a bit	Extremely
Trouble <i>falling</i> or <i>staying</i> asleep?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling <i>irritable</i> or having <i>angry</i> outbursts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having <i>difficulty concentrating</i> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Being " <i>super alert</i> " or watchful or on guard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling <i>jumpy</i> or easily startled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

60. From your answers above, the event, or group of events, you experienced was:

Year: _____

Event:

YOUR CHILDREN'S HEALTH AND YOUR PREGNANCY HISTORY (including your partner's)

We would now like to ask you some questions about your pregnancy history (if you are female) or that of your spouse/partner/s (if you are male). You may need to refer to your spouse/partner/s, or to your Child Health Record, to assist you in answering these questions. Your answers to these questions will help us compare your experience with information held in Australian National Registries, as well as the experiences of military personnel and their families as a whole.

61. How many times have you EVER been pregnant or fathered a pregnancy?

_____ times (please specify)

If your answer to question 61 is zero (0) please GO TO question 64

If one or more, proceed with question 62.

62. If you answered YES in question 65 please provide additional information, if known, about those particular pregnancies in the following table. Please complete a separate column for each pregnancy - pregnancies involving twins/triplets will require multiple columns.

PREGNANCY OUTCOME	1 st pregnancy	2 nd pregnancy	3 rd pregnancy	4 th pregnancy	5 th pregnancy
Miscarriage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Termination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stillbirth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Live birth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of the event/birth	___/___/___ day mth yr	___/___/___ day mth yr	___/___/___ day mth yr	___/___/___ day mth yr	___/___/___ day mth yr
Number of weeks pregnant At time of event/birth (if known) Note: Full term is 40 weeks	___ weeks <input type="checkbox"/> Not known	___ weeks <input type="checkbox"/> Not known	___ weeks <input type="checkbox"/> Not known	___ weeks <input type="checkbox"/> Not known	___ weeks <input type="checkbox"/> Not known
If miscarriage, stillbirth or live preterm birth, please specify the cause (if known)	_____ <input type="checkbox"/> Not known	_____ <input type="checkbox"/> Not known	_____ <input type="checkbox"/> Not known	_____ <input type="checkbox"/> Not known	_____ <input type="checkbox"/> Not known
Was this a twin / multiple pregnancy?	<input type="checkbox"/> NO <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> YES	<input type="checkbox"/> NO <input type="checkbox"/> YES
In which State or Territory did the event/birth occur?	<input type="checkbox"/> NSW <input type="checkbox"/> QLD <input type="checkbox"/> VIC <input type="checkbox"/> ACT <input type="checkbox"/> WA <input type="checkbox"/> SA <input type="checkbox"/> TAS <input type="checkbox"/> NT	<input type="checkbox"/> NSW <input type="checkbox"/> QLD <input type="checkbox"/> VIC <input type="checkbox"/> ACT <input type="checkbox"/> WA <input type="checkbox"/> SA <input type="checkbox"/> TAS <input type="checkbox"/> NT	<input type="checkbox"/> NSW <input type="checkbox"/> QLD <input type="checkbox"/> VIC <input type="checkbox"/> ACT <input type="checkbox"/> WA <input type="checkbox"/> SA <input type="checkbox"/> TAS <input type="checkbox"/> NT	<input type="checkbox"/> NSW <input type="checkbox"/> QLD <input type="checkbox"/> VIC <input type="checkbox"/> ACT <input type="checkbox"/> WA <input type="checkbox"/> SA <input type="checkbox"/> TAS <input type="checkbox"/> NT	<input type="checkbox"/> NSW <input type="checkbox"/> QLD <input type="checkbox"/> VIC <input type="checkbox"/> ACT <input type="checkbox"/> WA <input type="checkbox"/> SA <input type="checkbox"/> TAS <input type="checkbox"/> NT
Baby's sex (if known)	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not known
Birth weight (if known)	___ lbs ___ oz _____ kgs <input type="checkbox"/> Not known	___ lbs ___ oz _____ kgs <input type="checkbox"/> Not known	___ lbs ___ oz _____ kgs <input type="checkbox"/> Not known	___ lbs ___ oz _____ kgs <input type="checkbox"/> Not known	___ lbs ___ oz _____ kgs <input type="checkbox"/> Not known

PREGNANCY OUTCOME	1 st pregnancy	2nd pregnancy	3 rd pregnancy	4 th pregnancy	5 th pregnancy
Presence of birth defect (eg, cleft lip/palate)	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO
	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____
	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known
Presence of chromosomal abnormality (eg, Down syndrome)	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO
	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____
	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known

63. For all of your liveborn children, have any of the children died, had a cancer or other serious health problem?

- If NO go to question 68. If YES please complete the rest of the table below.

PREGNANCY OUTCOME	1 st pregnancy	2nd pregnancy	3 rd pregnancy	4 th pregnancy	5 th pregnancy
Cancers?	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO
	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____	<input type="checkbox"/> YES specify type _____
	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known
Other serious health problems?	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO
	<input type="checkbox"/> YES specify problem _____	<input type="checkbox"/> YES specify problem _____	<input type="checkbox"/> YES specify problem _____	<input type="checkbox"/> YES specify problem _____	<input type="checkbox"/> YES specify problem _____
	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known
Has any child died?	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO	<input type="checkbox"/> NO
	<input type="checkbox"/> YES specify cause _____	<input type="checkbox"/> YES specify cause _____	<input type="checkbox"/> YES specify cause _____	<input type="checkbox"/> YES specify cause _____	<input type="checkbox"/> YES specify cause _____
	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known	<input type="checkbox"/> Not known

64. Have you and your partner ever been unable to get pregnant after trying for 12 months?

- NO
 YES
If YES

When did you start trying to get pregnant? Please specify year _____

Was there any cause for infertility found?

NO YES, please specify _____

Have you sought or undertaken infertility treatment?

NO YES

Have you managed to get pregnant or father a pregnancy since then?

NO YES ➔ Which year? __ __ __ __ year

Demographics/background

BACKGROUND DETAILS

Now we have some general questions.

1. Are you male or female? Male Female
2. What is your date birth? ___ / ___ / 19 ___ (day/ month/ year)
3. In which country were you born?
 - Australia
 - New Zealand
 - United Kingdom
 - Republic of Ireland
 - Italy
 - Germany, Federal Republic of
 - Greece
 - India
 - Canada
 - Lebanon
 - Malaysia
 - Malta
 - Philippines
 - Poland
 - South Africa
 - USA
 - Vietnam
 - China
 - Netherlands
 - Vietnam
 - Yugoslavia (Former) NFD
 - Other , please specify_____

4. Do you regard yourself as being of Aboriginal or Torres Strait Islander origin?

(If you are both Aboriginal and Torres Strait Islander origin, mark both “yes” boxes).

- NO
- YES - Aboriginal
- YES – Torres Strait Islander

5. Do you usually speak English in your household?

- YES
- NO

6. What is your current ADF marital status? Choose one.

- Married
- De facto relationship (ADF recognised)
- De facto relationship (not ADF recognised)
- Separated
- Divorced
- Widowed
- Single, never married
- Other, please specify _____

7. Which category best describes the highest educational qualification you have completed? Choose one.

- Primary school
- Secondary school up to grade 10
- Secondary school grades 11-12
- Certificate (trade, apprenticeship, technicians etc)
- Diploma (associate, undergraduate)
- Bachelor degree
- Post-graduate qualification
- Other

8. What is your current occupational status?

- Paid employment full-time
- Paid employed part-time/casual
- Volunteer/community work
- Student
- Home duties

- Retired
- Not working due to ill-health / TPI
- Unemployed
- Other, please specify _____

9. How many hours per week do you normally work? _____

10. If you have separated from the ADF, have you had a period of unemployment greater than 3 months?

- YES NO

Was this period of unemployment primarily due to health problems?

- YES NO

If YES, please specify type _____

11. What is your main source of income now? Choose one

- Wage or salary
- Own business or share in a partnership
- Age Service pension
- Invalidity Service Pension
- Compensation benefit
Under the VEA SRCA MRCA
- Other government pension / allowance / benefit
- Child allowance
- Superannuation / annuity
- Dividends / interest / income from investments
- Other _____ please

12. Are you in receipt of any type of pension?

- YES NO

13. Please indicate your current service status.

- Australian Army
- Australian Army Reserve – Active / General
- Australian Army Reserve – Stand-by / Inactive
- Royal Australian Navy
- Royal Australian Navy Reserves – Active
- Royal Australian Navy Reserves – Stand-by

- Royal Australian Air Force
- RAAF Reserve - Active
- RAAF Reserve – Stand-by / General
- RAAF Reserve – Specialist
- Ready Reserve (Navy)
- Ready Reserve (Army)
- Ready Reserve (Air Force)
- Civilian employed by Dept of Defence
- Civilian contracted by Dept of Defence
- Foreign armed services
- Not in any service or Defence Force

YOUR BACKGROUND

People come to the military from a variety of different backgrounds. We are interested to see if and how experiences before you joined the Defence Forces affect your health and well-being.

14. I come from a close family True False
15. I used to get shouted at a lot at home True False
16. I often used to play truant from school True False
17. I felt valued by my family True False
18. I regularly used to see or hear physical fighting or verbal abuse between my parents
 True False
19. In my family there was at least one member I could talk to about things that were important to me True False
20. I used to be hit / hurt by a parent or caregiver regularly
 True False
21. One or more of my parents had problems with drugs or alcohol
 True False
22. My family used to do things together
 True False
23. I spent some time (any time) in Local Authority Care / Social Services
 True False
24. I had one special teacher / youth worker / family friend who looked out for me
 True False
25. I often used to get into physical fights at school
 True False

26. There was at least one thing / activity that I did that made me feel special or proud
 True False
27. I was suspended / expelled from school (ever)
 True False
28. I had problems with reading or writing at school and needed extra help
 True False
29. I did things that should have got me (or did get me) into trouble with the police
 True False

Questions 30 and 31 are important to assess your skin cancer risk.

30. What is your eye colour? Please specify _____
31. What was your hair colour during your childhood?
 Please specify _____
32. How tall are you? (Please indicate in cm) _____
33. How much do you currently weigh?
 (Please indicate in kgs) _____

RECREATION AND SOCIAL ACTIVITIES

Please answer the following questions regarding your recreation and social activities.

34. Do you commemorate significant military-related occasions such as attending ANZAC day services, participate in marches or attend dawn services?
 No Yes
35. Do you know of other service veterans living near you?
 No Yes
36. Are any of your close relatives (parents, siblings) military veterans?
 No Yes
37. Please answer the following questions about your participation in social and recreational activities.

How often do you	Every day	Several times per week	Weekly or fortnightly	Monthly	Rarely or on special occasions	Never
Have contact with an ex-service organisation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have social contact with other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How often do you	Every day	Several times per week	Weekly or fortnightly	Monthly	Rarely or on special occasions	Never
veterans?						
Have contact with friends or relatives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attend social activities such as watching sport, eat meals or watch movies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Play sport (golf, fishing, exercise)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Set aside time to do a hobby (wood work, craft, music)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Set aside time to relax (watch TV, read, listen to music)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do voluntary work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for completing this questionnaire. Your participation is appreciated.

Please return your completed questionnaire in the envelope provided.

Appendix 5.4 – Questionnaire: SI Deployment Section

YOUR DEPLOYMENT TO THE SOLOMON ISLANDS

We would like to know some specific details about your deployment to the Solomon Islands.

1. What were your MAIN duties during your deployment to the Solomon Islands?

(please mark all boxes that apply)

- | | |
|---|--|
| <input type="checkbox"/> Combat | <input type="checkbox"/> Logistics / supply |
| <input type="checkbox"/> Medical / welfare | <input type="checkbox"/> Air crew |
| <input type="checkbox"/> On board small craft (eg RHIB) | <input type="checkbox"/> Engineering |
| <input type="checkbox"/> On board above deck (major / minor vessel) | <input type="checkbox"/> Catering |
| <input type="checkbox"/> On board below deck (major / minor vessel) | <input type="checkbox"/> Administrative |
| <input type="checkbox"/> Intelligence | <input type="checkbox"/> Communications |
| <input type="checkbox"/> Military police | <input type="checkbox"/> Flight operations |
| <input type="checkbox"/> Musician | <input type="checkbox"/> Warfare Branch |
| <input type="checkbox"/> Air force protection | <input type="checkbox"/> Other, please specify _____ |

2. What was your rank when you were FIRST deployed to the Solomon Islands?

Please specify _____

3. Please indicate your service status during this deployment.

- Reservist on Full Time Service
- Full time member
- Other _____ please specify

4. Were you given a medical waiver in order to deploy to the Solomon Islands?

- Yes No Don't know

5. Were you given an administrative waiver in order to deploy to the Solomon Islands?

- Yes No Don't know

6. How many times did you deploy to the Solomon Islands? _____

7. How long in total were you deployed to the Solomon Islands? _____/_____

(months/weeks)

8. When did your FIRST deployment to the Solomon Islands begin?

Please include the month and year if you can recall them. _____/_____(month/year)

9. When did your LAST deployment to the Solomon Islands end?

Please include the month and year if you can recall them ____/____(month/year)

10. When you first deployed to the Solomon Islands did you know how long you would be deploying for?

- Yes No Don't know

11. What would have been your preferred length of deployment to the Solomon Islands?

- 1 month
 3 months
 4 months
 6 months
 Other (please specify) _____

12. Why did you leave the Solomon Islands? Please tick all that apply.

- End of the deployment
 Returned to Australia because of injury or illness
 Compassionate reasons or problems with family
 To attend a professional / military training course
 A routine posting to another unit
 To return to civilian employment (Reserve or Specialist forces only)
 Disciplinary reasons
 Administrative reasons (please specify) _____
 Other reason (please specify) _____

INSTRUCTIONS Use the map below to identify where you were on land or sea in or around the Solomon Islands. If you went to six or more locations please identify the **five** locations in which you spent the most time.



13. Which ground locations did you serve at or visit and how long were you there?

	Location	Length of Time		
		Days	Weeks	Months
1st location				
2nd location				
3rd location				
4th location				
5th location				

VACCINATIONS & MEDICATIONS

INSTRUCTIONS *We would like to know about any vaccinations and medications you received as part of your deployment. If you do not have your 'yellow book', please still complete this section to the best of your ability.*

14. As part of your deployment to the Solomon Islands, how many vaccinations did you receive in direct preparation for the Solomon Islands?

- none 1 2 3 4 5 6 ≥7

15. Over what time period did you receive these?

- all in one session
 across 1 week
 across 2-4 weeks
 across a period > 4 weeks
 did not receive any injections in direct preparation for deployment

16. Did you take tablets to protect you against malaria on the deployment?

- No Yes Don't know

If Yes,

a. Which antimalarial did you use mostly?

- Doxycycline (Doxy) Mefloquine (Lariam)
 Malarone Other _____
 Don't Know

b. Did you change antimalarial drug?

- No Yes,
If yes, what to?
 Doxycycline (Doxy) Mefloquine (Lariam)
 Malarone Other _____
 Don't Know

c. Did you take your antimalarial drugs?

- All the time
 Most of the time
 Some of the time
 Rarely or never

17. Did you use primaquine on return to Australia (post exposure prophylaxis)?

No Yes Don't know

If Yes,

a. How often were you directed to take primaquine?

Two times per day

Three times per day

b. Did you take your primaquine...?

As directed

Most of the time

Some of the time

Rarely or never

18. Did you take any other prescription medications (not prescribed within military system or otherwise) during your time in the Solomon Islands (e.g. asthma medications)?

No Yes Don't know

If Yes, please specify _____

19. Did you have a significant reaction to any vaccination(s) or medication(s) that you received for your deployment to the Solomon Islands?

No Yes Don't know

If Yes,

a. Which vaccination(s) or medication(s) did you react to?

Please specify _____

b. Did you need to seek medical advice for this reaction?

No Yes

YOUR DEPLOYMENT TO THE SOLOMON ISLANDS –

CHEMICAL & ENVIRONMENTAL EXPOSURES

We would like to know about chemical or environmental contaminants that you may have been exposed to during your deployment to the Solomon Islands.

INSTRUCTIONS: Please indicate whether or not you have experienced any of the activities and items, given below, during your deployment to the Solomon Islands.

20. During your deployment to the Solomon Islands	No	Don't know	Yes			
			How often?			
			Daily	At least once a week	At least once a month	Less than monthly
Did you enter buildings or areas that might have contained asbestos?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you close to loud noises?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you use high pressure sprayers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you in contact with or did you use heavy metals such as lead paints and mercury?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you eat locally sourced food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you drink water from local taps or wells?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you swim or bathe in local lakes, rivers or the sea?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you shower in water with fuel in it (evident by visible oil film, smell or stinging eyes)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you exposed to dust storms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you exposed to intense smoke e.g. from forest fires or burning oil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you do any refuelling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Did you use solvents/degreasing agents, e.g. from cleaning, painting or hand washing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you exposed to engine exhaust so that it irritated your eyes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you bitten by flies, sand flies, fleas, mosquitoes or other insects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you stung or bitten by spiders, scorpions or other "bugs"?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was your clothing or uniforms treated with pesticides (e.g. permethrin)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was your tent or mosquito net treated with pesticides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was your sleeping bag (Bivi bag) treated with pesticides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. During your deployment to the Solomon Islands	No	Don't know	Yes			
			How often?			
			Daily	At least once a week	At least once a month	Less than monthly
Did you live or work in an area that had been recently sprayed or fogged with a pesticide?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were you involved in the cleanup of any chemicals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. During your deployment to the Solomon Islands did you ever use a personal insect repellent?

No Yes Don't know

If Yes, please fill in the following table.

Please name the type of repellent you used and how often you used it.

What was the personal insect repellent?	No	Don't know	Yes			
			How often was it used?			
			Daily	At least once a week	At least once a month	Less than monthly
ADF issue repellent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial product issued	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-ADF military issue repellent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your own repellent (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. During your deployment to the Solomon Islands, did you ever apply pesticides including insecticides (but not including personal repellents) e.g. by spraying, fogging, laying bait etc?

No Yes Don't know

If yes, please answer the following:

a. Did you wear protective clothing while applying pesticides by spraying, fogging or laying bait?

No Yes

b. What type of pesticide or insecticide did you apply by spraying, fogging or laying bait etc.? (mark all those that apply)

- Permethrin based
- Baygon (Propoxur, Aprocarb)
- Bendicarb (Ficam)
- Diazinon
- Temephos (Abate)
- Malathion (Maldison)
- Other, unknown type
- Other, please specify _____

c. Please complete the following table about applying pesticides.

Did you ever?	No	Don't know	Yes			
			How often did you do it?			
			Daily	At least once a week	At least once a month	Less than monthly
Spray/fog an outdoor area e.g. for mosquitoes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray/fog an indoor area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray your body (with pesticides, not personal repellents)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray your uniform or bedding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lay bait as a solid or liquid eg rat poison?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. Please complete the following table about sun exposure.

Did you ever?	No	Don't know	Yes			
			How often?			
			Daily	At least once a week	At least once a month	Less than monthly
Get sunburnt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use sunscreen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work outside without long sleeved shirts and long trousers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wear a helmet when you worked outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wear a broad brimmed hat when you worked outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wear a "baseball" type cap when you worked outside	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wear another type of head dress when you worked outside (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. The level of morale in my section / unit was: (circle as applicable)

Very low low average high very high

25. During the deployment, what do you consider to have been the major POSITIVE experiences?

26. During the deployment, what do you consider to have been the major NEGATIVE experiences?

27. Have you ever had any experience on your deployment that was so frightening, horrible, or upsetting that in the past month you:
- a. Have had any nightmares about it or thought about it when you did not want to?
 No Yes
 - b. Tried hard not to think about it or went out of your way to avoid situations that remind you of it?
 No Yes
 - c. Were constantly on guard, watchful, or easily startled?
 No Yes
 - d. Felt numb or detached from others, activities, or your surroundings?
 No Yes

28. What were your career intentions PRIOR to the deployment?

- Long term service career
- Serve out current engagement / ROSO
- Seek TOC/TOB/Corps Transfer/Remuster/Specialisation Transfer
- Seek discharge within the next 12 months
- Seek discharge immediately
- Other (please state)_____

29. What are your CURRENT career intentions?

- Long term service career
- Serve out current engagement / ROSO
- Seek TOC/TOB/Corps Transfer/Remuster/Specialisation Transfer
- Seek discharge within the next 12 months
- Seek discharge immediately
- Discharged from / transferred within the ADF
- Other (please state)_____

30. Prior to your return to Australia, did you ANTICIPATE that you would have any difficulties on your return home?

- No Yes Uncertain

If Yes,

In which area did you anticipate that you would have difficulties? (e.g. family, work)?

31. Overall, how would you describe your deployment experience?

- Very negative
- Negative
- Neither Negative or Positive
- Positive
- Very Positive

32. INSTRUCTIONS: *The following questionnaire asks you about events that may have occurred during your deployment. Please read each event statement carefully and then indicate, by marking the square, how often you experienced the event, how it affected you at the time and how it affects you now.*

NOTE: *Some of this material may have the capacity to cause distress to some participants. You are free to omit answering any material which you find upsets you. If you do become distressed, contact telephone numbers where assistance or advice can be obtained are available at the start of this questionnaire.*

It is important that you mark a response in each of the three columns.

How often did the following occur...?	How often did you experience the event?					How did it affect you at the time? (felt fear, horror, or helplessness)				How does it affect you now? (feelings of fear, horror or helplessness)			
	Never	Rarely	On occasion	Often	Very often	Not at all	A little	A moderate amount	A great deal	Not at all	A little	A moderate amount	A great deal
You were in danger of being killed e.g. combat, motor vehicle accident (MVA), assault, sexual assault, natural disaster, hostage situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You were in danger of being injured e.g. combat, MVA, assault, sexual assault, natural disaster, hostage situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You had to handle dead bodies e.g. disaster situation, temporary morgue, mass graves including any form of human remains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You heard of a close friend or co-worker who had been injured or killed e.g. combat, MVA, disaster situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You were present when a close friend or co-worker was injured or killed e.g. combat, MVA, disaster situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You feared that you had been exposed to a contagious disease, toxic agent or injury e.g. radioactivity, HIV, chemical warfare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How often did the following occur...?	How often did you experience the event?					How did it affect you at the time? (felt fear, horror, or helplessness)				How does it affect you now? (feelings of fear, horror or helplessness)			
	Never	Rarely	On occasion	Often	Very often	Not at all	A little	A moderate amount	A great deal	Not at all	A little	A moderate amount	A great deal
You were witness to human degradation and misery on a large scale e.g. refugee camps, starvation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You heard of a loved one who had been injured or killed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You were present when a loved one was injured or killed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You believe your action or inaction resulted in someone being seriously injured e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
You believe your actions or inaction resulted in someone being killed, e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. Were there any events that you found to be traumatic but that are not listed above? Please specify below:

34. Below is a list of factors that some people may find stressful. Please read each factor carefully, and then indicate, by filling in the box, the response that best describes how much stress that factor caused you DURING your deployment.

	No stress	Slight stress	Moderate stress	A lot of stress	Extreme stress
Risk of unauthorised discharge (UD) of weapons	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Risk of vehicle accidents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Living conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolation from Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolation from other deployed members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorting out problems at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boredom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Living and working with the same people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overload of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Periods of high activity then low or no activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Health concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Behaviour of others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Living in a different culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Separation from family and friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Threat of danger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not getting on with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of opposite sex company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Language barriers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sorting out disagreements with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frustration generally	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thinking about returning home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The overseas organisation (e.g. UN, MFO)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your role in the country	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	No stress	Slight stress	Moderate stress	A lot of stress	Extreme stress
Completing deployment's objectives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADF's lack of concern with deployed troops/sailors/airmen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Australian military hierarchy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leadership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The deployment's rules and regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contact with family/friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking leave back in Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taking leave other than in Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mail service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working with military of other countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Length of deployment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Please list any other stressful experiences and fill in which best describes how much stress it caused					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RETURN TO AUSTRALIA PROCESSING

35. What did you do during this time? Please tick all that apply

- Relocated from main location occupied during the deployment to a staging area to prepare for RTA
- Travel (by air / sea / other) –
Please specify how long _____
- Preparation for RTA in main peacekeeping location
- Other - Please specify _____

36. What did you do in the two weeks immediately after you returned home?

- Went on leave for the entire time
- Had a few days off and returned to work before taking leave later on
- Went on short leave and returned to work. Deferred leave until much later.
- Was sick or injured requiring hospitalisation or convalescence leave
- Returned straight back to work
- Other - Please specify _____

37. Were you posted out of the Unit you served with in the Solomon Islands within six months of your return to Australia?

- No Yes

If Yes,

a. Was the posting or transfer from the Unit you served with at your request?

- No Yes

POST DEPLOYMENT EXPERIENCES

We would like to know about some of the experiences you may have had after returning from your deployment to the Solomon Islands.

INSTRUCTIONS: Please indicate whether you have experienced any of the items listed below, as a result of your deployment to the Solomon Islands. If YES, please estimate, for each section, whether you experienced the item a little, somewhat or a lot.

38. As a result of your deployment to the Solomon Islands have you experienced, or felt, any of the following?	No	Yes		
		How much?		
		A Little	Some	A lot
Greater self-pride?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rewarded for a job well done?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A greater appreciation for your country?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jealousy or resentfulness from other Defence Force members?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of recognition, or acknowledgement, of the value or nature of your deployment activities by the ADF or by the Australian Government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inadequately debriefed following your deployment activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved as a leader?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tougher, more confident or more self assured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More knowledgeable of world issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disillusioned by the destruction or hopelessness that you witnessed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Valued and respected for your deployment activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of recognition, or acknowledgement, of the value or nature of your deployment activities by the Australian people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More appreciative of being alive?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More respectful of other Australian and allied veterans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well looked after by the ADF or the Australian Government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stronger bonds with the members of your ship/unit/squadron?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proud to be an Australian veteran?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Since your return from your deployment to the Solomon Islands, has your marital status changed?

Select all that apply. Since my deployment I have:

- Not changed my marital status
- Married, or started living with a partner
- Separated from a partner
- Divorced from a partner
- Been widowed
- Other _____

FINAL QUESTIONS

As a check of our coverage in this questionnaire, please answer these final questions.

40. Are there other important military experiences or exposures we have not asked you about?

- No Yes

If Yes, please give details in the space provided here.

41. Are there other important health concerns we have not asked you about?

- No Yes

If Yes, please give details in the space provided here

42. Do you have any additional comments you would like to add?

- No Yes

If Yes, please give details in the space provided here or on additional pages.

Thank you for completing this questionnaire. Your participation is appreciated.

Appendix 5.5 - Additional Self-Report Tables

Solomon Islands Self-Report Questionnaire additional data

Health Questionnaire

Table 1: Question 3: I see myself as someone who has high self-esteem.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree or disagree</i>	<i>Disagree</i>	<i>Strongly disagree</i>	<i>Not Available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	46 (20)	103 (45)	40 (18)	18 (7.0)	1 (0.4)	19 (8.4)	227
<i>Comparisons</i>	36 (17)	101 (49)	32 (15)	10 (4.8)	1 (0.5)	2 (14)	208

Table 2: Question 4: In general I consider myself a happy person

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree or disagree</i>	<i>Disagree</i>	<i>Strongly disagree</i>	<i>Not Available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	50 (22)	123 (54)	29 (13)	7 (3.1)	1 (0.4)	17 (7.5)	227
<i>Comparisons</i>	41 (20)	109 (52)	23 (11)	7 (3.4)	.	28 (14)	208

Table 3: Question 5: I generally believe my life will be valuable and productive.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree or disagree</i>	<i>Disagree</i>	<i>Strongly disagree</i>	<i>Not Available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	63 (28)	114 (50)	26 (12)	4 (1.8)	1 (0.4)	19 (8.4)	227
<i>Comparisons</i>	48 (23)	104 (50)	18 (8.7)	8 (3.8)	1 (0.5)	29 (14)	208

Table 4: Question 6: Even when things go right, I often fear that my future is not under my control.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree or disagree</i>	<i>Disagree</i>	<i>Strongly disagree</i>	<i>Not Available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	9 (4.0)	40 (18)	49 (22)	88 (39)	23 (10)	18 (7.9)	227
<i>Comparisons</i>	9 (4.3)	37 (18)	34 (16)	73 (35)	24 (12)	31 (15)	208

Table 5: Question 7: I confide my feelings to others to build up and maintain close relationships.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neither agree or disagree</i>	<i>Disagree</i>	<i>Strongly disagree</i>	<i>Not Available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	15 (6.6)	83 (37)	50 (22)	45 (20)	16 (7.0)	18 (7.9)	227
<i>Comparisons</i>	21 (10)	62 (30)	50 (24)	32 (15)	12 (5.8)	31 (15)	208

Table 6: Questions 22 to 25 Days during the last month...

		<i>Exposure status</i>	<i>N</i>	<i>Mean Days</i>	<i>Std Dev</i>	<i>Median</i>	<i>Lower Quartile</i>	<i>Upper Quartile</i>
22a	How many days out of the past month were you totally unable to work ?	Veteran	207	0.75	2.47	0	0	0
		Comparison	172	0.92	3.47	0	0	0
22b	How many of these days were due to emotions, nerves, mental health or your use of alcohol or other drugs ?	Veteran	182	0.33	1.83	0	0	0
		Comparison	156	0.31	2.47	0	0	0
23a	How many days out of the past month were you able to work but had to cut back on what you did, or did not get as much done as usual?	Veteran	206	1.78	5.16	0	0	0
		Comparison	168	1.77	4.01	0	0	2
23b	How many of these days were due to emotions, nerves, mental health or your use of alcohol or other drugs ?	Veteran	183	0.81	3.58	0	0	0
		Comparison	158	0.96	3.39	0	0	0
24a	How many days out of the past month were you totally unable to carry out your normal family and social activities ?	Veteran	203	1.47	4.70	0	0	0
		Comparison	168	0.60	2.10	0	0	0
24b	How many of these days were due to emotions, nerves, mental health or your use of alcohol or other drugs ?	Veteran	178	0.69	3.61	0	0	0
		Comparison	157	0.21	0.88	0	0	0
25a	How many days out of the past month were you able to carry out your normal family and social activities, but had to cut back on what you did, or did not get as much done as usual?	Veteran	202	1.77	4.93	0	0	0
		Comparison	171	1.78	4.73	0	0	1
25b	How many of these days were due to emotions, nerves, mental health or your use of alcohol or other drugs ?	Veteran	182	0.62	2.41	0	0	0
		Comparison	158	0.66	2.47	0	0	0

Question 59 – PCL-C Scale

Table 7: PCL-C - Repeated disturbing memories, thought or images of a stressful experience from the past.

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	134 (59)	48 (21)	16 (7.0)	11 (4.8)	2 (0.9)	16 (7.0)	227
<i>Comparisons</i>	119 (57)	49 (24)	14 (6.7)	9 (4.3)	1 (0.5)	16 (7.7)	208

Table 8: PCL-C - Repeated disturbing dreams of a stressful experience from the past?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	156 (69)	37 (16)	11 (4.8)	5 (2.2)	2 (0.9)	16 (7.0)	227
<i>Comparisons</i>	142 (68)	36 (17)	11 (5.3)	2 (1.0)	1 (0.5)	16 (7.7)	208

Table 9: PCL-C - Suddenly acting or feeling as if a stressful experience were happening again?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	163 (72)	31 (14)	10 (4.4)	3 (1.3)	1 (0.4)	19 (8.4)	227
<i>Comparisons</i>	160 (77)	21 (10)	7 (3.4)	2 (1.0)	1 (0.5)	17 (8.2)	208

Table 10: PCL-C - Feeling very upset when something reminded you of a stressful experience of the past?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	137 (60)	52 (23)	10 (4.4)	7 (3.1)	4 (1.8)	17 (7.5)	227
<i>Comparisons</i>	121 (58)	48 (23)	15 (7.2)	6 (2.9)	1 (0.5)	17 (8.2)	208

Table 11: PCL-C - Having physical reactions (e.g. heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience of the past?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	167 (74)	24 (11)	11 (4.8)	5 (2.2)	1 (0.4)	19 (8.4)	227
<i>Comparisons</i>	140 (67)	34 (16)	10 (4.8)	5 (2.4)	1 (0.5)	18 (8.7)	208

Table 12: PCL-C - Avoiding thinking about or talking about a stressful experience from the past or avoiding having feelings related to it?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	136	(60)	44	(19)	12	(5.3)	10	(4.4)	6	(2.6)	19	(8.4)	227
<i>Comparisons</i>	123	(59)	42	(20)	14	(6.7)	10	(4.8)	2	(1.0)	17	(8.2)	208

Table 13: PCL-C - Avoiding activities or situations because they reminded you of a stressful experience from the past?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	169	(74)	23	(10)	10	(4.4)	1	(0.4)	5	(2.2)	19	(8.4)	227
<i>Comparisons</i>	145	(70)	31	(15)	5	(2.4)	10	(4.8)	.	.	17	(8.2)	208

Table 14: PCL-C - Trouble remembering important parts of a stressful experience from the past?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	173	(76)	27	(12)	3	(1.3)	5	(2.2)	.	.	19	(8.4)	227
<i>Comparisons</i>	154	(74)	22	(11)	10	(4.8)	4	(1.9)	1	(0.5)	17	(8.2)	208

Table 15: PCL-C - Loss of interest in activities you used to enjoy?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	146	(64)	40	(18)	13	(5.7)	6	(2.6)	3	(1.3)	19	(8.4)	227
<i>Comparisons</i>	132	(64)	35	(17)	13	(6.3)	8	(3.8)	2	(1.0)	18	(8.7)	208

Table 16: PCL-C - Feeling distant or cut off from other people?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	129	(57)	52	(23)	15	(6.6)	7	(3.1)	5	(2.2)	19	(8.4)	227
<i>Comparisons</i>	127	(61)	39	(19)	14	(6.7)	8	(3.8)	1	(0.5)	19	(9.1)	208

Table 17: PCL-C - Feeling emotionally numb or being unable to have loving feelings for those close to you?

	<i>Not at all</i>		<i>A little bit</i>		<i>Moderately</i>		<i>Quite a bit</i>		<i>Extremely</i>		<i>Not available</i>		<i>Total</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>N</i>
<i>SI veterans</i>	156	(69)	31	(14)	11	(4.8)	7	(3.1)	3	(1.3)	19	(8.4)	227
<i>Comparisons</i>	132	(64)	32	(15)	17	(8.2)	5	(2.4)	2	(1.0)	20	(9.6)	208

Table 18: PCL-C - Feeling as if your future somehow will be cut short?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	174 (77)	23 (10)	7 (3.1)	3 (1.3)	2 (0.9)	18 (7.9)	227
<i>Comparisons</i>	156 (75)	19 (9.1)	8 (3.8)	5 (2.4)	1 (0.5)	19 (9.1)	208

Table 19: PCL-C - Trouble falling or staying asleep?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	114 (50)	54 (24)	20 (8.8)	13 (5.7)	6 (2.6)	20 (8.8)	227
<i>Comparisons</i>	103 (50)	45 (22)	23 (11)	14 (6.7)	4 (1.9)	19 (9.1)	208

Table 20: PCL-C - Feeling irritable or having angry outbursts?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	111 (49)	61 (27)	21 (9.3)	8 (3.5)	6 (2.6)	20 (8.8)	227
<i>Comparisons</i>	112 (54)	47 (23)	20 (9.6)	8 (3.8)	1 (0.5)	20 (9.6)	208

Table 21: PCL-C - Having difficulty concentrating?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	116 (51)	67 (30)	18 (7.9)	4 (1.8)	4 (1.8)	18 (7.9)	227
<i>Comparisons</i>	114 (55)	54 (26)	14 (6.7)	5 (2.4)	1 (0.5)	20 (9.6)	208

Table 22: PCL-C - Being super alert or watchful or on guard?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	144 (63)	38 (17)	14 (6.2)	9 (4.0)	4 (1.8)	18 (7.9)	227
<i>Comparisons</i>	131 (63)	33 (16)	14 (6.7)	6 (2.9)	2 (1.0)	22 (11)	208

Table 23: PCL-C - Feeling jumpy or easily startled?

	<i>Not at all</i>	<i>A little bit</i>	<i>Moderately</i>	<i>Quite a bit</i>	<i>Extremely</i>	<i>Not available</i>	<i>Total</i>
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>N</i>
<i>SI veterans</i>	163 (72)	27 (12)	9 (4.0)	4 (1.8)	5 (2.2)	19 (8.4)	227
<i>Comparisons</i>	144 (69)	30 (14)	7 (3.4)	6 (2.9)	2 (1.0)	19 (9.1)	208

Table 24: Over your lifetime would you have smoked as much as 100 cigarettes or a similar amount of tobacco?

	<i>Yes</i>		<i>No</i>		<i>Not Available</i>		<i>Total</i> <i>N</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	
<i>SI veterans</i>	93	(41)	120	(53)	14	(6.2)	227
<i>Comparisons</i>	90	(43)	104	(50)	14	(6.7)	208

Table 25: Over your lifetime would you have smoked as much as 100 cigarettes or a similar amount of tobacco?

	<i>Yes</i>		<i>No</i>		<i>Not Available</i>		<i>Total</i> <i>N</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	
<i>SI veterans</i>	93	(41)	120	(53)	14	(6.2)	227
<i>Comparisons</i>	90	(43)	104	(50)	14	(6.7)	208

Table 26: Do you currently smoke as much as one cigarette per day (or one cigar per week or one gram of tobacco per month)? (Combined groups)

	<i>Yes</i>		<i>No</i>		<i>Not Available</i>		<i>Total</i> <i>N</i>
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	
<i>SI veterans</i>	49	(22)	43	(19)	135	(60)	227
<i>Comparisons</i>	35	(17)	51	(25)	122	(59)	208

Table 27: Have you ever smoked as much as one cigarette per day (or one cigar per week or one gram of tobacco per month)?

	Yes		No		Not Available		Total
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>N</i>
<i>SI veterans</i>	73	(32)	9	(4.0)	145	(64)	227
<i>Comparisons</i>	70	(34)	8	(3.8)	130	(63)	208

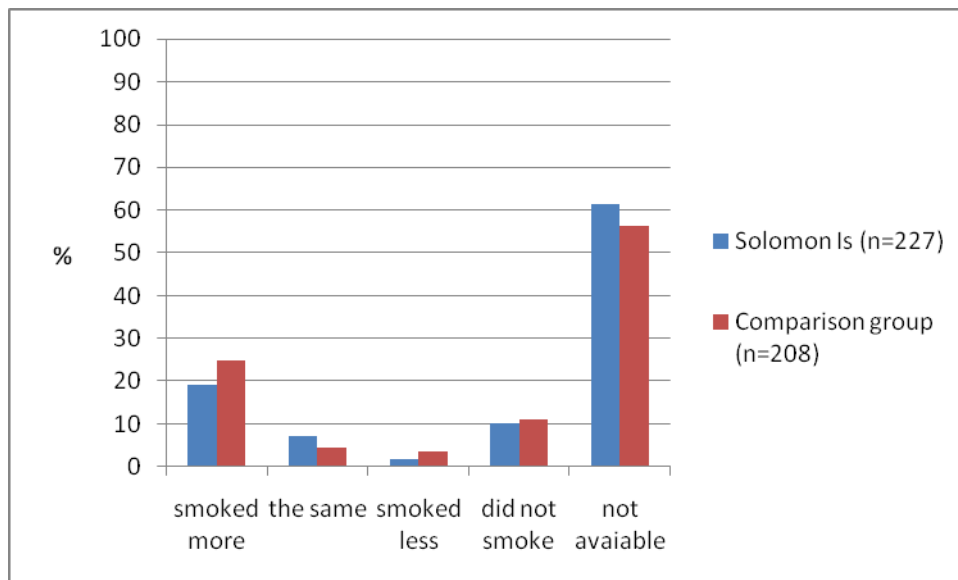


Figure 1: Compared with before you deployed, was your smoking pattern different while on deployment?

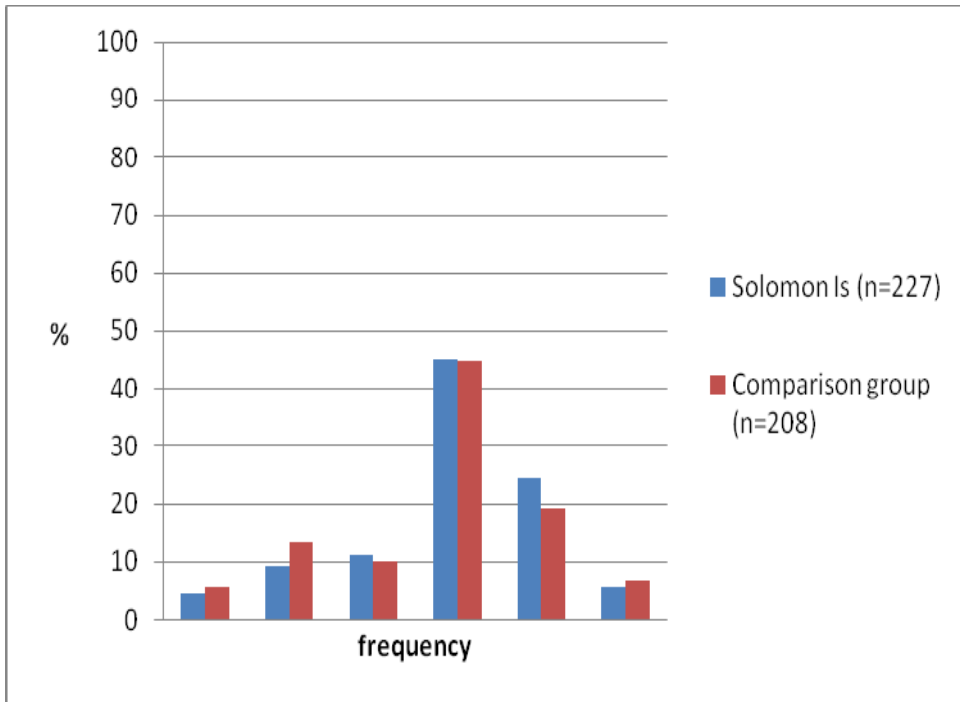


Figure 2: Frequency of alcohol consumption for Solomon Islands veterans and Comparison group

Background Details

Table 28: What is your current occupational status?

		<i>SI veterans</i>	<i>Comparisons</i>
<i>Paid employment full-time</i>	<i>n</i>	188	167
	(%)	83	80
<i>Home duties</i>	<i>n</i>	1	.
	(%)	0.4	.
<i>Unemployed</i>	<i>n</i>	1	1
	(%)	0.4	0.5
<i>Paid employed part-time/casual</i>	<i>n</i>	4	5
	(%)	1.8	2.4
<i>Student</i>	<i>n</i>	1	3
	(%)	0.4	1.4
<i>Retired</i>	<i>n</i>	1	2
	(%)	0.4	1
<i>Not working due to ill-health / TPI</i>	<i>n</i>		1
	(%)		0.5
<i>Other</i>	<i>n</i>	3	
	(%)	1.3	
<i>Not available</i>	<i>n</i>	28	29
	(%)	12.3	13.9
<i>Total</i>	<i>N</i>	227	208

Table 29: If you have separated from the ADF, have you had a period of unemployment greater than 3 months?

	Yes		No		Not available		Total
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	
<i>SI veterans</i>	9	(4.0)	119	(52)	99	(44)	227
<i>Comparisons</i>	15	(7.2)	106	(51)	87	(42)	208

Table 30: Was this period of unemployment due to health problems?

	Yes		No		Not available	Total	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	<i>N</i>	
<i>SI veterans</i>	2	(0.9)	5	(2.2)	220	(97)	227
<i>Comparisons</i>	4	(1.9)	7	(3.4)	197	(95)	208

Table 31: Are you in receipt of any type of pension?

	Yes		No		Not available	Total	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>N</i>
<i>SI veterans</i>	24	(11)	167	(74)	36	(16)	227
<i>Comparisons</i>	24	(12)	146	(70)	38	(18)	208

Table 32: What is your current service status?

	<i>SI veterans</i>	<i>Comparison group</i>
<i>Australian Army</i>	81	70
(%)	36	34
<i>Royal Australian Air Force</i>	34	25
(%)	15	12
<i>Ready Reserve (Air Force)</i>	.	1
(%)	.	0.5
<i>Australian Army Reserve - Active/General</i>	13	14
(%)	5.7	6.7
<i>Civilian employed by Dept of Defence</i>	1	2
(%)	0.4	1.0
<i>Australian Army Reserve - Stand-by/Inactive</i>	12	10
(%)	5.3	4.8
<i>RAAF Reserve - Stand-by/General</i>	2	2
(%)	0.9	1.0
<i>Civilian contracted by Dept of Defence</i>	.	2
(%)	.	1.0
<i>Royal Australian Navy</i>	17	24
(%)	7.5	11.5
<i>Royal Australian Navy Reserves - Active</i>	5	5
(%)	2.2	2.4
<i>Not in any service or Defence Force</i>	15	18
(%)	6.6	8.7
<i>Royal Australian Navy Reserves - Stand-by</i>	3	2
(%)	1.3	1.0
<i>Not available</i>	44	33
(%)	19	16
<i>Total</i>	<i>N</i> 227	208

Deployment Questionnaire

Table 33: Reported frequency (%) of exposure to chemical and environmental contaminants

<i>During your deployment to the Solomon Islands</i>	<i>No</i>	<i>Don't know</i>	<i>Yes</i>				<i>Not available</i>	<i>Exposed</i>
			<i>How often?</i>					
			<i>Daily</i>	<i>At least once a week</i>	<i>At least once a month</i>	<i>Less than monthly</i>		
<i>Did you enter buildings or areas that might have contained asbestos?</i>	33 (15)	84 (37)	39 (17)	24 (11)	12 (5.3)	7 (3.1)	29 (12)	82 (36)
<i>Were you close to loud noises?</i>	43 (19)	4 (1.8)	111 (49)	25 (11)	11 (4.8)	4 (1.8)	30 (13)	151 (66)
<i>Did you use high pressure sprayers?</i>	135 (59)	7 (3.1)	8 (3.5)	13 (5.7)	17 (7.5)	18 (7.9)	30 (13)	56 (25)
<i>Were you in contact with or did you use heavy metals such as lead paints and mercury?</i>	120 (53)	60 (26)	6 (2.6)	4 (1.8)	4 (1.8)	4 (1.8)	30 (13)	18 (7.9)
<i>Did you eat locally sourced food?</i>	44 (19)	21 (9.2)	29 (13)	43 (19)	33 (15)	26 (11)	32 (14)	131 (58)
<i>Did you drink water from local taps or wells?</i>	169 (74)	10 (4.4)	3 (1.3)	6 (2.6)	6 (2.6)	5 (2.2)	29 (13)	20 (8.8)
<i>Did you swim or bathe in local lakes, rivers or the sea?</i>	69 (30)	3 (1.3)	13 (5.7)	45 (20)	42 (18)	25 (11)	31 (14)	125 (55)
<i>Did you shower in water with fuel in it (evident by visible oil film, smell or stinging eyes)?</i>	155 (68)	38 (17)	1 (0.4)	0 (0)	1 (0.4)	4 (1.8)	29 (13)	6 (2.6)
<i>Were you exposed to dust storms?</i>	154 (68)	15 (6.6)	3 (1.3)	11 (4.8)	7 (3.1)	9 (4.0)	29 (13)	30 (13)
<i>Were you exposed to intense smoke e.g. from forest fires or burning oil?</i>	138 (61)	10 (4.4)	9 (4.0)	10 (4.4)	12 (5.3)	18 (7.9)	31 (14)	49 (21)
<i>Did you do any refuelling?</i>	92 (40)	1 (0.4)	36 (16)	49 (21)	9 (4.0)	11 (4.8)	30 (13)	105 (47)
<i>Did you use solvents/degreasing agents, e.g. from cleaning, painting or hand washing?</i>	89 (39)	5 (2.2)	48 (21)	35 (15)	10 (4.4)	10 (4.4)	31 (14)	103 (45)
<i>Were you exposed to engine exhaust so that it irritated your eyes?</i>	103 (45)	8 (3.5)	46 (20)	24 (11)	11 (4.8)	6 (2.6)	30 (13)	87 (38)
<i>Were you bitten by flies, sand flies, fleas, mosquitoes or other insects?</i>	32 (14)	16 (7.0)	93 (41)	38 (17)	13 (5.7)	7 (3.1)	29 (13)	151 (66)

<i>During your deployment to the Solomon Islands</i>	<i>No</i>	<i>Don't know</i>	<i>Yes</i>				<i>Not available</i>	<i>Exposed</i>
			<i>How often?</i>					
			Daily	At least once a week	At least once a month	Less than monthly		
<i>Were you stung or bitten by spiders, scorpions or other "bugs"?</i>	146 (64)	30 (13)	2 (0.9)	4 (1.8)	6 (2.6)	9 (4.0)	31 (14)	21 (9.2)
<i>Was your clothing or uniforms treated with pesticides (e.g. permethrin)?</i>	61 (27)	21 (9.2)	19 (8.3)	11 (4.8)	51 (22)	35 (15)	30 (13)	116 (51)
<i>Was your tent or mosquito net treated with pesticides?</i>	72 (32)	22 (9.7)	30 (13)	14 (6.1)	35 (15)	24 (11)	31 (14)	103 (45)
<i>Was your sleeping bag (Bivi bag) treated with pesticides?</i>	138 (61)	12 (5.3)	16 (7.0)	4 (1.8)	11 (4.8)	12 (5.3)	35 (15)	43 (19)
<i>Did you live or work in an area that had been recently sprayed or fogged with a pesticide?</i>	41 (18)	20 (8.8)	84 (37)	43 (19)	7 (3.1)	2 (0.9)	31 (14)	136 (60)
<i>Were you involved in the cleanup of any chemicals?</i>	158 (69)	10 (4.4)	9 (4.0)	7 (3.1)	4 (1.8)	10 (4.4)	30 (13)	30 (13)



Final Study Report - Annexes

Solomon Islands Health Study

Deliverable Item 4 (Phase 2)

30 May 2008



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DEFENCE DEPLOYMENT SOLOMON ISLANDS HEALTH STUDY

Detailed Research Plan (Phase 1b)

Deliverable Item 2p

Literature Review

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Glossary of Acronyms

ADF	Australian Defence Force
AFP	Australian Federal Police
ARF	Acute renal failure
AUSAID	Australian Agency for International Development
BCG	Bacille Calmette-Guérin vaccination
CJTF	Combined Joint Task Force 635
DEET	N,N-diethyl-3-methylbenzamide, diethyl toluamide
DFAT	Department of Foreign Affairs and Trade
DIC	disseminated intravascular coagulation
DVA	Department of Veterans' Affairs
FIA Act	Facilitation of International Assistance Act
GLF	Guadalcanal Liberation Front
GRA	Guadalcanal Revolutionary Army
IFM	Isatabu Freedom Movement
IPMT	International Peace Monitoring Team
MEF	Malaitan Eagle Force
NBI	non-battle injuries
NOSD	Nature of Service Declaration
NZDF	New Zealand Defence Force
PIC	Pacific Island Contingent
PNG	Papua New Guinea
PPF	Participating Police Force
RAMSI	Regional Assistance Mission to the Solomon Islands
RMA	Repatriation Medical Authority
RSIP	Royal Solomon Islands Police
SoP	Statement of Principle
STI	sexually transmitted infection
TPA	Townsville Peace Accord
UAV	unmanned aerial vehicle
US	United States
UXO	unexploded ordnance
WHO	World Health Organisation

Executive Summary

1. This document provides the literature review for the Defence Deployment Solomon Islands Health Study, which is a cross-sectional study of the health status of Australian service personnel who deployed to the Solomon Islands between July 2003 and December 2005 as part of OPERATION ANODE. The Australian Defence Force (ADF) deployed OP ANODE to the Solomon Islands in 2003 as part of the Regional Assistance Mission to the Solomon Islands (RAMSI). At this time the country was in a political and security crisis as a result of long-standing ethnic conflicts. It had weak institutions, a corrupt government, criminalisation of politics, poor law and order, economic stagnation, social dislocation, a growing culture of violence, international neglect, collapse of government services, disillusioned populations, and a plentiful supply of guns.

2. The aims of this literature review are:

- a) To document operational, occupational and environmental exposures potentially faced by ADF personnel deploying to the Solomon Islands during OPERATION ANODE that were potentially hazardous to their health and well-being.
- b) To search the literature and summarise the current best available knowledge on possible acute health problems during deployment and long-term adverse outcomes that could occur post-deployment.

3. The following sources were investigated for information relating to: the Solomon Islands; the Australian Defence Force (ADF); OP ANODE; RAMSI; the Australian Federal Police (AFP); and health. More search terms relating to the ADF deployments and particular health exposures and outcomes were also used.

- a) ADF websites;
- b) Australian Government websites;
- c) Non-government organisations and international organisation websites;
- d) International Defence Force websites;
- e) General internet search;
- f) Medical and public health literature;
- g) Post deployment health studies; and,
- h) ADF health providers who were deployed to the Solomon Islands during OP ANODE.

4. A significant limitation of this literature review is that only unclassified information was accessed. It is likely, therefore, that there was incomplete identification of important exposure information specific to the deployment. Specifically, there may be relevant information available on the Defence Restricted Network, such as hazard incident reports (AC563) and hazard assessment reports.

5. This review of literature will use a framework based on the Nature of Service Declaration (NOSD) which is used by the ADF to express the extent to which ADF personnel deployed on military operations are likely to be exposed to the risk of harm as a consequence of executing their mission and tasks. The NOSD framework is divided into categories of harm within which potential threats and levels of risk are described. While adaptation of the categories was necessary, the conceptual framework of the NOSD was deemed to lend itself to this document.

6. A hazard is defined as something that has the potential to cause injury or illness. Exposures that were potentially hazardous to the health and well-being of Defence personnel deploying to Solomon Islands during OP ANODE can be described according to their potential to cause harm: physical harm associated with operational and occupational hazards; physical harm associated with environmental hazards; and psychological harm. For each group of exposures there were contributing and mitigating factors. Within these three categories, hazards that may have contributed to adverse health outcomes included:

7. *Physical harm – operational and occupational hazards.*
 - a) Trained and armed militia groups.
 - b) World War II unexploded ordnance (UXO), including mustard-filled munitions of US origin, are still found on the Solomon Islands.
8. *Physical harm – environmental hazards.*
 - a) Combat- and sports-related physical activities.
 - b) Total collapse of the civil infrastructure, including: roads, health facilities, public health programs, water treatment and waste disposal.
 - c) Ineffective and corrupt local police and break-down of law and order.
 - d) Tropical climate: high levels of heat and humidity.
 - e) Insects, plants and animals that could be potentially harmful.
 - f) Contaminated food and water.
 - g) Proliferation of disease vectors, including mosquitoes
 - h) Adverse effects due to preventive medications and vaccinations.
 - i) Chemicals used for vector-control, including diesel, DEET and permethrin.
9. *Psychological harm.*
 - a) Fear of being harmed.
 - b) Witnessing and being involved in events that were distressing, and being aware of others being distressed by such events.
 - c) Potential feelings of ambiguity, boredom, frustration, rage and helplessness.
 - d) Potential stress associated with short deployment notice, uncertainty about length of deployment, isolation and separation from family, and living conditions with little privacy or social outlets.
10. There were also a number of mitigating factors in place for ADF personnel in the Solomon Islands as part of OP ANODE:
 - a) Clear and substantial rules of engagement protected by the Facilitation of International Assistance Act 2003 passed by the Solomon Islands Parliament.
 - b) Cooperation with the Australian Federal Police and allied Defence Forces.
 - c) Logistical support, including communications, medical facilities, accommodation, transport services, police posts and an engineering contingent.
 - d) Positive feedback from local citizens of the Solomon Islands.
 - e) Use of personal health countermeasures, including vaccinations, malaria chemoprophylaxis, mosquito control measures and individual repellent use.
11. This literature review has highlighted numerous exposures potentially hazardous to the health outcome of ADF personnel who deployed to the Solomon Islands during OP ANODE. This will be useful for informing the content of the study questionnaire and the data analysis strategy.

1 Introduction

12. The purpose of the Defence Deployed Solomon Islands Health Study is to conduct a cross-sectional study of the health status of Australian service personnel who deployed to the Solomon Islands between July 2003 and December 2005 as part of OPERATION ANODE. The Project Initiation Document states that the project will begin with a literature review of veteran's health salient to Operation Anode and a review of documented environmental, occupational and operational health hazards encountered on the deployment, both in terms of type and quantification of exposure¹. This document provides the literature review for the Defence Deployment Solomon Islands Health Study.

13. This review of literature will use a framework based on the Nature of Service Declaration (NOSD). The underlying conceptual basis for the NOSD is to express the extent to which Australian Defence Force (ADF) personnel deployed on authorised military operations in defence of the nation and its security interests are likely to be exposed to the risk of harm as a consequence of executing their mission and tasks². The NOSD was designed to enable those responsible for providing the resultant conditions of service benefits to do so in a fair and consistent manner. The NOSD framework is divided into categories of harm within which potential threats and levels of risk are described².

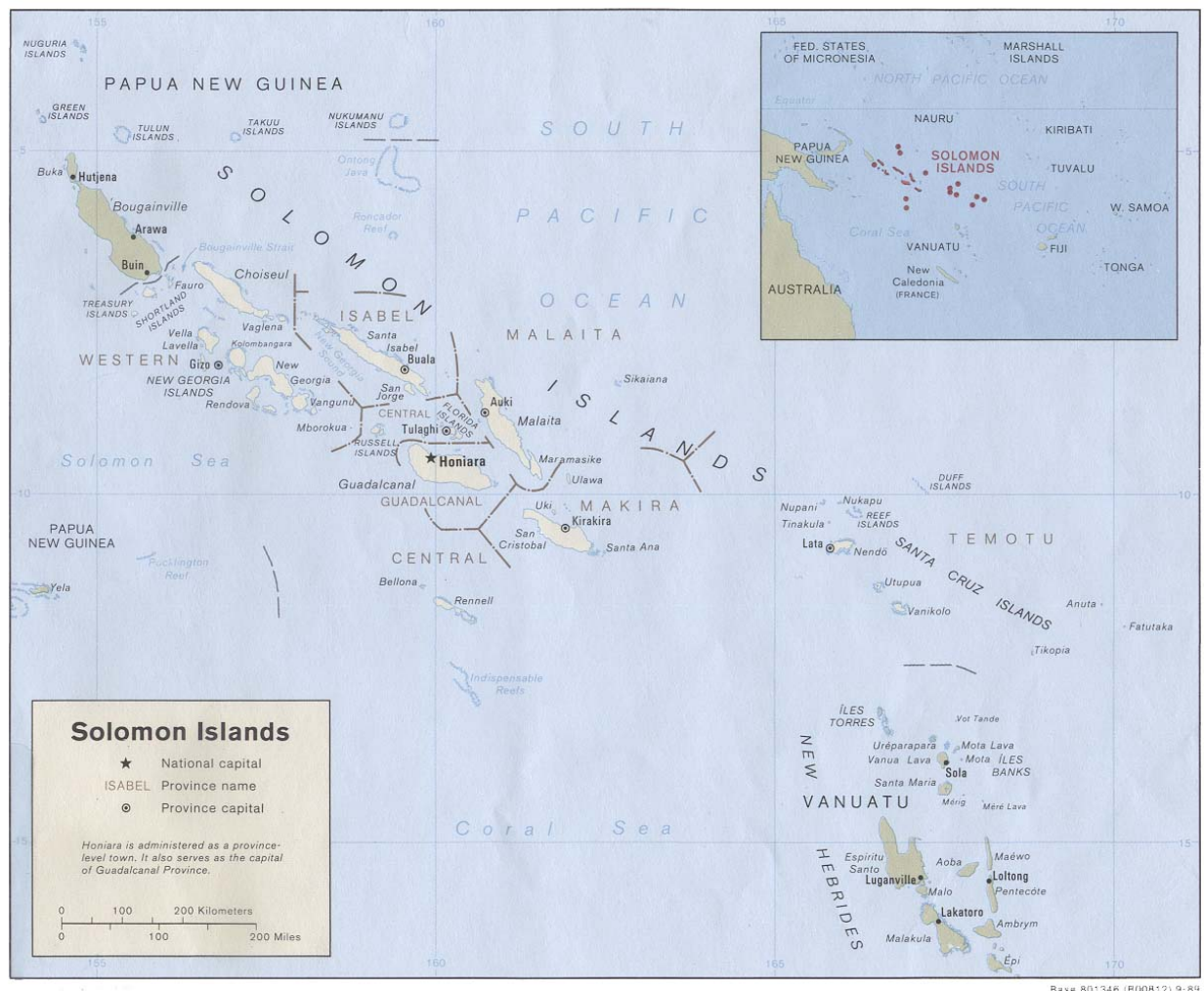
14. Exposure to the risk of harm underpins the meaning of words such as threat, hazard and danger. Given that this literature review is concerned with exposure to health hazards encountered on deployment, the conceptual framework of the NOSD was deemed to lend itself to this document. While adaptation of the framework was necessary, an attempt has been made to maintain the essence of the NOSD. A hazard or threat is defined as a person or thing likely to cause harm or illness, while a risk is an exposure to the chance of suffering harm². Exposures that were potentially hazardous to the health and well-being of Defence personnel deploying to Solomon Islands during OP ANODE have been described according to their potential to cause harm: physical harm associated with operational and occupational hazards; physical harm associated with environmental hazards; and psychological harm.

15. The NOSD framework does differ from more widely used approaches to hazard classification in that it focuses on health outcomes of hazards rather than types of hazards. To assist in tying this document in with more standard exposure classifications a table has been constructed (see Annex 1) that classifies potential deployment hazards into physical, chemical, biological and psychological types. The table also provides references to link each hazard to its relevant section in this literature review.

2 Background

2.1. Solomon Islands

16. The Solomon Islands is a scattered archipelago of 992 islands extending 1770 kilometres southeast from Bougainville. The population of approximately 538000 (July 2005 estimate) inhabits 347 of these islands. There are six major islands or groups of islands with numerous small islands and atolls: The major islands are Guadalcanal, Malaita, Choiseul, Santa Isabel, New Georgia and San Cristobal^{3,4}.



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2.2. The situation prior to intervention

17. In 2003, the Solomon Islands was in a political and security crisis. It had weak institutions, a corrupt government, criminalisation of politics, poor law and order, insufficient revenue, economic stagnation, social dislocation, disaffected and alienated youth, a growing culture of violence, international neglect, collapse of government services, disillusioned and passive populations, and a plentiful supply of guns. All this had paralysed the country's capital, stifled its economy, disrupted government, discouraged aid donors, and inflicted suffering and hardship on its people. The Solomon Islands had virtually ceased to function as an effective national entity⁶.

2.3. Political background

18. Even before Britain assumed a protectorate over the Solomon Islands in the 1890s, there had been longstanding clan-related conflicts between some of many different ethnic and language groups that make up this nation of numerous tiny islands. Drawing these disparate tribes together under British administration only added to these tensions, while further conflict resulted from colonial efforts to dispossess traditional landholders of their native land. The most significant ethnic conflict was that between the Isatabu tribe, of the main island Guadalcanal, and the Malaitan tribe, of neighbouring Malaita⁶⁻⁸.

19. After the Solomon Islands gained independence from Great Britain in 1978, the new constitution failed to provide formal recognition of traditional kinship rights or land ownership and poorly designed institutions of statehood resulted in weak post-independence governments with inadequate revenue bases. Meanwhile, the older, more deeply rooted political and social traditions remained⁶. On the island of Guadalcanal, tensions between the native Guadalcanese, known as Gwales, and Malaitans escalated to violence. After World War II, a large number of Malaitans had migrated to Guadalcanal as labourers in the capital Honiara^{7,8}.

20. This led to the formation of warrior-like militia groups to fight for control of land. In 1998, Guadalcanal tribes formed the Guadalcanal Revolutionary Army (GRA), which sought to forcibly expel the Malaitan population from Guadalcanal by conducting a terror campaign against the Malaitan settlers. As a result, some 20000 Malaitans abandoned their homes and sought shelter in the urban surrounds of Honiara^{7,8}.

21. In response to this violence, as well as dissatisfaction with government inaction, a group of Malaitans formed the Malaitan Eagle Force (MEF) in early 2000. The MEF was well-trained and armed, and had the support of many indigenous Malaitans serving in the Royal Solomon Islands Police (RSIP). They raided police armouries in Honiara in June 2000, gaining access to military-style weapons. The MEF effectively controlled Honiara during this time.

22. Meanwhile, the GRA, later known as the Isatabu Freedom Movement (IFM), controlled a significant proportion of Guadalcanal territory outside Honiara^{7,8}.

23. The Solomon Islands Government initially tried to control the violence by establishing a state of emergency. The parliament gave increased powers to the RSIP and outlawed the warring ethnic factions. The state of emergency lasted for four months but was not successful. The government relied on the RSIP to enforce the state of emergency, but the RSIP was effectively taking sides due to its close ties with the MEF. This suggested that the situation was going to need international assistance for resolution⁷. Loss of control by the government resulted in the rule of law collapsing and descent into corruption and criminality⁶.

24. Regional efforts were made to negotiate a peaceful resolution between the warring parties. In June 1999, the Honiara Peace Accord was signed by members of the government and opposition, but failed to resolve the conflict. The subsequent breakdown of law and order in the Solomon Islands was rapid and devastating. As a result of the IFM campaign to rid Guadalcanal of Malaitan settlers, the Red Cross repatriated many of the Malaitans to the relative safety of Malaita⁷.

25. The situation deteriorated further in June 2000, however, when rogue members of the RSIP and the MEF placed the prime minister under house arrest and took control of several key installations around Honiara. Considerable fighting between the MEF and the IFM followed, with dozens of people killed around Honiara and the MEF declaring a state of war with the IFM⁷.

26. Eventually, a fourteen-day truce was negotiated to allow for peace talks and, with the assistance of the Australian Government, a ceasefire agreement was reached. Discussions in

Townsville in October 2000 led to the signing of the Townsville Peace Accord (TPA) that sought to resolve the grievances of both the IFM and the MEF. The TPA put in place a committee to progress the previous peace agreements and provided for an International Peace Monitoring Team (IPMT). The main objective of the IPMT was to disarm the factions, as the possession of guns by the militias was seen as a significant obstacle to ending the dispute. The IPMT was mostly successful in quelling the violence and saw the surrender of some 1300 weapons, of which about 150 were military-style. They withdrew from the Solomon Islands on 25 June 2002, despite the lack of progress in implementing many of the provisions in the TPA⁷.

27. The situation deteriorated again, however⁷. While the MEF and IFM both joined the peace process, a breakaway of the IFM, known as the Gaudalcanal Liberation Front (GLF), refused to cooperate. This was led by Harold Keke and retained strongholds throughout the Weather Coast on the southern side of Guadalcanal⁸. By early 2003, the Solomon Islands had many of the characteristics of a failed state - general lawlessness was growing, while extortion and open corruption were rife. Government management of the economy and delivery of basic services had collapsed⁹. In these difficult circumstances, the Solomon Islands' Prime Minister, Sir Alan Kemakeza, wrote to the Australian Prime Minister, John Howard, in April 2003 requesting Australian assistance and the support of regional partners in the Pacific^{9, 10}. The international community, led by Australia, indicated that it would be prepared to send in an intervention force to disarm the militia groups and restore law and order⁷. A motion supporting the request for assistance was passed unanimously by the Solomon Islands Government. The United Nations Security Council was notified on 22 July 2003¹⁰.

28. Following the formal request for assistance from the Solomon Islands Government, Australian and Pacific Islands police, military and civilian personnel arrived in the Solomon Islands on 24 July 2003, as part of the Australian-led Regional Assistance Mission to the Solomon Islands (RAMSI)^{9, 10}. RAMSI's assistance is known as Operation HELPEM FREN (Pidgin English for 'Helping Friend') and was designed as a comprehensive package of assistance. While the first priority of the mission was to provide security and civil policing elements to restore law and order, the overall aim was to allow physical and economic stability and basic functioning of the Solomon Islands Government. RAMSI was to build on work already undertaken through Australia's development cooperation program, particularly in the justice sector, as well as existing support for economic reform, peace building, community development and health services⁹⁻¹¹. Shortly after police and military forces arrived in Honiara on 24 July 2003, it was decided that there should be an early focus on three issues:

- a) to resolve the situation on the Weather Coast involving the GLF and Harold Keke;
- b) to rid the Solomon Islands of illegal guns; and,
- c) to review professional standards within the RSIP to rid it of corrupt officers⁷.

29. The initial RAMSI deployment of 2225 personnel included 1745 Australians. These comprised 1500 personnel from the Australian Defence Force (ADF), 155 Australian Federal Police (AFP) officers, 90 staff from the Australian Protective Services, and the remainder from the Department of Foreign Affairs and Trade (DFAT)^{12, 13}. Approximately 300 police officers from Australia and across the region formed the RAMSI Participating Police Force (PPF), which supported the local RSIP^{10, 14}. Meanwhile, the military component included

armed forces primarily from Australia, but also from Fiji, New Zealand, Papua New Guinea and Tonga^{10, 11, 15}.

OPERATION ANODE is the name of the ADF contribution to RAMSI¹¹.

2.4. Solomon Islands ADF Operation

OP ANODE 24 Jul 03 – 31 Dec 05

30. The Australian Minister for Defence determined that service as a member of the ADF assigned on or after 24 July 2003 with OP ANODE is non-warlike service under subsection 5C(1) of the Veterans' Entitlement Act 1986. OP ANODE service refers to service in the areas of the total land mass, territorial water and superjacent airspace boundaries of the Solomon Islands^{16, 17}.

31. 'Non-warlike operations' are military activities where there is a risk associated with the assigned tasks, where the application of force is limited to self-defence, and where casualties could occur but are not expected¹⁸.

2.5. Research Questions

- a) Was the health of ADF personnel deployed to the Solomon Islands during OP ANODE adversely affected as a result of the deployment?
- b) What exposures faced by ADF personnel deploying to the Solomon Islands during OP ANODE were potentially hazardous to their health and well-being?
- c) What are the major acute health problems during deployment, and what are the possible long-term adverse outcomes that could occur post-deployment?

3 Method

32. A significant limitation of this literature review is that only unclassified information was accessed. It is likely, therefore, that there was incomplete identification of important exposure information specific to the deployment.

33. The following sources were investigated for information relating to: the Solomon Islands; the Australian Defence Force (ADF); OP ANODE; RAMSI; the Australian Federal Police (AFP); and health. More search terms relating to the ADF deployments and particular health exposures and outcomes were also used.

34. *Australian Defence Force websites.* Using Google and integral website search engines, ADF and related websites were searched for unclassified documents and links relating to the Solomon Islands in general, as well as RAMSI and OP ANODE in particular. The Defence Restricted Network (DRN) was not included.

35. *Australian Government websites.* Using Google and integral website search engines, Australian Government and related websites were searched for documents and links relating to the Solomon Islands in general, as well as RAMSI and OP ANODE, and specific

exposures and health outcomes. Websites included the Department of Veterans Affairs, the Department of Foreign Affairs and Trade, AusAID, the Solomon Islands consulate, the Australian National Audit Office, the Australian War Memorial and the Australian Parliament House.

36. *Non-government organisations and international organisation websites.* Using Google and integral website search engines, non-government organisations and international organisation websites were searched for documents and links relating to the Solomon Islands in general, as well as RAMSI and OP ANODE, and specific exposures and health outcomes. Websites included the World Health Organisation, the Centre for Disease Control, the Secretariat of the Pacific Community, the Organisation for the Prohibition of Chemical Weapons, the United Nations, Oxfam, the Red Cross, the Central Intelligence Agency, the World Bank, UNICEF, the International Civil Service Commission, the Food and Agricultural Organisation of the United Nations, and the UN Refugee Agency.

37. *International Defence Force websites.* Using Google and integral website search engines, defence force websites of New Zealand, Fiji, Papua New Guinea and Tonga were searched for documents and links relating to the Solomon Islands in general, as well as RAMSI and OP ANODE in particular.

38. *Internet search.* Using Google and integral website search engines, the internet was searched for documents and links relating to the Solomon Islands in general, as well as RAMSI and OP ANODE, and specific exposures and health outcomes.

39. *Medical and public health literature.* Medline, CINAHL and Proquest were searched for publications relating to the Solomon Islands in general, as well as RAMSI and OP ANODE, and specific exposures and health outcomes. Reference lists of selected publications were also used to acquire further sources.

40. *Post deployment health studies.* Search for research related to post deployment health from institutions undertaking defence-related research, including the Australian Gulf War Veterans' Study.

41. *Discussions with ADF health providers.* Those who were in the Solomon Islands and those providing health care to Solomon Islands veterans:
LTCOL Brad McCall, Public Health Physician
COL John Turner, Occupational Health Physician

4 Review of literature of relevance to the Solomon Islands Health Study

4.1. Physical Harm– Operational and Occupational Hazards

4.1.1. Friendly forces

4.1.1.1. Mission and tasks

42. The military component of RAMSI is known as the Combined Joint Task Force (CJTF) 635¹⁹. OP ANODE is the name of the ADF contribution to this Task Force¹¹. The official mission of the Task Force, including OP ANODE, was to provide military, security and logistic support to the PPF within the DFAT-led mission to restore order as part of RAMSI^{11, 19, 20}. This was to precede a process of civilian reconstruction given that, at the time, the Solomon Islands was approaching a failed state situation, with a barely functional criminal justice system and a collapse of other elements of governance¹³.

43. The various roles to be performed by the ADF in country were to include: military advice and support to the Special Adviser Solomon Islands; command and control of the ADF force elements; security support including police posts, facilities, reconnaissance and border surveillance; and logistic, communication and transport support. The ADF was also to provide support to other Government departments and agencies, including the AFP, AusAID and DFAT, as well as Pacific Island countries police and defence force contributions²¹.

44. Security for the RAMSI police was required due to the serious law and order situation and the large number of illegally held weapons present in the Solomon Islands community prior to the arrival of RAMSI^{10, 11, 14, 15}. The aim of RAMSI was to ensure that PPF elements dominated, with the mission's service personnel remaining in the background. The RAMSI military forces were not to act independently to arrest suspected criminals nor to restore law and order. In most cases, security consisted of a military presence - of no less than a section - at designated PPF outposts and various patrols that were designed to deny freedom of movement to any potential adversary. The patrols sought to communicate with outlying communities and to gather information in order to improve RAMSI's situational awareness. The aim was to disrupt criminal activity by restricting access to provisions and secure hideouts, as well as countering any intimidation tactics by dissidents trying to win control over the local population²⁰.

45. Each police patrol was to contain two radio-equipped soldiers as a minimum requirement for the provision of protection and communications. If a police patrol was considered likely to encounter a person of interest who might be armed, then a four-man fire-team including a medic was required. This approach, along with various presence patrols, ensured that the military appeared ubiquitous whilst actual force numbers were being slowly reduced in preparation for repositioning²⁰.

46. The security success of the RAMSI military and PPF is reflected in the establishment of 17 police posts covering all of the Solomon Islands' nine provinces^{10, 22} and over 6500 people being arrested with over 9,600 charges laid. These arrests included over 100 RSIP officers, while over 400 RSIP personnel had been dismissed or demobilised^{14, 22}.

47. Aside from security, the ADF was also to provide initial logistical support for the operation, including aerial transport, naval vessels, transport to various civilian agencies, engineering and medical detachments^{10, 14, 20}. ADF engineers were involved in the construction of numerous accommodation and working facilities in Honiara, while at the police posts on the Weather Coast and Malaita engineers were integral to the destruction of weapons for the gun amnesty¹⁹.

4.1.1.2. Rules of engagement

48. The Solomon Islands Parliament passed the Facilitation of International Assistance Act 2003 (FIA Act) to pave the way for the intervention force. The FIA Act gave members of the armed forces and police the powers of police officers of Solomon Islands, as well as permission to use force in order to achieve a public purpose if reasonably necessary. Both the armed forces and the police worked on the principle that any use of force had to be necessary in self-defence or in defence of others. The use of force to protect property was strictly regulated. In exercising these powers, police and service personnel were given immunity from the Solomon Islands criminal and disciplinary proceedings, as well as from civil court proceedings if they arose in connection with, or in the course of, the member's duties⁷.

49. The ability to remove firearms from militants was considered to be the key to restoring peace to the Solomon Islands. Given this, the FIA Act also provided significant powers to the military and police members of the visiting contingent to seize weapons. In addition, RAMSI personnel were given freedom of movement throughout the country⁷.

50. In carrying out their duties, the military abided by international humanitarian law on the deployment of weapons. Furthermore, they were expected to show appropriate restraint and proper respect for the attitudes and the culture of the people of the Solomon Islands¹³.

4.1.1.3. Reliability of ADF allies

51. As part of the RAMSI Task Force, the ADF had to cooperate closely with both foreign Defence Forces and the Australian Federal Police (AFP).

52. **Foreign Defence Forces.** The Combined Joint Task Force 635 consisted of service personnel from Fiji, Tonga, Papua New Guinea (PNG), New Zealand and Australia¹⁹. Of this contingent, the PNG Defence Force had never deployed offshore operationally, and Tonga had a limited history of international deployments. On the other hand, Australia, New Zealand and Fiji had extensive experience with overseas operational deployments. While there were some concerns initially, RAMSI military forces very quickly displayed their ability to work in a multinational environment. Combined national patrols from Tonga, PNG and Fiji were deployed right across Guadalcanal and eventually into Malaita⁷.

53. Tonga, Fiji and PNG became known as the 'Pacific Island Contingent' (PIC) and had a unique aspect. These countries share the 'wontok' system of tribal relationships with the Solomon Islands⁷. This is where people from the same clan or village assist and look out for one another²³. This system permeates every aspect of Solomon Islanders' lives and understanding it proved to be very important in the overall conduct of the mission, as the history of the conflict was largely based on feuding between tribal groups. Tonga, Fiji and

PNG personnel understood these wontok relationships implicitly, while Australian and New Zealand personnel had a very limited understanding⁷.

54. As with the activities of any combined military force, there were differences between the various contingents in terms of perceptions about the character of the mission, levels of acceptable risk, and attitudes towards the local population. As a result, there were a number of situations that highlighted the strengths and weaknesses of each national contingent. For example, personnel from Pacific Island countries were more easily able to establish a good rapport with the local population, while personnel from the New Zealand Defence Force (NZDF) and the ADF never achieved a rapport with the local people beyond the level of a smile and a greeting²⁰.

55. However, operations by Pacific Island military contingents were often hampered by differing types of doctrine, a lack of operational experience and diverse standards of training. These weaknesses were partly alleviated by the conduct of in-theatre training packages designed to build a collective capability in order to conduct subunit operations and reinforced force preparation training schemes already conducted in Australia. Cooperation would have been further enhanced by a regional initiative to develop doctrine and standardisation of training across the South Pacific in order to support the rapid deployment of a combined military force anywhere in the region²⁰.

56. **Australian Federal Police.** The primary objective of the AFP as part of RAMSI PPF was to work alongside the RSIP and other Pacific Island Forum police agencies to establish an environment of safety and stability to allow the Solomon Islands government, essential services and the economy to operate effectively. More specifically, this involved patrolling the streets with RSIP officers, conducting joint investigations and assisting in a range of areas such as criminal intelligence, professional standards and training. In doing so, the AFP aimed to help build the RSIP's capacity to enable them to meet future challenges without the need for ongoing assistance²⁴.

57. The ADF's relationship to the PPF was to provide support to ensure the safety of law enforcement officers and to allow them to achieve their objectives²⁴. Yet a number of the military activities conducted in this support role highlighted significant differences in the planning methodologies and descriptive language of each agency. For instance, the ADF had a proactive planning culture, while the PPF were largely reactive in character; the ADF held the concept of an operation with multiple tasks as part of a wider campaign plan, while police activities were more compartmentalised. The approach of the AFP led to many short-notice requests for military support, different task and asset priorities, and a tendency to take inadequate force protection measures. These differences were further exacerbated by different threat assessment methodologies²⁰.

58. A consequence of these differences between ADF and PPF planning was that it was difficult to ensure that military activities supported the civil authority in an efficient manner, for instance, during the arrests of suspected criminals. During the planning of military support, in which a platoon of troops was involved in assisting the PPF to apprehend a particularly high-profile criminal, there was a distinct lack of shared information between the police and the military. Lack of information resulted in insufficient time for briefing, rehearsals, and the preparation of police and soldiers for a potentially dangerous inter-agency operation. Lack of coordination of civil, police and military planning staff resulted in 'stovepiping' of information and created significant interoperability issues. These were only

alleviated by the efforts of key service personnel in building effective inter-agency working relations²⁰.

4.1.1.4. Force size and composition

59. The initial Australian contribution to RAMSI included approximately 1500 Australian Defence Force personnel, 155 Australian Federal Police and 90 personnel from the Australian Protective Services¹³. The military component of RAMSI comprised personnel from five troop contributing nations: Australia, New Zealand, Fiji, Papua New Guinea and Tonga¹¹. In a rotation to the Solomon Islands, military forces from Fiji, New Zealand, PNG and Tonga usually contributed a minimum of a rifle platoon each alongside a national command element²⁰.

60. At its height in September/October 2003, the military component of RAMSI numbered over 1,800 troops. By mid-2004 this was reduced to 650 serving in the Solomon Islands. Further withdrawals left around 100 troops in the Solomon Islands at the end of August 2004. Finally, that number was drawn down to about 60 in December 2004 following continued progress on law and order^{10, 25}. Following the killing of an AFP officer in Honiara in December 2004 in an incident specifically targeting a RAMSI police vehicle, the Australian Government decided to deploy an additional 100 infantry to ensure the security and ongoing progress of the mission to complete the restoration of law and order in the Solomon Islands^{10, 26}. The remaining military presence continues to play an active and visible part in the RAMSI operation, protecting and supporting the police and civilian components of RAMSI¹⁵. As at the end of June 2005, Australia's contribution in restoring the rule of law in the Solomon Islands included headquarters staff and an infantry force. An infantry platoon is shared on a rotational basis with other troop contributing nations²⁷.

4.1.1.5. Equipment type and availability

61. The use of military patrols in the Solomon Islands would have been greatly assisted by the deployment of unmanned aerial vehicles (UAVs). These would have aided the Task Force in building situational awareness of village geography (including entry and exit points) while providing visual deterrence. The employment of UAVs would have been effective in a country such as the Solomon Islands where the majority of the population live in outlying rural villages and have a high opinion of the power of technology²⁰.

4.1.1.6. Logistic and other support

62. Logistical support for ADF personnel included a headquarters with a range of communications, medical facilities, accommodation and transport services²⁸. An ADF engineering contingent deployed to the Solomon Islands focussed on the survivability and sustainability of the force. This included accommodation, sanitation, water supply, drainage and some strengthening of facilities to provide for force protection²⁹.

63. Other logistic support included the development of police posts and medical aid posts in the provincial areas of the Solomon Islands. The establishment of the police posts was essential for the development of law and order assisted a police presence²⁹.

4.1.1.7. Morale

64. A Defence media release on 13 August 2003, early in the RAMSI campaign, reported that ADF personnel had adapted to the conditions in the Solomon Islands in a professional manner and that morale was strong³⁰.

65. A number of events were organised in an effort to maintain morale amongst RAMSI personnel. On the first anniversary of the arrival of RAMSI in the Solomon Islands a concert was held for RAMSI personnel, a parade was run through the main street of Honiara and various sporting events were organised. These events were not only a good morale booster for the troops but also provided an opportunity for the locals to show their appreciation. An anecdotal report from an ADF member included feelings of excitement along with the realisation that there was “still a lot of work to do and a long way to go”. The same soldier was buoyed by being “able to see the progress and the impact we have had on the community and will continue to have”³¹.

66. Morale of ADF personnel was boosted by the respect they received both locally and regionally³⁰. In the main street of Honiara, the ADF were generally greeted with smiling faces and children waving, giving a sense of the job being worthwhile and the extent of the impact it had on so many people³¹. This positive feedback helped to overcome the hot and humid 40°C climate and basic living conditions with which the soldiers were contending³¹.

67. One issue concerning morale during RAMSI was conflict between the PPF and service personnel with regard to social policies, including alcohol consumption, standards of accommodation and the perception that the PPF somehow ‘looked down’ on soldiers. In an attempt to address these issues, PPF and CJTF joint activities were encouraged, including a Friday night ‘happy hour’ and a combined sports afternoon each Saturday. Such initiatives assisted in building better personal relations between members of the police and the military²⁰.

68. Another potential negative impact on morale was the monotonous character of much of the daily activity during RAMSI operations. One of the RAMSI Commanding Officers commented that there was “a need for clearly defined policies on rest and relief, on participation in local civic projects, on sporting activities and a need for frequent briefings in order to pass on information”²⁰.

4.1.1.8. Operational tempo

69. The operation was mounted rapidly, with a period of only several weeks elapsing between announcement of the commitment and the first detachments arriving in Honiara³².

4.1.2. Opposing forces

4.1.2.1. Militia groups

70. The Solomon Islands was not facing an insurgency or a guerrilla war, despite ethnic strife between people on the islands of Malaita and Guadalcanal. The problem in the Solomon Islands was essentially one that involved a break-down of law and order and a propensity for armed gangs to act in a lawless manner³³.

71. The two main opposing forces were the Isatabu Freedom Movement (IFM) and the Malaitan Eagle Force (MEF). The IFM, originally known as the Guadalcanal Revolutionary Army (GRA), was formed by Guadalcanal tribes in 1998. Its numbers fluctuated from 400 to 4000 depending on communal demands and the state of hostilities²³. The IFM controlled a significant proportion of Guadalcanal territory outside Honiara. It conducted military-style training for its personnel in camps set up on the Weather Coast, in the south of the island. The IFM was a militia organisation whose members wore army-style uniforms and displayed their weapons openly. They were led by Harold Keke, a former police officer⁷.

72. The MEF comprised a core group of approximately 150-300 Malaitans²³. Like the IFM, they were also trained and armed, but importantly the MEF had the support of many indigenous Malaitans from the RSIP. Due to these contacts, as well as via raids, the group was able to get access to military-style weapons from police armouries in Malaita and Honiara. The MEF effectively controlled Honiara during the tensions^{7, 23}. The MEF was disbanded on 19 December 2000, but its influence continued in other forms beyond this time. For example, at the weapons surrender ceremony in August 2003, tactical groupings of MEF appeared to persist. In addition, internal rivalries within the MEF led to the formation of various tribal factions following its official disbandment. Armed clashes occurred between these factions as they vied for power and territory to conduct illegal activities²³.

4.1.2.2. Government control over militia groups

73. Prior to RAMSI, the primary problem in the Solomon Islands was the absence of law and order. Although short of civil war, there was endemic, low-level violence and intimidation by former militants in Honiara and parts of rural Guadalcanal and Malaita, as well as periodic problems in Western Province⁶. Small and often poorly resourced police and customs forces found it difficult to monitor large or isolated areas of often-inhospitable territory. Corruption and poor discipline in law enforcement was also a serious problem, with police implicated in the theft and sale of weapons. There were significant areas of the Solomon Islands beyond the effective control of the police and where firearms were frequently used in crime and inter-communal violence³⁴.

74. Outside Honiara itself, the worst affected area was the southern coast of Guadalcanal, called the Weather Coast. Harold Keke, a leader of the IFM, was an outlaw on the Weather Coast and established a cult among his small group of followers. Police and others sent to deal with him (including a government minister) had been killed, and only Guadalcanal police were able to serve on this part of the Weather Coast; it was generally a no-go area for the government⁶. Keke and his supporters had access to a significant number of military-style weapons, so planning for his arrest needed to ensure that personnel had appropriate training in the use of force. In the end it was not necessary because Keke surrendered peacefully on 13 August 2003⁷.

4.1.2.3. Equipment type and availability

75. A variety of weapons were available to the opposition forces in the Solomon Islands. Some were improvised, often primitive, firearms fashioned from pipes and pieces of wood, but still potentially deadly. Apart from these 'homemades', there was no indigenous arms production in the Pacific. All military and civilian small arms were imported, with a steady transnational illicit trade. Some gun smuggling took place between PNG and Irian Jaya and

the Solomon Islands, as well as from Bougainville into the Solomons. However, the actual number of weapons involved was reported to be relatively small. There was no evidence of large numbers of weapons being procured from established arms pipelines in South or Southeast Asia³⁴.

76. Despite this, modern military weapons were reaching combatants in conflicts in the Solomon Islands. While some were smuggled in from overseas, many of the military weapons used during the recent troubles were looted from a small number of poorly maintained police armouries. The armouries were frequently insecure and their use by authorised personnel was poorly managed. The result was that arms and ammunition were misplaced, or stolen and sold by corrupt police officers³⁴.

77. It was recognised very early in the operation that restoring peace would first require the removal of these illegal firearms from the community. The Solomon Islands Government decided to address this, firstly, by holding an amnesty for members of the public to surrender weapons and, secondly, by declaring the entire Solomon Islands a 'weapons surrender area'. A significant media campaign was launched to spell out the government's intention to force all guns from the community. During the three-week amnesty, some 3000 firearms were surrendered for destruction⁷. Eventually, almost 3600 weapons and 305959 rounds of ammunition were collected or seized by RAMSI, and have now been destroyed¹⁴.

4.1.3. Introduced dangers

4.1.3.1. Mines, unexploded ordnance and other explosive devices

78. The Solomon Islands signed the Mine Ban Treaty on 4 December 1997, ratified on 26 January 1999, and the treaty entered into force on 1 July 1999. In September 2001, a diplomatic source confirmed that the Solomon Islands had never produced, transferred, or stockpiled antipersonnel mines³⁵.

79. In June 2003, the Solomon Islands' government told the Landmine Monitor that World War II unexploded ordnance (UXO) remained a problem not only on Guadalcanal, but in other parts of the country as well³⁵. A 2003 report by Landmine Action described the UXO contamination as significantly more complicated than in other parts of the Pacific³⁶. An enormous quantity of stockpiled ammunition remained following World War II. Due to the scale of the combat operations that occurred in the Solomon Islands during World War II, unexploded ammunition is routinely uncovered in all manner of places²⁹.

80. During the conflict in recent years, World War II 0.50 calibre ammunition was the preferred round used in homemade weapons during the fighting on Guadalcanal. UXO were also reportedly used to make improvised explosive devices^{34, 35}.

81. The incomplete destruction of chemical weapons also became evident when, in 1988, 109 mustard-filled munitions of US origin were found abandoned on the Solomon Islands³⁷. Mustard gas is a potentially deadly chemical agent that attacks the skin and eyes, causes severe blisters and, if inhaled, can also damage the lungs and other organs. It is usually disabling, but the symptoms of exposure appear one to six hours later. This makes mustard gas especially insidious, as victims can suffer tissue damage before they even realize they need treatment³⁸.

82. Programs have been established to collect weapons obtained by armed non-government groups from UXO sites, ammunition dumps, and arms caches³⁵. The ADF has been involved for a number of years in the destruction of UXO and in training Solomon Islanders in the correct techniques for the disposal of munitions²⁹.

4.2. Physical Harm– Environmental Hazards

83. In a 2000 report on the health status of ADF personnel, non-battle injuries and disease were highlighted as the major cause of personnel non-effectiveness during operational deployments. Health surveillance data from similar operations in Bougainville and East Timor suggested that the leading causes of disease and non-battle injury included dermatological conditions, injuries of all types, intestinal diseases, upper respiratory tract conditions, vector-borne disease and unexplained fever. These categories accounted for nearly half of all medical attendances in both these operations³⁹.

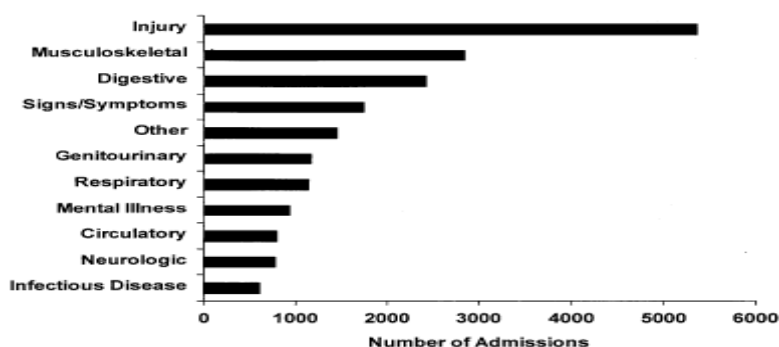
4.2.1. Physical activities

4.2.1.1. Non-battle injuries

84. Non-battle injuries (NBIs) are a common occurrence in military service. They are extremely important as they may affect a soldier's ability to perform their duties as well as may have numerous consequences in terms of treatment, rehabilitation, and future compensations⁴⁰.

85. In an attempt to describe the epidemiology of injuries in deployed personnel, four deployments of the United States (US) Army encompassing combat, humanitarian service and exercise were studied^{40, 41}. During the Persian Gulf War acute NBIs ranked first as the leading cause for hospitalisations (see Figure 1). Of these NBIs, motor vehicle crashes and falls were the leading causes of injuries, followed very closely by sports injuries and injuries involving machinery and tools (see Table 1)⁴⁰.

Figure 1. Leading hospitalisation diagnostic categories for US army troops during the Persian Gulf War.



Source: Writer JV, DeFraités RF, Keep LW. Non-battle injury casualties during the Persian Gulf War and other deployments. *Am J Prev Med* 2000;18(3 Suppl):64-70⁴⁰

Table 1. Leading causes of injury among hospitalized U.S. Army soldiers deployed to the Persian Gulf War

Cause of injury	Number (%)	Rate per 1000 person-years
Motor vehicle crashes	566 (19)	4.0
Falls	559 (19)	4.0
Sports and athletics	512 (18)	3.6
Machinery and tools	398 (14)	2.8
Other land transport	126 (4)	0.9
Weapons	113 (4)	0.8

Source: Writer JV, DeFraités RF, Keep LW. Non-battle injury casualties during the Persian Gulf War and other deployments. *Am J Prev Med* 2000;18(3 Suppl):64-70⁴⁰

86. In three other US Army Operations, in Somalia, Haiti and the Egypt, NBIs again ranked as the leading causes for both hospitalisations and outpatient visits⁴⁰.

87. Musculoskeletal injuries can be divided into acute traumatic injuries, such as sprains and fractures, and overuse injuries, such as tendonitis, bursitis and stress fractures⁴⁰. Studies have been performed on injuries in the military, mainly during basic training where the physical demands are higher. Musculoskeletal injuries are an important contributor for the overall injury burden⁴². Most of the injuries during basic training in the US military are overuse injuries, such as achilles tendinitis, patello-femoral syndrome, plantar fasciitis and stress fractures (about 60% to 80%)⁴³. Of these injuries most occur in the lower extremities (about 80% to 90%)⁴⁴⁻⁴⁶.

88. *Risk factors.* In general, risk factors for injuries can be divided into intrinsic and extrinsic (see Table 2, over page). Intrinsic factors relate to the individual characteristics of the person, such as gender and age. Extrinsic risk factors are the ones that influence the onset of injuries, such as parameters of training (duration, frequency and intensity) and the physical environment in which exercise takes place⁴³. Important examples of intrinsic risk factors include low aerobic fitness level and smoking⁴⁷. Past physical activity, low levels of previous occupational and leisure time physical activity, previous injury history, high running mileage, high amount of weekly exercise, smoking, age, and biomechanical factors have also been considered risk factors for injuries⁴².

89. *Gender and injuries in the military.* In the military, four studies have suggested that women are at higher risk of sustaining injuries than men. A number of studies of male and female US Army personnel have concluded that women experienced up to twice as many injuries as men, with cardiovascular fitness also being an important risk factor⁴⁸⁻⁵⁰.

90. *Long-term effects of injuries.* Although the immediate impacts of injuries are significant, reflected in the fact that the individual is unable to perform duties, the long-term effects of injuries are also important. In the US Army, musculoskeletal (orthopaedic) conditions are the leading cause of disability⁵¹.

Table 2. Risk factors for musculoskeletal injuries associated with weight-bearing exercise and activities.

Extrinsic factors	Intrinsic factors
Training parameters (excessive or rapid increase)	Sex
Duration	Age (extremes)
Frequency	Previous injury
Intensity	Behavioural factors
Environmental conditions (extremes or irregular)	Smoking
Terrain	Alcohol use
Surfacing	Previous physical activity/lifestyle (sedentary)
Weather	Physical fitness
Equipment (e.g. footwear)	Aerobic endurance (low)
	Muscle endurance (low)
	Strength (low or imbalanced)
	Flexibility (extremes or imbalanced)
	Body composition (extremes)
	Anatomic abnormalities
	High arches
	Bowed legs
	Leg-length discrepancies
	Musculoskeletal disease
	Osteoporosis
	Arthritis

Source: Centers for Disease Control and Prevention. Exercise-Related Injuries Among Women: Strategies for Prevention from Civilian and Military Studies Morbidity and Mortality Weekly Report 2000;49(RR02):13-33⁴³.

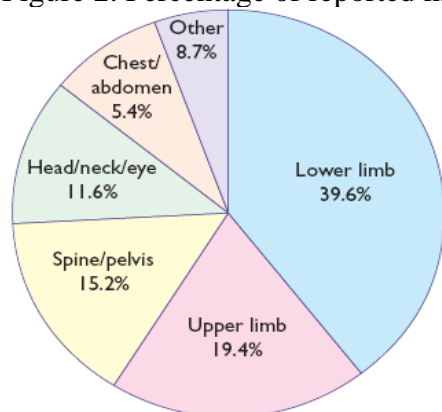
91. *Injuries in the ADF.* Disease and non-battle injuries are the major cause of non-effectiveness of the service personnel in the ADF⁵². A study of injuries in the Australian Army from 1987 to 1991 showed that the average report rate of injuries for 1991 was of 191 per 1000 soldiers per year. Lower limb injury was the most common injury reported by soldiers, with a rate of 60.1 per 1000 soldiers a year (see Figure 2) and in 1992 14% of the Army were not fully fit for duty⁵³.

4.2.1.2. Sporting injuries

92. Musculoskeletal injuries are a leading health problem in the military services and are usually found more often in combat units due to the nature of the physical activity performed. Although training and occupational injuries are of major importance, sporting activities contribute a substantial number of injuries. Depending on their location and duties, defence personnel may have some free time during which they can participate in recreational or competitive sports. In a study of a US Army population, the knee and the ankle were the body parts most frequently injured in sports and physical training hospitalisations⁴¹. During ADF OP BEL ISI in Bougainville, injuries due to sport accounted for nearly 10 per cent of medical attendances and the third highest average weekly incidence rates of one per cent per week³⁹.

93. Injuries occurring as a result of sporting activities can lead to prolonged periods away from soldiers' primary duties and can therefore affect their deployment status. Understanding the extent of sports injuries is important to Defence because military readiness is a function of the ability of each person to perform his or her full duty⁴¹.

Figure 2. Percentage of reported injuries in the ADF from 1987 to 1991



Source: Rudzki S. The number, rate and site of reported injuries in the Australian Army, 1987–1991. ADF Health 2000(1):54-57⁵³

4.2.2. Civil infrastructure

4.2.2.1. Standards of safety associated with transport infrastructure

94. Two-laned sealed roads are found only in Honiara. The roads are poorly marked, have many potholes and are not well lit at night. Outside Honiara, roads are made of coral or gravel, or are simple dirt tracks. Non-sealed roads often become muddy after rain, necessitating the use of 4WD vehicles²³.

95. The Solomon Islands has only one international airport, Henderson Airport, which is located 11km east of Honiara. It is used by a number of international passenger services, as well as an international cargo service. Solomon Islands Airways flies between Honiara and regional centres, mainly using Twin Otter aircraft²³.

4.2.2.2. Efficiency and effectiveness of local police, fire and emergency services, and medical facilities

96. Prior to the July 2003 arrival of the Pacific Islands Forum's RAMSI, Solomon Islands experienced major law and order problems²⁶. The country's institutions were greatly weakened and the Solomon Islands was in a severe state of economic decline, exacerbating the political and social instability. Prior to the intervention in 2003, critical social welfare infrastructure had almost ceased to function. There were no funds for vital medicines and hospital supplies. Power generation was essentially crippled resulting in an inability to supply power to hospitals, schools or businesses. Lack of power had also affected the water supply, which was already seriously degraded by poor maintenance⁵⁴.

97. **Local police.** Prior to RAMSI, the Royal Solomon Islands Police (RSIP) consisted of approximately 600 General Duties Officers. There were also two paramilitary elements: a 250 man Special Tasks and Rescue Division and a 60 man Rapid Response Unit. There were also smaller specialised groups, including a Maritime element and an Explosive Ordnance Division. A Special Constabulary Division was also formed to support the RSIP, consisting of up to 1500 enlisted personnel²³.

98. The RSIP had been unable to contain the militant and criminal activity during the ethnic conflict. This was the result of internal ethnic divisions, poor leadership, lack of capacity in operational planning and personal links with the MEF. Many Malaitan police officers are alleged to have assisted the MEF in their operations, while the paramilitary elements practically became personal armies of some senior officers, and participated in criminal and militant activities. Much of the RSIP's weapons and equipment fell into the hands of militants and criminals during the ethnic conflict²³.

99. After the arrival of RAMSI, the number of RSIP officers was significantly reduced with the removal of many corrupt and ineffective officers. In addition, the paramilitary elements and the Special Constabulary were disbanded. RAMSI focussed on rebuilding professional standards and competencies in the force, with the aim of restoring public confidence in the police²³.

100. **Medical facilities.** Medical facilities in the Solomon Islands are very limited, with hospitals and pharmacies limited to population centres and missions. The nearest reliable medical facilities are in Australia and New Zealand^{55, 56}.

101. There are eight public and three private hospitals in the country. Seven of the nine provinces have a public hospital. Guadalcanal Province is served by the National Referral Hospital, and Rennell/Bellona Province has no hospital. The total number of available hospital beds is unknown, as most hospitals were operating with a reduced number of wards and beds during the period of ethnic conflict. By the end of 2003, all hospitals were fully operational, but most were in need of repairs, refurbishing and supplies (certain equipment and drugs)^{23, 55}.

102. In rural areas, there are up to 130 rural health centres and nurse aide posts distributed throughout the provinces, based on the size and geographical distribution of the population. These facilities, however, are very basic and the availability of stocks of medicine is unreliable^{23, 55}.

103. Rescue and emergency services are not nearly as comprehensive as in Australia; evacuations are generally required in cases of serious illness or accident²⁶.

4.2.3. Natural environment

4.2.3.1. Topography

104. The main islands are rugged and mountainous, with steep interiors which rise to over 1,000 metres, and on Guadalcanal to 2447 metres. The only extensively coastal plains are on the north-east coast of Guadalcanal. Many outer islands are coral atolls and raised coral reef. Most agricultural activity is confined to the more favourable topography of the coastal areas where the climate is hot and wet, and vegetation is lowland rainforest³.

4.2.3.2. Climate

105. The Solomon Islands has a moist tropical climate. Its temperature range is typically 25-30°C with little seasonal and daily variation throughout the year. In coastal regions maximum temperatures seldom exceed 32°C while the minimum rarely falls below 23°C^{3, 57}.

⁵⁸. Sun exposure can be intense⁵⁶. Humidity is high all year round, fluctuating between 60 and 92 percent, and with evaporation rates averaging a low 5 mm a day^{3, 57-59}.

106. Generally rainfall is high and seasonal distribution patterns are not marked. Most areas receive an average rainfall of between 2,500 to 4,500 mm, but this varies between locations. Heaviest rainfall occurs during the summer months of December to March, during which cyclones may build up but rarely do much damage. Between April and November there are generally long periods of calm with occasional squalls, except on the Guadalcanal plains where from April to October rainfall is relatively low^{3, 57-59}.

107. Natural disasters pose some threat in the Solomon Islands. It is subject to earthquakes, volcanic activity, tidal waves and cyclones. The island of Savo - 35 kilometres north-west of Honiara - is a cyclically active volcano. The cyclone season is from November to April. Solomon Island authorities provide advice of any impending natural disaster threat through local media, radio and television²⁶.

108. The primary health risks relating to the climatic conditions in the Solomon Islands include increased risk of heat-related illness and dermatological conditions, such as prickly heat and fungal infections²³.

109. **Heat-related illness.** UV radiation, extreme temperatures and humidity were of significant concern to ADF personnel during deployment to the Solomon Islands⁴. Heat-related illness represents a continuum of disorders from minor syndromes such as heat cramps, heat syncope, and heat exhaustion to the severely life-threatening disorder known as heat stroke. Convection and evaporation are far more important than other methods of heat transfer because they are regulated primarily by the body to control temperature⁶⁰. The semi-tropical climate of the Solomon Islands makes heat exhaustion and heat stroke more likely⁵⁶.

110. The human body's response to heat stress is quite resilient if given several weeks for acclimatisation to occur. Acclimatisation involves a number of physiologic and biochemical adjustments that allow an individual to cope with heat stress that would otherwise result in substantial morbidity or even death⁶⁰. The rapid mobilisation of OP ANODE would have greatly limited the opportunity for acclimatisation. Personnel not acclimatised are susceptible to exposure related disorders²³.

111. *Types of heat stress.*

a) Heat oedema. Results when cutaneous vasodilatation and pooling of increased interstitial fluid in dependent extremities lead to swelling of the hands and feet. It is self-limited and rarely lasts more than a few weeks⁶⁰.

b) Heat syncope. Results from volume depletion, peripheral vasodilatation, and decreased vasomotor tone and occurs most commonly in elderly and poorly acclimatized individuals⁶⁰.

c) Heat cramps. Characterized by painful muscle spasms, especially in the voluntary muscles of the calves, thighs, and shoulders, which most often occur several hours after vigorous exertion and begin during rest or showering⁶⁰.

d) Heat exhaustion. The most common heat-related illness, it is characterized by water depletion and salt depletion that develops in conditions of heat stress; individuals present with systemic complaints including fatigue, weakness, dizziness, headache, nausea, vomiting, and muscle cramps. On examination, these patients usually have core

temperatures of less than 40°C and will not have signs of severe central nervous system damage⁶⁰.

e) Heat stroke. Exertional heat stroke is mainly seen in poorly acclimatised persons involved in strenuous physical activity in a hot environment; patients typically have a core temperature of 40°C or more and central nervous system dysfunction manifesting as seizures, delirium, or coma. In addition, patients may present with profuse sweating, tachycardia, hypotension, and tachypnoea (rapid breathing). Vomiting and diarrhoea are common, while 25% of patients may develop acute renal failure (ARF). Patients can also develop hemorrhagic diathesis as a result of disseminated intravascular coagulation (DIC). Rhabdomyolysis is the breakdown of muscle fibers resulting in the release of muscle fiber contents into the circulation. Some of these are toxic to the kidney and frequently result in kidney damage⁶⁰.

112. *Outcomes of heat stress.*

Heat stress causes damage to an organism by way of at least three mechanisms⁶⁰:

- a) Heat is directly toxic to cells. An increase in cellular temperature results in protein denaturation and interrupts critical cellular processes, resulting in apoptosis and cell death. Temperatures above 41.6°C to 42°C are considered to be above the critical thermal maximum for humans and can be expected to produce injury over even a few hours;
- b) Heat stress results in release of inflammatory mediators; and,
- c) Heat results in injury to vascular endothelium, resulting in enhanced vascular permeability, activation of the coagulation cascade, and disseminated intravascular coagulation (DIC).

113. Severe heat illness can be seen as a combination of direct cytotoxicity and a severe systemic inflammatory response in which encephalopathy predominates early in the course of the disease. If left unchecked, renal failure, coagulopathy, hepatic dysfunction and multiple organ system dysfunction system will result⁶⁰.

114. Most patients who have heat injuries have good outcomes if they are treated promptly. In patients who have heat stroke, mortality should be less than 10% with adequate treatment and supportive care. Poor prognostic factors include hypotension, the need for endotracheal intubation, altered coagulation profile and advanced age⁶⁰.

115. The vast majority of patients who have exertional heat stroke will recover without sequelae. Long-term effects for heat stroke survivors are rare with adequate treatment. In a case-control study of 21 young patients suffering exertional heat stroke followed up for 6 months and tested for heat tolerance and psychological sequelae, none were found to have any abnormal findings⁶⁰.

116. *Heat stress in the ADF.* A 25 year old soldier died of acute heat stress on November 10 2004 while training in extreme heat while training in extreme heat and humidity at Mt Bunday, near Kakadu National Park in the Northern Territory. He had been required to dig weapons pits and conduct patrols with little shade, sleep or relief from the 36°C heat. Thirteen other soldiers presented with heat-related sickness on the same day. Various allegations have been raised against the ADF as a result, including that the ADF conducted the training course in extreme and dangerous climatic conditions; failed to provide a safe working environment for the soldiers; provided inadequate monitoring of employee health and safety; failed to provide sufficiently trained medical personnel or an adequately equipped ambulance; failed to respond to prior reports of heat illness by soldiers; did not have rest

periods with adequate shade for soldiers; and failed to properly train its personnel about the dangers of heat-related illness⁶¹.

117. **Dermatological conditions.** Dermatological conditions have contributed a significant proportion of morbidity during previous ADF deployments to tropical climates. For OP WARDEN in East Timor and OP BEL ISI in Bougainville, dermatological conditions other than eczematous skin condition were associated with 15 per cent and 20 per cent of initial medical attendances, respectively. This category consistently had the highest average weekly incidence rate for all causes of medical attendance. Contributory risk factors may have included: hot and humid climate; failure to wash and change socks and undergarments regularly; exposure to poisonous plants; poor personal hygiene; and failure to apply sunscreen³⁹.

4.2.3.3. Harmful flora and fauna

118. **Fauna.** Crocodiles are native to parts of the Solomon Islands. Local advice was required before entering unfamiliar waters²⁶. Regarding animal bites, Solomon Islands is rabies free⁵⁶. There are some land snakes in the Solomon Islands but venomous varieties are generally limited to higher bush areas. There are, however, black widow and Sac spiders^{8, 56}.

119. Other possible fauna hazards include bees, hornets, wasps, feral pigs, scorpions, centipedes, ticks, lice and mites²³.

120. Dangerous marine life that may be a hazard to bathers include stinging corals, jellyfish, poisonous fish, cone shells, stonefish, garfish, sea urchins, sharks and sea snakes^{23, 56}.

121. Disease vectors, in particular mosquitoes, were the primary hazardous fauna in the Solomon Islands. Potential health outcomes are discussed below in 'Known diseases'.

122. **Flora.** Several plants found in the Solomon Islands can cause severe irritation or blistering of the skin when touched, or are toxic if ingested. Potential hazards include Barbados pride, cashew, cassava, golden dewdrop, Indian milkweed, nettle tree, rosary pea, tuitui and wild yam. Coarse grasses, bamboo and reeds can cause painful and debilitating puncture wounds to the skin²³.

4.2.3.4. Known diseases

123. In general, ADF personnel deployed to the Solomon Islands were primarily at risk of food- and water-borne diseases and vector-borne diseases. Vector-borne diseases include malaria, dengue/dengue haemorrhagic fever, yaws, and filariasis⁸.

124. Health data from 2001 gives an overall picture of the issues that have faced the Solomon Islands population in recent years⁶²:

Food and water-borne diseases

125. Inadequate sewerage disposal and water treatment (see 'Sanitation' below) in the Solomon Islands has led to significant water-borne disease threats. A number of water-

borne diseases are found in the Solomon Islands, including diarrhoea, hepatitis, typhoid, influenza and cholera⁵⁷.

126. Food and beverages from vendors are frequently prepared in unhygienic conditions and can contribute to gastrointestinal diseases, potentially leading to diarrhoea and dysentery⁸.

Table 3. Ten leading causes of morbidity in the Solomon Islands in 2001.

Causes of morbidity	Number	Rate/ 100 000
Acute respiratory infections	156 021	36 380
Malaria	131 266	30 610
Fever (syndromic)	123 368	28 770
Skin diseases (excluding yaws)	36 894	8600
Ear infections	20 831	4860
Yaws	17 609	4110
Conjunctivitis (red eye)	12 066	2810
Diarrhoeal diseases	10 390	2420
Sexually transmitted infections	1987	460
Tuberculosis	286	67

Source: World Health Organisation Regional Office for the Western Pacific. Western Pacific Region Health Databank, 2005 Revision. 2005⁶²

127. Infectious diseases are still the major causes of morbidity and mortality. Due to years of ethnic conflict, the Solomon Islands Government has had very limited resources to address this, although it has had the support of international agencies. Disease control is severely limited by the unavailability of up-to-date and reliable morbidity data⁵⁵.

128. Seafood in the region has the potential risk of contamination with toxic metals, pesticides, pathogenic bacteria and viruses. There also is a risk of ciguatera poisoning which results from eating reef fish such as grouper, snapper, amberjack and barracuda. The toxin remains even when fish are well cooked. Potentially toxic reef fish are in all areas excluding Santa Cruz, Rennell, Bellona, Ontong Java and Agina Island. In addition, the ingestion of Horseshoe crab flesh can result in a toxic reaction that may be fatal^{8, 56}.

129. A number of food and water-borne diseases are discussed below.

130. **Intestinal infectious diseases.** Diarrhoeal diseases are highly endemic throughout the region, in part due to a lack of food and water sanitation⁸.

131. *Intestinal infectious diseases amongst ADF personnel.* In recent ADF deployments there have been mixed experiences regarding intestinal infectious diseases. For OP WARDEN, in East Timor, these conditions accounted for 12.2% of initial medical attendances and had consistently one of the highest weekly incidence rates of all causes for medical attendances. This was attributed, in part, to logistical systems, including potable water production and distribution, waste disposal and rations. For OP BEL ISI, in Bougainville, these systems were much more developed and the incidence of intestinal disease was much lower than during OP WARDEN³⁹.

132. *Disease outcomes.* The primary adverse outcome of diarrhoea is dehydration⁶³.
133. **Hepatitis A.** Hepatitis A is a viral infection of the liver caused by hepatitis A virus (HAV). HAV is shed in the faeces of persons with HAV infection. Transmission can occur through direct person-to-person contact; through exposure to contaminated water, ice, or shellfish harvested from sewage-contaminated water; or from fruits, vegetables, or other foods that are eaten uncooked and that were contaminated during harvesting or subsequent handling⁶⁴.
134. *Disease outcomes.* HAV infection may be asymptomatic or its clinical manifestations may range in severity from a mild illness lasting 1-2 weeks to a severely disabling disease lasting several months. The incubation period for hepatitis A averages 28 days. Hepatitis A typically has an abrupt onset of symptoms that can include fever, malaise, anorexia, nausea, and abdominal discomfort, followed within a few days by jaundice. The likelihood of manifesting symptoms of clinical illness, once infected with HAV, is related to the infected person's age⁶⁴.
135. There is no chronic or ongoing infection associated with hepatitis A, but 10% of infected persons will have prolonged or relapsing symptoms over a 6 to 9 month period. The overall case-fatality rate among cases reported to CDC is 0.3%, however, the rate is 1.8% among adults greater than 50 years of age⁶⁴.
136. *Inoculations and their inherent risks.* Hepatitis A vaccination is a routine requirement of ADF personnel prior to deployment. Hepatitis A vaccines are made of inactivated hepatitis A virus. TWINRIX is a combined hepatitis A and hepatitis B vaccine containing hepatitis A antigen and recombinant hepatitis B surface antigen protein. Among adults, the most frequently reported side effects occurring 3-5 days after a vaccine dose are tenderness or pain at the injection site (53%-56%) or headache (14%-16%). No serious adverse events that could be definitively attributed to the vaccine have been identified⁶⁴.
137. **Typhoid Fever.** Typhoid fever is a bacterial infection of the Salmonella species. Risk of infection is greatest for those who have prolonged exposure to potentially contaminated food and beverages⁶³.
138. *Disease outcomes.* Typhoid fever is an acute, febrile illness that can be life-threatening. Typical presentation of typhoid infection is with persistent, high fevers. Other common symptoms and signs include headache, malaise, anorexia, splenomegaly, and relative bradycardia. Many mild and atypical infections occur⁶⁴.
139. *Inoculations and their inherent risks.* Typhoid vaccination is recommended where there is a recognised risk of exposure. There are two types of typhoid vaccine. One is an injectable vaccine and the other is a live, attenuated oral vaccine. The decision on which typhoid vaccine to use depends on personal medical history as well as the timing of anticipated travel. The oral vaccine, which takes about one week to complete, generally provides protection for five years, whereas the injectable vaccine provides protection for two years⁶³. Side effects of the oral vaccine are rare and mainly consist of abdominal discomfort, nausea, vomiting, and rash or urticaria, while the injection is sometimes associated with a local reaction, either erythema or induration of less than 1cm⁶⁴.

Vector-borne diseases

140. The climate and environment in the Solomon Islands supports a population of mosquitoes. Significant disease transmission from mosquitoes is sustained year-round and countrywide below 2000 metres⁸.

141. Information regarding important vector-borne diseases will be discussed here, along with potential health risks associated with vaccinations or chemoprophylaxis. While these preventive measures are important, the first-line of defence against many of these diseases is mosquito control. The types of countermeasures employed by the ADF and their potential health risks are discussed later in 'Man-Made Environment: Chemicals'.

142. **Malaria.** Malaria is caused by protozoan parasites belonging to the genus *Plasmodium*. Four species account for almost all human infections (*P. falciparum*, *P. vivax*, *P. malariae*, and *P. ovale*)⁶⁵. Malaria is a serious disease transmitted to humans by the bite of an infected female *Anopheles* mosquito⁶⁶. It has a significant impact in the Asia Pacific, with millions of infections and thousands of deaths annually⁶⁷. Malaria in the Solomon Islands remains widespread despite many years of interventions⁶⁸, with a malaria risk in all areas except for the southern province of Rennell and Bellona, the eastern province of Temotu, and the outer islands of Tikopia, Anuta, and Fatutaka⁶⁶. In 2003, the incidence of malaria in the Solomon Islands was 18995 per 100 000 population, with a mortality rate of 15 deaths per 100 000 population⁶². Papua New Guinea, the Solomon Islands and Vanuatu have by far the greatest incidence of malaria per person in the Western Pacific region⁶⁷. In 2000, of those reported confirmed cases in the Western Pacific region that specify the malaria parasite, 68% are *P. falciparum*⁶⁷. This is of concern due to the risk of mortality from *P. falciparum*⁶⁸.

143. Malaria surveillance and eradication programs through the 1970s, 1980s and, in particular, the late 1990s, saw the incidence of malaria decrease to relatively low levels. Anti-malaria campaigns aimed to reduce mortality and morbidity through early detection and treatment, and to reduce human-vector contact, primarily through the use of insecticide-impregnated bed nets⁶⁸. During the years of ethnic conflict in the Solomon Islands (1999-2003), however, this malaria program was severely disrupted and the number of reported new cases of malaria increased from 74 865 in 2002 to 90606 in 2003⁵⁵.

144. Malaria can be transmitted by several species of female anopheline mosquitoes that differ in behaviour⁶⁵. The predominant malaria vectors in Solomon Islands are *Anopheles farauti sensu stricto* (*A. farauti s.s.*) and *Anopheles punctulatus*. *A. farauti s.s.* tends to bite outdoors in the early hours of the night, while the biting cycle of *A. punctulatus* peaks towards midnight, with predominantly indoor biting. This species-specific behaviour suggests bed nets are most effective in areas where *A. punctulatus* is the dominant vector⁶⁸.

145. *Malaria amongst ADF personnel.* The experiences of ADF deployed forces on operations in East Timor and Bougainville suggest that malaria could also have been a significant threat in the Solomon Islands. From OP WARDEN in East Timor, the crude attack rate for troops was 15 cases per 1000 personnel, with up to 34 and 37 cases per 1000 for some infantry battalions. Major risk factors leading to a malaria outbreak during the operation included: physical location of a unit in an area with extremely high numbers of vectors (mosquitoes); lack of preventive medicine; and lack of chemicals to continue treatment of uniforms and bed nets³⁹.

146. A large proportion of malaria cases amongst OP WARDEN troops occurred whilst still in East Timor, however, a greater number of cases occurred on return to Australia³⁹. In particular, the more commonly acquired *P. vivax* was more likely to present on return to Australia, whereas infection with the potentially fatal *P. falciparum*, either alone or as a mixed infection with *P. vivax*, was more likely to present in the area of operations. This may reflect that the clinical symptoms of initial infection with *P. vivax* are readily suppressed by ADF chemoprophylaxis⁶⁹. Similarly, out of 1500 ADF personnel of OP BEL ISI in Bougainville, at least 25 cases of malaria occurred but they did not develop until return to Australia³⁹.

147. For ADF personnel deployed to OP ANODE in the Solomon Islands, 12 cases of malaria were diagnosed between July 2003 and December 2005. As for Bougainville, though, there were no cases of malaria diagnosed in defence personnel whilst they were still serving in the Solomon Islands. All cases of malaria have been diagnosed since their return to Australia⁷⁰. This may indicate that the use of chemoprophylaxis, personal protection measures and vector control programs were successful in suppressing the onset of disease while deployed³⁹.

148. *Disease outcomes.* Malaria is always a serious disease and may be a deadly illness, and immediate medical attention should be sought. Symptoms may include fever and flu-like illness, including chills, headache, muscle aches, and fatigue. Malaria may also cause anaemia and jaundice. *P. falciparum* infections, if not immediately treated, may cause kidney failure, coma, and death. Malaria symptoms will occur at least 7 to 9 days after being bitten by an infected mosquito⁶⁶.

149. *Inoculations and inherent risks.* There is no malaria vaccine currently available. Taking an appropriate drug regimen (chemoprophylaxis) and using anti-mosquito measures will help prevent malaria, but no method can protect completely against the risk of contracting malaria⁶⁴.

150. Malaria chemoprophylaxis is the prevention of malaria disease by giving medication prior to exposure to infective mosquitoes. It is not perfect, however, primarily due to non-compliance with medication regimens, adverse reactions associated with them, and parasite drug resistance, particularly to *P. falciparum*^{71, 72}. Doxycycline is highly effective in suppressing clinical illness and is the first line drug used by the ADF for malaria prophylaxis. Mefloquine is also effective but generally reserved for service personnel who are unable to take doxycycline for any reason. Both drugs act against the asexual blood stages of the parasite and are generally considered to be the most effective agents available today for malaria chemoprophylaxis⁷².

151. Possible side-effects of doxycycline include nausea, abdominal cramps, oesophagitis, photosensitivity and superinfection. Mefloquine, which is taken only once a week, has an incidence of side effects comparable to doxycycline but with a different profile. Dizziness and headaches can occur and are usually mild and do not interfere significantly with daily activities. Rarely, mefloquine can also cause serious neuropsychiatric disturbances such as seizures, psychosis and nightmares (reported to affect about 1 in 10000 individuals on prophylaxis). The occurrence of neurological side effects, particularly dizziness, has led to concern that mefloquine may impair the performance and precision of service personnel using weapons and military equipment⁷².

152. *P. vivax* relapses are a continuing problem for ADF personnel following their return from malarious areas^{69,70}. Relapses occur due to the *P. vivax* hypnozoites, which hibernate in the liver of an infected person, being released into the blood stream periodically, thus causing clinical illness. Primaquine is the only currently available drug used to eradicate *P. vivax* hypnozoites from the liver, and is given to ADF personnel returning from malarious areas for this purpose. The relatively few cases of *P. vivax* in personnel returning from OP ANODE suggests that compliance with taking the primaquine regime was reasonably good⁷³.

153. Several methods of mosquito control are discussed later in 'Mosquito control measures'.

154. **Dengue.** Dengue is a disease caused by four serotypes of a virus of the same name (dengue 1, 2, 3 and 4)⁷⁴. It is transmitted via a mosquito vector of the *Aedes* species. The incubation period for dengue fever after the mosquito bite occurs is between 3 and 8 days^{75, 76}. The primary vector of dengue is *Aedes aegypti*, which is found in and around homes, and has a short flight range. It breeds in a variety of containers, usually associated with human refuse or water storage. A secondary vector, *Aedes albopictus*, has similar habits to *Aedes aegypti* and has recently invaded the south-west Pacific region⁷⁴.

155. *Dengue amongst ADF personnel.* As for malaria, experiences during operations in East Timor provide some indication of the risk that dengue could have posed to ADF personnel in the Solomon Islands. Virtually all cases of dengue fever occurred in-country with crude attack rates of 29 cases per 1000 troops during OP WARDEN³⁹. No data could be found regarding dengue fever amongst OP ANODE personnel in the Solomon Islands.

156. *Disease outcomes.* Infection may be subclinical, or produce an illness with fever, arthralgia and rash, or be complicated by haemorrhagic diatheses or shock syndromes⁷⁵. The severity of dengue infections is influenced by the age and genetic background of the host, the strain and serotype of the infecting virus and the prior history of dengue infections of the host⁷⁴.

157. Dengue fever is a severe, flu-like illness, the clinical features of which vary according to the age of the patient. The more severe cases usually occur in older children and adults and are characterized by a rapidly rising temperature (39°C) that lasts approximately 5 to 6 days and sometimes may be biphasic. During the febrile period, the patient may experience severe headache, retro-orbital pain, myalgia, arthralgia, nausea, and/or vomiting. More than half of infected patients report having a rash during this period that initially is macular or maculopapular and becomes diffusely erythematous. Minor hemorrhagic manifestations such as petechiae, epistaxis, and gingival bleeding can occur⁷⁶.

158. Although dengue fever may be incapacitating, its prognosis is favourable and the patient generally recovers after having 7 to 10 days of illness⁷⁶.

159. *Inoculations and inherent risks.* Until a vaccination becomes available, the mainstays of dengue prevention are personal protective measures and environmental health measures against disease vectors, i.e. mosquito control⁷⁵.

160. **Yaws.** Yaws is an infectious, contagious, chronic, relapsing non-venereal treponematosi s caused by *Treponema pallidum* subspecies *pertenue*⁷⁷. It is a disease of rural tropical areas with high levels of humidity and rainfall, and predominantly affects children⁷⁷.

161. *Disease outcomes.* Early clinical features of yaws include a papule at the entry site which enlarges and ulcerates. Subsequent to this, smaller widespread cutaneous papules may form, accompanied by systemic features and generalised lymphadenopathy⁷⁷.

162. Late features of yaws can occur after variable latency period of upto years, and may involved painful palmoplantar hyperkeratosis and keratoderma⁷⁷.

163. **Lymphatic filariasis.** The thread-like, parasitic filarial worms *Wuchereria bancrofti* and *Brugia malayi* that cause lymphatic filariasis live almost exclusively in humans. These worms lodge in the lymphatic system, producing millions of immature microfilariae (minute larvae) that circulate in the blood. The disease is transmitted by mosquitoes that have bitten infected humans⁷⁸.

164. In tropical and subtropical areas where lymphatic filariasis is well-established, the prevalence of infection is continuing to increase. A primary cause of this increase is the rapid and unplanned growth of cities, which creates numerous breeding sites for the mosquitoes that transmit the disease⁷⁸.

165. The national malaria eradication program between 1960 and 1975 was reported to have eradicated filariasis from the Solomon Islands. More recently, a blood survey in 2003 by the Pacific Programme to Eliminate Lymphatic Filariasis returned 0.3% positive results from an ICT test of 11134 subjects⁷⁹.

166. *Disease outcomes.* Most infections are asymptomatic, but the living adult worm causes progressive lymphatic vessel dilation and dysfunction. Lymphatic dysfunction may lead to lymphoedema of the leg, scrotum, penis, arm, or breast. Tropical pulmonary eosinophilia is a potentially serious progressive lung disease with nocturnal cough, wheezing, and fever, resulting from immune hyperresponsiveness to microfilariae in the pulmonary capillaries⁶⁴.

167. *Inoculations and inherent risks* No vaccine is available, nor has the effectiveness of chemoprophylaxis been well documented. Protective measures include avoidance of mosquito bites through the use of personal protection measures⁶⁴.

Respiratory diseases

168. **Upper respiratory tract infections.** The experiences of ADF deployed forces on operations in East Timor and Bougainville suggest that upper respiratory tract conditions could also have been an issue in the Solomon Islands. Circulating upper respiratory tract infections (URTIs), flu-like illness and viral, self-limiting URTI were reported regularly in health surveillance messages during OP WARDEN in East Timor. Upper respiratory tract conditions were associated with 8.5 and 10 per cent, respectively, of initial medical attendances for OP BEL ISI and OP WARDEN. OP ANODE personnel in the Solomon Islands could potentially have faced similar risks factors thought to be associated with these conditions, such as close living quarters with other troops, failure to wash hands, exposure to

local nationals with poor health and hygiene practices, and exposure to the elements during military training and operations³⁹.

169. **Tuberculosis.** There is a trend for the prevalence of tuberculosis (TB) to be increasing while the notification rate is decreasing, implying that the number of new cases of TB is declining. The TB prevalence rate for the Solomon Islands was 126 per 100 000 people in 2002, while the TB notification rate was 65 per 100 000⁸⁰. Data from 2003 reported by the World Health Organisation (WHO) Regional Office for the Western Pacific indicated an incidence of 60 cases of tuberculosis (TB) per 100 000 population^{54, 62}. There were a total of 293 TB cases in the Solomon Islands during 2003⁵⁵. About half of these cases were sputum smear-positive (SS+) TB, a rate of 27 SS+ cases per 100 000 people. The mortality rate for the same year was 4 deaths per 100 000 people. Total numbers of TB in 2003 were down from previous years, with the Honiara National Referral Hospital reporting 647 confirmed positive smears in 2001 and 421 in 2002⁵⁵.

170. The Solomon Islands has implemented all aspects of WHO TB control policies, although coverage is not complete⁶². In the Solomon Islands in 2002, the proportion of TB cases detected by the directly observed treatment short course (DOTS) was 57%, while in 2001 89% of DOTS treatments were successful⁸⁰.

171. The TB bacilli are transmitted by the airborne route. To become infected a person usually has to spend a relatively long time in a closed environment where the air is contaminated by a person with untreated TB who was coughing and who had numerous *M. tuberculosis* organisms in secretions from the lungs or larynx. There is little danger of infection being spread by dishes, linens, and items that are touched, or by most food products. In addition, persons who already have a positive tuberculin reaction are unlikely to be reinfected⁶⁴.

172. *Disease outcomes.* *Mycobacterium tuberculosis* can cause disseminated disease but is usually associated with pulmonary infections. Depending on host factors, infection may lead to latent tuberculosis infection or tuberculosis disease. Both conditions can usually be treated successfully with medications⁶⁴.

173. *Available countermeasures and associated risks.* Primary TB prevention entails avoiding exposure to known tuberculosis patients in crowded environments (e.g., hospitals, prisons, or homeless shelters). Those working in health-care settings where TB patients are likely to be encountered may be advised to take special precautions, such as personal respiratory protective devices⁶⁴.

174. Bacille Calmette-Guérin (BCG) vaccine has variable efficacy in preventing the adult forms of tuberculosis and interferes with testing for latent tuberculosis infection⁶⁴.

4.2.4. Man-made environment

4.2.4.1. Mosquito control measures

Fogging

175. The number of biting mosquitoes can be reduced by controlling the larval and adult populations through source reduction and insecticide treatment of larval habitats, spraying of insecticides to kill adults, and fogging^{81, 82}.

176. Fogging, also called thermal fogging, involves applying a mixture of insecticide and diesel fuel to a warm manifold and then to a stream of air. This produces a dense grey fog of microscopic droplets that lingers near the ground, penetrating the area inhabited by adult mosquitoes. The insecticide enters the mosquito through the exoskeleton or through the breathing system. Thermal fogging can reduce biting activity for several hours to several days depending on the environmental conditions, the size of the mosquito population, and the active ingredient chosen. Mosquitoes must be in a fairly dense fog for a minimum of 20 to 30 seconds to be killed; if the fog is intermittent and the mosquitoes are exposed to it for a lesser period of time, they are likely to survive. Residual deposits are minimal and are insufficient to kill mosquitoes landing later on^{81, 82}.

177. Fogging is most effective when conducted during the evening or early morning hours. At this time a temperature inversion may occur, causing the warm fog containing the insecticide to stay near the ground, which is desirable. During the heat of the day, fogs tend to rise and are dispersed too rapidly. An additional advantage to fogging during the evening is that, at this time, usually the greatest number of mosquitoes are starting to move from their resting places and thus more likely to come into contact with fog⁸².

178. *Use by ADF.* Fogging using a permethrin and diesel mix was used for widespread spraying to control mosquito populations around operational areas in the Solomon Islands, including the Guadalcanal Beach Resort (GBR)⁸³. Fogging programs have been used on other deployments by the ADF, with vehicle mounted foggers and the more commonly seen hand-held foggers operated by preventative medical support operators (PMSO)⁸⁴.

179. **Diesel.** With the use of diesel as the dispersal agent for fogging, the diesel fumes that are produced constitute an environmental hazard⁸⁵. Diesel emissions are a complex mixture of hundreds of organic and inorganic particulate and gaseous compounds⁸⁶. The pollutants in diesel fumes include carbon monoxide (CO), carbon particulates, hydrocarbons, formaldehydes and nitrous oxides (NO, NO₂)^{85, 87}.

180. *Adverse effects.* Acute effects of exposure to diesel emissions may include irritation of the eyes and nose, lung function changes, respiratory changes, headache, fatigue and nausea. There is also some evidence of chronic health effects including coughing, sputum production, lung function decrements and profound inflammatory effects in the lung epithelium. These outcomes may be more pronounced in asthmatics. Diesel emission may also have the potential to induce allergies by acting as adjuvants to other allergens. Animal experiments have suggested an association between diesel emissions and asthma, chronic bronchitis and pollinosis^{86, 87}.

181. The use of permethrin as an insecticide will be discussed in detail in the following section.

Insecticide treatment of bed nets and uniforms

182. Use of bed nets treated with an insecticide can be an effective barrier against biting mosquitoes, although nets are only effective while the person is under them. As such, uniforms are also often treated to reduce the number of mosquito bites. A common and effective insecticide used for these purposes is permethrin⁸¹.

183. **Permethrin.** Permethrin is a synthetic pyrethoid which is both a potent insecticide and a repellent^{88, 89}. Permethrin may exist as cis and trans isomers, but since the cis isomer is relatively more toxic and slowly secreted, permethrin used in medical applications consists predominantly of the trans isomer⁸⁹. Pyrethrums, the source drug for permethrin, cause neurological paralysis in insects. Permethrin is the only photostable and relatively non-toxic member of this group⁸⁹.

184. *Formulations and Use.* A frequently used formulation of permethrin is as an aerosol that is sprayed on tents and clothing⁸⁸. The treatment of uniforms with permethrin has been found to be effective in reducing the number of mosquito bites⁸¹.

185. *Pharmacokinetics and Adverse effects.* Percutaneous absorption in humans is minimal and mammalian toxicity appears to be very low^{88, 89}. The Committee on Toxicology of the US National Research Council noted that 'although permethrin is highly toxic for insects and other arthropods, it is one of the less toxic insecticides for humans'. The WHO stated that while 'no undesired adverse effects could be observed during the use of permethrin in humans over many years, investigations concerning the exposure of humans to this drug should be continued'⁸⁹.

186. Permethrin should be washed off with soap and water 8 to 14 hours after topical application to minimise the risk of allergic contact dermatitis. This is particularly important when using formulations containing formaldehyde^{88, 89}. After it is percutaneously absorbed, permethrin is rapidly cleaved to inactive metabolites by skin esterases. The metabolites are then promptly excreted in the urine. After topical application of permethrin, the ratio of cis to trans isomers of permethrin in the skin has been observed to equilibrate to about 2.8. In plasma and brain, this ratio varies from 0.7 to 1.3, however some investigators have found post-treatment plasma permethrin concentrations to be undetectable. The long-term effects of permethrin on humans have not yet been studied in depth⁸⁹.

187. The National Research Council in the US reviewed possible health problems for service personnel wearing permethrin-treated military clothing. They concluded that it is unlikely that soldiers would experience adverse health effects at the suggested exposure levels. Permethrin is unlikely to be a skin irritant or skin sensitizer for those exposed to it dermally from wearing permethrin impregnated uniforms⁹⁰.

Individual personal protection

188. The final, and often most effective, method of mosquito control is individual personal protection using repellents⁸¹. One such mosquito repellent is DEET.

189. **DEET.** N,N-diethyl-3-methylbenzamide is commonly known as DEET, but is also called diethyl toluamide⁸¹. DEET is a synthetic insect repellent and is the most effective and widely used repellent to date⁸¹.

190. *Formulations and Use.* An estimated 200 million persons worldwide use DEET repellents each year⁸⁸. A variety of DEET mosquito repellent formulations are used in Australia, ranging from 7-80% concentrations and supplied as either gels or lotions (see Table 4)⁸¹.

Table 4⁸¹. DEET mosquito repellent formulations used in Australia.

Product Type	Packaging	Concentration of DEET	Manufacturer
Bushman Gel	75 g	80%	North Queensland Laboratories
ADF Gel	75 mL	35%	Colbar Laboratories
Aerogard Lotion	125 mL	17%	Reckitt Benckiser
RID Lotion	125 mL	16%	Thorley Laboratories
Skintastic Lotion	125 mL	7%	S C Johnson

Source: Frances S, Cooper R. Personal protection measures against mosquitoes A brief history and current use of repellents by the Australian Defence Force. ADF Health 2002(3):58-63⁸¹

191. In the ADF, a 35% DEET gel formulation was placed into service in 1992. It was designed to allow more DEET to remain on the treated skin for longer than ethanol formulations, with less intradermal absorption. This gel has been shown to be effective in protecting people against mosquitoes in PNG and Australia. Despite this, the gel was poorly accepted by ADF personnel because many soldiers complained that it did not feel good on the skin and that it melted plastic. As an alternative, ADF personnel often used commercial products containing DEET⁸¹.

192. A survey from East Timor showed that only 10% of personnel used the ADF repellent during their deployment. On the other hand, 57% used Rid, 44% used Aerogard, 28% used Skintastic and 14% used Bushman. Many soldiers used more than one formulation of insect repellent during their deployment of several months. Forty-seven per cent of soldiers preferred an aerosol spray formulation, while only 4% preferred a gel formulation. In addition, while 84% of soldiers used repellents sometimes, only 19% used repellents daily. The main reason given for non-compliance was because they felt that there was no need as mosquitoes were not a problem⁹¹.

193. *Pharmacokinetics and Adverse effects.* The absorption of DEET would be expected to be less than 10% of the applied dose. When DEET is applied to skin it is absorbed at a steady rate and rapidly eliminated in the urine. There is complete elimination of DEET and its metabolites within four hours of application. Increased transcutaneous absorption may occur through sunburnt or damaged skin⁸¹.

194. Adverse reactions to DEET range from mild skin irritation to local allergic reactions in the form of contact urticaria⁸¹. Reports include burning, erythema, and blisters of the antecubital fossa, followed by ulceration and scarring with use of 50%-75% DEET⁸¹. Products containing less than 50% DEET rarely cause side effects when applied to the skin of adults⁸⁸.

195. The risk of serious adverse effects from the use of DEET is slight. Reports of adverse effects in humans associated with the dermal application of DEET are rare in the context of their widespread use by the general population⁹². Some studies have reported dermatitis, allergic reactions, and neurologic and cardiovascular toxicities after the use of DEET but the reasons for neurologic and cardiovascular toxicities of DEET are speculative. The mechanistic basis for neurotoxic effects remains unclear and difficult to extrapolate from the results of animal toxicology studies⁹². It has been suggested that DEET may interfere with the urea cycle metabolic pathway and animal studies provide evidence that the cardiovascular toxicity of DEET may be mediated through reduced atrioventricular node conduction, resulting in clinical signs of hypotension and bradycardia⁸⁸.

196. Epidemiological studies have not clarified the relative role of DEET, other ingredients in repellent formulations, and the circumstances surrounding their use in the aetiology of adverse neurological effects⁹². Results of animal safety studies showed that disorders of the nervous system were seen only in the presence of generalized toxicity, suggesting that DEET is not a selective neurotoxin. There is also no evidence that increasing DEET concentration has any effect on the severity of the symptoms reported. Adverse effects were more likely to occur after ocular or inhalation exposures and least likely to occur if the product was ingested⁸⁸.

197. Use of DEET has been implicated as a possible contributing factor in the condition known as "Gulf War syndrome". In animal experiments, simultaneous exposure to pyridostigmine bromide (an anti-nerve-gas agent), DEET and permethrin was found to increase neurotoxicity compared with just one of two of these compounds. The combination of these chemicals may have resulted in a decrease in their breakdown and elimination and an increase in their availability to the nervous system⁹³. These findings, however, were based on responses to very high concentrations of DEET and permethrin, much higher than the normal dose of DEET used by soldiers. Other studies have found no toxic synergism between DEET and permethrin, even when high doses far exceeding those recommended were used⁸¹.

198. Overall, the literature suggests there is very little risk of serious adverse effects from DEET provided that it is used appropriately and not excessively for prolonged periods. Due to possible toxicity problems, however, most countries now recommend the use of repellents containing less than a 50% concentration⁸¹.

4.2.4.2. Water supply and sanitation

199. WHO published a report in 2004 on water quality surveillance in the Solomon Islands⁵⁷. According to a 1999 census, 60% of the population has access to water supplied by either the Solomon Islands Water Authority (SIWA) or Rural Water Supply and Sanitation Project (RWSS). But despite legislative provision for water quality surveillance and monitoring, policies and strategies for quality and safety of drinking water are frequently ignored.

200. In the urban areas of the capital, water supply is the responsibility of SIWA and 93% of the population have access to improved water. In Honiara, most water comes from surface sources, with some from underground. Depending on the area, pollution has been a threat to water, with the greatest concern being the direct impact of human activity in and around the

fringes of catchment areas, as well as contamination from animal sources. Population growth has increased the risk of population housing developments encroaching on both surface and underground catchments^{8, 57}. The Solomon Star, the Solomon Islands' leading daily newspaper, reported recently that SIWA found that three of Honiara's water sources are continuously contaminated with faecal bacteria. Both surface and underground water sources had been contaminated by household waste^{8, 94}. Pesticides also contribute to the contamination of food, water and soil⁸. Despite chlorination of the water to reduce bacteria before reaching residences in Honiara, SIWA recommended that people in the capital boil tap water before drinking⁹⁴.

201. Water supply and contamination problems were discussed at a Ministerial Conference on Environment and Development in Asia and the Pacific in 2000, where the issue was seen as critical because of the inability of governments to maintain ageing water reticulation and treatment systems set up during the colonial period. The water is not safe to drink, even in the capitals of all but two of the independent Pacific island developing countries. The Solomon Islands tries to treat their water but does not always have access to adequate amounts of chlorine and chlorine injection systems fail from poor maintenance. Even where the fresh water source is protected from pollution, tap water from urban systems is seldom safe to drink because of leaky pipes and negative water pressure during times of high use⁹⁵.

202. In rural areas, there is no form of water treatment. Protection of water sources from animals, people and land 'runoff' is all that is feasible. Sixty-nine per cent of the rural population has access to 'clean' water. The most common source of water utilised for water supply in the country is surface water supplied to consumers using gravity feed systems from rivers, streams and springs (80%). Fifteen percent of people have rainwater tanks, while the remainder of the population accesses underground water sources. Landowners claiming rights to water sources have led to disruption to some water supplies and their improvement, resulting in town residents experiencing inconsistent and sometimes unreliable water supplies⁵⁷.

203. Waste water and sewerage are also managed by SIWA and are linked into a common network that pumps waste and effluent directly into the ocean so as to reduce threat to water quality. Solid waste dumps are the responsibility of the Town Council and are removed from catchment areas⁵⁷.

204. *Potential adverse health outcomes.* Potential diseases associated with consumption of contaminated food and water, such as intestinal infectious diseases, hepatitis A and typhoid fever, were discussed earlier (see 'Food- and water-borne diseases').

4.3 Psychological Harm

4.3.1 Psychological stressors

205. For OP ANODE, unambiguous rules of engagement were necessary in order to ensure that the military would not be portrayed as an invading force. In accordance with this, it was determined that the police would be the 'public' face of RAMSI and would always be present when the military interacted with the Islanders. As such, the military role was strictly to provide security and support for the police²².

206. Missions such as OP ANODE can lead to a wide variety of stressors that have short and long-term effects on mental health. Restricted tactical freedom and use of force may expose soldiers to stresses beyond just that of combat. Strict rules of engagement that only allow a soldier to shoot if under direct threat of loss of life or limb may increase the stress of service personnel in a peacekeeping role. They may also experience feelings of isolation, boredom, frustration, rage and helplessness⁹⁶.

207. A pilot study within the ADF reported that participants had greater levels of stress while on deployment than they encountered in their normal work environment in Australia. This was not only due to witnessing and being involved in events that were distressing, but also due to being aware of others being distressed by such events. This result was consistent with other reviews in finding that soldiers on peacekeeping, observer, peace-enforcement and humanitarian missions face increased stresses⁹⁶.

208. A US Gulf War study reported a number of potential psychological stressors that may have relevance for those deployed as part of OP ANODE. These include short deployment notice, uncertainty about length of deployment, isolation and separation from family, a polluted environment, poor living conditions with little privacy or social outlets and prolonged working hours⁹⁷.

209. In a study examining the effects of gender, length of deployment, and number of previous deployments on the psychological health of US soldiers deployed to Bosnia-Herzegovina as part of a peacekeeping mission. Deployment length was related to increases in depression and posttraumatic stress scores. This effect was found for male but not for female soldiers. Previous deployment experience was significantly related to lower depression and posttraumatic stress scores for both male and female soldiers. There were no significant gender differences in the impact of deployment experience on well-being⁹⁸.

210. A review of UN peacekeeping operations identified a variety of potential psychological stressors before, during and after deployment. Before deployment, a major stress factor is the uncertainty associated with getting to know peers and leaders and finding out who is being deployed and when. An additional stress may be related to time pressure, such as conflicts between unit preparation for deployment and the time needed for personal and family preparation. Study results suggest that the predeployment phase is stressful and that actual deployment, at least temporarily, may decrease psychological stress⁹⁹.

211. During the deployment period, five factors were identified as potentially contributing to psychological harm⁹⁹:

- a) Physical and psychological isolation: Operations often take place in remote areas of the world where the environment is harsh and communication with families is difficult. Response to requests for supplies and replacement personnel may be slow⁹⁹;
- b) Ambiguity: A soldier's role of providing peacekeeping and humanitarian aid may be ambiguous and difficult¹⁰⁰. They need to be impartial and minimise the use of weapons. Soldiers may experience distress as a result of the need to show passivity and exercise restraint in the face of real threats to personal safety. Furthermore, there may be insufficient time for personnel to understand the country's background and the mission's purpose, and changing circumstances may mean objectives change during deployment and the length of stay⁹⁹;

- c) Powerlessness: This feeling may result from personnel experiencing concerns about their ability to meet the needs of the local population and relieve their suffering. They may encounter death, overcrowding, dying people competing desperately for scarce resources and high levels of disorganisation⁹⁹;
- d) Danger: Defence personnel on deployment clearly face exposures to dangerous situations and threats to life, including militia wielding weapons and environmental risks⁹⁹; and,
- e) Boredom: Although many situations may be dangerous, a large part of the work consists of simple, repetitive, monotonous routines. Personnel may get bored not only because of a lack of entertaining things to do, but also due to a lack of meaningful, professionally relevant work⁹⁹.

212. The term 'post-deployment stress syndrome' has been used to represent the variety of symptoms soldiers experience after an operational deployment. The symptoms include physical, emotional, cognitive and behavioural components, which may, in some cases, persist for months⁹⁹.

4.3.2 Potential adverse psychological outcomes

213. Acute stress reactions are a normal psychological and physiological response to grossly abnormal situations. Most servicemen and women who experience such reactions will recover completely and return to duty without sequelae. Each individual has his or her own personal threshold of acute stress reaction in the face of physical risk (sometimes moral risk), pain, horror, disgust or exhaustion¹⁰¹.

214. In some stressed individuals, the stressor reactions of fear, horror or revulsion exceed the normal adaptive responses of fight or flight. Maladaptive acute stress reactions may involve egodefence mechanisms of depersonalisation and derealisation. A number of traumatic stress disorders are now recognised. This review is not intended to provide a comprehensive overview of the extensive literature available on potential psychological disorders. Some recognised acute stress syndromes of operational service include acute stress disorder (ASD); conversion reaction; and peacekeepers' acute stress syndrome¹⁰¹. Chronic post-traumatic stress syndromes include post-traumatic stress disorder (PTSD); somatisation syndrome; chronic fatigue syndrome; and, alcoholism and drug abuse¹⁰². Furthermore, these disorders may be associated with a number of related psychological problems, including anger; emotional and behavioural avoidance; depression; nightmares; self-harm; sleep disturbances; and suicide¹⁰⁴. A brief discussion will follow of two examples of psychological disorders that may potentially affect ADF personnel post-deployment: ASD and PTSD.

215. ASD is a formal psychiatric diagnosis, and is produced by intense fear, horror, helplessness, violation or pain, again with varying threshold points in different individuals. It is a decompensated progression from the more normal acute stress reaction. People with ASD may become withdrawn, appear mute, or deny personal or environmental reality. They are temporarily ineffective in their operational role and may be a risk or burden to others¹⁰¹.

216. Post traumatic stress disorder (PTSD) is an anxiety disorder that can occur after a person is exposed to a traumatic experience - usually within three to six months of that experience. It is characterised by a range of symptoms that can be broadly classified into three groups: re-experiencing the event, avoidance and emotional numbing, and increased arousal. Sufferers will often experience intrusive thoughts about the event and experience flash-backs, bringing on an exaggerated emotional and physical reaction. Situations that remind them of the event act as triggers^{102,104}.

217. PTSD is caused when something unpredictable and uncontrollable happens to a person. Potentially traumatic events include a threat to one's life or bodily integrity, severe physical harm or injury, exposure to the grotesque, violent or sudden loss of a loved one, witnessing or learning of violence to a loved one, learning of exposure to a noxious agent, and causing death or severe harm to another^{102,104}.

218.

5 Veterans' health outcomes

219. Military deployments involve certain risks of injury or illness due to higher levels of exposure to certain risks factors. Many of the exposures of deployment may lead to acute adverse health outcomes whilst still on deployment. These may only be short-term problems, but some conditions have the possibility of longer-term consequences. It is also important to note, that some health effects may not become apparent whilst on deployment or, in fact, until well after defence service is completed. Exposures, experiences, and occupational and lifestyle influences during military service may result in illnesses and injuries which could show up well after the conclusion of ADF service³⁹.

5.1. Department of Veterans' Affairs 2004/5 Report

220. The Department of Veterans' Affairs (DVA) published the following table (see Table 5, over page) in their 2004/5 report under the Compensation and Support section¹⁰⁵. Statements of Principles (SoPs) are legal instruments which set out the factors that must exist to cause a particular kind of disease, injury or death that could be related to service, based on sound medical-scientific evidence. The Repatriation Medical Authority (RMA) is an independent statutory authority responsible to the Minister for Veterans' Affairs. It consists of five practitioners eminent in the field of medicine or medical science, and its main role is to determine SoPs¹⁰⁶.

221. The results published in this table give some indication of longer-term post deployment health outcomes for ADF who deployed to the Solomon Islands. In the time since deployment, the predominant categories of successful claims for compensation are hearing problems, skin conditions and musculoskeletal disorders¹⁰⁵ (see Figure 3, over page). Due to the recency of OP ANODE, it would be expected that the number of claims for compensation for adverse health outcomes related to deployment will increase with time.

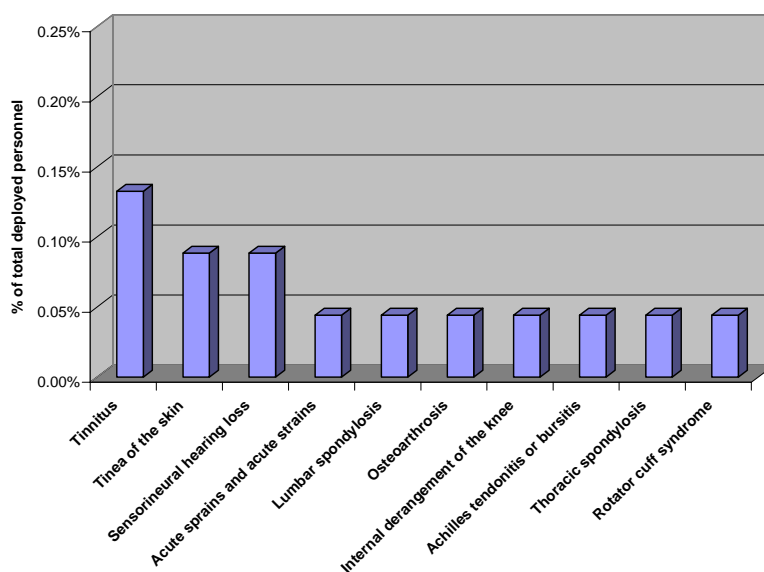
Table 5. 2004/05 Top 10 accepted disabilities using Repatriation Medical Authority Statements of Principles - Solomon Islands veterans

Statement of principle	Disabilities accepted (per cent)	Disabilities accepted (number)	Disabilities rejected	Total	Total deployed
Tinnitus	0.13%	3	3	6	2261
Tinea of the skin	0.09%	2	3	5	2261
Sensorineural hearing loss	0.09%	2		2	2261
Acute sprains and acute strains	0.04%	1	3	4	2261
Lumbar spondylosis	0.04%	1	3	4	2261
Osteoarthritis	0.04%	1	2	3	2261
Internal derangement of the knee	0.04%	1	1	2	2261
Achilles tendonitis or bursitis	0.04%	1		1	2261
Thoracic spondylosis	0.04%	1		1	2261
Rotator cuff syndrome	0.04%	1		1	2261
Tinnitus	0.13%	3	3	6	2261

Source: Department of Veteran Affairs. Department of Veteran Affairs Annual Report 2004/5. Canberra: Commonwealth of Australia; 2005¹⁰⁵

Figure 3.

2004/05 Top 10 accepted disabilities using Repatriation Medical Authority Statements of Principles - Solomon Islands veterans



Source: Department of Veteran Affairs. Department of Veteran Affairs Annual Report 2004/5. Canberra: Commonwealth of Australia; 2005¹⁰⁵

6 Conclusion

222. This literature review has highlighted numerous exposures potentially hazardous to the health outcome of ADF personnel who deployed to the Solomon Islands during OP ANODE. This will be useful for informing the content of the study questionnaire and the data analysis strategy. A significant limitation of this literature review is that only unclassified information was accessed. It is likely, therefore, that there was incomplete identification of important exposure information specific to the deployment.

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Annex A. Summary table of exposures and potential associated adverse health outcomes.

Potential exposures	Known potential adverse health outcomes	Literature review section/s
<i>Physical hazards</i>		
Solomon Islands militia groups		4.1.2 Opposing forces Militia groups
World War II unexploded ordnance (UXO), including mustard-filled munitions		4.1.3 Introduced dangers Mines, unexploded ordnance and other explosive devices
Occupational and sports-related physical activities.	<p>Non-battle injuries: Acute traumatic injuries, including sprains and fractures. Overuse injuries, including tendonitis, bursitis and stress fractures. Lower limb injuries are most commonly reported by soldiers.</p> <p>Sporting injuries: The knee and the ankle were the body parts most frequently injured in sports and physical training hospitalisations</p>	4.2.1 Physical activities Non-battle injuries Sporting injuries
Tropical climate: high levels of heat and humidity	<p>Heat oedema, heat syncope, heat cramps, heat exhaustion and heat stroke. In patients who have heat stroke, mortality should be less than 10% with adequate treatment and supportive care. Most will recover without sequelae. Severe heat illness, if left unchecked, can result in renal failure, coagulopathy, and hepatic dysfunction, leading to multiple organ dysfunction and possible death.</p>	4.2.3 Natural environment Climate

<i>Chemical hazards</i>		
Malaria chemoprophylaxis: doxycycline mefloquine	Nausea, abdominal cramps, oesophagitis, photosensitivity and superinfection. Mild dizziness and headaches; rarely, can cause neuropsychiatric disturbances such as seizures, psychosis and nightmares.	4.2.3 Natural environment Known diseases: Vector-borne diseases
DEET (N,N-diethyl-3-methylbenzamide)	Mild skin irritation to local allergic reactions in the form of contact urticaria, dermatitis and allergic reactions. Products containing less than 50% DEET rarely cause side effects when applied to the skin. Use of 50%-75% DEET may lead to burning, erythema, and blisters, followed by ulceration and scarring. Some reports of neurologic and cardiovascular effects. Very little risk of serious adverse effects from DEET if used appropriately and not excessively for prolonged periods.	4.2.4 Man-made environment Mosquito control measures: Individual personal protection
Permethrin	Some risk of allergic contact dermatitis with prolonged contact. Unlikely adverse health effects at the normal exposure levels. Unlikely to be a skin irritant or skin sensitizer for those exposed to it dermally from wearing permethrin impregnated uniforms. The long-term effects of permethrin on humans have not yet been studied in depth.	4.2.4 Man-made environment Mosquito control measures: Fogging Insecticide treatment of bed nets and uniforms
Diesel	Acute effects may include irritation of the eyes and nose, lung function changes, respiratory changes, headache, fatigue and nausea. Some evidence of chronic health effects including coughing; sputum production; lung function decrements and profound	4.2.4 Man-made environment Mosquito control measures: Fogging

	inflammatory effects in the lung epithelium; induce allergies by acting as adjuvants to other allergens. Animal experiments have suggested an association between diesel emissions and asthma, chronic bronchitis and pollinosis.	
<i>Biological hazards</i>		
Contaminated food and water	Food- and water-borne diseases: ciguatera poisoning, infectious intestinal diseases (including) diarrhoea, hepatitis, typhoid, influenza and cholera.	4.2.3 Natural environment Known diseases: Food- and water-borne diseases 4.2.4 Man-made environment Water supply and sanitation
Disease vectors, particularly mosquitoes	Vector-borne diseases: malaria, dengue, yaws, lymphatic filariasis.	4.2.3 Natural environment Known diseases: Vector-borne diseases
Harmful flora and fauna	Bites and stings	4.2.3 Natural environment Harmful flora and fauna
<i>Psychological hazards</i>		
Psychological stressors	Acute stress syndromes: acute stress disorder (ASD); conversion reaction; peacekeepers' acute stress syndrome. Chronic post-traumatic stress syndromes: post-traumatic stress disorder (PTSD); somatisation syndrome; chronic fatigue syndrome; alcoholism and drug abuse. Related psychological problems: anger; emotional and behavioural avoidance; depression; nightmares; self-harm; sleep disturbances; suicide.	4.3.1 Psychological stressors 4.3.2 Potential adverse psychological outcomes



DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 1 (Phase 2)

Sample Generation

Due Date: 31 October 2006

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Document Administration

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Approvals

This document requires the following approvals:

Name	Position	Signature	Date	Version
A/Prof Cate D'Este	First Chief Investigator			
Prof Annette Dobson	Chair Scientific Research Team			
Prof Tony McMichael	Scientific Advisory Committee			

Signed approval forms are filed in the Management section of the project file.

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DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 1 (Phase2)

Sample Generation

Due Date: 31 October 2006

Description of Deliverable from Statements of Works

Deliverable item 1 (Sample Frame Generation) The agreed methodology has been developed in conjunction with the SAC (refer teleconference 5 June 2005). The Sample Frame Generation will be based on:

- a. the nominal roll, as developed utilising source documents provided by PMO; and*
- b. definition and selection of an appropriate comparison group*
- c. 500 personnel from the comparison group and 500 Solomon Island (Project Anode) veterans as derived from the nominal roll.*
- d. a Summary of Activities undertaken to achieve this deliverable will be submitted and will include:*
 - 1. the size of the project nominal roll and overlap between sources of data for the project nominal roll*
 - 2. a description of the overlap between the Solomon Islands project nominal roll and the Bougainville and East Timor project nominal rolls and*
 - 3. a summary of any issues with the data used to generate the project nominal rolls.*

Executive Summary

1. Based on the problems with the InterFET Pilot Project Nominal Roll, which was based only on data obtained from PMKeyS, a new procedure was developed for generation of the Solomon Islands Health Study Nominal Roll. This process involved the use of data from two sources: PMKeyS, the system used by the Department of Defence for all aspects of personnel management; and ADFPAY, which is the Australian Defence Force Pay System and is responsible for salary payment for Service personnel. A variety of other potential sources of data were identified and investigated, but were not considered relevant for generation of the Solomon Islands Nominal Roll. Individuals were included in the data files if they had been allocated a relevant code or descriptor indicating that they had deployed as part of OP ANODE.
2. Defence personnel were eligible for inclusion on the Solomon Islands Health Study Nominal Roll if they deployed to the Solomon Islands as part of Operation ANODE (OP ANODE), conducted between July 24th 2003 and December 31 2005. Individuals deployed as part of this Operation after December 31 2005 were ineligible for inclusion. In order to be inclusive, individuals whose deployment start date was prior to July 24, 2003 were retained, as it is standard practice for some individuals to deploy early to prepare for the operation. Individuals were included on the Project Nominal Roll if they were identified in either PMKeyS or ADFPAY data as having been deployed as part of OP ANODE.
3. Individuals were eligible for inclusion in the Solomon Islands Health Study Comparison Group if they had not deployed as part of OP ANODE, who were not included on the Solomon Islands Health Study Nominal Roll, and were a member of a Defence Service on July 24, 2003. Comparison individuals were randomly selected from the PMKeyS database, and frequency matched to the veteran group on service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988).
4. From each of the Project Nominal Roll and comparison group, stratified random sampling with proportional allocation was used to select 500 individuals for inclusion in the Solomon Islands health Study.
5. The Solomon Islands Health Study Nominal Roll included of 4092 individuals: with 3829 identified in both PMKeyS and ADFPAY data; 74 identified in ADFPAY only and 189 identified in PMKeyS only. Capture-recapture methods estimated the total size of the Project Nominal Roll as 4096.
6. Despite the fact that 94% of individuals on the Project Nominal Roll were identified in both PMKeyS and ADFPAY, and that capture-recapture methods indicated that ascertainment was high, the actual validity and reliability of the Nominal Roll is still unknown. However this can be assessed to some degree by comparison of the deployment history obtained from the Solomon Islands, Bougainville and East Timor Nominal Rolls with self-reported deployment history obtained from participants.

7. Up-to-date address data should be obtained prior to mail-out of the invitation package.
8. Any problems highlighted during contact with potential study participants, or based on information provided by participants, should be incorporated into SOPs for generation of future Nominal Rolls.

Introduction

9. The Solomon Islands Health Study is the first in a series of studies that aim to research the health and well-being of veterans who have deployed on active service overseas. It is being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program.

10. Traditionally post-deployment health studies have been retrospective studies examining health issues which have arisen from veterans' concerns on return from deployment or hypotheses generated in descriptive studies of veterans' health. The CMVH Deployment Health Surveillance Program aims to replace that approach with a prospective, analytic system for longitudinal surveillance of the health of Australian Defence Force (ADF) personnel who have been deployed on specific operations.

11. The purpose of the Solomon Islands Health Study is to conduct a cross-sectional study of the health status of Australian service personnel who deployed to the Solomon Islands between July 24, 2003 and December 31, 2005 as part of OPERATION ANODE. The first stage of this study is the selection of the study samples, involving identification and selection of the appropriate veteran and comparison individuals for inclusion in the study. This requires the development of a Project Nominal Roll, followed by selection of an appropriate comparison group.

12. This report is the first Deliverable for the Solomon Islands Health Study and documents the development of the Project Nominal Roll, generation of the comparison groups, and selection of the sample for inclusion in the study.

Methods

Project Nominal Roll

13. The Solomon Islands Health Study Nominal Roll, or Project Nominal Roll, is a list of Service personnel identified as having deployed to the Solomon Islands as part of OP ANODE between 24 July, 2003 and 31 December, 2005.

Lessons learned from InterFET Pilot Project

14. The InterFET Pilot Project has provided valuable information on generation of the Project Nominal Roll which has been incorporated into the Solomon Islands Project Nominal Roll methodology.

15. The Nominal Roll for InterFET was generated by Defence from PMKeyS, which is the system used by the Department of Defence for all aspects of personnel management. The Nominal Roll for the InterFET Pilot Project was found to have errors in both ascertainment and in content, as outlined below.

16. Errors of ascertainment refer to errors where Service personnel who should have been included on the roll were not, or personnel who were included on the roll but did not actually deploy to the specified operations and were thus ineligible for this study.

- a) It has been estimated, based on expert knowledge of the number and size of deployments and on post-activity reports, that at least 7000 individuals had been deployed as part of InterFET. Only 4124 individuals were on the Nominal Roll provided by Defence.
- b) In addition the Royal Australian Navy and Royal Australian Air Force were under-represented as the number of individuals from these services who were included on the Nominal Roll was substantially less than the minimum number known to have been deployed.
- c) Individuals known to have been deployed were not included on the roll.
- d) It is possible that individuals were included on the Nominal Roll but were not actually deployed; although there is currently no evidence of this and it is likely to be a minor problem.
- e) Thus it is possible that between 25% and 50% of the true InterFET deployment population may not have been included on the InterFET Nominal Roll.

17. Errors in content of data included on the Nominal Roll are errors of omission or inaccuracy of data provided as part of the Nominal Roll.

- a) Details of service were incorrect for some records (e.g. stated as Navy when were actually Army).
- b) Date of entry into service was after date of deployment.
- c) It was found that 29% of details of current address were not correct, particularly since the Nominal Roll was obtained prior to the last posting cycle, and given that a posting cycle is 2-3 years, it is estimated that about one third of Defence Personnel are transferred at each posting cycle.
- d) Errors in content of data of the comparison group also occurred whereby persons initially deemed as eligible for inclusion in the comparison group were later found to have deployed to InterFET.

18. The information on problems with the InterFET Nominal Roll has been incorporated into a new Standard Operating Procedure (SOP) for generation of the Solomon Islands Health Study Nominal Roll and provision of the Project Nominal Roll to the Research Coordination Unit (RCU) of CMVH. Primarily this has involved exploration of other sources of data for generation of the Project Nominal Roll. The problem of errors in content of the Project Nominal Roll is unlikely to be resolved in the short term, thus these are likely to persist for the Solomon Islands Health Study.

Data Sources

19. There are multiple sources of information identifying Service personnel who have been deployed on military operations. Based on the experience of the InterFET Pilot Project, and following discussions with the Defence Health Surveillance Program Office, record keepers and military personnel, it is evident that no one source of information can be verified to be a complete and accurate record of personnel

deployed on any operation. Thus two sources of data are used in generation of the Solomon Islands Project Nominal Roll: PMKeyS and ADFPAY.

20. **PMKeyS** is the system used by the Department of Defence for all aspects of personnel management. It includes information on postings and deployments, including a code of the operation on which individuals were deployed, as well as demographic information. PMKeyS was implemented for the Navy in August 2001, the RAAF in February 2002 and the Army in July 2002.
21. **ADFPAY** is the Australian Defence Force Pay System, which is responsible for salary payment for Service personnel. Service personnel who are on deployment may be eligible to receive additional financial remuneration, which depends on the operation. Since each operation is identified in the ADFPAY database, this allows identification of personnel deployed to OP ANODE. ADFPAY is linked to PMKeyS.
22. Thus searching on operation code and/or description in either PMKeyS or ADFPAY should identify all Service personnel who have been on a particular deployment. However this is not necessarily the case. Since membership on the deployment lists and operation orders may change over time, different versions of these may be generated and different information provided to the recipients of these data. Changes in membership could be due to last minute changes in circumstances of individuals or operational needs. It is also possible that details of all personnel deployed are not entered into PMKeyS and ADFPAY. If an individual is eligible for deployment pay supplements and does not receive these, he/she has the opportunity to correct this. There is no similar “check” of deployment identification for PMKeyS. Thus there may be some variation in the individuals identified through the PMKeyS and ADFPAY. Data from both PMKeyS and ADFPAY will be included in the generation of the Project Nominal Roll.
23. Other data sources, such as **allotment certificates**, whilst useful in some studies, are not appropriate for the Solomon Islands Health Study Project Nominal Roll. Allotment certificates are provided to serving members of the Australian Defence Force deployed on a war-like operation, for the purposes of Veterans’ Affairs, taxation and Defence home loans. Since OP ANODE was not a war-like operation, the allotment lists are not a relevant source of data for the Project Nominal Roll for this deployment.
24. Names of individuals who have been deployed could potentially be obtained from secondary data sources. While all of these sources have been deemed to be infeasible, a brief outline of the sources and the reasons why it is not possible or appropriate to obtain these data is included below.
25. **Honours and awards**. This is a list of all personnel receiving honours or awards while serving with Australian Defence Forces during a variety of warlike and non-warlike operations. Personnel will be included on this list if their name appeared on the allotment certificate list or if they applied for an honour or award and were deemed eligible, and then had this information appropriately recorded. The managers of this database were approached by DHSPO for access to the Honours and Awards data. However the data were considered to be very unreliable by the managers. Many eligible individuals have not yet applied for awards, and the database was not up-to-

date, with time lags between eligibility and application of up to 2 years. While in the past the Governor General's Office has had a copy of the honours and awards list for each deployment, this source is not currently an option.

26. **The National Welfare Coordination Centre** is a unit which is responsible for provision of information, support and referral to other family support agencies for families of deployed Service personnel. This unit was founded in 1999 to provide support for families of Service personnel deployed to East Timor. Since that time, the Centre has been expanded to provide assistance for all deployments. Individuals are included in this database if they completed a specific handwritten form prior to deployment. Approximately 27,000 names are on this list. Details of the operation on which individuals have been deployed may be retained for up to 12 months following completion of the operation. After this time no information is available to link personnel to individual operations, thus it is not a feasible or valid method of identifying individuals for the Solomon Islands Health Study Nominal Roll.

27. **Next-of-Kin Lists.** Prior to any deployment all Service personnel are required to provide details of their next-of-kin so that relevant information can be provided to families. Separate lists are generated for each deployment, and these are archived after completion of the operation. Information from next-of-kin lists is 'in-confidence' and cannot be accessed. In addition the lists do not necessarily include correct details of service personnel but may include contact information of a relative or even a post office. Once personnel have returned from deployment they may have a new posting and thus the previous address may not be correct. Next-of-Kin lists are generated as part of the NWCC activities.

28. **The Australian Taxation Office (ATO).** Members of the Australian Defence Forces and employees of the Department of Defence who had been deployed to the Solomon Islands as part of Operation ANODE for a period of continuous service of 91 days or more are exempt from income tax under section 23AG of the ITAA 1936 (Class Ruling CR 2003/94). Therefore the ATO may be a source of information on Operation ANODE deployments. The ATO were contacted by DHSPO, and it became evident that it was not feasible to access this information. Tax concessions could be obtained concurrently, during the time of deployment, or retrospectively at some period following completion of the deployment. Some individuals, particularly if their marriage was unstable, did not apply for their tax rebate for up to 4 years following deployment. In addition the ATO was unable to appropriately identify deployed individuals, thus it is not a feasible source of data for the Project Nominal Roll.

29. **Deployed Forces Support Unit (DFSU).** This was a unit established to do the 'sign off' of preparation of Service personnel for deployment. They checked medical and dental fitness, gave some vaccinations and ensured that persons deploying were administratively and medically prepared. Thus a list is available of individuals who have passed through the DFSU; however not all individuals went through this unit prior to deployment. In addition, on completion of the operation the DFSU database is closed down and all data is rolled into the NWCC.

30. **Single Service Lists** are lists held by each service on members who have been deployed. These lists are based on the Unit Roll Books and Ships' Logs. However this system is no longer in use and Single Services rely on PMKeyS information.

Generation of the Project Nominal Roll

31. Service personnel were included on the Solomon Islands Health Study Nominal Roll if they appeared in either PMKeyS or ADFPAY as having been deployed as part of OP ANODE between July 24, 2003 and December 31, 2005. Following meetings with PMKeyS and ADFPAY personnel, a list of items to be provided from each data source was generated.

32. The DHSPO provided CMVH Research Coordination Unit with separate EXCEL (Microsoft Corporation, Redmond WA, USA) files which included all Service personnel identified through PMKeyS or ADFPAY. These files were merged into a single file with one record for each individual, removing the duplicate records. This process was managed by CMVH RCU staff, who were cleared to at least 'Restricted', with statistical and programming input from the (then) Project Statistician and the First Chief Investigator.

33. As not all required information was available on ADFPAY data, a list of individuals identified from ADFPAY but not PMKeyS was sent to PMKeyS staff, who then provided all the necessary data on these individuals to the RCU for addition to the Project Nominal Roll.

Data Management and Analysis

34. All data files from each source were appended to obtain one PMKeyS dataset and one ADFPAY dataset. Records with duplicate combinations of service number (or PMKeyS number if no service number), deployment location, deployment start date and deployment end date were deleted. Records were deleted for deployments which commenced after December 31, 2005, which is the end date for inclusion in the Solomon Islands Health Study. Data were then sorted by service number (or PMKeyS number), deployment location and deployment start date, and only the first deployment (within each deployment location) for each individual retained: further deployments to OP ANODE were deleted. This then produced a file for each of PMKeyS and ADFPAY data with only one record per individual for each deployment location. These files were merged by service number (or PMKeyS number if no service number) and deployment location, to produce a Nominal Roll for each of the Solomon Islands, Bougainville and East Timor Health Studies.

35. A table providing details of the total number of individuals identified for the Project Nominal Roll, as well as the number of individuals identified from each source was produced. This information was then used to estimate the number of individuals likely to be missed from the Project Nominal Roll using capture-recapture methods. Annex 1 provides a description of this method, including appropriate assumptions.

36. A deployment Profile Analysis was undertaken to determine the deployment history, based on the Nominal Rolls for the three Near North Area of Influence

Studies, for all individuals on these Rolls. This involved merging of data for each of the three Project Nominal Rolls by service number (or PMKeyS number if no service number was available) and determining on which combination of Project Nominal Rolls individuals were included. A table was produced which showed the number of individuals with deployments to all three locations, to each individual location only, and to all other possible combinations of deployments. As the Project Nominal Rolls for Bougainville and East Timor have not yet been completed, these data are estimates only at this stage.

37. Individuals on the Solomon Islands Health Study Nominal Roll were stratified according to service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988). Birth year was considered to be a more logical variable than current age, or age at commencement of the deployment, as this would vary between deployments and studies. A table was generated with the strata definition, the number of deployed personnel and the number of comparison individuals to be selected in each stratum and provided to PMKeyS staff for selection of the comparison group.

38. Analyses were undertaken using the SAS (SAS institute Inc. NC, USA) statistical analysis program.

Comparison Group

39. The comparison group for the Solomon Islands Health Study includes Service personnel who were not deployed to the Solomon Islands as part of OP ANODE, but were potentially eligible for deployment. For scientific rigour and to reduce the effect of confounding as much as possible, it was important that the Solomon Islands Health Study comparison group was as similar to the deployed group as possible on all potential confounding factors except for deployment. To ensure this similarity, the comparison group has been selected to reflect the characteristics of the deployed group, using frequency matching.

40. For security reasons, the comparison group was selected from PMKeyS by Defence personnel with security clearances commensurate with access to such data, using the protocol prescribed by the Solomon Islands Health Study Research Team. The comparison group was frequency matched to the deployment group on service (AirForce, Army, Navy), status (permanent or reserve), gender and birth year (1937-1966, 1967-1976 and 1977-1988).

41. All individuals who are included on the PMKeyS database who did not have an OP ANODE code, or who were not included on the Solomon Islands Health Study Nominal Roll, and were a member of a Defence Service on July 24, 2003 – the date of commencement of OP ANODE - were eligible for inclusion in the study comparison group.

42. Service personnel who have been deployed as part of any military operation apart from OP ANODE were eligible for inclusion in the comparison group if they were a member of any Service on July 24th 2003, the date of commencement of OP

ANODE. This also included those who had been previously deployed to the Solomon Islands as part of another operation such as OP PLUMBOB or OP TREK. Reservists and permanent personnel were both included.

43. DHSP0 organised for a file that included names, addresses and other variables required for recruitment of participants to be sent to the CMVH RCU. This file was merged with the Solomon Islands Health Study Nominal Roll to produce a study sample file.

Sampling

44. Due to the budget restrictions it was not possible for the Solomon Islands Health Study to include all veterans and an equal number of comparison individuals. It was estimated that only 500 veterans and 500 comparisons could be invited to participate in the study. Thus a sample needed to be selected from the Project Nominal Roll and comparison group. Individuals were selected from each group using stratified random sampling, using the same strata used to frequency match the comparison group to the Veteran group (Project Nominal Roll). Proportional allocation was used to determine the number of individual selected from each stratum. A random number was generated for each individual, and observations sorted by group (veteran and comparison), service, service type, gender, year of birth category and random number. Within each strata the required number of observations were selected in order of increasing random number. These individuals then constituted the study sample.

Overlap between deployments

45. For a given health study, it is expected that members of both the veteran and the comparison groups will include Service personnel who have been deployed to locations other than those relevant to that study, and thus eligible for inclusion in more than one study. The Solomon Islands Health Study is the first of three studies looking at the health effects of deployment, with the other two studies looking at Bougainville and East Timor. Therefore, there will be some overlap between individuals deployed to these three operations. This is described in more detail in Annex 2.

46. Once the veteran and comparison groups for the three studies were selected, a “Deployment Profile Analysis” was undertaken, which documents the overlap of the veterans and comparisons sampled for the studies. This will inform the contact strategy for the three Deployment Health Studies, so that individuals are not contacted for more than one study. In addition it will allow management of resources for the studies, given that the funding for the Solomon Islands Health Study is very limited. Individuals who are eligible for inclusion in the Solomon Islands Health Study who have also been selected for either the Bougainville or East Timor Studies may be approached (and therefore funded) as part of the sampling for these studies. While study data will be obtained once for each individual, individuals may be included in more than one set of statistical analysis. For example an individual deployed to the Solomon Islands may be included as a veteran for the Solomon Islands Health Study,
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but may also be in the comparison group for the Bougainville Health Study. This “sharing” of study participants is an epidemiologically and statistically valid approach.

47. While the process of independently sampling for each of the three Deployment Health Studies (and then examining the overlap) may seem like a convoluted approach, it is necessary to ensure scientific rigour of the studies. If, for example, the comparison group for the Bougainville Health Study is selected excluding Service personnel who have been deployed to the Solomon Islands, then the comparison group will be biased relative to the veteran group (some of whom will have deployed to the Solomon Islands). This is particularly an issue as multiple deployments may have a greater impact on health outcomes than a single deployment. The analysis strategy for the Deployment Health Studies will allow for examination of this potential “dose-response” effect.

48. A Deployment Profile Analysis, similar to that described above for the Project Nominal Roll was also obtained for the comparison group, to determine deployment history to Bougainville and East Timor for this group, and to check whether any of the comparisons had also potentially been deployed as part of OP ANODE. This process was repeated for the 500 individuals selected for each of the Veteran and comparison sample groups. Details of individuals selected for inclusion in the comparison group were merged with the file obtained for the Deployment Analysis Profile for the Veteran group, described above.

Ethical Approval

49. Formal ethics approval was obtained for generation of the Project Nominal Roll, generation of the Comparison Group and selection of the study sample from the Australian Defence Health Research Ethics Committee (ADHREC), and from the University of Queensland: Behavioural & Social Sciences Ethical Review Committee (BSSERC). Copies of these approval letters are shown in Annexes 3 and 4.

Results

Solomon Islands Health Study Project Nominal Roll

Source Data Files

50. Files provided by PMKeyS and ADFPAY included data for all deployments relevant to the three Near North Area of Influence Deployment Health Studies. Due to the size of some of the data files from PMKeyS and ADFPAY, they were separated into multiple parts of appropriate size to allow files to be emailed to CMVH RCU

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over the Defence Restricted Network. A description of the names and size of files is provided in Annex 5, with details of file formats provided in Annex 6.

51. Data were provided to CMVH RCU in EXCEL format, and each file was converted to tab delimited format to enable reading by SAS.

52. For PMKeyS data there were two sets of files. The first included all deployment information, while the second included details of all discharge and rehire information for individuals in the deployment files. The status of individuals (i.e. permanent or reserve) on the deployment files was as at the time of deployment. As individuals can be discharged and rehired for a specific time period, then discharged and rehired again, there can be multiple occurrences of discharge and rehire for individuals. The most recent information on discharge and rehire was required to specify the most recent status of individuals. While status at the time of deployment was used to select the appropriate comparison group, the most recent status will be used to determine whether the study documentation will be mailed to the individual's home or work address.

53. ADFPAY data on individuals who are no longer in Defence are periodically archived (approximately every 12-24 months). ADFPAY data files therefore included deployment data for individuals on active status, as well as archived deployment data.

Preliminary Data Checks

54. There were seven files for each of PMKeyS deployment and discharge/rehire data files types: five files for Army deployments (because of the number of Army deployments and thus the size of the files), one for Navy and one for Air Force deployments.

55. The format of PMKeyS data was consistent for each file type (i.e. within deployment data and within discharge/rehire data), with one exception. For the NAVY file, cell R66 (sex variable) was located after the medical category code description; for all other files it was included after the "former name" variable.

56. There was one error in the PMKeyS deployment data: one date of birth was in a format which could not be read in. This resulted in missing date of birth and thus missing age for this individual. There were 11 errors in the date of discharge or rehire: eight of these could be appropriately corrected, while the remaining three were uninterpretable and were thus classified as missing data.

57. There were 10 files for ADFPAY deployment data, four of which included previously archived data. The format of the data files was not consistent, with variation in the row at which the data commenced. The first row of data commenced on row 5 (4 data files), 6 (5 data files) or 7 (1 data file). One file had an extra non-empty row at the end of the file. This row did not contain any data, but included the words "security classification restricted". Apart from these issues, the format of data within the files appeared to be consistent, and no obvious errors were encountered by SAS on reading of data.

58. Allowance codes and allowance descriptions do not match for ADFPAY data (see Table 1). For example Deployment code DEP001 relates to both OP ANODE and OP CITADEL, but both of these Operations also include other codes (OP CITADEL includes codes DEP002, while OP ANODE includes codes DEP001 and DEP029). Codes and Descriptors appear to separate deployment versus Peace Enforcement Allowance (PEA prefixes).

Table 1: Number of deployments within each of the codes and descriptors used in ADFPAY data

Allowance Description	Operation Code		Total n
	DEP001 n	DEO029 n	
Dep All OP ANODE Leave Outstanding	3	404	407
Deploymt Allow – OP ANODE - Solomon Islds	2	5597	5599
Total	5	6001	6006

Generation of Project Nominal Roll

59. The PMKeyS and ADFPAY data files all included service number as an identifier. PMKeyS data also included PMKeyS number (called EMPLID) in addition to service number. Both numbers were not available for all individuals. Service personnel who enlisted after the introduction of PMKeyS will not have been allocated a Service number, and are thus only identifiable by PMKeyS number. Service number was used as the primary identification key, with PMKeyS number used when there was no service number.

In total there were 4700 deployments for OP ANODE identified via PMKeyS (Opcode H22). Of these, 595 had a deployment start date after December 31, 2005 and were excluded as they were ineligible for inclusion in the study. Twenty-seven individuals whose deployment start date was prior to July 24, 2003 were retained. Most of these individuals had a start date within the month prior to the commencement of the deployment, and it is common practice for some individuals to deploy early to prepare for the operation. There were 4105 remaining deployments for 4018 individuals.

60. A total of 6006 OP ANODE deployments were identified from ADFPAY data, of which 678 had commenced after the study end date (December 31, 2005) and were excluded. There were 5328 eligible deployments records (which may not necessarily equate to actual deployments) undertaken by 3903 individuals.

61. Merging of PMKeyS and ADFPAY data resulted in a Solomon Islands Health Study Project Nominal Roll of 4092 individuals. The majority of individuals (94%) were identified in both data sources, with 4.6% identified in PMKeyS but not

ADFPAY, and 1.8% identified in ADFPAY only (see Table 2). Using the capture-recapture method outlined in Annex 1, the estimated “true” size of the Project Nominal Roll is 4096 – i.e. 4 larger than that actually obtained.

Table 2: Number of individuals on the Solomon Islands Nominal Roll by source of data - generated by CMVH 27 September 2006

Data Source	Solomon Islands	
	n	%
PMSKeyS & ADFPAY	3829	93.6
ADFPAY only	74	1.8
PMKeyS only	189	4.6
Total	4092	100.0

Characteristics of OP ANODE Veterans

62. Table 3 below shows the characteristics of OP ANODE Veterans used for selection of the comparison group: service, status, gender and birth year. Only 11% of eligible Solomon Islands Health Study veterans were female, and 43% were born between 1977 and 1988 (inclusive). Note that date of birth was missing for 6 individuals, 5 of whom also had missing gender. More than half of the Nominal Roll individuals were in the Army (60%), and the majority (94%) were in the permanent Defence Force (rather in the Reserves).

Table 3: Characteristics of OP ANODE veterans eligible for Solomon Islands Health Study

Characteristic		Frequency	Percent
Sex	Female	442	11
	Male	3644	89
Birth group	1937-1966	762	19
	1967-1976	1555	38
	1977-1988	1769	43
Service	Army	2450	60
	Navy	1021	25
	RAAF	621	15
Service Type	Permanent	3856	94
	Reserve	236	5.8

Comparison Group Selection

63. The number of OP ANODE veterans in each of the strata used for selection of comparison is shown in Table 4. Six observations are missing from this cell because of missing data on gender and year of birth. In order to obtain the correct number of comparisons a count of 2 was added to the strata with the largest number, and a count of 1 added to the each of the next four largest strata. The final numbers in each stratum, provided to PMKeyS for selection of the comparison group are shown in Annex 7.

64. PMKeys generated the required sample using a random number to sort records within sampling strata and then select the required number of observations. The data were provided to CMVH RCU over the Defence Restricted Network in ZIP archives which contained the EXCEL files, with data for each strata provided in a separate spreadsheet. This then required manipulation to combine the EXCEL files and then save as tab delimited files for input to SAS.

Table 4: Number in Strata used for selection of comparison group

		Sex						Total
		F			M			
		Birth group		Birth group	Birth group		Birth group	
Service	Type	1937-1966	1967-1976	1977-1988	1937-1966	1967-1976	1977-1988	
Army	Permanent	23	112	123	309	758	936	2261
	Reserve	8	10	3	67	38	59	185
Navy	Permanent	3	27	61	136	330	428	985
	Reserve	2	2	-	27	3	-	34
RAAF	Permanent	9	33	23	165	241	136	607
	Reserve	2	1	-	11	-	-	14
Total		47	185	210	715	1370	1559	4086

Sampling

65. The number of veteran and comparison individuals in each stratum selected for inclusion in the Solomon Islands Health Study is shown in Table 5. Due to rounding error in the calculation of numbers in each stratum, a denominator of 502 was required to ensure that the stratum counts added to 500. A copy of the stratum proportions used to generate the sample is provided in Annex 8.

Table 5: Number of individuals in each of the veteran and comparison group study sample: by strata.

		Sex						Total
		F			M			
		Birth group			Birth group			
Service	Type	1937-1966	1967-1976	1977-1988	1937-1966	1967-1976	1977-1988	
Army	Permanent	3	14	15	38	93	115	278
	Reserve	1	1	-	8	5	7	22
Navy	Permanent	-	3	7	17	41	53	121
	Reserve	-	-	-	3	-	-	3
RAAF	Permanent	1	4	3	20	30	17	75
	Reserve	-	-	-	1	-	-	1
Total		5	22	25	87	169	192	500

Overlap between deployments

66. While the Project Nominal Rolls have not yet been finalised for the Bougainville and East Timor Deployment Health Studies, a preliminary version of each of these has been obtained. Table 6 shows the number of individuals with various combinations of deployment locations. The table also includes multiple deployment location data obtained by the DHSPO using manual searching.

Table 6: Preliminary data on multiple operations of deployment for Near North Area of Operations¹.

Operation/s	Provided by DHSPO 21 July 2006	Generated by CMVH 27 September 2006 ²
Solomon Islands Only	1310	2469
Bougainville Only	1327	2639
East Timor Only	13700	16028
Solomon Islands and Bougainville	129	269
Solomon Islands and East Timor	1465	1144
Bougainville and East Timor	1564	1664
Solomon Islands and Bougainville and East Timor	274	210
Total	19769	24423
Total for Solomon Islands	3178	4092
Total for Bougainville	3294	4782
Total for East Timor	17003	19045

¹Note that these numbers represent the approximate number of individuals, not the number of deployments.

²Numbers for Bougainville and East Timor deployments are estimates only, as extensive data checks have not yet been completed for these Operations.

Table 7 below shows the Deployment Profile Analysis for the overall comparison group (n=4092) as well as for each of the 500 Veteran and comparison individuals selected for inclusion in the study sample. Note that there are no individuals in the Veteran sample who have not been deployed to the Solomon Islands (as this is one of the eligibility criteria for the Solomon Islands Nominal Roll). None of the comparison individuals should have been deployed to the Solomon Islands, however it appears that 9 individuals in the overall comparison group and 3 in the comparison study sample may have deployed as part of OP ANODE. These individuals have been retained in the groups at this point in time, given the small number, as their status is unclear, and this deployment history may be due to other errors in the data. The self-reported deployment history of the individuals in the study will be used to check these data (if individuals respond to the study invitation package).

Table 7: Preliminary data on multiple operations of deployment for Near North Area of Operations¹ for comparison group and study sample

Operation/s	All Comparison individuals (n=4092)	Study sample Veteran group (n=500)	Study sample Comparison group (n=500)
Solomon Islands Only	3	305 ³	2 ³
Bougainville Only	122		18
East Timor Only	1078		31
Solomon Islands and Bougainville	4	31	
Solomon Islands and East Timor	2	143	131 ³
Bougainville and East Timor	104		14
Solomon Islands and Bougainville and East Timor	0	21	0
No deployments	2779		334
Total	4092	500	500

¹ Note that these numbers represent the approximate number of individuals, not the number of deployments.

² Numbers for Bougainville and East Timor deployments are estimates only, as extensive data checks have not yet been completed for these Operations.

³ Three individuals in the Veteran group were potentially also included in the comparison group

Discussion

Data Management

67. Generation of the Project Nominal Roll and the comparison group required a substantial amount of data management and manipulation. This was in part due to the large size of the source data files provided from PMKeyS and ADFPAY for generation of the Project Nominal Roll. In order for these files to be able to be

emailed over the Defence Restricted Network, the data were provided in multiple files. Each file needed to be checked for structure and format, and then saved in a tab delimited format for input to SAS (the program used to manipulate and check the data).

68. The “Restricted” security classification of the source data required a complex process for generation of the Project Nominal Roll. Generally this process would be undertaken by a statistician. However the statistician was not security cleared to access the data, and it is not appropriate for Study Chief Investigators to access or view any named data prior to individuals consenting to participate in the study. All data had been sent to the RCU over the Defence Restricted Network. It was not possible to load the statistical software required for analysis on to the computer which allowed access to the DRN. Thus a laptop capable of processing “Restricted” information was obtained and the SAS statistical software program then installed. The RCU generated a “dummy” dataset for each different type of data. The dummy datasets had the same format as the original dataset, but with “notional” names and addresses. The statistician then wrote the programming code required to read in and merge the data from the various files, and tested this code on the dummy datasets. Once it had been verified that the programming code was valid for the dummy datasets, the SAS code was then transferred to the “Restricted” laptop and used to read in the “real” data. This was done by the RCU and the First Chief Investigator (who was familiar with the SAS program), who made any required modifications to the program, with advice from the statistician. Any checking required on the original datasets was undertaken by the RCU.

69. For the PMKeyS and ADFPAY data there were multiple records per individual (each representing a different deployment, or in some cases duplicates of the same deployment). Each file was initially examined separately and duplicates removed. Files were then merged to provide a more comprehensive list of deployed personnel and determine the overlap between files.

Validity and Reliability

70. It is still unclear how comprehensive the Project Nominal Roll is, and what the true number of Service personnel deployed as part of OP ANODE is. The estimated size of the Nominal Roll, using capture-recapture methods is virtually the same as the size obtained from the two data sources. Although it is unclear how appropriate the assumptions are for this method, there is a reasonable level of confidence that the ascertainment is high. This is also confirmed by the fact that 94% of individuals were identified in both sources of data.

71. Because of the classified nature of their work, deployment details of Special Forces (SF) personnel may not be included in the Defence databases. They might still receive deployment allowances, however they will not necessarily be identified as SF.

72. Following implementation of the PMKeyS Personnel Management system in 2001-2002, new enlistments into the Defence Force have been allocated a PMKeyS number for purposes of identification, and individuals have been deployed using this

identification system. Individuals who had enlisted since 1996 (or who were still in Defence since 1996) but prior to PMKeyS have also been allocated a PMKeyS number in addition to their service number, which was previously used for identification and deployment. Databases should include, where relevant, both identification numbers as these will differ for the same individual. For OP ANODE all Service personnel should have been deployed on PMKeyS number. The different identification numbers used adds another level of complexity to management and analysis of the data. Service Number was used as the primary identification key, however if this was missing then PMKeyS number was used. Records in ADFPAY data were identified by one variable, called "Service Number", which was actually Service Number (if the individual had been allocated one) or PMKeyS number otherwise. As identification number was used to merge the data from PMKeyS and ADFPAY, it is possible that some personnel were identified by different numbers in the files, and thus may appear as two individuals. The large number of individuals identified in both PMKeyS and ADFPAY files (94%) provides some confidence that this problem is unlikely to be substantial.

73. There may be a small number of individuals in the comparison group who have been deployed to the Solomon Islands as part of OP ANODE. These individuals should not have been eligible for the comparison group, and the reason for their inclusion is unclear. As the number is so small (9 for the total comparison group and 3 for the study sample comparison group), their inclusion is unlikely to be the result of a systematic error in selection of the comparison individuals: if this was the case we would expect the number to be substantially larger. The deployment history of the comparison individuals was determined by linking their service number (or PMKeyS number if there was no service number) to all individuals on the three study Nominal Rolls. The inclusion of the individuals with a possible OP ANODE deployment may be due to other errors, for example incorrect service number or PMKeyS numbers, resulting in an incorrect link to a Veteran.

74. While the Project Nominal Rolls have not yet been completed for Bougainville and East Timor, preliminary estimates indicate slightly higher numbers to those obtained by DHSPO but of the same order of magnitude. The Deployment Profile Analysis will be repeated when the Bougainville and East Timor Nominal Rolls have been finalised.

75. Further estimates of validity and reliability of the Project Nominal Roll and comparison group selection will be obtained when data from the invitation package are received. As part of the first stage of the study, participants are requested to provide details of all of their recent deployments. These data will then be compared to the deployment history of individuals obtained as part of the Deployment Profile Analysis.

76. Changes in postings can have an impact on the validity of both home and work address data for Service personnel. It was found in the InterFET Pilot Project that 29% of individuals had a change in address details between receipt of the original Project Nominal Roll and mail-out of the survey. This will mean that, because invitation packages will not be mailed to individuals until 2007 (after a new posting round), address details will need to be obtained again from PMKeyS prior to mail-out.

77. While the process for generation of the Solomon Islands Health Study Project Nominal appears to have improved based on the modification implemented after the InterFET Pilot Project, it is unclear how valid the methods will be for the Bougainville and East Timor Health Studies. These two Operations occurred much earlier than OP ANODE, prior to the implementation of PMKeyS, and it is still unclear how much of the detail of these operations has been incorporated into the PMKeyS database.

Recommendations

78. The following recommendations, based on the experience of generating the Solomon Islands Health Study Nominal Roll should be considered for the conduct of the health study, and for generation of future Project Nominal Rolls:

- Where possible, the validity and reliability of the Project Nominal Roll should be checked with data provided by individuals on their deployment history.
- Up-to-date address data should be obtained prior to mail-out of the invitation package.
- For future studies, it is important that data be provided by PMKeyS and ADFPAY in a consistent format, and that the format of all data files should be checked by the RCU prior to any analysis being conducted.
- Any problems highlighted during contact with potential study participants, or based on information provided by participants, should be incorporated into SOPs for generation of future Nominal Rolls.

Annex 1 – Description of Capture-recapture Method

Capture-recapture methods are used to estimate the number of individuals in a closed population. They were initially developed by zoologists to count wildlife populations. In human studies these methods are useful to count numbers with specific characteristics, usually a disease or condition of interest, when there are multiple sources or lists, none of which is comprehensive. Capture-recapture methods have been used to estimate numbers of people with birth defects, infectious diseases, drug use and injuries, so that estimates of prevalence and/or incidence may be obtained. Firstly the sources or lists must be identified. These can include hospital databases, disease registers, support group membership, general practice records, etc. Individuals need to be identified from the lists and a unique identifier must be available so that the overlap between lists can be determined, ie the number of people appearing on each list only and the numbers appearing on all combinations of lists need to be obtained. In animal studies animals are usually ‘captured’, tagged and then released and can therefore be identified during a different capture (recapture). The number missing from the lists can then be estimated.

For capture-recapture with 2 lists or data sources, the number of people in either or both of the lists can be counted and this then used to estimate the number in neither of the lists (the missing number). Data can be arranged in a 2 x 2 contingency table

Table 1.2 Format for 2X2 table for capture-recapture method

In List A	In List B		Total
	Yes	No	
Yes	m		M
No		*	
Total	n		

* missing data – to be estimated

The total population, N, can then be estimated using the formula:

$$N = \frac{(M + 1)(n + 1)}{(m + 1)} - 1$$

When three or more lists are to be used, the method is slightly more complicated and log-linear models can be used to estimate the missing number.

The assumptions for capture-recapture methods are:

- The study population is a closed population
- Lists are independent of one another
- All members of the population have the same probability of being captured
- All identified elements are members of the population

Annex 2 – Description of Overlap in Deployments

Figure 1. Venn diagram of the overlap between individuals deployed to the Solomon Island (SI), Bougainville (BV) and East Timor (EM), and how selection of the veteran and comparison groups for the three Health Studies will be managed.

Figure 1a.
Sampling for the Defence Deployment Solomon Islands Health Study.

- Randomly selected comparison individuals
- All individuals who deployed to the Solomon Islands

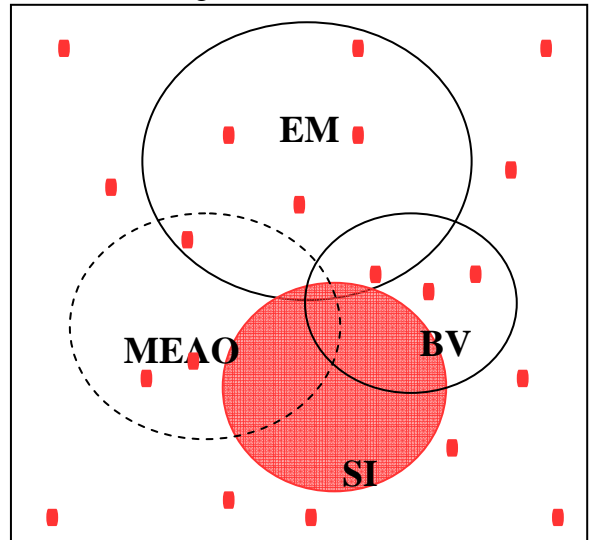


Figure 1b.
Sampling for the Defence Deployment Bougainville Health Study.

- ◆ Randomly selected comparison individuals
- All individuals who deployed to Bougainville

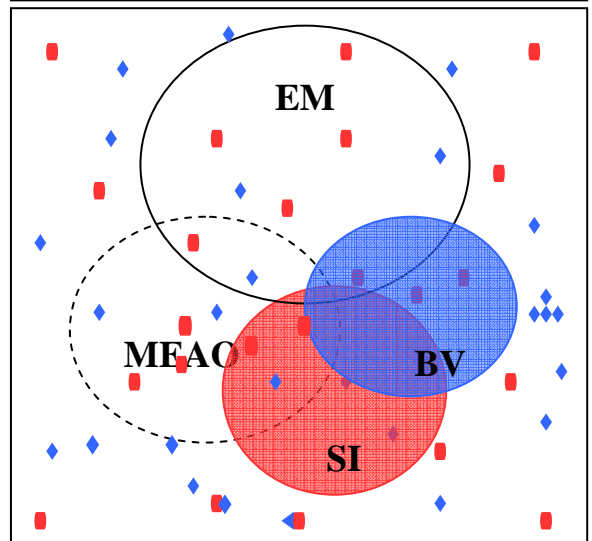
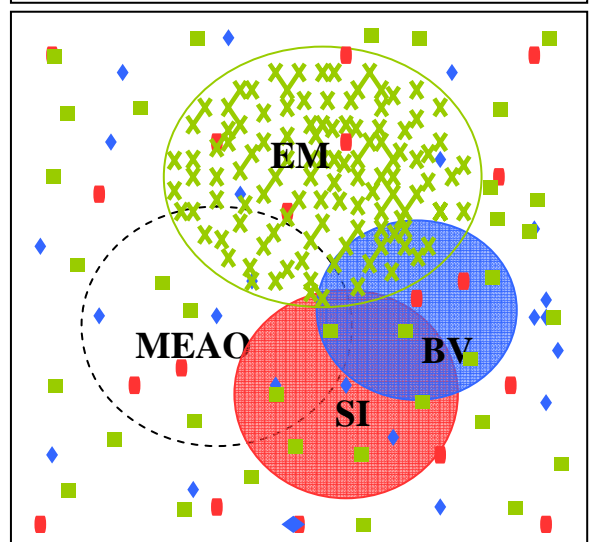


Figure 1c.
Sampling for the Defence Deployment East Timor Health Study.

- Randomly selected comparison individuals
- XXX Sample of individuals who deployed to East Timor



Annex 3 - Australian Defence Health Research Ethics Committee (ADHREC) letter of approval



Australian Government

Department of Defence
Defence Support Group

DEFENCE HEALTH
SERVICES
CP2-7-068
Campbell Park
CANNBERRA ACT 2600

2006/1091530
ADHREC 449/06
DCP/OUT/2006/134

Doctor Catherine D'Este
Associate Professor
Centre for Military and Veterans Health
Deployment Health Surveillance Unit University of Queensland
Level 2 Mayne Medical School Herston Road
HERSTON QLD 4006

Dear **Doctor D'Este**

**AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS COMMITTEE
(ADHREC) PROTOCOL 449/06: DEPLOYMENT HEALTH SURVEILLANCE
PROGRAM: SAMPLE GENERATION AND MORTALITY AND CANCER
INCIDENCE STUDIES**

1. ADHREC has considered your protocol and has cleared your project to proceed. Please note that ethical clearance from ADHREC does not automatically confer access to ADF personnel; this will have to be sought from the relevant military commanders.
2. Your protocol has been allocated **ADHREC Protocol Number 449/06, and this number should be quoted in all correspondence.** Your protocol has been approved for a period of three years. If your research is to continue over the three year approval time, ADHREC approval for an extension is to be sought in writing.
3. ADHREC requires you to provide six-monthly progress reports. The first report is due on **23 January 2007.** As part of your report would you please include a narrative describing the progress to date, and any events of significance occurring in the conduct of the protocol, in particular any adverse outcomes are to be described. Could you please also comment on the following, where applicable:
 - a. Outcome in the case of completed research,
 - b. Maintenance and security of your records,
 - c. Compliance with the approved protocol,
 - d. Any amendments or modifications to the protocol, and
 - e. Compliance with any other special conditions that ADHREC may have required
4. **If your protocol requires any modification, ADHREC approval must be sought in writing, detailing all modifications required.**

Defending Australia and its National Interests

5. For Clinical trials, ADHREC is to be notified in writing of all **Serious Adverse Events within 72 hours of the event occurring.**
6. For completeness, would you please sign and initial the enclosed Researcher's Agreement and return it to me at your convenience. I have also enclosed ADHREC's Guidelines for Volunteers, a copy of which is to be given to each study participant.
7. The Committee wishes you well with your research. Please contact me if I can be of any assistance.

Yours sincerely,



Doctor Rosemary A. Landy
Executive Secretary
Australian Defence Human Research Ethics Committee
CP2-7-068
Campbell Park Offices
CANBERRA ACT 2600

Tel (02) 62663837
Fax (02) 62664982
E-mail: ADHREC@defence.gov.au


10 July 2006

Attachment:

- A. ADHREC *Researchers Agreement*
- B. ADHREC *Guidelines for Volunteers*

Defending Australia and its National Interests

Annex 4 - University of Queensland: Behavioural & Social Sciences Ethical Review Committee (BSSERC) letter of approval.



THE UNIVERSITY OF QUEENSLAND
Institutional Approval Form For Experiments On Humans
Including Behavioural Research

Chief Investigator: Associate Professor Cate D'Este

Project Title: Deployment Health Surveillance Program: Sample Generation

Supervisor: None

Co-Investigator(s): Associate Professor Scott Kitchener, Professor Sandy McFarlane, Dr Sonya Bennett, Professor Annette Dobson, Dr Ben Stute

Department(s): Centre for Military and Veterans' Health

Project Number: 2006000478

Granting Agency/Degree: Department of Defence

Duration: 31st October 2007

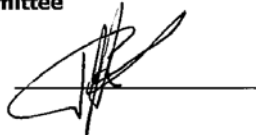
Comments:

Approval is for Stage I of current project (compiling list of eligible participants – nominal roll).

(The Committee advises that the investigator should consult with appropriate organisations concerned with the welfare of specific vulnerable groups (e.g. Armed Force Federation of Australia in cases of service personnel; Aboriginal and Torres Strait Islander Studies Unit for indigenous service personnel) for subsequent stages to progress.)

Name of responsible Committee:-
Behavioural & Social Sciences Ethical Review Committee
 This project complies with the provisions contained in the *National Statement on Ethical Conduct in Research Involving Humans* and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:-
Dr Jack Broerse
Chairperson
Behavioural & Social Sciences Ethical Review Committee

Date 18/08/06 Signature 

Annex 5 – Data files provided by PMKeyS and ADFPAY

Filename	Row at which data commences	Column at which data commences	Number of data records	Description
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 1 - ARMY	2	1	4999	PMKeyS deployment data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 2- ARMY	2	1	5000	PMKeyS deployment data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 3- ARMY	2	1	5000	PMKeyS deployment data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 4- ARMY	2	1	5000	PMKeyS deployment data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 5- ARMY	2	1	3783	PMKeyS deployment data for ARMY part 1 of 5
PMKEYS nominal rolls data IN62825 NAVY CMVH 290806 NAVY.xls	2	1	1256	PMKeyS deployment data for NAVY
PMKEYS nominal rolls data IN62825 RAAF CMVH 290806 RAAF.xls	2	1	1038	PMKeyS deployment data for RAAF
Total number of records			26076	
20060717 ADFPAY nominal roll raw data DHSD1 Part 1.xls	6	1	10000	ADFPAY deployment data file 1 part 1 of 5
20061717 ADFPAY nominal roll raw data DHSD1 Part 2.xls	6	1	10000	ADFPAY deployment data file 1 part 2 of 5
20061717 ADFPAY nominal roll raw data DHSD1 Part 3.xls	6	1	10000	ADFPAY deployment data file 1 part 3 of 5
20061717 ADFPAY nominal roll raw data DHSD1 Part 4.xls	6	1	10000	ADFPAY deployment data file 1 part 4 of 5
20060717 ADFPAY nominal roll raw data DHSD1 Part 5.xls	6	1	14626	ADFPAY deployment data file 1 part 5 of 5
File 2 - 20060618 ADFPAY nominal roll raw data DHSD2.xls	7	1	217	ADFPAY deployment data file 2
File 3 - 20063107 ADFPAY nominal roll raw data Batch-Wipe-2000.xls	5	1	170	ADFPAY deployment data archived in 2000
File 4 - 20063107 ADFPAY nominal roll raw data Batch-Wipe-2002.xls	5	1	3542	ADFPAY deployment data archived in 2002
File 5 - 20063107 ADFPAY nominal roll raw data Batch-Wipe-2005.xls	5	1	7826	ADFPAY deployment data archived in 2005
File 6 - 20063107 ADFPAY nominal roll raw data Onlie-Wipe-2000-2007.xls	5	1	4163	ADFPAY deployment data archived from 2000-2007
Total number of records			70545	

Filename	Row at which data commences	Column at which data commences	Number of data records	Description
File 7 - original - allotment certificate - Op Tanager.xls	2	2	17281	Allotment certificate data for Op Tanager
File 8 - original - allotment certs - Op Stabilise ARMY.xls	4	1	323	Allotment certificate data for Op Stabilise - ARMY
File 8 - original - allotment certs - Op Stabilise NAVY.xls	4	1	3907	Allotment certificate data for Op Stabilise - NAVY
File 8 - original - allotment certs - Op Stabilise RAAF.xls	4	1	5	Allotment certificate data for Op Stabilise - RAAF
File 8 - original - allotment certs - Op Warden ARMY.xls	4	1	6285	Allotment certificate data for Op Warden - ARMY
File 8 - original - allotment certs - Op Warden NAVY.xls	4	1	88	Allotment certificate data for Op Warden - NAVY
File 8 - original - allotment certs - Op Warden RAAF.xls	4	1	740	Allotment certificate data for Op Warden - RAAF
File 9 - original – Supp allotment certificate Op Tanager for HMA Ships.xls	3	1	118	Allotment certificate data for Op Tanager - data from ships
Total number of records			28747	
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 1 REH_TER	2	1	7999	PMKeyS discharge and rehire data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 2 REH_TER	2	1	8000	PMKeyS discharge and rehire data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 3 REH_TER	2	1	8000	PMKeyS discharge and rehire data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 4 REH_TER	2	1	8000	PMKeyS discharge and rehire data for ARMY part 1 of 5
PMKEYS nominal rolls data - IN62825 ARMY CMVH 290806 - Part 5 REH_TER	2	1	10312	PMKeyS discharge and rehire data for ARMY part 1 of 5
PMKEYS nominal rolls data IN62825 NAVY CMVH 290806 REH_TERM	2	1	2034	PMKeyS discharge and rehire data for NAVY
PMKEYS nominal rolls data IN62825 RAAF CMVH 290806 REH_TER	2	1	1741	PMKeyS discharge and rehire data for RAAF
Total number of records			46086	

Annex 6 – Description of variables provided by PMKeyS and ADFPAY

Data Source	content of file	variable name	variable description	Variable codes
PMKeyS	<i>deployment data</i>	service	service	ARMY, NAVY, RAAF
		stype	service type - regular or reserve	CFT, REG, RES
		EmplID	employee number - PMKeyS	
		sno	number	
		rank	Service number	
		rankd	rank code	
		empls	rank description	
		sname	employment status	A=active, D=discharged, T=
		gname1	surname	
		gname2	given name 1	
		fname	given name 2	
		sex	firstname	
		oprcode	sex	
		oprd	operation code	
		sdate	operation description	
		edate	date of start of deployment	
		mcode	date of end of deployment	
		mdscr	medical employment category code	
		bdate	medical employment category description	
		ddate	date of birth	
mstatus	date of death			
haddr1	marital status			
	home address field 1			

Data Source	content of file	variable name	variable description	Variable codes			
PMKeyS	deployment data	service	service	ARMY, NAVY, RAAF			
		haddr2	home address field 2				
		haddr3	home address field 3				
		city	home address city				
		state	home address state				
		pcode	home address postcode				
		cntry	home address country				
		unitid	most recent unit - identification number				
		unitd	most recent unit - description				
		location	most recent unit - location				
		uaddr1	most recent unit - address (line 1)				
		uaddr2	most recent unit - address (line 2)				
		uaddr3	most recent unit - address (line 3)				
		uaddr4	most recent unit - address (line 4)				
		ucity	most recent unit - city				
		ustate	most recent unit - state				
		upcode	most recent unit - postcode				
		ucntry	most recent unit - country				
		discharge & rehire data			service	service	ARMY, NAVY, RAAF CFTS, REG, RES-A, RES-ES, RES-HRR, RES-1
					stype	type of service	
					EMPLID	PMKeyS id number	
					effdate	date of discharge or rehire	
					action	whether discharged or rehired	HIR, MTR, REH, TER
reason	reason for discharge of rehire						

Data Source	content of file	variable name	variable description	Variable codes
PMKeyS	deployment data	service	service	ARMY, NAVY, RAAF
		descr		
		status		
		comments		
ADFPAY		si	service indicator	1=ARMY, 2=RAAF, 3=NAVY
		sno	service number	
		sname1	first surname	allows for up to 6 different surnames
		sname2	second surname	
		sname3	third surname	
		sname4	fourth surname	
		sname5	fifth surname	
		sname6	sixth surname	
		gnames	given names	all given names in the same field
		dob	date of birth	
		endate	date of enlistment	
		acode	deployment allowance code	
		adescr	deployment allowance description	
		sdate	date of start of deployment	
		edate	date of end of deployment	
		rcode	rank code	
		pstation	pay station	5 digit code 2 digit code - sub-unit of pay station
		ppoint	pay point	
		paddress	pay address	
		disdate	date of discharge	
disreas	reason for discharge			

Data Source	content of file	variable name	variable description	Variable codes
PMKeyS	deployment data	service	service	ARMY, NAVY, RAAF
		stype	service type	P = permanent, R=reserve
		mstatus	marital status	
Allotment Certificates		sno	service number	
		rank	rank at time of deployment	
		initials	initials	
		sname	surname	
		sdate	date of start of deployment	
edate	date of end of deployment			

Annex 7 - Numbers for Solomon Islands Comparison Group

Service	Service Type	Gender	Birth year	number
ARMY	Regular/permanent	Male	1937-1966	310
ARMY	Regular/permanent	Male	1967-1976	759
ARMY	Regular/permanent	Male	1977-1988	938
ARMY	Regular/permanent	Female	1937-1966	23
ARMY	Regular/permanent	Female	1967-1976	112
ARMY	Regular/permanent	Female	1977-1988	123
ARMY	Reserve (and CFT)	Male	1937-1966	67
ARMY	Reserve (and CFT)	Male	1967-1976	38
ARMY	Reserve (and CFT)	Male	1977-1988	59
ARMY	Reserve (and CFT)	Female	1937-1966	8
ARMY	Reserve (and CFT)	Female	1967-1976	10
ARMY	Reserve (and CFT)	Female	1977-1988	3
NAVY	Regular/permanent	Male	1937-1966	136
NAVY	Regular/permanent	Male	1967-1976	331
NAVY	Regular/permanent	Male	1977-1988	429
NAVY	Regular/permanent	Female	1937-1966	3
NAVY	Regular/permanent	Female	1967-1976	27
NAVY	Regular/permanent	Female	1977-1988	61
NAVY	Reserve (and CFT)	Male	1937-1966	27
NAVY	Reserve (and CFT)	Male	1967-1976	3
NAVY	Reserve (and CFT)	Male	1977-1988	0
NAVY	Reserve (and CFT)	Female	1937-1966	2
NAVY	Reserve (and CFT)	Female	1967-1976	2
NAVY	Reserve (and CFT)	Female	1977-1988	0
RAAF	Regular/permanent	Male	1937-1966	165
RAAF	Regular/permanent	Male	1967-1976	241
RAAF	Regular/permanent	Male	1977-1988	136
RAAF	Regular/permanent	Female	1937-1966	9
RAAF	Regular/permanent	Female	1967-1976	33
RAAF	Regular/permanent	Female	1977-1988	23
RAAF	Reserve (and CFT)	Male	1937-1966	11
RAAF	Reserve (and CFT)	Male	1967-1976	0
RAAF	Reserve (and CFT)	Male	1977-1988	0
RAAF	Reserve (and CFT)	Female	1937-1966	2
RAAF	Reserve (and CFT)	Female	1967-1976	1
RAAF	Reserve (and CFT)	Female	1977-1988	0
			Total	4092

Annex 8 – Strata proportions used to Veteran and comparison groups sample

Service	Service type	Sex	Year of birth	Number on Nominal Roll	Proportion in strata	n in sample (rounded)
ARMY	Regular/permanent	Male	1937-1966	310	0.075757576	38
ARMY	Regular/permanent	Male	1967-1976	759	0.185483871	93
ARMY	Regular/permanent	Male	1977-1988	938	0.229227761	115
ARMY	Regular/permanent	Female	1937-1966	23	0.005620723	3
ARMY	Regular/permanent	Female	1967-1976	112	0.027370479	14
ARMY	Regular/permanent	Female	1977-1988	123	0.030058651	15
ARMY	Reserve (and CFT)	Male	1937-1966	67	0.016373412	8
ARMY	Reserve (and CFT)	Male	1967-1976	38	0.009286413	5
ARMY	Reserve (and CFT)	Male	1977-1988	59	0.014418377	7
ARMY	Reserve (and CFT)	Female	1937-1966	8	0.001955034	1
ARMY	Reserve (and CFT)	Female	1967-1976	10	0.002443793	1
ARMY	Reserve (and CFT)	Female	1977-1988	3	0.000733138	0
NAVY	Regular/permanent	Male	1937-1966	136	0.033235582	17
NAVY	Regular/permanent	Male	1967-1976	331	0.080889541	41
NAVY	Regular/permanent	Male	1977-1988	429	0.10483871	53
NAVY	Regular/permanent	Female	1937-1966	3	0.000733138	0
NAVY	Regular/permanent	Female	1967-1976	27	0.00659824	3
NAVY	Regular/permanent	Female	1977-1988	61	0.014907136	7
NAVY	Reserve (and CFT)	Male	1937-1966	27	0.00659824	3
NAVY	Reserve (and CFT)	Male	1967-1976	3	0.000733138	0
NAVY	Reserve (and CFT)	Male	1977-1988	0	0	0
NAVY	Reserve (and CFT)	Female	1937-1966	2	0.000488759	0
NAVY	Reserve (and CFT)	Female	1967-1976	2	0.000488759	0
NAVY	Reserve (and CFT)	Female	1977-1988	0	0	0
RAAF	Regular/permanent	Male	1937-1966	165	0.040322581	20

Service	Service type	Sex	Year of birth	Number on Nominal Roll	Proportion in strata	n in sample (rounded)
RAAF	Regular/permanent	Male	1967-1976	241	0.058895406	30
RAAF	Regular/permanent	Male	1977-1988	136	0.033235582	17
RAAF	Regular/permanent	Female	1937-1966	9	0.002199413	1
RAAF	Regular/permanent	Female	1967-1976	33	0.008064516	4
RAAF	Regular/permanent	Female	1977-1988	23	0.005620723	3
RAAF	Reserve (and CFT)	Male	1937-1966	11	0.002688172	1
RAAF	Reserve (and CFT)	Male	1967-1976	0	0	0
RAAF	Reserve (and CFT)	Male	1977-1988	0	0	0
RAAF	Reserve (and CFT)	Female	1937-1966	2	0.000488759	0
RAAF	Reserve (and CFT)	Female	1967-1976	1	0.000244379	0
RAAF	Reserve (and CFT)	Female	1977-1988	0	0	0
Total				4092	1	500¹

¹A denominator of 502 was used to ensure that the rounded integer numbers in each stratum summed to 500



Mortality Study Report

Solomon Islands Health Study

Deliverable Item 2 (Phase 2)

27 June 2007



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Approvals

This document requires the following approvals:

Name	Position	Signature	Date	Version
A/Prof Susan Treloar	First Chief Investigator			
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Prof Tony McMichael	Scientific Advisory Committee			

Signed approval forms are filed in the Management section of the project file.

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DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 2 (Phase2)

Mortality Study Report

Due Date: 15 May 2007

Executive Summary

1. The Defence Deployed Solomon Islands Health Study is the first in a series of studies being conducted by the Centre for Military and Veterans' Health to investigate the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service to the Solomon Islands.
2. This is an updated report of the Solomon Islands mortality study. This report now includes the cause of death information from 2005, information on date of enlistment to the person-years calculations, and updated presentation of the results based on advice from members of the Scientific Research Team (SRT). In addition the suggestions received from the Scientific Advisory Committee (SAC) have been incorporated into the report.
3. This report presents the mortality component of the Solomon Islands Health Study. One of the main questions of interest in veterans' health is whether veterans are at an increased risk of dying compared to their Australian contemporaries. Deployment may increase the risk of death in a number of ways. A psychological trauma may lead to later suicide; a physical trauma may lead to a chronic disease that reduces life expectancy; exposure to known or unknown environmental toxins may lead to cancer and death.
4. The aims of the study were:
 - To compare the mortality rate for veterans of Operation ANODE to a comparison group of Defence personnel who did not deploy as part of Operation ANODE.
 - To compare the mortality rate for veterans of Operation ANODE to the general Australian population
5. A Project Nominal Roll was generated from two sources of data: PMKeyS, the system used by the Department of Defence for all aspects of personnel management; and ADFPAY, which is the Australian Defence Force Pay System and is responsible for salary payment for Service personnel. Defence personnel deployed to the Solomon Islands as part of Operation ANODE between 24th July 2003 and 31st December 2005 were eligible for inclusion on the Nominal Roll.

The comparison group was selected from Defence personnel who were serving at the start of Operation ANODE and were frequency matched to the deployed group on service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988).

6. The mortality comparison was based on the entire Nominal Roll (n = 4089) and comparison group (n= 4092). The risk of death in each group was calculated as the total number of deaths divided by the total person years of follow-up from the start of Operation ANODE to time of death or end of the study. Relative risks and 95% confidence intervals were obtained for the veteran group relative to the comparison group.
7. The Standardised Mortality Ratios (SMRs) were obtained to compare death rates in the veteran and comparison groups (separately and combined) to Australian norms. The SMR is calculated firstly by obtaining the expected number of deaths in each age stratum (15-24, 25-34, 35-44, 45-54, 55-64, 65-74 years) based on the three year average population mortality rate in the strata from 2003-2005. The number of observed deaths were divided by the number of expected deaths for the various age strata and multiplied by 100 to provide the SMRs.
8. The NDI linkage identified 7 deaths in the Solomon Islands veterans and 7 deaths in the non-deployed comparison group between the start of follow-up and 31 December 2005.
9. The Solomon Islands mortality analysis did not show a difference in all-cause mortality between the deployed and the non-deployed comparison group (RR 1.02 95% CI (0.30, 3.40)). However, ADF personnel in the Solomon Islands study had a lower mortality level than can be expected in the general population (SMR 42.8 95% CI (23.4, 71.8)).
10. The short follow-up period for the study population and the comparatively young age of those deployed meant that the power of the study was small and any differences in mortality from chronic illnesses were unlikely to be shown. Potential biases may have occurred because of difference in mobility, fitness, length of enlistment in the ADF and deployment history between the veteran and comparison samples.
11. This study has developed methods for similar studies of the mortality associated with military deployments. There is the opportunity for the results of this Solomon Islands report to be updated when follow-up period has increased. There is also the opportunity to compare the impact of different deployments on the mortality of ADF personnel, and to assess the impact of multiple deployments on the health of Defence personnel by combining the results of the Near North Studies
12. It is recommended that the completeness and sensitivity of the NDI matching process of ADF personnel is investigated further to rule out possible bias due to deaths not being identified and included in analyses. Future studies should add to the data by including updated death and population statistics. The bias of not using

updated data will be small in the short term, but may become large if, for example, the life expectancy of Australians continues to increase

1 Introduction

1. The Defence Deployed Solomon Islands Health Study (hereafter referred to as the Solomon Islands Health Study) is the first in a series of studies that aim to research the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service overseas. It is being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).
2. This report presents the mortality component of the Solomon Islands Health Study, hereafter to be entitled the Solomon Islands Mortality Study. One of the main questions of interest in veterans' health is whether veterans are at an increased risk of dying compared to their Australian contemporaries. Deployment may increase the risk of death in a number of ways. A psychological trauma may lead to later suicide; a physical trauma may lead to a chronic disease that reduces life expectancy; exposure to known or unknown environmental toxins may lead to cancer and death.
3. In recent times ADF personnel have deployed on active service overseas in a variety of war-like and non war-like roles. Post deployment health concerns have followed wars since at least the United States Civil War (Hyams et al, 1996) and the Boer war (Jones et al, 2002). Focus on the psychological and physical ill health of veterans in the United States became acute following the Vietnam conflict, when the first five years after separating from the military was associated with an increased risk of dying from motor vehicle accidents, suicide, homicide and accidental poisoning (The Centers for Disease Control Vietnam Experience Study. Post-service mortality among Vietnam veterans, 1987).
4. In Australia there has been evidence of higher mortality in both Korean and Vietnam Veterans. Korean War veterans have a 21% increase in overall mortality compared with the Australian male population, and an increase in cancer mortality of 31% (Harrex et al, 2003). For Vietnam veterans, the mortality rate is 6% lower than expected compared to the Australian male population, but 23% higher than the mortality of serving non-veterans who did not serve in Vietnam (Wilson et al, 2005).

1.1 Deployment Health Surveillance Program

5. The Centre for Military and Veterans' Health (CMVH) is a consortium of The University of Queensland, University of Adelaide and Charles Darwin University, which is dedicated to innovatively seeking solutions to military and veterans' health issues through research, education, e-health and public debate. CMVH is conducting a series of studies examining the long-term health issues of deployed Australian Defence personnel, as part of its Deployment Health Surveillance Program (DHSP). The program will look at the health of troops deployed to the Solomon Islands, Bougainville, East Timor and the Middle East Area of Operations (MEAO).

6. The studies to be conducted by CMVH as part of the Deployment Health Surveillance Program aim to eventually develop a prospective, analytic system for longitudinal surveillance of health of ADF personnel who are deployed on specific operations. The core of the Deployment Health Surveillance Program is the formation of an integrated data system which will be established at the CMVH consortium of Universities. The Deployment Health Surveillance Program build on previous and current national and international studies, and is a critical step in establishing best practice surveillance methodologies and providing a baseline for monitoring the future health of Veterans of ADF operations to these regions.

1.2 The Solomon Islands Deployment

7. The Solomon Islands is a nation in Melanesia, east of Papua New Guinea, consisting of a scattered archipelago of 992 islands extending 1770 kilometres southeast from Bougainville. The population of approximately 538,000 (July 2005 estimate) inhabits 347 of these islands. There are six major islands or groups of islands with numerous small islands and atolls: The major islands are Guadalcanal, Malaita, Choiseul, Santa Isabel, New Georgia and San Cristobal (Aregheore, 2006; Central Intelligence Agency, 2006).

8. In 2003, the Solomon Islands was in a political and security crisis, as a result of long-standing ethnic conflicts. It had weak institutions, a corrupt government, criminalisation of politics, poor law and order, economic stagnation, social dislocation, a growing culture of violence, international neglect, collapse of government services, disillusioned populations, and a plentiful supply of guns. All this had paralysed the country's capital, stifled its economy, disrupted government, discouraged aid donors, and inflicted suffering and hardship on its people. The Solomon Islands had virtually ceased to function as an effective national entity.

9. The Australian Defence Force (ADF) deployed Operation ANODE (OP ANODE) to the Solomon Islands in 2003 as part of the Regional Assistance Mission to the Solomon Islands (RAMSI). The overall RAMSI undertaking is known as operation HELPEM FREN. Operation ANODE commenced on July 24th 2003 and is still underway.

10. Operation ANODE was classified as a non-warlike operation. This is defined as where there is a risk associated with the assigned tasks, where the application of force is limited to self-defence, and where casualties could occur but are not expected.

11. Although Operation ANODE was essentially a peacekeeping Operation, ADF personnel deployed to the Solomon Islands faced a wide variety of exposures which were potentially hazardous to their health and wellbeing. These included operational and occupational hazards such as trained and armed militia groups and unexploded ordnance (UXO), environmental hazards such as contaminated food and water and proliferation of disease vectors like mosquitoes, and psychological harm such as fear of being harmed and witnessing distressing events. These hazards may have contributed to adverse health outcomes in personnel deployed to the Solomon Islands.

2 Aims and Objectives

12. The purpose of the Solomon Islands Mortality Study is to determine whether deployment to the Solomon Islands as part of Operation ANODE was associated with increased mortality. The specific aims of the Study are:

- To compare the mortality rate for veterans of Operation ANODE to a comparison group of Defence personnel who did not deploy as part of Operation ANODE.
- To compare the mortality rate for veterans of Operation ANODE to the general Australian population.

13. In order to address the above aims, the objectives of the Solomon Islands Mortality Study are:

- To formulate the methodology for making comparisons, specifically:
 - The process for matching files with the NDI
 - The required statistical analysis
- To run the analysis for the veterans listed on the Solomon Islands Health Study Nominal Roll, and identify areas of possible improvement for future deployment health studies.
- To collect information on cause of death and compare deaths from different causes between the comparison groups.

3 Methods

3.1 Study design

14. The Solomon Islands Mortality Study is a Retrospective Cohort Study. The mortality of veterans who deployed to the Solomon Islands was compared to that of a comparison group of Defence personnel who did not deploy as part of Operation ANODE, as well as to the general Australian population. Information on mortality was obtained from linkage with the National Death Index (NDI) held by the Australian Institute of Health and Welfare (AIHW). The AIHW is provided with data on vital status from all State and Territory Registries of Births, Deaths and Marriages, as it is a legal requirement to register all deaths in Australia.

15. Comparison of mortality rates of veterans of Operation ANODE with the Australian population provides an estimate of the mortality of the deployed group relative to the population; however it may result in systematic bias. The Healthy Worker Effect, which was first described in 1885 (Ogle, 1885), is an effect whereby individuals who are in the workforce are healthier than the average population: the “sicker” or “unhealthier” components of the population are unable to work. Thus comparison of mortality for an occupational group relative to the general Australian population may demonstrate the appearance of reduced mortality in the group of

workers. This phenomenon has been extended to the “Healthy Soldier Effect”, where, because of recruitment processes and enlistment requirements, members of the Australian Defence Force are “healthier” than other workers (Wen et al, 1983). More recently in relation to studies conducted in veterans of the first Gulf War, the “Healthy Warrior Effect” has been identified (Hayley, 1998). This refers to the fact that Defence personnel who undertake operational deployments are required to be at the highest level of fitness, and have undergone another level of health screening beyond those not deployed.

16. Therefore for the Solomon Islands Mortality Study, comparisons were made between deployed personnel and a comparison group of Defence personnel who were not deployed to the Solomon Islands as part of Operation ANODE, as well as comparisons with the Australian population.

3.2 Study population

17. The list of Defence personnel deployed to the Solomon Islands as part of Operation ANODE who are eligible for inclusion in the Solomon Islands Health Study is termed the Solomon Islands Health Study Nominal Roll. Based on the pilot work undertaken as part of the DHSP, a procedure was developed for generation of the Solomon Islands Health Study Nominal Roll from Department of Defence data. This process involved the use of data from two sources: PMKeyS, the system used by the Department of Defence for all aspects of personnel management; and ADFPAY, which is the Australian Defence Force Pay System and is responsible for salary payment for Service personnel. A variety of other potential sources of data were identified and investigated, but were not considered relevant for generation of the Solomon Islands Nominal Roll. Individuals were included in the data files if they had been allocated a relevant code or descriptor indicating that they had deployed as part of Operation ANODE.

18. Defence personnel were eligible for inclusion on the Solomon Islands Health Study Nominal Roll if they deployed to the Solomon Islands as part of Operation ANODE between July 24 2003 and December 31 2005 (defined as the end of the study period). Individuals deployed as part of this Operation after December 31 2005 were ineligible for inclusion. In order to be inclusive, individuals whose deployment start date was prior to July 24, 2003 were retained, as it is standard practice for some individuals to deploy early to prepare for the operation. Individuals were included on the Project Nominal Roll if they were identified in either PMKeyS or ADFPAY data as having been deployed as part of OP ANODE.

19. The comparison group for the Solomon Islands Health Study includes Service personnel who were not deployed to the Solomon Islands as part of OP ANODE, but were potentially eligible for deployment. For scientific rigour and to reduce the effect of confounding as much as possible, it was important that the Solomon Islands Health Study comparison group was as similar to the deployed group as possible on all potential confounding factors except for deployment. To ensure this similarity, the comparison group was selected to reflect the characteristics of the deployed group, using frequency matching.

20. Individuals were eligible for inclusion in the Solomon Islands Health Study Comparison Group if they had not deployed as part of OP ANODE, were not included on the Solomon Islands Health Study Nominal Roll, and were a member of a Defence Service on July 24, 2003. Comparison individuals were randomly selected from the PMKeyS database (after excluding individuals on the Solomon Islands Health Study Nominal Roll), and frequency matched to the veteran group on service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988).

21. The Solomon Islands Health Study Nominal Roll included 4089 individuals and the comparison group included 4092 current or past Defence personnel. The number of veterans is slightly larger than that of the comparisons because, after generation of the Project Nominal Roll, duplicate records were found for 3 individuals.

22. More detailed information on the Solomon Islands Health Study Nominal Roll can be obtained in the Defence Deployed Solomon Islands Health Study Sample Generation Document (Deliverable 1 of Phase 2 of the Solomon Islands Health Study).

3.3 Data Collection

23. Details (full name, gender and date of birth) were extracted for individuals on the Solomon Islands Health Study Nominal Roll and the comparison group and were forwarded to the AIHW for linkage with the National Death Index.

24. The AIHW required the data to be in a particular format. This format required the following information in separate fields:

1. ID number
2. Surname
3. First given name
4. Second given name
5. Third given name
6. Sex
7. Date of birth
8. Date of last contact
9. State of residence at last contact
10. Date of death if known

25. AIHW required all names in UPPER CASE and all dates in the format YYYYMMDD. The date of last contact for all participants was set as 24 July 2003.

26. At the time of finalisation of this updated report, cause of death information was available from the AIHW for deaths registered up to 2005. Cause of death (where available) was provided by AIHW using ICD10 codes.

27. While coded cause of death was available up to 2005, the AIHW was still able to provide notifications of date of death (without the cause of death code) through the NDI beyond this date.

28. The receipt of NDI output was managed through the recorded delivery of a zipped password protected file. The password for the file was sent separately by email. This was considered appropriate given the confidential nature of the information. The AIHW provided an output of the National Death Index comparison in multiple files, with different files obtained from different matching strategies, and thus generally reflecting varying probabilities of “true” matches.

3.4 Validating the death data from AIHW

29. The matching process undertaken by AIHW uses a probabilistic matching program. This is necessary because details on the death records and in the project nominal roll may not be completely accurate. For example a birth day may be entered as ‘1’ in one source and ‘7’ in another due to handwriting, misreading or even random error.

30. The AIHW program compares several variables in the health study data file, including names and date of birth, with these variables in the NDI data. This is because there are many possible sources of error and discrepancy. For example, name, month and year of birth may be the same, but day of birth may be different. The matching process will provide some “exact” matches, where names, date of birth and sex are exactly the same in both files. There will usually be many more “possible” matches – some of which may be very likely and others highly unlikely. Therefore as part of the process of determining whether the individual has died, some examination of all of the possible matches is required. All possible matches are provided, in various files, so that the user can undertake an appropriate check to identify acceptable matches. Because the number of potential matches can be very high, it is not feasible to examine all possible individual matches. Thus a set of rules has been developed to facilitate this process and identify only likely matches for manual checking (Table 1). However, AIHW emphasise that these rules of thumb are rough guides and there is no substitute for human judgement. It is not possible to eliminate all clerical checking, but rather the aim is to reduce the amount of manual checking to a manageable form.

Table 1: Rules for actioning matches from the National Death Index by pass number, weight and sex

Pass	Quality
g1ex	All matches are of the highest quality possible.
g4dmy	Very high quality matches at top of file. Anything with a weight above 20 is a likely true match. Dubious matches may start appearing at a weight of around 16. Very few true matches below 10, though some may be found even below 5.
g2ay, g3sy, g5dy, g7my, g9dm	Any match with a weight above 30 is a good candidate for a true match. Below 30 and down to 20 there will be many plausible-looking matches but how many of them are true is up for debate. It really depends on your own judgement and the strictness you wish to apply to your study. Accepting matches with a weight below 20 is entering dangerous territory. Note that g7my and g9dm will have more true matches than the others, presumably because these kinds of errors in the birth date are more common.
g6a, g8s, g10y, g11d, g12m	All matches are dubious. You might accept a match if the weight is particularly high, say above 35, and the two birth dates are “close”, e.g. 12/03/1934 and 11/03/1935.
g13n	All matches are highly dubious. You should only accept a match if its weight is extremely high, say above 40, and there are other compelling reasons.
b1y	Remember: even if the NDI record has a full date of birth you should ignore it because it is, or is likely to be, a dummy. Only consider the year. With this in mind, these matches are difficult to resolve. How many people might share the same name and the same birth year? As a rough guide, if you accept all matches with a weight of above 25 and reject those below, you might be about right in terms of overall numbers of true matches. You will probably have accepted some false matches but these may be approximately cancelled out by the true matches below 25 that you rejected.
b2n	You can apply similar rules to whatever you used for pass b1y but be more wary. If you used a straight cutoff rule like that suggested above then you should probably raise the cutoff for this pass by, say, 3.

31. Additional information from a variety of sources was used to check the validity of information obtained from the NDI. A Google search was undertaken on names in the “definitely dead” and “possibly dead” groups in an effort to confirm vital status.

32. Information in the date of death field from the PMKeyS records was used as a cross-check of the NDI data.

33. A logical check was also applied to the data, as matches with a date of death that predates the deployment are ignored (i.e. moved to the “definitely alive” group).

34. The above checks allowed some individuals in the group of “possibly dead” to be allocated to the “definitely dead” or “definitely alive” groups, with the vital status of some individuals remaining uncertain.

3.5 Statistical Methods

35. This section outlines the statistical methods undertaken for the Solomon Islands Mortality Study.

36. To account for a possible reduction in coverage of deaths in the most recent three months, the follow-up date three months less than the date of request to AIHW was used. Thus the end of the follow-up period for assessing mortality was in this analysis was 24 January 2007.

37. For the purposes of statistical analyses, only individuals with date of death on or before 24 January 2007 who were identified as “exact” matches from the NDI linkage, or “possible” matches with verification of death through clerical check or an alternate source of information were classified as having died and were defined as “verified deaths”. All other individuals were classified as alive.

38. There are two main comparisons to the analysis of the mortality data: comparison of the validated deaths for veterans with the number of deaths amongst the comparison group of service personnel; and comparison with the expected deaths based on Australian population data. Comparing observed death rates to the general Australian population may be biased because ADF personnel are generally fitter and healthier than the general population. This is called the “healthy soldier effect” and will bias true associations towards the null hypothesis of no effect (Haley, 1998). To somewhat overcome this problem the observed number of deaths can also be compared to a non-deployed comparison group.

3.5.1 Mortality Relative to Comparison Group

39. Examining mortality in the Solomon Islands Health Study veteran group relative to the comparison group involved firstly determining the risk of death in each group. This is defined as the number of deaths divided by the total person-years of follow-up for each group.

40. Person-years is defined by the period of observation and hence covers the time when the subject could have possibly died. In this study an individual’s person-years of exposure spans from the 24 July 2003 or the date the member joined defence (whichever was later), to the date of death or follow-up date.

41. As the number of events was expected to be small (less than 20) a Cox proportional hazards model was not fitted. A crude rate ratio is presented to compare the mortality rate in each group.

42. Rate ratios were calculated as the rate of mortality in the veteran group divided by the rate of mortality in the comparison group. Rate Ratios with associated 95% confidence intervals were obtained.

3.5.2 Mortality Relative to the Australian Population

43. Comparison of mortality in the study groups with the Australian population involves comparing the actual or observed number of deaths, with the number of deaths we would expect if the death rates were similar between the study sample and the population.

44. The expected number of deaths was based on population and mortality data from the Australian Bureau of Statistics (ABS) for the years 2003 to 2005. This period was the best available to match the deployment and follow-up time. The data is available online from the ABS. As an example, the 2004 death data is available from Table 4.1 in the annual ABS summary of Australian death data, which is available online.

45. Assuming a stable death rate in the Australian population across the years studied, the average rate was calculated by simply averaging the rates in each 5 year age group and sex across the three years 2003-2005. (This assumption may not be valid for future studies that span decades of follow-up.) This average rate was then multiplied by the total person years in each age and sex group to give the expected number of deaths in the deployed group. As a formula this statistic is (in each age group):

$$\text{Expected number of deaths} = \text{Total person years} \times \text{Average death rate.}$$

46. The Standardised Mortality Ratio (SMR) was used to compare deaths rates in the veteran population to Australian norms. It is defined as (in each age group):

$$\text{SMR} = 100 \times (\text{Observed number of deaths} / \text{Expected number of deaths}).$$

47. An SMR equal to 100 indicates no difference between the observed and expected number of cancers. An SMR above 100 means that the observed number of cases was higher than expected, and an SMR below 100 indicates that the number of cases was lower than the expected number. An overall SMR (across sex and all age groups) was calculated using the direct method (dos Santos Silva, 1999). Statistical p-values for the difference between the observed number of deaths and the expected number based on Australian population data was calculated using Fisher's exact method (Rothman, 1979).

48. A frequency table of cause of death will be useful when the number of observed deaths is large. The rates of death by cause can then be compared between the deployed and non-deployed groups. Cause of death can be grouped into external causes and disease using the International Classification of Diseases 10th version (ICD-10). External causes can be further grouped into intentional self-harm. Disease-related deaths can be further grouped into cancer versus other. Because of the anticipated small number of deaths, a list of cause of death has been presented (where

available), but frequency tables or cause specific comparisons have not been undertaken for the current Solomon Islands Mortality Study. These analyses may be appropriate in the future when a long follow-up time has occurred.

49. Life tables of mortality and Kaplan Meier plots of Survival were uninformative in this analysis due to the small number of deaths and the short follow-up period of the study to date.

3.6 Sample size

50. The Solomon Islands Mortality Study was performed on the full Nominal Roll and comparison group selected as opposed to a sample of deployed personnel to maximise power of statistical comparisons. Due to the comparatively short follow-up period of this mortality study and the young age distribution of the veterans and comparisons, the power of the study to detect statistically significant differences will be low. However, the power of this mortality study will increase as the follow-up period of the study increases.

3.7 Ethics

51. Ethical clearance was received from the Australian Institute of Health and Welfare (AIHW) Ethics Committee (protocol no 06/542), the University of Queensland Behavioural & Social Sciences Ethical Review Committee (UQBSSERC) (protocol no 2006000886) and the Australian Defence Human Research Ethics Committee (ADHREC) (protocol no 449/06), to conduct the Mortality and Cancer Incidence Studies.

4 Results

4.1 Characteristics of Sample

52. As expected, because of the method of selecting the comparison group, the demographic characteristics of the exposed and unexposed groups were similar.

53. The mean age on the 24 July 2003 was 29.7 years in both the veteran and the comparison groups. A breakdown of the age-sex distribution of the nominal roll and comparison group is presented in Table 2. Even though broad age cohorts (1937-1966, 1967-1976 and 1977-1988) were used in the frequency matching of the comparison group to the Nominal Roll, the age distribution is very similar between the two study groups.

Table 2: Age - sex distribution of Defence personnel in the Solomon Islands Mortality Study

Age	Solomon Islands veterans		Comparison group	
	Males n (%)	Females n (%)	Males n (%)	Females n (%)
15-24	1271 (35)	176 (40)	1256 (34)	169 (38)
25-34	1518 (41.2)	200 (46)	1497 (41)	201 (45)
35-44	662 (18)	53 (12)	697 (19)	59 (13)
45-54	176 (4.8)	9 (2.1)	191 (5.2)	13 (2.9)
55-64	23 (0.6)	1 (0.2)	9 (0.2)	0
65-74				
Total	3650	439	3650	442

54. The distribution of service and service type (Permanent or Reserve) was also similar between the nominal roll and comparison group (Table 3).

Table 3: Service and Service type distribution of Defence staff in the Solomon Islands mortality study

Service	Solomon Islands veterans		Comparison group	
	Regular/Permanent n (%)	Reserve n (%)	Regular/Permanent n (%)	Reserve n (%)
Navy	2260 (59)	188 (80)	2265 (59)	185 (79)
Army	984 (25.6)	35 (15)	987 (26)	34 (14.5)
RAAF	610 (16)	12 (5.1)	607 (16)	14 (6.0)
Total	3854	235	3859	233

4.2 Mortality

55. There were 16 deaths identified through the linkage with NDI data. One other death not identified through the NDI linkage was recorded on the PMKeyS database and verified using an internet search. Analyses were undertaken using the 16 deaths identified through the NDI linkage, as there may be differential bias in reporting and coding of death data on PMKeyS between the veteran and comparison groups. However relative risks and SMRs were also calculated for the 17 deaths and presented in the text as a sensitivity check.

56. Thirteen of the 16 deaths identified through the NDI linkage were identified as dead on the PMKeyS database. However, the three deaths that were not in the data extracted from PMKeyS were all recent deaths that occurred in late 2006 or early 2007. Therefore it is likely that some of these three deaths may have occurred after DSHP's most recent data request from PMKeyS. Only deaths that were notified through to the NDI before the follow-up date were included in the primary analysis.

57. Death rates in the Solomon Islands veteran group and the comparison group are presented in Table 5.

Table 5: Mortality from all causes in the Solomon Islands veteran group and the comparison group

	Number of persons	Person years	All cause deaths		Rate ratio (95% CI) SI veterans vs comparison group
			n	Rate per 1000 person years	
Solomon Islands veterans	4089	14099	7	0.50	1.02 (0.30, 3.40)
Comparison group	4092	14329	7	0.49	

58. There was no difference in the mortality rate in the Solomon Islands veteran group and the corresponding comparison group (Rate Ratio (RR) 1.02).

59. Information on cause of death was available from AIHW for all deaths registered before the end of 2005. Nine deaths were found on the NDI database within this interval and are presented in Table 6. One record of death in 2005 from the PMKeyS data was not on the NDI database. This participant who died in 2005 is not included in Table 6.

Table 6: Mortality by cause of death in the Solomon Islands Mortality Study for deaths registered before 31 December 2005

Cause of death	Solomon Islands Veteran	Comparison group
Ill defined and unknown causes of mortality R95-99	1	2
All external causes of mortality V01-Y89	3	3
Total	4	5

60. All deaths registered before 31 December 2005 were ill-defined (ICD10 R99) or due to external causes (V01-V89). These six external causes of death have not been broken down into more detailed categories (i.e. traffic accidents and intentional self harm) to avoid including potentially identifiable information.

61. The number of deaths from external causes in our study up to 31 December 2005 was compared to the rate of deaths from external causes expected in the general population over the same time period. Based on death rates from external causes in the Australian population 2003-2005 and the age distribution of our cohort, 11.6 deaths would be expected in the general population (5.7 and 5.9 in the veteran and comparison groups respectively). So the rates of external causes of death in our study

were lower than those seen in the general population in people of the same age. However, the difference in death rates from external causes in the Solomon Islands study and in the population is not significant and based on a small number of events.

62. The death rates observed in the general population were compared to the Solomon Islands veterans, the Solomon Islands comparison group and the veteran and comparison group combined. These results are presented in Table 7.

Table 7: Observed and expected total number of deaths 24 July 2003 to 24 January 2007

	Person-years	Observed deaths	Expected deaths	SMR	95% CI
SI veterans	14099	7	16.3	42.9	(17.2, 88.4)
SI controls	14329	7	16.4	42.7	(17.2, 88.0)
SI veterans and controls combined	28428	14	32.7	42.8	(23.4, 71.8)

SMR=Standardised Mortality Ratio

Expected deaths based on population rates for 2003-2005

63. The SMR of 42.9 indicates that there were fewer deaths in the Solomon Islands veteran group than would be expected in the Australian population. The rate observed in the veteran group was more than 50% lower than the rate expected in the general population. This result was statistically significant (95% CI (17.2, 88.4)).

64. There was a lower rate of all-cause mortality in the Solomon Islands Comparison group than would be expected in the Australian population (SMR 42.7 95% CI (17.2, 88.0)). This result was statistically significant.

65. The SMRs observed comparing the Solomon Islands veteran group and the comparison group with the general population were very similar (42.9 and 42.7 respectively).

66. The combined mortality rates of veterans and comparisons in the Solomon Islands Study was lower than the mortality rate expected in the general population. The mortality rate amongst ADF personnel was approximately half the rate observed in the general population (SMR 42.8 95% CI (23.4, 71.8)). This result was statistically significant at the 5% level.

67. Including the additional death identified from PMKeyS data and the additional deaths identified after the follow-up date by the NDI results in a relative risk for mortality of 1.16 95% CI (0.37, 3.76) for veterans relative to comparisons, and SMRs of 52.7 and 47.4 for the veteran and comparison samples respectively relative to the Australian population.

5 Discussion

68. The small number of deaths observed in this mortality analysis of Solomon Islands veterans was anticipated due to the age distribution of the participants and the relatively short follow-up period of the study.

69. No difference in the risk of all-cause mortality was found between the Solomon Islands veterans and the comparison group. However, this calculation was only based on a total of 14 deaths

70. It has been noted that the causes of death presented were not 'Chronic Disease' but 'External causes of Mortality' or from 'Ill-defined and unknown causes'. This pattern is consistent with the young age distribution of the cohorts studied, and the number of deaths from external causes was lower than the rate observed in the general population (difference not statistically significant).

71. Large mortality studies of UK (Macfarlane et al 2000) and US veterans (Kang et al 2001) of the First Gulf War have shown increased mortality of veterans from motor vehicle accidents. Currently the number of deaths in the Solomon Islands study is too small to perform a meaningful analysis of deaths from specific external causes. With increased follow-up and by pooling the results of the Near North Studies it may be possible to look at specific causes such as 'Transport accidents' and 'Intentional self harm' in more detail.

72. The statistically significant lower rate of deaths among Solomon Islands veterans compared to the Australian population was evident. The same pattern of lower mortality in the comparison group who did not deploy to the Solomon Islands compared to the Australian population was also observed. However, these results should be treated with caution because calculations are based on a small number of deaths.

73. It is possible that this is a genuine difference because, as discussed earlier, ADF personnel are generally fitter than the general population and hence can be expected to live longer, given similar levels of challenges in the longer-term environments of both groups. However shorter term gains in fitness might impact on risk of chronic illness, hence an effect on chronic-illness related mortality would be more likely detectable over a longer term of follow-up.

74. It is important to consider the following potential sources of bias in this and all future mortality studies.

- Australian Personnel are generally more mobile than the Australian population, and hence may be more likely to have an unregistered death because, for example, they died abroad
- The National Death Index may have failed to find real matches because of surname changes or misspellings on the project nominal roll or death register.

75. In the Solomon Islands Study the Nominal Roll was generated from two sources, ADFPAY and the PMKeyS database, and there is good confidence in the

coverage of this Nominal Roll. Therefore it is expected that the potential bias resulting from the completeness of the Solomon Islands Nominal Roll is minimal.

76. The largest differences between observed and expected deaths (Table 9) were in men aged 25 to 34. This difference supports either a bias due to a more mobile population or the healthy soldier effect.

77. It will be useful to see whether the same pattern of lower death rates in military personnel is seen in the Bougainville and East Timor mortality analyses.

78. Although the veteran and comparison groups are well balanced in terms of age, gender, service and service type, there may still be some potential confounders, some of which are flagged in points 78-79 below.

79. Another potential confounder is the health status (Medical classification) of those on the Solomon Islands nominal roll compared to the comparison group. Those on the Nominal Roll would have all been fit to deploy to the Solomon Islands at the time of their deployment. The comparison group were not required to be fit to deploy on the 24 July 2003. This is a potential confounder as the comparison group may be 'less healthy' and more susceptible to negative health outcomes than the group who deployed to the Solomon Islands.

80. ADF personnel who deployed to the Solomon Islands may have been more likely to be employed on multiple deployments than people who did not deploy to the Solomon Islands. If this is true and if there are also negative health outcomes associated with more than one deployment, it may be that the Solomon Islands veterans are at higher risk of adverse events due to other military operations pre- or post- Operation ANODE.

81. To assess the accuracy of the National Death Index it would be useful to keep a record of military deaths reported in the media and Defence websites and magazines. It is recommended that a protocol for checking possible deaths from the NDI is developed using the most relevant information and up-to-date sources. This way the accuracy of the NDI in matching deaths in a young and mobile population studied in similar analyses can be verified.

82. To detect a large hypothesised difference of 50% in the all cause mortality (RR 1.5) with 80% power, a total of 200 deaths are required (120 deaths in the Solomon Islands veterans and 80 deaths in the Solomon Islands comparison group). Based on death rates for Australian males (AIHW 2007) and assuming death rates remain at the 2005 level beyond 2005, 80 deaths in the comparison group may be achieved by 2016.

83. To detect a 30% increase in all cause mortality (RR 1.3) with 80% power, 460 deaths would need to have been observed over the study period (260 in the Solomon Islands veterans versus 200 in the SI comparisons). It is estimated that this number of deaths will be accrued by 2025.

84. Similarly to detect a 20% increase in mortality among the Solomon Islands veterans (RR 1.2) at 80% power, 880 events are required (480 in the Solomon Islands

veterans versus 400 in the SI comparisons). Based on the same assumptions 80% power may be achieved by including all deaths up to the end of 2033.

85. These calculations of the years when 80% power may be achieved are likely to be underestimates. The estimates are based on male death rates for all participants in the study. 11% of the study population are women, and the mortality for these is likely to be lower than that assumed. Population death rates have been falling over time as life expectancy increases and no adjustment was made for this in the calculations presented. In addition, the death rates of the personnel in the Solomon Islands mortality study are most probably going to be lower than the death rate in the Australian population due to the Healthy Soldier effect. For these reasons the anticipated time required to achieve 80% power should be interpreted cautiously.

86. It is also important to factor in the time lag between the events occurrence and when the data is available from AIHW. Presently for mortality studies this is a 2 year interval and for cancer incidence 4 years.

87. It would be possible to increase the power of the Solomon Islands Mortality Study by increasing the ratio of the non-exposed comparisons to exposed veterans to 2:1 for potential future analyses

88. Future studies should add to the data by including updated death and population statistics. The bias of not using updated data will be small in the short term, but may become large if, for example, the life expectancy of Australians continues to increase.

89. The above analysis of mortality can be repeated in future studies, and similarly applied to data of cancer incidence.

6 Summary, Conclusions and Recommendations

90. The Solomon Islands mortality analysis did not show a difference in all-cause mortality between the deployed and the non-deployed comparison group. However, ADF personnel in the Solomon Islands Study had a lower mortality level than can be expected in the general population.

91. It will be instructive to see whether the 'Healthy Soldier Effect', which may have been present in this analysis, is also observed in the Bougainville and East Timor studies.

92. The number of deaths identified through the NDI linkage was small, and it is recommended that the completeness and sensitivity of the NDI matching process of ADF personnel is investigated further to rule out possible bias due to deaths not being identified and included in analyses. Nevertheless the records of death identified through the NDI were broadly consistent with the records of death stored on the PMKeyS database.

93. The follow-up period of the Solomon Islands mortality analysis is the shortest of the three Near North Area of Influence Studies. However, it is possible to repeat this

mortality analysis at a future time point when the number of deaths will be greater. It is anticipated that the primary mortality analyses of the Bougainville and East Timor studies will contain more death data due to a longer follow-up period and larger nominal rolls and comparison groups. The increased follow-up of the Bougainville and East Timor studies will potentially allow other statistical analyses to be performed.

94. There is also the opportunity to compare the impact of different deployments on the mortality of ADF personnel, and to assess the impact of multiple deployments on the health of Defence personnel by combining the results of the Near North Studies.

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Cancer Incidence Study Report

Solomon Islands Health Study
Deliverable Item 2 (Phase 2)

Due Date: 28 September 2007



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26/06/07	V1.0	Interim Report (ACT, WA, NT, SA, NSW, TAS included, to be updated with QLD and VIC data)	
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Approvals

This document requires the following approvals:

Name	Position	Signature	Date	Version
A/Prof Susan Treloar	First Chief Investigator			
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Signed approval forms are filed in the Management section of the project file.

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DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 2 (Phase2)

Cancer Incidence Study Report

Date: 28 September 2007

Executive Summary

1. The Defence Deployed Solomon Islands Health Study is the first in a series of studies being conducted by the Centre for Military and Veterans' Health to investigate the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service to the Solomon Islands.
2. This deliverable has been updated to include in the recommendations of the Scientific Advisory Committee (SAC).
3. This report presents the cancer incidence component of the Solomon Islands Health Study. One of the main questions of interest in veterans' health is whether veterans are at an increased risk of cancer compared to their Australian contemporaries. Deployment may increase the risk of cancer in a number of ways. Exposure to known or unknown environmental toxins may lead to cancer and death. Differences in diet and in the prevalence of smoking and alcohol consumption whilst on deployment may also lead to an increased risk of cancer.
4. The aims of the study were:
 - To compare cancer incidence for veterans of Operation ANODE to a comparison group of Defence personnel who did not deploy as part of Operation ANODE.
 - To compare cancer incidence for veterans of Operation ANODE to the general Australian population
5. A Project Nominal Roll was generated from two sources of data: PMKeyS, the system used by the Department of Defence for all aspects of personnel management; and ADFPAY, which is the Australian Defence Force Pay System and is responsible for salary payment for Service personnel. Defence personnel deployed to the Solomon Islands as part of Operation ANODE between 24th July 2003 and 31st December 2005 were eligible for inclusion on the Nominal Roll. The comparison group was selected from Defence personnel who were serving at the start of Operation ANODE and were frequency matched to the deployed group on service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988).

6. The cancer incidence comparison was based on the entire Nominal Roll (n = 4089) and comparison group (n= 4092). The cancer incidence in each group was calculated as the total number of new first cancers divided by the total person-years of follow-up from the start of Operation ANODE (or enlistment if this occurred after commencement of the Operation) to time to death or end of the study (31 December 2003).
7. The linkage with the National Cancer Statistics Clearing House identified 1 cancer in the Solomon Islands veterans and 0 cancers in the non-deployed comparison group between the start of follow-up and 31 December 2003.
8. The Solomon Islands cancer incidence analysis did not show a difference in cancer between the deployed and the non-deployed comparison group. All comparisons were based on small numbers and lacked the statistical power to detect differences between groups.
9. The short follow-up period for the study population and the comparatively young age of those deployed meant that the power of the study was small and any differences in cancer were unlikely to be shown. Potential biases may have occurred because of difference in mobility, fitness, length of enlistment in the ADF and deployment history between the veteran and comparison samples.
10. This study has developed methods for similar studies of cancer incidence associated with military deployments. There is the opportunity for the results of this Solomon Islands report to be updated when follow-up period has increased to a level where the statistical power is adequate to make comparisons of cancer incidence. There is also the opportunity to compare the impact of different deployments on the cancer incidence of ADF personnel, and to assess the impact of multiple deployments on the health of Defence personnel by combining the results of the Near North Area of Influence Studies.

1 Introduction

1. The Defence Deployed Solomon Islands Health Study (hereafter referred to as the Solomon Islands Health Study) is the first in a series of studies that aim to research the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service overseas. It is being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).
2. This report presents the cancer incidence component of the Solomon Islands Health Study, hereafter to be entitled the Solomon Islands Cancer Incidence Study. One of the main questions of interest in veterans' health is whether veterans are at an increased risk of cancer compared to their Australian contemporaries. Deployment may increase the risk of cancer in a number of ways. Exposure to known or unknown environmental toxins may lead to cancer and death.
3. Deployment may increase certain behaviours and lifestyle factors such as smoking and alcohol consumption which can lead to an increased risk of cancer. A UK study of smoking rates of British armed forces in the second Gulf War indicated that the prevalence of smoking increased whilst on deployment (Boos et al, 2004).
4. In recent times ADF personnel have deployed on active service overseas in a variety of war-like and non war-like roles. Post deployment health concerns have followed wars since at least the United States Civil War (Hyams et al, 1996) and the Boer War (Jones et al, 2002).
5. In Australia there has been evidence of higher cancer incidence in both Korean and Vietnam Veterans, compared to the general population. Australian veterans of the Korean War have been found to have a significantly greater overall cancer risk than the Australian community, with an excess of between 13% and 23% (AIHW. Cancer Incidence Study: Australian veterans of the Korean War, 2003). Australian Vietnam veterans have also been found to have a significant elevated overall cancer incidence rate, 15% higher than expected compared to the Australian male population (Wilson et al, 2005).

1.1 Deployment Health Surveillance Program

6. The Centre for Military and Veterans' Health (CMVH) is a consortium of The University of Queensland, University of Adelaide and Charles Darwin University, which is dedicated to innovatively seeking solutions to military and veterans' health issues through research, education, e-health and public debate. CMVH is conducting a series of studies examining the long-term health issues of deployed Australian Defence personnel, as part of its Deployment Health Surveillance Program (DHSP). The program will look at the health of troops deployed to the Solomon Islands, Bougainville and East Timor.

7. The studies to be conducted by CMVH as part of the Deployment Health Surveillance Program aim to eventually develop a prospective, analytic system for longitudinal surveillance of health of ADF personnel who are deployed on specific operations. The core of the Deployment Health Surveillance Program is the formation of an integrated data system which will be established at the CMVH consortium of Universities. The Deployment Health Surveillance Program builds on previous and current national and international studies, and is a critical step in establishing best practice surveillance methodologies and providing a baseline for monitoring the future health of veterans of ADF operations to these regions.

1.2 The Solomon Islands Deployment

8. The Solomon Islands is a nation in Melanesia, east of Papua New Guinea, consisting of a scattered archipelago of 992 islands extending 1770 kilometres southeast from Bougainville. The population of approximately 538,000 (July 2005 estimate) inhabits 347 of these islands. There are six major islands or groups of islands with numerous small islands and atolls: The major islands are Guadalcanal, Malaita, Choiseul, Santa Isabel, New Georgia and San Cristobal (Aregheore, 2006; Central Intelligence Agency, 2006).

9. In 2003, the Solomon Islands was in a political and security crisis, as a result of long-standing ethnic conflicts. It had weak institutions, a corrupt government, criminalisation of politics, poor law and order, economic stagnation, social dislocation, a growing culture of violence, international neglect, collapse of government services, disillusioned populations, and a plentiful supply of guns. All this had paralysed the country's capital, stifled its economy, disrupted government, discouraged aid donors, and inflicted suffering and hardship on its people. The Solomon Islands had virtually ceased to function as an effective national entity.

10. The Australian Defence Force (ADF) deployed Operation ANODE (OP ANODE) to the Solomon Islands in 2003 as part of the Regional Assistance Mission to the Solomon Islands (RAMSI). The overall RAMSI undertaking is known as operation HELPEM FREN. Operation ANODE commenced on July 24th 2003 and is still underway.

11. Operation ANODE was classified as a non-warlike operation. This is defined as where there is a risk associated with the assigned tasks, where the application of force is limited to self-defence, and where casualties could occur but are not expected.

12. Although Operation ANODE was essentially a peacekeeping Operation, ADF personnel deployed to the Solomon Islands faced a wide variety of exposures which were potentially hazardous to their health and wellbeing. These included operational and occupational hazards such as trained and armed militia groups and unexploded ordnance (UXO), environmental hazards such as contaminated food and water and proliferation of disease vectors like mosquitoes, and psychological harm such as fear of being harmed and witnessing distressing events. These hazards may have contributed to adverse health outcomes in personnel deployed to the Solomon Islands.

2 Aims and Objectives

13. The purpose of the Solomon Islands Cancer Incidence Study is to determine whether deployment to the Solomon Islands as part of Operation ANODE was associated with increased cancer incidence. The specific aims of the Study are:

- To compare cancer incidence for veterans of Operation ANODE to a comparison group of Defence personnel who did not deploy as part of Operation ANODE.
- To compare cancer incidence for veterans of Operation ANODE to the general Australian population.

14. In order to address the above aims, the objectives of the Solomon Islands Cancer Incidence Study are:

- To formulate the methodology for making comparisons, specifically:
 - The process for matching files with the National Cancer Statistics Clearing House and the Victorian Cancer Registry.
 - The required statistical analysis
- To run the analysis for the veterans listed on the Solomon Islands Health Study Nominal Roll, and identify areas of possible improvement for future deployment health studies.
- To collect information on type of cancer and compare cancers from different causes between the comparison groups.

3 Methods

3.1 Study design

15. The Solomon Islands Cancer Incidence Study is a Cohort Study. The cancer incidence of veterans who deployed to the Solomon Islands was compared to that of a comparison group of Defence personnel who did not deploy as part of Operation ANODE, as well as to the general Australian population. Information on cancer incidence was obtained from linkage with the National Cancer Statistics Clearing House (NCSCH) held by the Australian Institute of Health and Welfare (AIHW) and the Victorian Cancer Registry. The AIHW is provided with data on cancer from all State and Territory Cancer Registries, with the exception of Victoria, as the Victorian Cancer Registry undertake their own record linkage. It is a legal requirement to register all cancers, except for non-melanocytic skin cancer, in Australia.

16. Comparison of cancer rates of veterans of Operation ANODE with the Australian population provides an estimate of the cancer incidence of the deployed group relative to the population; however it may result in systematic bias. The Healthy Worker Effect, which was first described in 1885 (Ogle, 1885), is an effect whereby individuals who are in the workforce are healthier than the average population: the “sicker” or “unhealthier” components of the population are unable to work. Thus comparison of cancer incidence for an occupational group relative to the

general Australian population may demonstrate the appearance of reduced cancer incidence in the group of workers. This phenomenon has been extended to the “Healthy Soldier Effect”, where, because of recruitment processes and enlistment requirements, members of the Australian Defence Force are “healthier” than other workers (Wen et al, 1983). More recently in relation to studies conducted in veterans of the first Gulf War, the “Healthy Warrior Effect” has been identified (Haley, 1998). This refers to the fact that Defence personnel who undertake operational deployments are required to be at the highest level of fitness, and have undergone another level of health screening beyond those not deployed.

17. Therefore for the Solomon Islands Cancer Incidence Study, comparisons were made between deployed personnel and a comparison group of Defence personnel who were not deployed to the Solomon Islands as part of Operation ANODE, as well as comparisons with the Australian population.

3.2 Study population

18. The list of Defence personnel deployed to the Solomon Islands as part of Operation ANODE who are eligible for inclusion in the Solomon Islands Health Study is termed the Solomon Islands Health Study Nominal Roll. Based on the pilot work undertaken as part of the DHSP, a procedure was developed for generation of the Solomon Islands Health Study Nominal Roll from Department of Defence data. This process involved the use of data from two sources: PMKeyS, the system used by the Department of Defence for all aspects of personnel management; and ADFPAY, which is the Australian Defence Force Pay System and is responsible for salary payment for Service personnel. A variety of other potential sources of data were identified and investigated, but were not considered relevant for generation of the Solomon Islands Nominal Roll. Individuals were included in the data files if they had been allocated a relevant code or descriptor indicating that they had deployed as part of Operation ANODE.

19. Defence personnel were eligible for inclusion on the Solomon Islands Health Study Nominal Roll if they deployed to the Solomon Islands as part of Operation ANODE between July 24, 2003 and December 31, 2005 (defined as the end of the study period). Individuals deployed as part of this Operation after December 31, 2005 were ineligible for inclusion. In order to be inclusive, individuals whose deployment start date was prior to July 24, 2003 were retained, as it is standard practice for some individuals to deploy early to prepare for the operation. Individuals were included on the Project Nominal Roll if they were identified in either PMKeyS or ADFPAY data as having been deployed as part of Operation ANODE.

20. The comparison group for the Solomon Islands Health Study includes Service personnel who were not deployed to the Solomon Islands as part of OP ANODE, but were potentially eligible for deployment. For scientific rigour and to reduce the effect of confounding as much as possible, it was important that the Solomon Islands Health Study comparison group was as similar to the deployed group as possible on all potential confounding factors except for deployment. To ensure this similarity, the

comparison group was selected to reflect the characteristics of the deployed group, using frequency matching.

21. Individuals were eligible for inclusion in the Solomon Islands Health Study Comparison Group if they had not deployed as part of OP ANODE, were not included on the Solomon Islands Health Study Nominal Roll, and were a member of a Defence Service on July 24, 2003. Comparison individuals were randomly selected from the PMKeyS database (after excluding individuals on the Solomon Islands Health Study Nominal Roll), and frequency matched to the veteran group on service (Navy, Army or Air Force), service type (Permanent or Reserve), sex and birth year (1937-1966, 1967-1976 or 1977-1988).

22. The Solomon Islands Health Study Nominal Roll included 4089 individuals and the comparison group included 4092 current or past Defence personnel. The number of veterans is slightly larger than that of the comparisons because, after generation of the Project Nominal Roll, duplicate records were found for three individuals.

23. More detailed information on the Solomon Islands Health Study Nominal Roll can be obtained in the Defence Deployed Solomon Islands Health Study Sample Generation Document (Deliverable 1 of Phase 2 of the Solomon Islands Health Study).

3.3 Data Collection

24. Details (full name, gender and date of birth) were extracted for individuals on the Solomon Islands Health Study Nominal Roll and the comparison group and were forwarded to AIHW for linkage with the National Cancer Statistics Clearing House (NCSCH).

25. The format of the data required by AIHW was the same as that required for linkage with the National Death Index (NDI). The format has been detailed in Annex 1. The results of the cancer incidence linkage with the NCSCH were to be given in de-identified form. For this reason it was necessary to supply AIHW with the study arm of each participant as an additional field.

26. After discussion with the Victorian Cancer Registry, AIHW were permitted to link the data supplied by DHSP with the cancer records from Victoria as well as the other Australian States and Territories. This ensured that the same cancers were not notified twice in two separate linkages.

27. At the time of finalisation of this report, information on cancer incidence by cause was available from AIHW for cancers registered up to 2003.

28. The receipt of NCSCH output from AIHW was managed through the recorded delivery of a zipped password protected file. The password for the file was sent separately by email. This was considered appropriate given the confidential nature of the information. Due to small numbers and because individual consent from each participant was not obtained, the results provided by AIHW were in de-identified,

tabular form. AIHW provided an output of the cancer linkage in an Excel file with the headings: group (study arm), sex, birth date range (5-year intervals), year of diagnosis and the International Classification of Disease summary code (ICD-10). The results were split by those diagnosed before the date of entry into the cohort and those diagnosed after this date.

3.4 Statistical Methods

29. This section outlines the statistical methods undertaken for the Solomon Islands Cancer Incidence Study.

30. Because the AIHW records were current up to the end of 2003, all participants were followed up from July 24, 2003 or from the date of enlistment to defence if the subject enlisted after this date. Follow-up continued up to December 31, 2003. Participants who died before December 31, 2003 were censored at date of death.

31. There are two main comparisons to the analysis of the cancer data: comparison of the cancers for veterans with the number of cancers amongst the comparison group of service personnel; and comparison with the expected cancer incidence based on Australian population data. Comparing observed cancer rates to the general Australian population may be biased because ADF personnel are generally fitter and healthier than the general population. This is called the “healthy soldier effect” and will bias true associations towards the null hypothesis of no effect (Haley, 1998). To somewhat overcome this problem the observed number of cancers can also be compared to a non-deployed comparison group.

32. Non-melanocytic skin cancers were not included in any of the comparisons presented since not all registries collect information on this type of cancer. These cancers are indexed as ‘C44 Other malignant neoplasms of skin’ in ICD-10.

3.4.1 Cancer incidence Relative to Comparison Group

33. Examining cancer incidence in the Solomon Islands Health Study veteran group relative to the comparison group involved firstly determining the risk of cancer in each group. This is defined as the number of cancers divided by the total person-years of follow-up for each group.

34. The cancer incidence analysis performed included the subjects first primary cancers diagnosed after entry into the study cohort. Patients were not censored at diagnosis of cancer because the exact date of diagnosis was not known. All participants who had a cancer before entry into the cohort were eligible for inclusion in the study and were included in the statistical analysis, but cancers diagnosed prior to the deployment start date were not included in the follow-up analyses.

35. Person-years are defined by the period of observation, and hence cover the time when the subject could have possibly been diagnosed with cancer. In this study an individual’s person-years of exposure begins on the 24 July 2003 or the persons

enlistment date into the ADF (whichever was later). Person years were counted up to the date of death or follow-up date (31 December 2003).

36. Relative risk was then calculated as the risk of cancer in the veteran group divided by the risk of cancer in the comparison group. Rate Ratios with associated 95% confidence intervals were obtained. Due to the short period of follow-up and the anticipated small number of cancers observed the confidence intervals were calculated using the 'exact' method using STATA (StataCorp, Texas).

3.4.2 Cancer Incidence Relative to the Australian Population

37. Comparison of cancer incidence in the study groups with the Australian population involves comparing the actual or observed number of cancers, with the number of cancers we would expect if the cancer rates were similar between the study sample and the population.

38. The expected number of cancers was based on population and cancer incidence data from the AIHW Cancer Cubes for the year 2003 (AIHW, 2007). The expected number of deaths in the population was calculated by multiplying the number of person years in each 5-year age and sex group for each calendar year by the mortality rate for that age / sex group and year.

39. The Standardised Incidence Ratio (SIR) was used to compare cancer rates in the veteran population to Australian norms. It is defined as (in each age group):

$$\text{SIR} = 100 \times (\text{Observed number of cancers} / \text{Expected number of cancers}).$$

40. An SIR equal to 100 indicates no difference between the observed and expected number of cancers. An overall SIR (across sex and all age groups) was calculated using the direct method (dos Santos Silva, 1999). Statistical p-values for the difference between the observed number of cancers and the expected number based on Australian population data were calculated using Fisher's exact method.

41. A frequency table of type of cancer will be useful when the number of observed cancers is large. The rates of different types of cancer can then be compared between the deployed and non-deployed groups.

3.5 Sample size

42. The Solomon Islands Cancer Incidence Study was performed on the full Nominal Roll and comparison group selected, as opposed to a sample of deployed personnel, to maximise power of statistical comparisons. Due to the comparatively short follow-up period of this Cancer Incidence Study and the young age distribution of the veterans and comparisons, the power of the study to detect statistically significant differences will be low. However, the power of this Cancer Incidence Study will increase as the follow-up period increases.

3.6 Ethics

43. Ethical clearance was received from the Australian Institute of Health and Welfare (AIHW) Ethics Committee (protocol no 06/542), the University of Queensland Behavioural & Social Sciences Ethical Review Committee (UQBSSERC) (protocol no 2006000886) and the Australian Defence Human Research Ethics Committee (ADHREC) (protocol no 449/06), to conduct the Mortality and Cancer Incidence Studies. Separate ethics approvals were gained from each of the State and Territory Cancer Registries.

4 Results

4.1 Characteristics of Sample

44. As expected, because of the method of selecting the comparison group, the demographic characteristics of the exposed and unexposed groups were similar.

45. The mean age on the 24 July 2003 was 29.7 years in both the veteran and the comparison groups. A breakdown of the age-sex distribution of the nominal roll and comparison group is presented in Table 1. Even though broad age cohorts (1937-1966, 1967-1976 and 1977-1988) were used in the frequency matching of the comparison group to the nominal roll, the age distribution is very similar between the two study groups.

Table 1: Age - sex distribution of Defence personnel in the Solomon Islands Cancer Incidence Study

Age	Solomon Islands veterans		Comparison group	
	Males n (%)	Females n (%)	Males n (%)	Females n (%)
15-24	1262 (35)	176 (40)	1256 (34)	169 (38)
25-34	1520 (42)	200 (46)	1497 (41)	201 (45)
35-44	666 (18)	52 (12)	697 (19)	59 (13)
45-54	178 (4.9)	10 (2.3)	191 (5.2)	13 (2.9)
55-64	24 (0.7)	1 (0.2)	9 (0.2)	0
65-74				
Total	3650	439	3650	442

46. The distribution of service and service type (Permanent or Reserve) was also similar between the nominal roll and comparison group (Table 2).

Table 2: Service and Service type distribution of Defence personnel in the Solomon Islands Cancer Incidence study

Service	Solomon Islands veterans		Comparison group	
	Regular/Permanent n (%)	Reserve n (%)	Regular/Permanent n (%)	Reserve n (%)
Navy	2260 (59)	188 (80)	2265 (59)	185 (79)
Army	984 (26)	35 (15)	987 (26)	34 (15)
RAAF	610 (16)	12 (5.1)	607 (16)	14 (6.0)
Total	3854	235	3859	233

4.2 Cancer Incidence

47. Twenty-one of the cancers identified through the linkage were diagnosed before 24 July 2003. This data on cancer diagnosis before the Solomon Islands deployment gives some indication of the baseline characteristics of the veteran and comparison groups. A breakdown of the cancers diagnosed before date of entry into the cohort is presented in Table 3.

Table 3: Baseline table of cancers diagnosed on or before July 24 2003.

Cancers	Veterans n = 4089	Comparison group n = 4092
Malignant melanoma of skin	11	10
Other malignant neoplasms	5	11
Total malignant neoplasms	16	21

48. In both the veteran and comparison groups, malignant melanoma of the skin was the most common cancer. Table 3 indicates that there were a similar number of malignant neoplasms in the comparison group and the veteran group in the period before deployment to the Solomon Islands. However, this comparison at baseline is based on small numbers of cancers. The other cancer sites were grouped into 'other malignant neoplasms' because there were insufficient events to compare the frequency of the specific sites.

49. Cancer incidence rates from date of entry into the study cohort in the veteran and comparison groups are presented in Table 4.

Table 4: Cancer (all types) in the Solomon Islands veterans and the comparison group

	Number of persons	Person years	All types of cancer	
			n	Rate per 1000 person years
Solomon Islands veterans	4089	1726.5 [#]	0	0
Comparison group	4092	1803.3	1	0.55

156 Solomon Islands veterans had an enlistment date after 31 December 2003. These people do not contribute any person-years in this table

50. Only one cancer was diagnosed in the study between July 24, 2003 and December 31, 2003. The comparison between the Solomon Islands veterans and the comparison group is non-informative because of the short follow-up time and the number of cancers observed.

51. The SIR of cancer incidence in the veteran and comparison groups combined compared to the general population was calculated. The short follow-up period of six months and the fact that this calculation is based a single observed cancer mean that no inferences may be drawn from this result. For this reason this measure has not been presented in this report.

5 Discussion

52. The small number of cancers observed in this cancer incidence analysis of Solomon Islands veterans was anticipated due to the age distribution of the participants and the short follow-up period of the study.

53. The incidence of cancer was not significantly higher in the comparison group than the veteran group in the pre-study period. Malignant melanoma of the skin was the most common cancer in both the veterans and the comparison group in cancers diagnosed prior to commencement of the Solomon Islands deployment.

54. The comparison of risk of cancer between the Solomon Islands veterans and the comparison group from July 24, 2003 to December 31, 2003 was uninformative as this calculation was only based on a total of one cancer.

55. The follow-up period of the Solomon Islands Cancer Incidence Study from July 24, 2003 to December 31, 2003 has not been sufficient to make any meaningful comparisons or draw any conclusions from the data. Because of the young age distribution of the population being studied, the cohort of veterans and comparisons would have to be followed up over an extended time interval for a study of this type to have adequate power.

56. The average age at entry for the Solomon Islands Study was 29.7 years. Typically cancer incidence for many sites of cancer increases with age, with many more cancers presenting in the age group 40 to 59 than between 20 to 39 years. The age distribution of the study population and the incidence rates of cancer sites of interest should be considered at the design phase of cancer incidence studies to determine the optimum length of follow-up.
57. The cancer incidence data available at any point in time is not as current as the mortality data. At the time of this report's preparation, cause of mortality information was available from AIHW for deaths registered in 2005, whilst cancer incidence data was current for cancers registered up to 2003. This lag in the availability of cancer incidence data should be taken into account in future cancer incidence studies.
58. The planned length of time needed to successfully obtain ethics approval from all of the State and Territory Cancer Registries must be factored into the timelines of projects for future cancer incidence studies. The Queensland Cancer Registry requires applications to be approved by Queensland Health, which significantly increases the time taken for ethical approval to be granted.
59. The process of submitting records to the Victorian Cancer Registry for linkage in addition to AIHW should also be factored into timelines and analysis plans. In this analysis AIHW were permitted to link the cohort with the VCR data held by AIHW. This was not considered a breach to the Victorian Cancer Registry access policy because the data was to be returned to DHSP in tabular de-identified form.
60. In the Solomon Islands Study the Nominal Roll was generated from two sources, ADFPAY and the PMKeyS database, and there is good confidence in the coverage of this Nominal Roll. Therefore it is expected that the potential bias resulting from the completeness of the Solomon Islands Nominal Roll is minimal.
61. A potential confounder is the health status (Medical classification) of those on the Solomon Islands Nominal Roll compared to the comparison group. Those on the Nominal Roll would have all been fit to deploy to the Solomon Islands at the time of their deployment. The comparison group were not required to be fit to deploy on the 24 July 2003. For this reason it may be possible that the comparison group are 'less healthy' and more susceptible to negative health outcomes than the group who deployed to the Solomon Islands.

6 Summary, Conclusions and Recommendations

62. The Solomon Islands cancer incidence analysis did not show a difference in cancer incidence between the deployed and the non-deployed comparison group. The follow-up period of six months from the start of the Solomon Islands deployment was insufficient to draw conclusions from the data.
63. The follow-up period of the Solomon Islands Cancer Incidence Study is the shortest of the three Near North Area of Influence Studies. However, it is possible to

repeat this cancer incidence analysis at a future time point when the number of cancers will be greater. It is anticipated that the primary cancer incidence analyses of the Bougainville and East Timor studies will contain more cancer data due to a longer follow-up period and larger nominal rolls and comparison groups. However because of the age distribution of the Near North Nominal Rolls, the number of cancers observed is still expected to be small.

64. To detect a large hypothesised difference of 50% (RR 1.5) in cancer incidence with 80% power, a total of 200 cancers are required (120 cancers in the Solomon Islands veterans and 80 cancers in the Solomon Islands comparison group). Based on cancer incidence rates for Australian males (AIHW 2007) and assuming death rates and cancer incidence rates stay at the 2005 and 2003 levels respectively, 80 cancers in the comparison group may be achieved by 2016.

65. To detect a 30% increase in cancer incidence (RR 1.3) with 80% power, 460 cancers would need to have been observed over the study period (260 events in the Solomon Islands veterans versus 200 events in the Solomon Islands comparisons). Using the same technique it is estimated that this number of cancers will be accrued by 2024.

66. Similarly to detect a 20% increase in cancer incidence among the Solomon Islands veterans (RR 1.2) at 80% power, a total of 880 events are required (480 in the Solomon Islands veterans versus 400 in the Solomon Islands comparisons). Based on the same assumptions 80% power may be achieved by including all cancers up to the end of 2031.

67. If cancer incidence rates fall for the age cohorts included in this study or the level of cancer incidence in the military is lower than that observed in the general population then both these calculations are likely to underestimate the time taken to achieve 80% power. For these reasons the anticipated time required to achieve 80% power should be interpreted cautiously.

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8 Annexes

8.1 Annex 1

Fields required by AIHW for cancer linkage with the NCSCCH

AIHW required the data to be in a particular format. This format required the following information in separate fields:

1. ID number
2. Surname
3. First given name
4. Second given name
5. Third given name
6. Sex
7. Date of birth
8. Date of last contact
9. State of residence at last contact
10. Date of death if known
11. Study arm (Veteran or Comparison)

AIHW required all names in UPPER CASE and all dates in the format YYYYMMDD. The date of last contact for all participants was set as 24 July 2003.



Completion of Defence Owned Data Collection

Solomon Islands Health Study

Deliverable Item 4 (Phase 2)

30 November 2007



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Document Administration

Document Location

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Approvals

This document requires the following approvals:

Name	Position	Signature	Date	Version
Prof Cate D'Este	First Chief Investigator			
A/Prof Susan Treloar	Head, Deployment Health Surveillance Program			
Prof Annette Dobson	Chair Scientific Research Team			
Prof Tony McMichael	Scientific Advisory Committee			

Signed approval forms are filed in the Management section of the project file.

Distribution

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Scientific Research Team		
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DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 4 (Phase2)

Complete Defence Owned Data Collection Stage

Due Date: 30 November 2007

Executive Summary

1. This report describes the Defence Owned Data collection stage of the Solomon Islands Health Study. Two types of Defence Owned Data were collected: the Defence Health Data, which were extracted from medical records, and Defence Psychology Data, which were sourced from the electronic files managed by the Psychology Research and Technology Group (PRTG).
2. For Defence Health Data, selected health assessment documents were obtained from the Central Medical Records (CMR). CMR paper records were requested for each of the 1000 individuals in the sample. For those in the sample who had deployed to the Solomon Islands, additional deployment health records were collected. The assessment date and form type were documented for each of the forms to assess comprehensiveness of the files.
3. The range and availability of health assessment forms in the CMRs is reasonable, with approximately 90% of collected CMRs having relevant Annual Health Assessments (AHA). In contrast, the inclusion of forms relating to deployment on OP ANODE among Solomon Islands veterans is only between 21% and 36%.
4. CMVH has planned to use Unit Medical Records (UMR) for future studies. For the current study CMVH was advised to collect the UMRs for RAAF participants. This proved impractical. Consequently, there are concerns about the future feasibility of accessing the UMRs.
5. Psychological screening tests routinely conducted by Defence for those who deploy include the Return to Australia Psychological Screen (RtAPS) and Post Operational Psychology Screen (POPS). The PRTG is providing individual record data for participants who have consented to linkage, not for all individuals in the sample. The first 182 consent forms were provided to PRTG and the data were supplied promptly. The balance of consent forms will be submitted when final consent data are entered.
6. Initial findings suggest some inherent problems with the availability of electronically stored RtAPS and POPS data for each participant. Only 67% of consenting participants had RtAPS data and only 26% had POPS data.
7. Any change in future approaches to collection of Defence Owned Health and Psychology Data will be based on evidence from data analysis from this study. Questions of cost-benefit, feasibility and logistics will be addressed once the completeness and value of each data item and form is assessed.

1. Introduction

1. The Defence Deployed Solomon Islands Health Study (hereafter referred to as the Solomon Islands Health Study) is the first in a series of studies that aim to assess the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service overseas. It is being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).

2. The objective of the Solomon Islands Health Study is to conduct a cross-sectional health study on personnel who deployed on OP ANODE between July 24, 2003 and December 31, 2005 and an appropriate comparison group.

3. The Solomon Islands Health Study includes data gathered from mortality and cancer incidence registries, a comprehensive self-reported health status questionnaire, a deployment experiences questionnaire, and health and psychological records retained by the ADF. The Solomon Islands Health Study is part of a health surveillance system which will provide comprehensive and longitudinal monitoring of any links between deployment and the subsequent development of adverse health effects.

4. A representative sample of 500 personnel who deployed on OP ANODE and a comparison group (matched for key demographic characteristics) of 500 personnel who were in Defence at the time but who did not deploy were selected for the study.

5. This report presents the collection of the Defence Owned Data for the Solomon Islands Health Study and reports on the availability of various types of data; not on data completeness or quality. The Defence Owned Data includes the collection of Defence Health Data and Defence Psychological Data. The report does not provide results of any analysis of the Defence Owned Data; this will be the subject of a further report.

2. Methods of Data Collection

6. Two types of Defence Owned Data were collected: the Defence Health Data, which were extracted from medical records, and Defence Psychology Data, which were sourced from the electronic files managed by the Psychology Research and Technology Group (PRTG). The methods of collection for each type of data are described separately. In the study consent form, participants are asked to provide separate consent for each of the three components of the study: self report data, Defence Health Data and Defence Psychology Data.

2.1. Defence Health Data

7. Defence routinely conducts and documents various health assessment activities for individuals. Selected health assessment documents were obtained from the Central Medical Records (CMR) for individuals in the Solomon Islands Health Study. These documents were.

8.
 - a. Annual Health Assessment (AHA) (AD146) (Annex A) – conducted annually ;
 - b. Five Yearly Comprehensive Preventive Health Examination (CPHE) (AD147) (Annex B) – a more detailed assessment which replaces the AHA every 5 years ;
 - c. Medical Board (MB) (PM005, PM085, PM128) – similar to and predating the AHA (Annex C);
 - d. Specialist Employment Stream Annual Health Assessment (SESAHA) (AD146-1) – an AHA for those in specialist categories such as divers etc (Annex D);
 - e. Pre-Deployment Medical Checklist (AD359) (Annex E);
 - f. Post-Deployment Health Screen (AD369) (Annex F); and,
 - g. Health/Medical Insert Slips (AD367) (Annex G).

9. The CMR was requested for each of the 1000 individuals selected for the sample (including 5 individuals later found to have died). The most recent CPHE and AHA (or SESAHA) was collected for each individual. For those in the sample who had deployed to the Solomon Islands, the Pre-Deployment Medical Checklist, Health Insert Slip and Post-Deployment Health Screen forms for OP ANODE were also collected. In addition, the assessment date and form type for each of the forms listed at a-g above were documented so that the comprehensiveness of the CMR could be assessed.

10. Army and Navy CMRs were collected from their storage locations in Melbourne and Canberra, respectively. CMRs were delivered to CMVH via couriers in batches of between 25 and 100 dependent upon staffing, couriers and turnaround times. All records were released into the custody of a senior medical officer at CMVH, either COL Len

Brennan (Chief of Operations till July 2007) or LTCOL Peter Nasveld (Research Manager / Acting Chief of Operations from July 2007). While the CMRs were in the custody of CMVH they were either stored in locked cabinets in secure rooms or were under the supervision of a CMVH staff member who held appropriate level clearances.

11. Two hundred and forty eight Navy CMRs, 600 Army CMRs and 14 RAAF CMRs were requested from the Central Medical Records storage facilities. CMRs were unavailable for four Navy participants and 58 Army participants. Delivery of the available CMRs to CMVH was completed in early October 2007.

12. RAAF CMRs are currently being transferred from paper to electronic based records. Consequently, their collection has been more complex. Initially, CMVH was advised to seek the Defence Health Data from RAAF via the participants' Unit Medical Record (UMR), as the CMRs would be unavailable during their transfer to electronic form. However, there was reluctance by the RAAF to release the UMRs into CMVH's custody. Based on this information, renegotiation took place with the members of the RAAF Health Records Recovery Project and in mid November 2007 collection commenced. One hundred and thirty eight files have been requested and the first 'batch' of these has been received.

13. At CMVH relevant forms were located within the CMR, de-identified and provided with a specific study number generated for Defence Health Data. This number was different from the identification numbers used for self-reported questionnaire data and for the psychology data, but with consent, linkable to these sources using a key held at CMVH. The de-identified form was photographed and saved as a PDF file. The Standard Operating Procedure (SOP) detailing de-identification, form capture and form naming is included at Annex H.

14. All forms listed at paragraph 8 a-g contained in the file were recorded on the Summary Sheet. An example of a Summary Sheet is included at Annex I. The Summary Sheet also recorded when a CMR held no relevant forms, thus documenting that the CMR had been reviewed. The details recorded on the Summary Sheet and the forms digitally collected were entered in a database and various checks conducted to ensure the validity and accuracy of the form capture process.

15. Casual staff were employed to extract and photograph the relevant forms from the CMRs. All those employed for this task had completed a course at The University of Queensland in medical ethics. Additionally, all staff received extensive briefings on the particular nature of this medical-in-confidence data, the importance of confidentiality, signed a confidentiality agreement (Annex J), and were under supervision of CMVH staff holding security clearances while working with the CMRs.

16. Collected PDF files were transferred to the Data Management Analysis Centre (DMAC) at the University of Adelaide using secure transfer processes: either personal delivery or via registered post person-to-person.

17. DMAC entered the de-identified data from the forms into a database specifically constructed for the Defence Health Data in the DHSP studies. This database was used previously for the InterFET pilot project. Data entry commenced in August and was completed in November.

18. These processes and those described below were approved by the Australian Defence Human Research Ethics Committee (See Annex K), University of Queensland Behavioural and Social Sciences Ethical Review Committee and DVA Human Research Ethics Committee.

2.2. Defence Psychology Data

19. DHSP's research protocol includes the collection of psychological screening tests routinely conducted by Defence for those who deploy on operations. Specifically, this includes the Return to Australia Psychological Screen (RtAPS) completed on leaving theatre along with individual interviews and Post Operational Psychology Screen (POPS) completed six months after return from theatre.

20. Psychological Research and Technology Group (PRTG), as part of the Defence Health Services Division (DHSD), are the custodians of the electronic database containing the RtAPS and POPS data. For the Solomon Islands Health Study, a process has been established for the management and transfer of the relevant RtAPS and POPS data (See Annex L).

21. PRTG will provide to DHSP the RtAPS and POPS data for those participants who specifically consented to the linkage of their RtAPS and POPS with their self-reported data. For participants who have not provided explicit consent, including those who were not able to be contacted for this study, PRTG has agreed to conduct specified analyses for DHSP.

22. Data collected from PRTG are de-identified and assigned a unique study number that is different from both the Defence Health Data and the self-reported data study numbers, but with consent linkable to these records.

3. Results

3.1. Defence Health Records

3.1.1. Health Assessment forms

23. Table 1 shows that the majority of CMRs requested were able to be found and provided. The RAAF CMRs retrieved are those for ex-serving RAAF personnel, which were not undergoing transfer to electronic format.

24. CMVH is currently collecting the remaining RAAF medical records from the RAAF Health Records Recovery Project and the finalised tables for these data will be provided as soon as possible.

25. It is clear from Table 1 that with the exception of RAAF, Army reservists were the least likely to have a CMR available for review. CMVH was informed when a record was unavailable for review but no explanation was provided.

Table 1: Records requested and available

Service	CMRs	Regular	Reserve	Total
Army	Requested	556	44	600
	Available	516 (94%)	27 (61%)	543 (91%)
Navy	Requested	242	6	248
	Available	238 (98%)	6 (100 %)	244 (98%)
RAAF	Requested	150	2	152
	Available	14 ^a (9.3%)	0 (0.0%)	14 (9.2%)
Total (All Services)	Requested	948	52	1000
	Available	768 (81%)	33 (64%)	801 (80%)

a. See paragraphs 12 and 24

CMR – Central Medical Record

26. Table 2 shows that the availability of CMRs was similar for the veterans of the Solomon Islands deployment and those in the comparison group.

Table 2: CMRs available by Veteran and Comparison Group

	Army	Navy	RAAF	Total
Veteran	276	121	3	400
Comparison	267	123	11	401
Total	543	244	14	801

27. Table 3 shows the Health Assessment forms that were available from the CMRs. The majority of Defence members had had an AHA and/or a CPHE or its equivalent.

28. Navy personnel were more likely to have had both an AHA and/or a CPHE than their Army counterparts. Given the paucity of data for RAAF currently, similar comparisons cannot be made. In total there were 18 files (or 2% of those reviewed) in which there were no relevant health assessment forms.

Table 3: Health forms collected

	CMR Available	AHA or SESAHA in CMR (%)	CPHE in CMR (%)
Army	543	497 (92%)	484 (89%)
Navy	244	233 (96 %)	222 (91%)
RAAF	14	10 (71%)	11 (79 %)
Total	801	740 (92%)	717 (90%)

CMR – Central Medical Record; AHA – Annual Health Assessment; SESAHA – Specialist Employment Stream Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination

29. ADF personnel deploying on operations are expected to complete an AHA prior to departure. Accordingly, it is important to ascertain whether veterans of the Solomon Islands deployment had completed the expected health assessments. This information is contained in Table 4 below. Almost all individuals’ files included at least one appropriate health assessment form. However, if the record is not available it is not possible to ascertain if a Pre-Deployment health assessment was not completed or if it was not placed on the CMR. Additionally the data in the table below do not show whether or not the health screen was conducted close to the date of deployment; assessment is not possible at this time.

Table 4: Health forms collected for Army and Navy veterans of the Solomon Islands deployment

	Army n = 276	Navy n = 121
At least one AHA, SESAHA or CPHE in CMR (%)	267 (97%)	121 (100%)

CMR – Central Medical Record; AHA – Annual Health Assessment; SESAHA – Specialist Employment Stream Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination

30. CMVH collected the most recent AHA, or equivalent, from each CMR. One criterion for entry into the Solomon Islands Health Study was that the participant must have been a serving member on the 24th July, 2003. Table 5 details the year of the most recent AHA (or equivalent) in the CMR by service. From this table it is clear that some serving members do not necessarily have regular health assessments. All personnel in the study were serving in 2003 and the majority continue to serve.

Table 5: Most recent Health Assessment (AHA / SESAHA / CPHE/ or MB)

	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	Total
Army	118	220	95	52	34	1	4	2	0	1	527
Navy	86	101	24	22	9	1	0	0	0	0	243
RAAF	0	3	4	2	3	1	0	0	0	0	13
Total	204	324	123	76	46	3	4	2	0	1	783

CMR – Central Medical Record; AHA – Annual Health Assessment; SESAHA – Specialist Employment Stream Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination; MB – Medical Board

31. Table 6 provides a summary of those who are still serving and have either an AHA and/or a CPHE in their CMR dated after January 2006. As collection of CMRs commenced in July 2007, time is needed for forms to be filed, and since serving members may have health assessments at a variety of times throughout the year, an assessment was made that evaluating this from January 2006 allowed sufficient time to appraise the current level of health assessments. The data for RAAF are not currently included.

32. It appears that Army personnel do not receive the same level of health assessments as their Naval counterparts. The Navy percentage over 100% indicates that at least two Naval members had both an AHA and a CPHE in their file dated after January 2006.

Table 6: Most recent AHA and most recent CPHE by service from January 2006 onwards

	AHA	CPHE	Total records	N still serving	% serving with records
Army	234	168	402	461	87
Navy	129	93	222	218	101
Total	363	261	624	679	92

NB: the calculated number of personnel in Army and Navy who are still serving is based upon data received from PMKeyS and whose CMR was reviewed.

AHA – Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination

3.1.2. Pre and Post Deployment Forms

33. While most members of Defence had at least some health assessment forms in their CMR, the same was not true of pre- and post-deployment forms. For each deployed member there should be a Pre-Deployment Medical Checklist, Health Insert Slip and Post-Deployment Health Screen filed in their CMR. From Table 7 below it is clear that this did not happen. The proportion of participants who had all three forms on file is lower again.

34. It is unclear from the data available whether these health screens were not conducted or not filed. Given that the Solomon Islands Health Study examines deployment on OP ANODE until 2005, it may be assumed that there has been sufficient time for the forms to be filed in the CMR.

Table 7: OP ANODE Deployment Forms

	Number Deployed (with CMR reviewed)	Pre-Deployment Form	Health Insert	Post- Deployment Form
Army	276	78 (28%)	68 (25%)	87 (32%)
Navy	121	58 (48%)	16 (13%)	53 (44%)
RAAF	3	2 (67%)	1 (33%)	2 (33%)
Total	400	138 (35%)	85 (21%)	142 (36%)

CMR – Central Medical Record; OP ANODE – Operation Anode

3.2 Defence Health Data availability by type of form

35. Table 8 describes the total number of health assessment forms (as described in paragraph 8 a-g) available from the 801 CMRs that were reviewed.

36. As would be expected there are very few SESAHA's, as there is a relatively smaller number of Defence Force members serving in roles requiring this more extensive screening.

Table 8: Total number of health assessment forms found in the CMRs

	AHA	CPHE	SESAHA	MB	Total
Army	1291	782	30	380	2495
Navy	756	313	66	4	1148
RAAF	23	17	1	0	42
Total	2047	1095	96	384	3643

CMR – Central Medical Record; AHA – Annual Health Assessment; SESAHA – Specialist Employment Stream Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination; MB – Medical Board

37. Table 9 details the average numbers of each type of form per person. The number of each type of form ranged from 0-7 (AHA), 0-8 (CPHE), 0-4 (SESAHA) and 0-5 (MB). The numbers of each form per person is not an indicator of the availability of appropriate forms in the CMRs as it does not take into account the length of service of each individual. However this measure provides a guide for planning the logistics of data extraction from the CMRs for future projects. The numbers of SESAHA and MB forms are very low because the number of participants who would have these forms is expected to be relatively low.

Table 9: Average number of AHA / CPHE / SESAHA / MB per person*

	Number of CMRs reviewed	AHA	CPHE	SESAHA	MB
Army	543	2.37	1.44	0.06	0.69
Navy	244	3.09	1.28	0.27	0.016
RAAF	14	1.64	1.21	0.07	0
Total	801	2.55	1.37	0.12	0.48

CMR – Central Medical Record; AHA – Annual Health Assessment; SESAHA – Specialist Employment Stream Annual Health Assessment; CPHE – Comprehensive Preventative Health Examination; MB – Medical Board

* The denominator of person-years rather than person-years explains the low averages, especially relevant to SESAHA

38. Table 10 describes the total number of deployment-related health forms for any deployment found in the 801 CMRs reviewed. As details of operations each participant has been deployed on are not known, it is not possible to know how many forms should have been available in any particular CMR.

Table 10: All Operation forms

	Number of CMRs reviewed	Pre-Deployment Form	Health Insert	Post- Deployment Form
Army	543	273	193	184
Navy	244	88	44	76
RAAF	14	10	1	1
Total	801	371	238	261

CMR – Central Medical Record

39. Table 11 below describes the frequency of each form type. As data on the number of operations a participant has been deployed is not available these measures are not an indicator of the completeness of the CMR. However, as for the data in Table 9 they provide a volume indicator useful for planning purposes.

Table 11: Average number of deployment related forms for all Operations per person

	Number of CMRs reviewed	Pre-Deployment Form	Health Insert	Post- Deployment Form
Army	543	0.50	0.36	0.34
Navy	244	0.36	0.18	0.31
RAAF	14	0.71	0.07	0.07
Total	801	0.46	0.30	0.33

CMR – Central Medical Record

3.3 Defence Psychology Data

40. The tables below summarise the Defence Psychology Data collected to date. The collection of the psychology data cannot be completed until after the closure of the self-report component of the Solomon Islands Health Study, when the collected consent forms have been scanned, analysed, supplied to PRTG and the data returned.

41. The first group of consent forms for participants who had agreed to the linkage of their psychology data were collated at the end of September 2007 and sent to PRTG. At this time approximately 249 individuals had participated in the study and 182 of those had consented to the linkage of their psychology data, a consent rate of 73% for linkage. However, this percentage may not reflect the final figures, as at this time it was not possible to complete the consent form online, and occasionally there were lag times between participation and receipt of consent.

42. PRTG provided RtAPS and POPS data to CMVH on 16 November for all deployments. Table 12 shows the number of people in the sample that had no RtAPS or POPS data available for any deployment. While it is plausible that those in the comparison sample have not deployed on any operation and therefore would not be expected to have these data, all those who deployed to the Solomon Islands should have received psychological screens upon their return.

Table 12: Proportion of consenting participants with no psychological screening data available

	Consents	No RtAPS available (any deployment)	No POPS available (any deployment)
SI Veterans	97	18 (19%)	63 (65%)
SI Comparisons	85	53 (62%)	69 (81%)

RtAPS – Return to Australia Psychological Screen; POPS – Post Operational Psychology Screen

43. The RtAPS total of 71 in Table 13 includes four people who had two RtAPS assessments following different deployments on Operation ANODE and one person who had three ANODE RtAPS assessments.

Table 13: Frequency of psychology assessments for OP ANODE and other operations among the consenting Solomon Islands veterans and comparison group

	Consents	RtAPS records	POPS records
SI Veterans OP ANODE	97	71	25
SI Veterans other operations	97	29*	9^
SI Comparisons other operations	85	41#	16

* Based on 13 people

Based on 32 people

^ Based on 6 people

RtAPS – Return to Australia Psychological Screen; POPS – Post Operational Psychology Screen

44. When these multiple RtAPS are taken into account RtAPS was obtained for 65 (67%) of the 97 consenting participants who deployed to the Solomon Islands. ANODE POPS data were received for 25 of the 97 consents supplied (26%). It is unclear from the data available whether these health screens were not conducted or were conducted but the data has not yet been entered onto the electronic data base.

45. While other data are available for the sample, as described in Table 13, we do not have figures on how many operations each individual had deployed on and therefore what would be a reasonable expectation for the number of assessments available.

46. It has been agreed that analysed aggregate data on Solomon Islands veterans who did not consent to access to the psychological screens will be provided by PRTG at the request of CMVH. This request will be made following the analysis of the data for those who have consented.

4. Discussion

47. The comprehensiveness and availability of health assessment forms in the CMRs are reasonable. During the data analysis phase of the project, the completeness of the data contained within the forms will be evaluated.

48. In contrast, the availability of forms relating to deployment in the CMRs borders on poor. Less than 40% of those who deployed to the Solomon Islands had a Post-Deployment Health Screen in their CMR. This particular form includes a list of hazards deployed individuals had been exposed to and is anticipated to comprise key data for this project and for future projects. The Pre-Deployment Medical Checklists are similarly unavailable.

49. CMVH has planned to use Unit Medical Records (UMRs) for future studies based on advice that the UMRs are more comprehensive and include vaccination records. For the current study the RAAF CMRs were originally not available and CMVH was

advised to use the UMR; however, this was not practical. We are therefore concerned about the feasibility of the use of the UMR for future studies.

50. The collection of the RtAPS and POPS psychological screens is not yet complete. However, initial data suggest that there are some inherent problems with the availability of these data.

5. Evaluation of Defence Owned Data Collection

51. Analysis of the Solomon Islands Defence Health Data will inform decisions about which types of forms, the time frame for collection and which data items from each form should be extracted from medical records in future deployment health studies.

52. Likewise, analysis of the psychological screening data for the Solomon Islands Health Study will inform the approach to analysis of future deployment studies.

6. Rationale for changes to future study protocols

53. Any change in future approaches to collection of Defence Owned Health and Psychology Data will be based on evidence from data analysis from this study. Questions of cost-benefit, feasibility and logistics will also be addressed once the value of each data item and form is assessed.

7. Annexes

Annex A: Annual Health Assessment

Annex B: Comprehensive Personal Health Examination

Annex C: Medical Board

Annex D: Specialist Employment Stream Annual Health Assessment

Annex E: Pre-Deployment Medical Checklist

Annex F: Post-Deployment Health Screen

Annex G: Health Insert Slip

Annex H: Standard Operating Procedures (SOPs)

Annex I: Summary Sheet

Annex J: Confidentiality Agreement

Annex K: Ethics Approval

Annex L: Letter to CDRE Walker (psychology data)

Annex M: Letter of Response from CDRE Walker (psychology data)



Completed Self Reported Data Collection Stage

Solomon Islands Health Study

Deliverable Item 3 (Phase 2)

30 November 2007



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Approvals

This document requires the following approvals:

Name	Position	Signature	Date	Version
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Signed approval forms are filed in the Management section of the project file.

Distribution

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DEFENCE DEPLOYED SOLOMON ISLANDS HEALTH STUDY

Deliverable Item 3 (Phase2)

Completed Self Reported Data Collection Stage

Due Date: 30 November 2007

Extract from Statement of Works - Solomon Islands Health Study

Deliverable Item 3 - Completed Self Reported Data Collection Stage

Due – 30 November 2007

Self reported data will be collected through a two stage process:

- a. Self report questionnaire Stage 1 contact will provide selected individuals with:
 1. invitation to participate;
 2. study background and information;
 3. study consent form;
 4. letter of support from CDF and/or Repatriation Commissioner;
 5. preferred mode of completion of Study Questionnaire; (Internet, mail, telephone interview or face-to-face); and
 6. section requesting specification of the individual's deployment history.
- b. Self report questionnaire Stage 2 contact will provide participants with:
 1. study questionnaires relevant to the deployments specified in Stage 1; and
 2. study questionnaire in their preferred mode of delivery.

Executive Summary

1. The Defence Deployed Solomon Islands Health Study invited a random sample of Australian Defence Force serving and ex-serving members who had deployed on OP ANODE, plus a frequency-matched comparison group, to complete self-report questionnaires.
2. Self-report data were collected between late March and early November 2007. A total of 995 individuals were invited to complete a choice of paper, online or telephone questionnaires. After 5.5 months of mail and telephone follow-up a participation rate of 44% (436/995) was obtained. Individuals who did not respond and were not contactable were retained in the denominator for calculating this rate.
3. The participation rate in the Solomon Islands veterans was similar to that in the comparison group. The participation rate among women was noticeably higher than for men. There was also a clear trend of increasing participation rate with increasing age. The participation rate increased from 35% in the 20-29 age group, to 47% in those aged 30-39 and to 58% in the over 40s. Although the participation rate in the Army and Navy was similar (43% and 42% respectively), the percentage of RAAF members in the sample who participated was higher at 52%. The participation rate among those who had left the ADF was far lower than those currently serving (26% versus 46%). The recruitment of ex-serving personnel represents a significant challenge in all future studies. Permanent members of the Defence force had a participation rate 10% higher than the Reserves. There was variation in participation rates between States.
4. Considerable effort was involved in collecting the self-report questionnaire data. Over half (55%) of all questionnaires were collected as a direct result of telephone follow-up. Refusals were most likely to be registered at the first telephone contact. The second round of follow-up was important in collecting outstanding questionnaires and was beneficial in reducing potential differences between participants and non-participants, with regard to factors such as SI deployment status, age, gender, ADF service arm and ADF regular/reserve employee status.
5. The online questionnaire proved to be a popular, convenient and ultimately the most cost effective delivery mode, used by approximately half of all participants. The one drawback was that participants tended to overlook the return of their paper consent/contact forms, which then had to be followed up by telephone.
6. Locating uncontactable individuals (around 37% of the sample) was attempted via PMKeyS, the publicly available Australian Electoral Roll and the Department of Veterans' Affairs. Approximately 50% of these remained uncontactable.
7. Most participants (around 70%) consented to record linkage with Defence medical records and to linkage with psychology record data.
8. Lessons learnt are being incorporated into the subsequent Defence Deployed East Timor and Bougainville Health Studies.

1. Introduction

1. The Defence Deployed Solomon Islands Health Study (hereafter referred to as the Solomon Islands Health Study) is the first in a series of studies that aim to assess the health and well-being of Australian Defence Force (ADF) veterans who have deployed on active service overseas. It is being conducted by the Centre for Military and Veterans' Health (CMVH) as part of the Deployment Health Surveillance Program (DHSP).
2. The objective of the Solomon Islands Health Study is to conduct a cross-sectional health study on personnel who deployed on OP ANODE between July 24, 2003 and December 31, 2005 and an appropriate comparison group.
3. The Solomon Islands Health Study includes data gathered from mortality and cancer incidence registries, a comprehensive self-reported health status questionnaire, a deployment experiences questionnaire, and health and psychology records retained by the ADF. The Solomon Islands Health Study is part of a health surveillance system which will provide comprehensive and longitudinal monitoring of any links between deployment and the subsequent development of adverse health effects.
4. This document reports on the process of collection of self-report data for the Solomon Islands Health Study. Study response rates and participant characteristics are presented; however the report does not provide results of any analysis of the self-reported data; this will be the subject of a further report.
5. For the purposes of this report, “**response/respondent**” refers to individuals who replied to the study invitation and includes individuals who refused to participate, while “**participation/participant**”, refers only to those individuals who provided self-reported questionnaire data.

2. Methods of Data Collection

6. The Solomon Islands Health Study Nominal Roll included 4089 individuals who had deployed to the Solomon Islands as part of Operation ANODE (OP ANODE) between July 24, 2003 and December 31, 2005. A comparison group of 4092 Defence personnel who had not deployed as part of OP ANODE, frequency matched to the veteran group on sex, age group, service and service type were randomly selected from PMKeyS (details of the generation of the Nominal Roll and comparison group are provided in the Solomon Islands Health Study Sample Generation Report, Deliverable Item 1, Phase 2). Due to budgetary constraints the Solomon Islands Health Study was limited to 500 veteran and 500 comparison group individuals, obtained from the larger groups using stratified random sampling.

7. Prior to any contact attempts by the study team, details of the 1000 individuals selected to be included in the study sample were linked to the National Death Index, and a list of Defence personnel known to have died, and any individuals identified as having died were excluded from the study. All remaining individuals in the study sample were contacted by mail and invited to participate in the Solomon Islands Health Study. A Dillman methodology was employed for participant approach. This methodology is common in health research and has been used in most international studies of deployment health. The method improves the relationship between the respondent and researchers through varied means. This includes multiple methods of contact, support for the research by perceived figures of authority, positive regard for the respondents, and language that supports the importance of and reasons for the research (Dillman, 2000).

8. A two stage approach for contacting potential participants and obtaining self-reported study data was used. The first contact (the invitation package) provided a “warm-up” to the study, informed individuals about the study and invited them to participate, and requested information on preferred mode of completion of the questionnaire (mail, internet, phone interview or face-to-face interview) and deployment history. The second stage involved provision of the questionnaire to participants via their indicated preferred mode of delivery.

9. The invitation package mailed to potential participants included:
- A letter from the First Chief Investigator inviting individuals to participate in the study
 - A Letter of Support signed by both the Chief of Defence and the Repatriation Commissioner
 - A study Information Sheet, which included login details for the completion of the questionnaire online
 - A Consent Form, which allowed individuals to consent to any combination of the following components:
 - Participation in the self-report questionnaire
 - Being contacted periodically for follow-up studies
 - Linkage of Defence health data
 - Linkage of Defence psychology data
 - A brief questionnaire asking participants to:

- Provide contact details for questionnaire delivery and future communication and follow-up
- Nominate their preferred mode of completion of the questionnaire (internet, mail, phone or face-to-face interview)
- Indicate which of a list of deployments they had been involved in
- Reply paid envelope for return of consent form and brief questionnaire

10. A 1800 (free-call) number was also provided in the initial contact package whereby clarification about any aspect of the study could be sought. This telephone number was staffed by a member of the study team, and had voicemail so that a message could be left.

11. For serving personnel, the invitation package was sent to their unit address. Ex-serving members and reservists were contacted via the residential address. All address data were obtained from PMKeyS.

12. Participants returned their completed consent form, contact details, and the list of previous deployments. The questionnaire was then provided to participants in their preferred mode of delivery. Individuals who elected to complete the questionnaire by mail were sent a paper copy. Individuals who wished to complete the questionnaire by phone or face-to-face interview were contacted by an interviewer to arrange a time. A paper copy of the questionnaire was also sent to facilitate the interview. Login details for completion of the questionnaire online were provided in the invitation package.

13. All participants were asked to complete a General Health Questionnaire, and those who had deployed to the Solomon Islands were asked to complete a Solomon Islands Deployment Questionnaire. Both these questionnaires were available online.

14. Participants who had deployed to Bougainville and/or East Timor (a total of 212 individuals – Bougainville (N = 28), East Timor (N = 147), Solomon Islands, Bougainville and East Timor (N = 23), Bougainville and East Timor but not Solomon Islands (N = 14)) were also asked to complete separate questionnaires on these deployments. This eliminated the need to recruit them again for the Bougainville and East Timor studies. Paper copies of these questionnaires were sent to individuals, if relevant. In the latter stages of data collection, active collection of Bougainville and/or East Timor questionnaires ceased in anticipation of the launch of the Bougainville / East Timor studies. Upon the launch of these studies and the determination of the final samples, all deployment questionnaires will be available online. Any outstanding deployment questionnaires may then be collected.

15. Three weeks after the invitation package was sent out, a reminder card was sent to all non-respondents. For individuals who had not responded within 3 weeks of the reminder card a second invitation package was sent, with a modified covering letter. For serving personnel, this was sent to their residential address, if available.

16. If no reply was received within two weeks of the second mailed package, a telephone call was placed to confirm details. Telephone calls were made at a variety

of times during the day and evening in order to maximise contact opportunities. Up to 10 attempts were made to contact individuals. Calls were made by appropriately trained interviewers, hired as casual staff by CMVH.

17. If the individual was reached, and reported that they had not received their invitation package, another package was mailed to the address provided by the participant. Questionnaires were included in the same package to expedite this process. Individuals contacted by phone who preferred to complete the questionnaire/s online were emailed their login details (if they did not already have this information).

18. Initially, mail out and receipt of documents was conducted by the bulk mail house *SecurityMail*. Four months after the study commenced, DHSP assumed direct control of all mail processing because of *SecurityMail*'s unsatisfactory performance. The mail house's services were retained solely for printing the study documents and scanning return data.

19. Where individuals had not responded and were unable to be contacted after all mail and telephone attempts had been completed, updated address details were obtained from:

- i. PMKeyS (where new contact details were found, a phone call was placed to confirm details and study documents were re-mailed / emailed where desired);
- ii. The Australian Electoral Roll (where new contact details were found, protocol was same as for i.); and,
- iii. Department of Veterans' Affairs (DVA) (where new contact details were found, invitation/questionnaire packages were re-mailed by DVA with a covering letter explaining that no direct contact would be made by DHSP unless they chose to reply).

20. Questionnaire reminder cards were mailed in the following circumstances:

- a mailed questionnaire was not returned;
- a consent form indicating a preference for web mode of delivery had been received and/or the web questionnaire had been commenced but not completed.

If the reminder did not elicit a response, an email reminder (containing login details) was sent, or a telephone call placed (if no email address was available).

21. A further round of telephone follow-up was undertaken in October 2007 to re-contact individuals who had still not submitted questionnaires after the previous step. Individuals were encouraged to complete the questionnaire online or over the phone with an interviewer without delay.

22. A communication and media strategy was designed and implemented prior to contact with potential study participants and at various times during the recruitment and data collection process. The aims of this were to alert individuals to the study and potentially increase response rates. The communication and media strategy involved advertisements and editorials in various Defence and ex-Serving publications (such as Service newspapers, Defence Today, Defence Family Matters, Australian Peacekeepers and Peacemakers Veterans Association magazine) as well

as editorials in non-Defence media, media releases and distribution of posters to selected Regimental Aid Posts and Frontline stores.

23. Data are provided on the number and percentage for overall responses to the various contacts, methods of completion of the questionnaire and participation rates. Participation rates were compared by sociodemographic and Defence characteristics using the chi-squared test. Characteristics of participants in the veteran and comparison groups were also compared using the chi-square test. In order to investigate whether characteristics varied with time to response, participants were classified as early (participated between March to June), mid (participated between July and September) and late (participated from October to November) participants. Characteristics were compared among the three response groups. A significance level of 5% was used for all statistical tests.

24. Individuals known to have died were excluded from the denominator for calculation of participation rates. The main participation rates obtained included all individuals, apart from those who had died, one person whose home address was in Finland with no unit address available, and one person with no contact details recorded on the PMKeyS database (“Lost Contact”). All others for whom no contact could be made are included in the denominator of the participation rates. As a sensitivity analysis, participation rates were also calculated excluding non-contactable individuals.

25. In addition to response characteristics, process measures are also reported, including an outline of recruitment and management activities for each month, details of response contacts and response to different recruitment and follow-up activities.

3. Results

3.1 Response rates for self report questionnaire

26. Of the original study sample of 1000, three individuals were identified as having died, one individual's only available address was abroad and one person had no contact details on the PMKeyS database. Invitations were mailed to the remaining 995 eligible individuals. Of these individuals, 436 (44%) provided questionnaire data and a further 36 (4%) consented to other components of the study. In total 48% of eligible individuals consented to some aspect of the study. One hundred and forty-two individuals (14%) refused to participate in the study, and a further 136 (14%) had been contacted but had not completed the study questionnaire. Table 1 provides details of response, refusal and contact rates for the Solomon Islands Health Study.

27. Sixty two individuals (6%) were confirmed as being on overseas deployment and 183 (18%) were unable to be contacted despite multiple mail and phone attempts. If these 245 (25%) individuals are excluded from the denominator, the overall participation rates are 55% for completion of questionnaire data and 58% for consent for any aspect of the study.

Table 1 Solomon Islands Health Study Self-reported data: Response categories

Response category	Total N=995		
Responded			
Questionnaire received:	n	n	%
Telephone interviews	79		
Mailed surveys	144		
Web surveys	213	436	44
Refused		142	14
Consented to data linkage only*		36	4
SUBTOTAL		614	62
No response			
Contacted by telephone:			
Confirmed as currently deployed / participation not possible†		62	6
Nothing received despite several reminders		136	14
Unable to be contacted			
10 contact attempts completed &/or tracing efforts exhausted		183	18
SUBTOTAL		381	38

* Some individuals explicitly refused to do the questionnaire but agreed to other parts of the study; others consented but did not complete questionnaires.

† Contact was made with a work colleague or family member who stated that the potential respondent was currently on deployment or unable to take part (note was made of the expected date of return of the potential respondent to enable further follow-up if possible in the data collection period).

Note: throughout this report, “response/respondent” refers to individuals who replied to the study invitation, while “participation/participant”, refers only to those individuals who provided self-reported questionnaire data.

3.2 Participant characteristics

28. Table 2 below shows the participation rates for people according to their demographic characteristics. The participation rate in the Solomon Islands veterans was similar to that in the comparison group (45% versus 42% respectively).

29. The participation rate among women (58%) was statistically significantly higher than the rate for men (42%). The participation rate increased from 35% in the 21-30 age group, to 47% in those aged 31-40 and to 58% in the over 40s, and this difference was highly significant.

30. Although the participation rates in the Army and Navy were similar (43% and 42% respectively), the percentage of RAAF members in the sample who participated was higher at 52%. However the difference in response rates among the three Services was not statistically significant.

31. The participation rate among those who had left the ADF was substantially (and significantly) lower than those currently serving. Twenty-six percent of ex-serving members in the sample participated in the study, compared to 46% of serving members. Permanent members of the Defence force had a participation rate 10% higher than reservists, and this difference was statistically significant.

32. Participation rates differed significantly among states, from above 50% in ACT, South Australia, Tasmania and Victoria to lower than 40% in Queensland and Western Australia.

Table 2 Participation by demographic characteristics

Characteristic	Total N=995	Questionnaire submitted N=436		Test Statistic		
	N	n	%	X ²	df	P
Exposure						
SI Veteran	498	225	45	0.7509	1	0.386
SI Comparison	497	211	42			
Sex						
Male	891	376	42	9.0799	1	0.003
Female	104	60	58			
Age group						
21-25	149	52	35	28.3818	4	<0.0001
26-30	282	101	36			
31-35	211	94	45			
36-40	171	84	49			
41+	182	105	58			
Service						
ARMY	598	255	43	4.9180	2	0.086
NAVY	245	102	42			
RAAF	152	79	52			
Employee status						
Active	871	404	46	8.6694	1	<0.0001
Terminated	124	32	26			
Service Type						
Regular/Permanent	864	390	45	4.6433	1	0.031
Reserve	131	46	35			
State						
ACT	117	60	51	15.9007	7	0.026
NSW	331	139	42			
NT	67	30	45			
QLD	281	110	39			
SA	33	17	52			
TAS	15	10	67			
VIC	90	49	54			
WA	61	21	34			

Note: Participation refers to submission of self-reported questionnaire data

33. Table 3 shows the breakdown of demographics in the Solomon Islands veteran and comparison groups. The distribution of demographics is similar between the two exposure groups. The main differences noted are a slightly higher (non-significant) proportion in the comparison group who completed the questionnaire by interview compared to veterans (22% versus 15%) and a higher proportion of participants from Queensland among the Solomon Islands veterans than in the comparison group (31% versus 19%). The distribution among states varies significantly between veteran and comparison groups.

Table 3 Participant characteristics by exposure status

Characteristic	SI Veteran N=225		SI comparison N=211		Test statistic		
	n	%	n	%	X ²	df	P
Sex							
Male	194	86	182	86			
Female	31	14	29	14	0.0001	1	0.992
Age group							
21-25	29	13	23	11			
26-30	55						
31-35	49	22	45	21			
36-40	41	18	43	20			
41+	51	23	54	26	1.3497	4	0.853
Service							
ARMY	130	58	125	59			
NAVY	50	22	52	25			
RAAF	45	20	34	16	1.2206	2	0.543
Employee status							
Active	212	94	192	91			
Ex-serving	13	6	19	9	1.6673	1	0.197
Service Type							
Regular/Permanent	202	90	188	89			
Reserve	23	10	23	11	0.0531	1	0.818
Questionnaire method							
Mail	78	35	66	31			
Web	114	51	99	47			
Interview	33	15	46	22	3.7499	2	0.153
State							
ACT	28	12	32	15			
NSW	75	33	64	30			
NT	14	6	16	8			
QLD	70	31	40	19			
SA	5						
TAS	5	2	5	2			
VIC	21	9	28	13			
WA	7	3	14	7	15.2342		0.033

34. Table 4 shows the characteristics of those who completed the questionnaire by time of data collection. Exposure group (veteran versus comparison) and sex were similar across the three response time categories. The proportion of participants aged 21-30 increased through the study period. There was a higher proportion of RAAF participants in the earlier time period and more Navy in the later time period; and the difference in service participation over time was statistically significant.

35. The level of participation among ex-serving members and reservists was initially very low following the first mail-out. Through subsequent follow-up of these individuals, the proportion of ex-serving members and reservists participating increased.

36. There was some variability in response times among the states, although this did not quite reach statistical significance

Table 4 Participant characteristics by time of data collection

Characteristic	Early (March to June) N=102		Mid (July to September) N=155		Late (October /November) N=179		X ²	df	P
	n	%	n	%	n	%			
Exposure									
SI Veteran	56	55	82	53	87	49	1.1943	2	0.550
SI Comparison	46	45	73	47	92	51			
Sex									
Male	88	86	127	82	161	90	4.4896	2	0.106
Female	14	14	28	18	18	10			
Age group									
21-25	11	11	15	10	26	15	16.0257	8	0.042
26-30	15	15	36	23	50	28			
31-35	18	18	40	26	36	20			
36-40	28	27	25	16	31	17			
41+	30	29	39	25	36	20			
Service									
ARMY	60	59	87	56	108	60	12.0571	4	0.017
NAVY	16	16	36	23	50	28			
RAAF	26	25	32	21	21	12			
Employee status									
Active	101	99	143	92	160	89	8.9250	2	0.012
Ex-serving	1	1	12	8	19	11			
Service Type									
Regular/Permanent	96	94	140	90	154	86	4.6937	2	0.096
Reserve	6	6	15	10	25	14			
State									
ACT	17	17	21	14	22	12	22.7533	14	0.064
NSW	30	29	49	32	60	34			
NT	1	1	9	6	20	11			
QLD	31	30	33	21	46	26			
SA	7	7	7	5	3	2			
TAS	1	1	6	4	3	2			
VIC	10	10	21	14	18	10			
WA	5	5	9	6	7	4			

Note: throughout this report, “response/respondent” refers to individuals who replied to the study invitation, while “participation/participant”, refers only to those individuals who provided self-reported questionnaire data.

3.3 Summary of data collection process

37. The following tables summarise study activity by month. Table 5(a) shows management activity directly related to the self-reported data collection. Table 5(b) details the numbers of mailed items, follow-up attempts (telephone / email) and questionnaires collected by month. The timeline in Table 5(a) demonstrates the considerable time required for recruitment and contact tracing in this group. As shown in Table 5(b) over five and a half thousand phone calls were made to follow-up individuals, and participation increased after commencement of phone follow-up.

Table 5(a) Self-reported data: Summary of management activities by month






Month	 Study management activities
	<p><u>Ongoing tasks:</u></p> <ul style="list-style-type: none"> ▪ Tracking and reporting (DHSP database) ▪ Communications strategy ▪ Review and modify BV / EM protocols
March	<ul style="list-style-type: none"> ▪ Liaison with mail house (<i>SecurityMail</i>) re study documents and mailing dates ▪ Online questionnaire provided by Data Management & Analysis Centre (<i>DMAC</i>) at Adelaide University: development and testing
April	<ul style="list-style-type: none"> ▪ Liaison with mail house: establish/develop protocols for communication and reporting ▪ Telephone staff: recruitment and protocol development
May	<ul style="list-style-type: none"> ▪ Mail house: conduct 1st review of processes: <ul style="list-style-type: none"> ○ identify and process outstanding mailings ○ liaise with key staff ○ consider alternative systems / providers ▪ Telephone staff: training and protocol refinement
June	<ul style="list-style-type: none"> ▪ Mail house: outcomes of 1st review: <ul style="list-style-type: none"> ○ revise and implement protocols ▪ Ethics committees: approve revised protocols ▪ Tracing of study members for whom contact details are unavailable or incorrect via Defence Restricted Network (DRN) and Electronic White Pages
July	<ul style="list-style-type: none"> ▪ Mail house: 2nd review (following resignation of key <i>SecurityMail</i> staff member involved in the initial review): <ul style="list-style-type: none"> ○ identify problems ○ consider alternative systems / providers ▪ Tracing: DRN; Electronic White Pages
August	<ul style="list-style-type: none"> ▪ Mail house: outcomes of 2nd review: <ul style="list-style-type: none"> ○ DHSP to process outstanding and all further mailing and receipt of documents in-house ▪ Tracing: PMKeyS update; DVA liaison
September	<ul style="list-style-type: none"> ▪ In-house mailings / emails to non-respondents ▪ Tracing: DVA results and mail-out
October	<ul style="list-style-type: none"> ▪ Telephone staff: revise and implement email and interview protocols for follow-up 'Round 2' (i.e. re-contacting of individuals who have still not responded after the initial follow-up, reminder and/or re-mailing of documents). ▪ Tracing: Electoral roll
November	<ul style="list-style-type: none"> ▪ Follow-up of outstanding consent forms ▪ Final report

Table 5(b) Self-reported data: Number of other activities by month

	Month	March	April	May	June	July	August	September	October	November	TOTAL (N)
 Mailed items	1. Invitation	995									995
	2. Invitation reminder card		887								887
	3. Resend invitation		21	796					1		818
	4. Questionnaire (QA)			41	63	5	11	12			132
	5. Resend invitation /QA					36	227	44	*59	3	369
	6. QA reminder card				60		67	194	52		373
	TOTAL	995	908	837	123	41	305	250	112	3	3574
 Emails	Reminder / login / consent		2	4	4	95	38	46	307	26	522
 Phone calls	Non-respondent / undeliverable mail		4	21	375	1460	346	601	266		3073
	Return of QA / consent					72	99	7	1745	414	2337
	Make appointment / conduct interview			10	19	6	13		50		98
	Queries	7	23	7	4	6	1	7	6		61
	TOTAL	7	27	38	398	1544	459	615	2067	414	5569
 QAs received	Mail				27	24	37	26	23	7	144
	Online	11	37	12	13	28	20	18	65	9	213
	Interview				2	2			67	8	79
	TOTAL (N)	11	37	12	42	54	57	44	155	24	436
	CUMULATIVE TOTAL (% of 995)	1%	5%	6%	10%	16%	21%	26%	41%	44%	

DHSP

SecurityMail

* includes 10 mailed by DVA

Note: for October the number of interviews conducted was greater than the number of calls made to arrange appointments because other types of calls sometimes resulted in on-the-spot interviews.

38. The currency of address data was a problem in initial mailings, with a total of 265 items of mail returned undeliverable to *SecurityMail*. These comprised:

- 93/995 (9%) of initial invitations;
- 106/887 (12%) of the invitation reminder cards - as for the original invitation, these were sent mainly to ADF addresses;
- 65/818 (8%) of the re-mailed invitations (generally mailed to private address);
- one of the 109 questionnaires they mailed.

39. Less than 2% of all the items mailed directly by DHSP (12/660) were returned to sender, as current address details were generally confirmed by telephone before sending documents. Of the 358 people who requested that the study documents be re-mailed to them, almost half provided new address details. Among the remainder there was a strong preference to have the packages posted to a private residential address rather than an ADF one.

40. Table 6 shows the number of mailed items and follow-up attempts per individual, giving an indication of the level of effort required to obtain a single questionnaire. (Some of these contacts were initiated by the respondents - there were 206 incoming calls and 56 incoming emails.)

Table 6 Contacts or contact attempts made per person by participation status

Questionnaire data received	No. of contacts or contact attempts per person (mean)		
	Mail	Phone / email	All
Yes (N=436)	3.8	6.3	10.1
No (N=559)	3.5	6.1	9.6
All (N=995)	3.6	6.2	9.8

Note: contact attempts did not necessarily yield actual contact with a person.

3.4 Evaluation of recruitment strategies

41. Table 7 summarises the effectiveness of each recruitment strategy. Telephone follow-up (round 1) refers to initial personal contact with non-respondents (commenced in mid June 2007). Telephone follow-up (round 2) refers to the re-contacting of those contacted in round 1, who had still not returned questionnaire data (this follow-up round was conducted in October 2007). While 55% of all questionnaires were collected as a direct result of telephone follow-up, it should also be noted that many of those who returned consent forms as a result of mail contact alone still had to be contacted by telephone before they returned their questionnaires. Overall, telephone contact was made with 88% of the 614 who responded in any fashion.

42. The table shows that refusals were most likely to be registered at the first telephone contact. The second round of follow-up appears to be very important in collecting data from those who were not averse to participation but had not actually completed the consent form and/or questionnaire. This second round of follow-up was beneficial in reducing potential differences between participants and non-participants, with regard to factors such as age, ADF service arm and employee status.

Table 7 Response category by recruitment strategy

Contact mechanism	Response:							
	Questionnaire received N=436		Refused N=142		Consent only N=36		Any N=614	
	n	%	n	%	n	%	n	%
Invitation	74	17%	7	5%	3	8%	84	14%
Invitation reminder	60	14%	2	1%	8	22%	70	11%
Re-mail invitation	28	6%	0	0%	5	14%	33	5%
QA reminder	34	8%	8	6%	0	0%	42	7%
Telephone follow-up (round 1)	113	26%	92	65%	10	28%	215	35%
Telephone follow-up (round 2)	127	29%	33	23%	10	28%	170	28%

Note: throughout this report, “response/respondent” refers to individuals who replied to the study invitation, while “participation/participant”, refers only to those individuals who provided self-reported questionnaire data. “Contact mechanism” is the first mechanism they responded to; “Response type” is the eventual outcome of all contact.

3.5 Contact tracing

43. Tracing, via the electronic white pages and other available sources such as the Defence Restricted Network (DRN), was an iterative process conducted along with telephone follow-up throughout the study. At the end of August 2007 there were 367 individuals who had not responded and were unable to be contacted at available phone numbers / addresses. Updated address details for this group were obtained from:

- i. PMKeyS: updated contacted details were supplied for 70% of these.
- ii. The Australian Electoral Roll: One or more possible new addresses were found on the electoral roll for 77 (39%) out of 196 searches conducted via public access at the Brisbane Electoral office. New telephone listings were then found via the electronic white pages for 20 of the 77 successful searches.
- iii. Department of Veterans’ Affairs (DVA): DVA records matched 53 of the 367, and in 23 cases new address details were found. Of the 23, only 10 had not already been contacted by DHSP by the end of September, at which point invitation/questionnaire packages were re-mailed by DVA. Of these ten mailings, two questionnaires were returned and two were returned to DVA as undeliverable.

44. The overall outcome for these 367 individuals was:
 184 (50%) remained uncontactable
 76 (21%) returned questionnaires
 43 (12%) refused to participate
 20 (5%) were found to be away on deployment
 44 (12%) were contacted but never provided data.

3.6 Preferred modes of delivery for the self report questionnaire

45. Upon consent, very few people indicated a desire for a telephone (n=3) or face-to-face interview (n=5). No face-to-face interviews were conducted, either due to geographical access, difficulty contacting the respondent to arrange an appointment, or the fact that respondents completed the questionnaire by paper when they received it in the mail prior to the interview. Twenty-two percent of those who returned consent forms indicated a preference for online delivery, while for 75% the preference for paper was either mail or not specified (mail was the default option in these cases).

46. Of the 267 people who had initially indicated a preference for paper questionnaires on their consent forms, 121 (45%) submitted their data via this mode. For the remainder, data were eventually collected online (n=95, 36%) or by telephone interview (n=37, 14%) in the final round of telephone follow-up. Early participants mainly availed themselves of the online questionnaire, mid-term participants mainly used the mail mode, while online and interview delivery dominated the late period.

47. Table 8 shows details for participants who completed the questionnaire online. Eighty-two percent of online participants completed at least 80% of the questionnaire. Because some questions were targeted to specific groups, for example women, or depended on answers to certain other questions, respondents were eligible in most cases to complete fewer than 100% of all questions in the questionnaire. Hence 80% represented a high level of completeness.

Table 8 Online questionnaire details

Online questionnaire statistics	SI Veteran	SI Comparison	All participants
Completion (mean %)	88	84	85
Logons (mean no. of sessions)	2.1	1.5	1.8
Total duration of logon (mean no. of minutes)	126	76	103

Note: the number of minutes logged on overestimates the amount of time taken to complete the questionnaire, as about half of all sessions were timed out rather than being terminated by the participant actively logging out.

3.7 Consents to linkage

48. Table 9 summarises consent to linkage of survey data to ADF health and psychology records. As noted in Section 3.6, obtaining outstanding consent forms from online participants was problematic. This also proved to be the case where data was collected by interview during the second round of follow-up. Despite numerous attempts, consent forms were unable to be collected for 20% of all participants. Where consent forms are outstanding, consent to the use of questionnaire data is inferred from the fact of questionnaire completion, but linkage between the survey data and ADF health and psychology data is not possible.

49. A total of 350 (80%) of the 436 survey participants provided consent forms. In addition there were 36 people who declined to do the questionnaire, but consented to other components of the study, hence the total number of consent forms collected was 386 (or 39% of the 995 persons invited to take part). Around 70% of those who completed consent forms agreed to each type of linkage, while 67% gave permission for both.

Table 9 Consent to record linkage

ADF Psychology record linkage	ADF Health record linkage					
	Consented		Refused		Total	
	n	%	n	%	n	%
Consented	258	67	9	2	267	69
Refused	17	4	102	26	119	31
Total	275	71	111	29	386	100

4. Discussion

50. The participation rate for the Solomon Islands Health Study was lower than anticipated and less than optimal for a research study: 44% for completion of the questionnaire, and 48% for consent to any component of the study. This raises concerns for the generalisability of the results of the study. While low response is an issue for cross-sectional studies, it is of less importance for longitudinal studies, as long as follow-up is good.(Kelsey 1996)

51. Research in Military populations conducted in the past few years have demonstrated higher participation rates than the Solomon Islands Health Study. For example the Gulf War study had participation rates of 80.5% and 56.8% for veteran and comparison groups respectively. There are several possible reasons for these differences. These previous studies were conducted some time after the deployment or exposure of interest, were undertaken in populations which were generally older than the population of interest for the Solomon Islands Health study and were mainly conducted at the instigation of the population of interest and / or in response to specific concerns raised by the study population. Thus the target population may have had more interest in participating. There was a high level of general awareness of possible problems associated with these deployments / activities. In addition, even in the last few years there has been a substantial increase in research conducted in Military and ex-Military populations. Thus participant burden and “research fatigue” may be an issue. Other reasons for low response include the high mobility of this population.

52. Response rates for the Solomon Islands Health Study are consistent with international studies in similar populations conducted recently. The US Millennium Cohort Study, the largest prospective study ever undertaken in the U.S. military and to be conducted over 21 years, achieved an overall response rate of 33% after 17 months of follow-up (Ryan et al. 2007). The major cohort study of UK military personnel who deployed to the 2003 Iraq war, conducted by the King's Centre for Military Health Research, King's College London, achieved a higher response rate of 58% over a 22 month recruitment period (Hotopf et al 2006). Almost half of this response was achieved through over 200 on site visits to Military bases; although the average response for mail outs was 23% after 10 to 16 months (Hotopf et al. 2006). In addition, promotion strategies included an incentive to participants (a lottery with a cash prize). A Cochrane Collaboration Review of study strategies (including incentives) to increase response to postal questionnaires (<http://www.cochrane.org/reviews/en/mr000008.html>) showed that, while there was substantial heterogeneity between studies on many strategies, several strategies significantly increased the odds of response. See cited Cochrane URL for the magnitudes of changes in odds. The odds of response were at least doubled using monetary incentives, recorded delivery, a teaser on the envelope - e.g. a comment suggesting to participants that they may benefit if they open it, and a more interesting questionnaire topic. The odds of response were substantially higher with pre-notification, follow-up contact, unconditional incentives, shorter questionnaires, providing a second copy of the questionnaire at follow-up, mentioning an obligation to respond and university sponsorship. The odds of response were also increased with non-monetary incentives, personalised questionnaires, use of coloured as

opposed to blue or black ink, use of stamped return envelopes as opposed to franked return envelopes, an assurance of confidentiality and first class outward mailing. The odds of response were reduced when the questionnaire included questions of a sensitive nature, when questionnaires began with the most general questions, or when participants were offered the opportunity to opt out of the study. Many of these activities and strategies have been already implemented and others such as incentives should be considered for future DHSP studies.

53. Data collection involved self-report only (no Defence health records were extracted).

54. Solomon Islands Health Study response rates are not inconsistent with other studies conducted in Australia in recent years. For example, in the Growing Up in Australia longitudinal study of children the response rate was 53% (Gray et al. 2005). Agreement to participate in recent health studies conducted through the Australian Twin Registry has ranged from 3% to 62%, depending on the age group and topic (<http://www.twins.org.au>). In the Australian Longitudinal Study of Women's Health, an estimated 41–42% of the younger women ($n = 14\ 247$), 53–56% of the mid-age women ($n = 13\ 716$), and 37–40% of the older women ($n = 12\ 432$) agreed to participate in the longitudinal study (Lee et al. 2005). However, women may be more likely than men to volunteer as study participants (Todd et al. 1983).

55. Despite the lower than ideal response rates for the Solomon Islands health Study, response rates were similar for the veteran and comparison groups. Characteristics were similar for the veteran and comparison groups, with the exception of state of residence (which is unlikely to be an important confounder). This is encouraging and demonstrates a lack of differential response bias between groups, and improves the internal validity of the study.

56. Response rates were significantly higher for females than males and for permanent Defence members relative to Reservists, increased with increase age and varied with state of residence. However the largest difference was between active and terminated Defence personnel, with terminated members have a 20% lower response rate than active members. The low response rate for ex-serving members is of concern. Ninety-two of these could not be contacted despite multiple attempts. Some of these people may not have an up-to-date residential address on the PMKeyS database, as subsequent changes of addresses after separation from the ADF are unlikely to be captured unless the ex-member informs the ADF of their new address. The recruitment of ex-serving personnel represents a significant challenge in all future studies. This is of particular concern for recruitment for the Bougainville and East Timor Health Studies, as these deployments were earlier than OP ANODE, and thus more individuals were likely to have left Defence and thus be non-contactable. Researchers will need to work closely with the Department of Veterans' Affairs in the future to make sure this group is given the same level of follow-up as the rest of the sample. Other strategies include targeting publicity towards the major Ex-service Organisations, to reach individuals who have not yet entered the Veterans' Affairs system and using publicly available resources to locate individuals.

57. The difference in the participation rate with age may be due to a number of factors including attitude, workload, time and geographical mobility. The differences in participation rates between the States may be due to differences in rates of deployment and/or demographic characteristics. Proportion of participants from the Northern Territory increased in the later follow-up period. The reason for this is unclear, but variations from State to State may be a result of units returning from deployments at different times.

58. The overall contact rate for the study was good, with less than 20% of the sample being uncontactable and a further 6% on deployment. The US Millennium Study failed to make contact with more than half of those in their sample (Ryan et al. 2007). Similarly the UK Kings College London Study (UK) (no contact or dead mail 42%) found making any contact with participants extraordinarily difficult (Hotopf et al. 2006). This high contact rate may be a reflection of the high percentage of the sample who were current serving members, and may not be repeatable for studies of earlier deployments, such as Bougainville and East Timor, when more of the sample are likely to have left active Military service.

59. It may be argued that calculation of response rates should exclude individuals who were not contactable as they did not really have the opportunity to participate in the study. Excluding from the denominator the 183 individuals who could not be contacted and 62 who were confirmed as being on deployed resulted in a response rate of 55% for questionnaire data and 58% for questionnaire data or consent for Defence owned data linkage. Individuals who had been contacted but had not completed the questionnaire should be retained in the denominator as some of these individuals are likely to be “passive” refusers.

60. As evident from the tables, considerable effort was involved in collecting responses to the self-report questionnaire. Participating on the web was the most popular and ultimately most cost effective means of responding, and was used by approximately half of all respondents. The one drawback was that participants tended to overlook the return of their paper consent/contact forms, which then had to be followed up by telephone. Face-to-face interview was neither popular among participants nor practical for the researchers.

61. Online responses, while popular, presented unnecessary complexities for the study team. In particular for the Solomon Islands Health Study, participants were not able to formally consent to participate in the study via the web. As a consequence, the study team was required to trace these participants and ask them to complete a consent form and return it either by fax or mail.

62. While the refusal rate for the study was relatively high in comparison with other published studies, once potential participants were contacted by phone they were encouraged to either commit to participation or register a refusal and therefore end the contact cycle. Many refusals came with comments such as ‘I just don’t have time right now’ rather than refusal due to lack of faith in the research process or an unwillingness to participate.

5. Rationale for changes to future study protocols

63. In light of the lessons learned during the Solomon Islands study, the following changes have been initiated for the Defence Deployed East Timor and Bougainville Health Studies.

- I. The questionnaire has been shortened significantly and its flow improved in order to make it more ‘user friendly’ for participants.
- II. Online delivery – consent to participate, all study information and the questionnaire/s will be available to participants online. This has been a popular method of participation. ADHREC and other Human Research Ethics Committee (HREC) approvals have been obtained for online consent, not requiring a signature, for future DHSP studies.
- III. First contact will be made where possible via email – this allows for a quick evaluation of whether contact has been made or not and allows participants to complete the consent process and questionnaire in their own time without waiting for further information from the study team.
- IV. Personal contact from a member of the study team improves participation – therefore personal contact will be initiated as soon as there is an indication of non-response. Rather than sending out a reminder card to participants who have not responded after the first mailing (or emailing), the study team will move straight to phone contact. For future studies, HREC approval has also been sought to obtain audio-recorded consent by telephone.
- V. Communication strategies have been enhanced, with additional and significant input being provided by a variety of professional sources. Improvements have been made in the areas of:
 - a. Advertisements.
 - b. Communications in the form of media releases.
 - c. Site visit protocols.
 - d. Information provided to participants – information sheets have been simplified, made more colourful and laid out with clear headings and subheadings.
- VI. Mail house functions have been brought in-house to avoid delays in mailing, to enable greater control and monitoring, and to ensure participants are provided with any materials they require as quickly as possible.
- VII. Batching – the study team will send out invitations in groups by location, improving monitoring and follow-up.
- VIII. Protocols established - the study team is now trained in all study protocols, which significantly improves the management of the study.
- IX. Larger sample – as the number of people being invited to participate is larger, it is more likely that multiple people in the same location will be invited. In turn, this means the research is more likely to be discussed

and validated by other participants, increasing the likelihood that people will participate.

6. Conclusions

64. Data collection was completed, with follow-up in the time available achieving a participation rate of 44%, including all those mailed in the denominator. This rate was higher than in some contemporary cohort studies with follow-up possible over a much longer period of time. We modified protocols during data collection to maximise the likelihood of contacting respondents. Future protocols will benefit from the experience of conducting the self-report data collection for this study.

7. References

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8. Annexes

Annex 1 - Ethics Approval

Annex 2 - Invitation Package

Annex 3 - Invitation Reminder Card

Annex 4 - Questionnaire Reminder Card

Annex 5 - Health and Demographics Questionnaire

Annex 6 - Solomon Islands Deployment Questionnaire

COPY



Australian Government
Department of Defence
Defence Support Group

Defence Health
Services Division
CP2-7-194
Campbell Park

2003/28092/1
PRTG/OUT/2007/33

Associate Professor Cate D'Este
Centre for Military and Veterans' Health
Level 2, Mayne Medical School
Herston Road
Herston QLD 4006

Dear Cate,

RE: DEFENCE HEALTH SURVEILLANCE PROGRAM – RTAPS/POPS DATA REQUEST

Reference:

A. DHSP 070501 of 1 May 2007

1. In response to your query of 1 May 07, the RtAPS and POPS records are classified as Psychology-in-Confidence and are controlled by the Defence Force Psychology Organisation (DFPO) and managed by the Psychology Research and Technology Group (PRTG). Requests for data may be made to COL Peter Murphy, Director DFPO.
2. It is noted that you are seeking to obtain records that fall into two categories:
 - a. Records that are identifiable and which will be linked to other data sets following receipt of consent from the individuals concerned;
 - b. De-identified records for which consent for access has not been obtained.
3. With regard to 2(a), a data request form and proposed agreement for use of the data are attached (Enclosure A and B). The data request form seeks to clarify what data is required. The data use agreement protocol is designed to provide Defence with an assurance that the data will be used in accordance with agreed conditions of use.
4. These should be completed and forwarded to COL Murphy with a minute requesting release of the relevant records. Copies of completed consent forms for participating individuals should also be enclosed.
5. With respect to 2(b), the process for accessing de-identified data for deployment-related mental health screens (5(a) above) is to request data summary reports or technical briefs from PRTG, specifying details of the analyses you request. A data summary report request form is attached (Enclosure C). These reports will be released through Head Defence Health Services.
6. For assistance in requesting RtAPS and POPS data and data summary reports (Reference A, Enclosure 1, Data Requirements 1 and 2), including queries regarding the data use agreement protocol, my point of contact is Ms Helen Wood, on (02) 6266 3193.

7. With regard to the additional request for information relating to the use of psychological screens within Defence (Reference A, Enclosure 1, Data Requirements 3 to 6), you may liaise directly with Ms Wood.

8. If you require further assistance please contact either Ms Wood or Mr John Maguire, Programme Manager on (02) 6266 3879.

Yours sincerely,



R.M. WALKER

Commodore

Director General Strategic Health Personnel and Plans

Defence Health Services Division

28 May 07

Enclosures:

Enclosure A. Data Request Form

Enclosure B. Data Use Agreement

Enclosure C. Data Summary Report – Request Form



Australian Government
 Department of Defence
 Defence Support Group

**DEFENCE FORCE PSYCHOLOGY ORGANISATION
 PSYCHOLOGY RESEARCH AND TECHNOLOGY GROUP**

DATA USE AGREEMENT

The following agreement provides conditions of use for psychology records, controlled by the Defence Force Psychology Organisation, and supplied to the Centre for Military and Veterans health (CMVH) by the Psychology Research and Technology group for the purpose of research.

I, _____ (Name), First Chief Investigator for the
 _____ (Name of study) agree to the following conditions
 of use:

- a. The data will be managed in accordance with the Commonwealth Privacy Act 1988 National Health and Medical Research and Defence guidelines;
- b. The data will be used only in accordance with obligations outlined in contractual arrangements between CMVH and the Department of Defence regarding the above-named research;
- c. The data will be used only for such purposes as approved in the ADHREC Protocol (Protocol No _____), and for no other purpose;
- d. The data will be destroyed following completion of the study in accordance with ADHREC guidelines;
- e. The data will held in a secure location; and,
- f. The data will not be released to any third party for any reason, unless legally obliged to do so.

(Signature)

(Date)



Australian Government

Department of Defence
Defence Support Group

**DEFENCE FORCE PSYCHOLOGY ORGANISATION
PSYCHOLOGY RESEARCH AND TECHNOLOGY GROUP**

DATA SUMMARY REPORT – REQUEST FORM

Note that this form is to be completed in consultation with a Psychologist at PRTG. Please contact the relevant PRTG section for advice on (02) 6266 3193.

Requested From:

Section/Organisation:

Date Requested:

Date Required:

Information/Analysis Requested:

Reason for Request:

(PRTG Office Use Only)

Report Number:

Author:

Date Completed:

Information Provided:
(Copy of summary report attached here)

Summary Results:

File Reference: DHSP - 070501

Commodore Robyn Walker
DHSD
CP20-2-021
CAMPBELL PARK ACT 2600

CMVH

Dear Robyn

Re: Defence Health Surveillance Program – Solomon Islands Health Study

I am writing to seek your advice on the appropriate process to follow and personnel to contact with regard to obtaining the Defence owned psychological data relating to the Solomon Islands Health Study.

The intention to utilise Defence owned psychological data was described in the research plan approved by the Program Management Board (PMB) and in various ethics protocols. Specifically, the plan is to access and analyse the RtAPS and POPS psychological screens held by Defence on those service personnel deployed to the Solomon Islands who form our veteran sample for the Solomon Islands Health Study. The nature of the data is detailed in Enclosure 1.

While we understand the Psychology Research and Technology Group manage these data, it is currently unclear who owns the data. Therefore, would it be possible for you to, firstly, clarify who will direct the release of the data and, secondly, outline any specific processes we would be required to follow to obtain the data? Direct Liaison Authority with relevant stakeholders would be appreciated in order to facilitate clear and direct communication. This will assist in establishing comprehensive processes and documenting standard operating procedures that can, in turn, be employed for the Bougainville, East Timor and MEAO studies.

Thank you for your consideration of this request. I anticipate that your clarification of the issues raised will assist to progress this aspect of the study in a meaningful and transparent way.

Yours sincerely

C. D'ESTE

Associate Professor Cate D'Este
First Chief Investigator
Solomon Islands Deployment Health Study
Deployment Health Surveillance Program

15th May 2007

Enclosure 1:**DATA Requirements**

1. RtAPS and POPS for the Solomon Islands Health Study sample
2. Individual item results and scores for each participant.
3. Cut off scores used by Defence
4. Categorical data used by Defence
5. Validation of measures conducted by Defence
6. Documentation relating to known systematic biases.

Use of the data

1. Data will be deidentified prior to analysis.
2. Where the participant has expressly consented to linkage with their self reported data and their Defence data, specific protocols relating to linkage of deidentified data will be followed.
3. Where consent has not been granted, we will use deidentified data for overall analysis of the sample.

Annex H - Annual Health Assessment

MEDICAL-IN-CONFIDENCE (After first entry)

AD 146
Revised Dec 2004

Department of Defence

Annual Health Assessment

• Use only black pen and/or stamps

Health facility		Number		Encl or Folio
Service		Rank		
Unit, ship or section		Family name		
Corps, category or mustering		Given name(s)		
Reason for assessment		Date of birth		
Current medical classification	Date of last five yearly examination	Age	Gender	

<p>Patient to complete</p> <p>General health</p> <p>Do you have any current illnesses?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Details of current illnesses</p> <hr/> <p>Do you have any current injuries?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Details of current injuries</p> <hr/> <p>Have you undergone any operative procedure in the last 12 months?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Details of operative procedures within the last 12 months</p> <hr/> <p>Are you presently taking prescription medication or non prescription medication?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Details of medication (<i>Prescription, non prescripion, vitamins, etc</i>)</p> <hr/>	<p>Patient to complete</p> <p>Do you smoke?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Quantity</p> <hr/> <p>Do you drink alcohol?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Amount per day How often do you drink?</p> <hr/> <p>How often do you feel that your present lifestyle is putting you under too much stress?</p> <input type="checkbox"/> Often <input type="checkbox"/> Sometimes <input type="checkbox"/> Seldom <input type="checkbox"/> Never <p>During the past two weeks, how much stress have you experienced?</p> <input type="checkbox"/> A lot of stress <input type="checkbox"/> A moderate amount of stress <input type="checkbox"/> Relatively little stress <input type="checkbox"/> Almost no stress at all <p>Have you been deployed overseas within the last 12 months?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>↓</p> <p>Details of deployment</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Location</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>Do you wear glasses or contact lenses?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>Have you had a dental check within the last 12 months?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>Have you passed your annual fitness test?</p> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>NO, AMA, SMA or authorised delegate to complete</p> <table border="1"> <tr> <td>Height</td> <td>Weight</td> <td>BMI</td> <td>Blood pressure</td> </tr> <tr> <td>Pulse rate</td> <td colspan="2">Faecal occult blood test (<i>Result</i>)</td> <td>FOBT date</td> </tr> </table> <p>Females</p> <table border="1"> <tr> <td>Pap smear date</td> <td><input type="checkbox"/> Not applicable</td> <td>Mammogram date</td> <td><input type="checkbox"/> Not applicable</td> </tr> <tr> <td colspan="2">Pap smear result</td> <td colspan="2">Mammogram result</td> </tr> </table>	Date	Location							Height	Weight	BMI	Blood pressure	Pulse rate	Faecal occult blood test (<i>Result</i>)		FOBT date	Pap smear date	<input type="checkbox"/> Not applicable	Mammogram date	<input type="checkbox"/> Not applicable	Pap smear result		Mammogram result	
Date	Location																								
Height	Weight	BMI	Blood pressure																						
Pulse rate	Faecal occult blood test (<i>Result</i>)		FOBT date																						
Pap smear date	<input type="checkbox"/> Not applicable	Mammogram date	<input type="checkbox"/> Not applicable																						
Pap smear result		Mammogram result																							

* Perform lifestyle counselling at every opportunity *

MEDICAL-IN-CONFIDENCE (After first entry)

MEDICAL-IN-CONFIDENCE (After first entry)
AHA Personal Health Summary Report

Rank	Given name(s)	Family name	Encl or Folio
Number	Age	Unit, ship or section	Date

This report gives an overall summary of your health status and provides advice to promote improved health. Consult your Health Personnel if you have any questions or concerns.

Medical classification

Current MEC

Body weight

	Desirable	Actual
Height		
Weight		
BMI	Between 20.0 and 26.9	

Screening

Blood pressure	Normal range < 130/80 mmHg	
----------------	----------------------------	--

Other screening

Test	Result	Action

Blood profile

	Normal range	Actual
Cholesterol (mmol / l)	Less than 5 mmol / l	
HDL (mmol / l)	Greater than 1 mmol / l	
LDL (mmol / l)	Less than 3 mmol / l	
Ratio (HDL / LDL)	Less than 1:3	

Personal health issues

	Action
Smoking	
Alcohol or drugs	
Sun protection	
Diet	
Physical activity	
Oral hygiene	
Stress or mental health	

Recommendations or follow up action

--

Is a review appointment required?

Yes No

↓

Date

Completed by

Signature	Printed name	Rank or title	Phone number	Date
-----------	--------------	---------------	--------------	------

Annex I - Five Yearly Comprehensive Preventive Health Examination

MEDICAL-IN-CONFIDENCE (After first entry)

AD 147
Revised Feb 2007

Department of Defence

Comprehensive Preventive Health Examination

• Use only black pen and/or stamps

Health facility		Number			Encl or Folio
Service		Rank			
Unit, ship or section		Family name			
Corps, category or mustering		Given name(s)			
Reason for assessment		Date of birth	Age	Gender	
Current medical classification	Date of last five yearly examination				

Patient to complete

Family History

Have any of your family suffered from Heart disease, high blood pressure, diabetes, depression, stroke etc?

Yes No

Relationship	Problem

General Health

Have you had any persistent cough?

Yes No

Have you had any unusual shortness of breath or exertion?

Yes No

Have you had any chest pains?

Yes No

Have you had any persistent abdominal pains or cramps?

Yes No

Have you suffered any persistent indigestion or heartburn?

Yes No

Have you experienced any change of bowel habits?

Yes No

Have you passed blood with your bowel motions?

Yes No

Has your weight changed significantly?

Yes No

Are you on any special diet?

Yes No

Have you had any changes in passing urine?

Yes No

Patient to complete

General health (continued)

Do you experience any menstrual problems?

Yes No Not applicable

Have you had any pain or swelling in the scrotum?

Yes No Not applicable

Do you have any persistent muscular pain or weakness?

Yes No

Do you suffer migraines or severe headaches?

Yes No

Do you suffer dizzy spells, fits, fainting?

Yes No

Do you experience any problems with your hearing?

Yes No

Do you experience any problems with your vision?

Yes No

Do you have any problems sleeping?

Yes No

Do you have current illnesses or injuries?

Yes No

Have you had any operative procedures since your last medical?

Yes No

Have you received medical care outside of the ADF since your last medical?

Yes No

If you answered 'Yes', to any questions, please describe

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

Patient to complete
Current medications
 Are you taking any prescription or non-prescription medication?
 Yes No
 Are you taking any vitamins or alternative therapies?
 Yes No
 Details of medication, vitamins or alternative therapies

Allergies
 Have you any allergies?
 Yes No
 Details of allergies

Preventive health
Stress
 How often do you feel that your present lifestyle is putting you under too much stress?
 Often Sometimes Seldom Never
 During the past two weeks, how much stress have you experienced?
 A lot of stress A moderate amount of stress Relatively little stress Almost no stress at all
 Is there any other health problem troubling you?
 Yes No
 Details of problems troubling you

Patient to complete
Smoking history
 Do you smoke? Quit date
 Yes No Never smoked OR
 If "Yes, what do you smoke? Please describe
 Cigarettes Other
 How much do you smoke per day ?
 How long have you smoked for ?
Exercise
 How many days per week do you exercise
 What type of exercise do you do?
 Sport
 Gym
 Unsupervised or individual
 Other
 Please describe
 How many sessions per week do you exercise *(One session equals 30 minutes of exercise)*
Sun protection
 Do you use sun protection *(Hat, blockout, clothing, etc)?*
 Yes No
 Do you regularly check for new moles or skin lesions ?
 Yes No
Contraception
 Do you use contraception?
 Yes No
Females
 Have you had pap smear in the last two years?
 Yes No
 If over 50, have you had a mammogram in the last two years?
 Yes No
Operational factors
 Have you seen the dentist in the last 12 months?
 Yes No
 Date
 Have you passed your fitness test in the last 12 months ?
 Yes No
 Date
 Do you wear glasses or contact lenses?
 Yes No
 Date of last optometry or ophthalmology examination *(Month and year)*

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

Patient to complete

Operational factors *(Continued)*

Have you been deployed overseas since your last medical?

Yes No



Details of deployment

Date	Location

Do you have any specific occupational or workplace exposure hazards or concerns *(eg radiation, noise, solvents, etc)*

Patient to complete

Aircrew only

Type of aircraft currently being flown

Type of aircraft that you have the most flying hours with

Total flying hours

Total military flying hours for the last six months

Total civilian flying hours for the last six months

Total aided night flying hours for last six months

Total unaided night flying hours for last six months

Date of last CASA medical examination

Parachutists only

Approximate date of your first jump

Current level of jump qualifications

Approximate number of military jumps

Approximate number of civilian jumps

Date of last chamber run *(Free fall parachutists only)*

Divers only

Date you obtained your qualification

Number of military hours logged

Number of civilian hours logged

Maximum diving depth

Date of maximum dive

Member's certification

I certify that this is an accurate record of my medical history since my last examination and I will immediately report any changes in my medical status to ADF medical personnel

Signature	Phone number	Date
-----------	--------------	------

MEDICAL-IN-CONFIDENCE (After first entry)

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

NO, AMA, SMA or authorised delegate to complete
Alcohol history

Question 1

How often do you have a drink containing alcohol?

<input type="checkbox"/> Never <i>(Go to Question 9)</i>	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Monthly or less	1	
<input type="checkbox"/> 2 to 4 times a month	2	
<input type="checkbox"/> 2 to 3 times a week	3	
<input type="checkbox"/> 4 or more times a week	4	

Question 2

How many drinks containing alcohol do you have on a typical day when you are drinking ?

<input type="checkbox"/> 1 or 2	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> 3 or 4	1	
<input type="checkbox"/> 5 or 6	2	
<input type="checkbox"/> 7, 8 or 9	3	
<input type="checkbox"/> 10 or more	4	

Question 3

How often do you have six or more drinks on one occasion ?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

Question 4

How often after during the last year have you found that you were not able to stop drinking once you started ?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

Question 5

How often during the last year have you failed to do what was normally expected from you because of your alcohol ?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

Question 6

How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

NO, AMA, SMA or authorised delegate to complete
Alcohol history (Continued)

Question 7

How often during the last year have you had a feeling of guilt or remorse after drinking?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

Question 8

How often during the last year have you been unable to remember what happened during a night of drinking ?

<input type="checkbox"/> Never	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Less than monthly	1	
<input type="checkbox"/> Monthly	2	
<input type="checkbox"/> Weekly	3	
<input type="checkbox"/> Daily or almost daily	4	

Question 9

Have you or someone else been injured as a result of your drinking?

<input type="checkbox"/> No	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Yes, but not in the last year	2	
<input type="checkbox"/> Yes, during the last year	4	

Question 10

Has a relative, friend, or doctor or another health worker been concerned about your drinking or suggested you cut down?

<input type="checkbox"/> No	Points 0	➔ <input style="width: 80px; height: 40px;" type="text"/>
<input type="checkbox"/> Yes, but not in the last year	2	
<input type="checkbox"/> Yes, during the last year	4	

Record total of Questions 1 to 10 here ➔

Do not score Questions 11 and 12. These questions provide an indication of the client's 'readiness to change' or 'motivation to change' their alcohol use. This will assist you in deciding the level of intervention

Question 11

Do you think you presently have a problem with drinking ?

No
 Probably not
 Unsure
 Possibly
 Definitely

Question 12

In the next 3 months, how difficult would you find it to cut down or stop drinking?

Very easy
 Fairly easy
 Neither difficult nor easy
 Fairly difficult
 Very difficult

*** Perform lifestyle counselling at every opportunity ***

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

NO, AMA, SMA or authorised delegate to complete

Date of last comprehensive medical

Anthropometry

Sitting height	Buttock to knee length	Buttock to heel length
----------------	------------------------	------------------------

Urinalysis

SG	Protein	Glucose	Blood	Other

Full blood count	Fasting blood glucose
------------------	-----------------------

Spirometry

FEV1	FVC	Ratio %
------	-----	---------

Sharpened rhomberg test

1 min	2 min	3 min	4 min	Total

Age or Specialist Employment Stream specific screening

Height	Weight	BMI	Pulse rate
Blood pressure <i>(Sitting)</i>		Blood pressure <i>(Second reading if required)</i>	
Cholesterol	HDL	LDL	Ratio
Faecal occult blood test <i>(Result)</i>			FOBT date

Visual acuity

Distant		Near (N5)	
R6/	Corr to 6/	R	Corr to
L6/	Corr to 6/	L	Corr to
Visual standard		Colour perception	

Females

Pap smear date <input type="checkbox"/> Not applicable	Mammogram date <input type="checkbox"/> Not applicable
Pap smear result	Mammogram result

Hearing

- Refer to form PM - 139 Hearing Conservation Report
- If there is a 10dB or greater difference between left and right ears at any one frequency refer to a Medical Officer.

Date of hearing test

	250	500	1000	1500	2000	3000	4000	6000	8000	Hearing standard
R										
L										

NO, AMA, SMA or authorised delegate to complete

Serology

HIV <input type="checkbox"/> Positive <input type="checkbox"/> Negative	HEP C <input type="checkbox"/> Positive <input type="checkbox"/> Negative
HEP B <input type="checkbox"/> Positive <input type="checkbox"/> Negative	Date serology performed
G6PD <i>(Once only)</i> <input type="checkbox"/> Normal <input type="checkbox"/> Deficient	G6PD date Blood type

Vaccinations

Routine vaccinations	Date of vaccinations
Hep A	
Hep B	
Hep A and Hep B	
MMR	
Sabin	
ADT	
Typhoid	
Mantoux	
Varicella	
Other vaccinations	Date of vaccination
JEV	
Menecevax	
Influenza	
Anthrax	
Smallpox	

Vaccinations required

NO,AMA or SMA signature

NO, AMA or SMA printed name

Rank or title	Phone number	Date
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MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

NO to complete
Lifestyle counselling
 Have you conducted lifestyle counseling on the following:

Smoking
 Yes No

Drugs and alcohol
 Alcohol audit score

Sun protection
 Yes No

Diet *(Including cholesterol, calcium, iron, and energy)*
 Yes No

Physical activity
 Yes No

Oral hygiene
 Yes No

Stress and mental health
 Yes No

NO to complete
Lifestyle counselling *(Continued)*
Sexual behaviour and STIs
 Yes No

Clinical examination	Normal	Abnormal
1. Head, face, neck, scalp		
2. Nose		
3. Mouth		
4. Teeth, gums		
5. Ears _ Including drums and vasa		
6. Eyes - General		
7. Eyes - Ocular motility		
8. Eyes - Ophthalmoscopic		
9. Eyes - Visual fields (Confrontation)		
10. Respiratory system		
11. Cardiovascular system		
12. Peripheral vascular system		
13. Abdomen - Including hernial orifices		
14. Genito-urinary system		
15. Anus - per rectum (if applicable)		
16. Skin		
17. Nervous system		
18. Endocrine system		
19. Upper extremities		
20. Lower extremities		
21. Spinal system		
22. Posture		
23. Gait		
24. Lymphatic system		
25. Mental state		
26. Identifying marks and scars		
27. ECG results		

*** Perform lifestyle counselling at every opportunity ***

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

<p>MO to complete Clinical examination <i>(Continued)</i></p> <div style="border: 1px solid black; height: 450px; margin-bottom: 10px;"> <p>Comments</p> </div> <p>Are routine vaccinations complete? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is a continuation sheet attached? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is UMR available? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Outstanding problems</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Problem</th> <th style="width: 30%;">Action</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Problem	Action																	<p>MO to complete Diagnosis of disabilities <i>(Continued)</i></p> <div style="border: 1px solid black; height: 250px; margin-bottom: 10px;"> <p>Comments</p> </div> <p>Restrictions</p> <div style="border: 1px solid black; height: 250px; margin-bottom: 10px;"> <p>Comments</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td>P</td><td>U</td><td>L</td><td>H</td><td>E</td><td>E</td><td>M</td><td>S</td> </tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </table> <p>Recommended MEC</p> <div style="border: 1px solid black; height: 20px; margin-bottom: 5px;"> </div> <p>Recommended SPEC</p> <div style="border: 1px solid black; height: 20px; margin-bottom: 5px;"> </div> <p>Does the member require reclassification? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>↓</p> <p>Is MECR <i>(Form PM518)</i> attached? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has member been referred for MECRB? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	P	U	L	H	E	E	M	S								
Problem	Action																																		
P	U	L	H	E	E	M	S																												

*** Perform lifestyle counselling at every opportunity ***

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Given name(s)	Family name	Encl or Folio
--------	------	---------------	-------------	---------------

<p>MO to complete Medical fitness recommendation Is the member cleared for full specialist duties without restrictions? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has the unit been notified by either PM 101 - Medical or Dental Fitness Advice, PM 64 - Notification of Medical Assessment or by Drivers Log Book? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <div style="border: 1px solid black; height: 400px; padding: 5px;"> <p>Comments</p> </div>	<p>MO to complete Medical fitness recommendations <i>(Continued)</i> Have all outstanding vaccinations been completed? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has post deployment screening been conducted <i>(If applicable)</i>? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is a continuation sheet attached? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has UMR been reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Individual readiness status <input type="checkbox"/> Ready <input type="checkbox"/> Not ready</p> <p>Is the member in receipt of a Department of Veterans Affairs pension? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <div style="border: 1px solid black; width: 150px; margin-left: 20px; padding: 2px;"> Disability percentage </div> <div style="border: 1px solid black; height: 300px; margin-top: 10px; padding: 5px;"> <p>Comments</p> </div>
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Medical officer conducting examination

Signature	Printed name	Rank or title	Phone number	Date
-----------	--------------	---------------	--------------	------

Confirming authority *(If required)*
 Is MEC valid?
 Yes No

Recommendations

Signature	Printed name	Rank or title	Phone number	Date
-----------	--------------	---------------	--------------	------

*** Perform lifestyle counselling at every opportunity ***

MEDICAL-IN-CONFIDENCE *(After first entry)*

MEDICAL-IN-CONFIDENCE (After first entry)
CPHE Personal Health Summary Report

Rank	Given name(s)	Family name	Encl or Folio
Number	Age	Unit, ship or section	Date

This report gives an overall summary of your health status and provides advice to promote improved health. Consult your Health Personnel if you have any questions or concerns.

Medical classification

Current MEC

Body weight

	Desirable	Actual
Height		
Weight		
BMI	Between 20.0 and 26.9	

Screening

Blood pressure	Normal range < 130/80 mmHg	
----------------	----------------------------	--

Other screening

Test	Result	Action

Blood profile

	Normal range	Actual
Cholesterol (mmol / l)	Less than 5 mmol / l	
HDL (mmol / l)	Greater than 1 mmol / l	
LDL (mmol / l)	Less than 3 mmol / l	
Ratio (HDL / LDL)	Less than 1:3	

Personal health issues

	Action
Smoking	
Alcohol or drugs	
Sun protection	
Diet	
Physical activity	
Oral hygiene	
Stress or mental health	

Recommendations or follow up action

--

Is a review appointment required?

Yes No

↓

Date

Completed by

Signature	Printed name	Rank or title	Phone number	Date
-----------	--------------	---------------	--------------	------

Annex J - Medical Board

MEDICAL-IN-CONFIDENCE

Department of Defence

PM 1
Introduced
Sept 84

MEDICAL BOARD EXAMINATION RECORD

Type of Board		2. ECN		3. Corps		Number		Encl/Folio
1. Trade or Qualification						Rank		
4. Unit		5. Length of Service		6. Age		Surname		
7. Height (cm)		8. Weight (kg)		9. CHEST (cm) Exp Ins		10. Waist (cm)		
						Christian or Given Names		
						Date of Birth		Sex

11. URINALYSIS		12. BP (Sitting)		13. DISTANT VISION		14. RESP FUNC		15. AUDIOGRAM					
Protein				Unaided	Corrected To	FEV ₁			500	1000	2000	3000	4000
Sugar				R 6/	6/	FVC		R					
SG				L 6/	6/			L					
<i>If not examined enter 'NE' in abnormal column</i>				Normal	Ab-normal	<i>If not examined enter 'NE' in abnormal column</i>				Normal	Ab-normal		
16. Head, face, neck, scalp					30. Anus (<i>per rectum if indicated</i>)								
17. Nose					31. Skin								
18. Mouth, throat, speech					32. Nervous system								
19. Teeth, gums					33. Endocrine system								
20. Ears – including drums					34. Upper extremities								
21. Eyes – general					35. Lower extremities								
22. Eyes – ocular motility					36. Back								
23. Eyes – ophthalmoscopic					37. Posture								
24. Eyes – visual fields (<i>confrontation</i>)					38. Gait								
25. Respiratory system					39. Lymphatic system								
26. Cardiovascular system					40. Emotional stability								
27. Peripheral vascular system					41. Mental capacity								
28. Abdomen, including hernial orifices					42. ECG (<i>if performed</i>)								
29. Genito – urinary system					43. Additional marks and scars								

44. Notes (*enter relevant item number before each comment*)

If additional comments on continuation sheet PM 223, mark in box

45. Particulars of any Disabilities (<i>Entered by the Examining Medical Officer</i>)								46. Previous PES	
Diagnosis of Disabilities Discovered						Percentage Degree of Each Incapacity		Composite Assessment of Incapacity (<i>per cent</i>) for General Labour Market	
							 (Date)	
47. Next Board Date		If Permanently Unfit List Disabilities by Item No		48. PULHEEMS		CP		New PES	
				P U L H E E M S					
50.						49. Employment Restrictions			
a. (Signature of Examining MO)						51. Decision of Confirming Authority			
b. (Signature of Examining MO)									
..... (Printed Name)					 (Signature)			
..... (Printed Name)					 (Date)			
Examined at..... Date.....						Official Stamp			

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Annex K - Specialist Employment Stream Annual Health Assessment

AD 146-1
Revised Dec 2004

MEDICAL-IN-CONFIDENCE (After first entry)

Department of Defence

Specialist Employment Stream Annual Health Assessment

(Divers, Submariners, Aircrew, Parachutists,
Air Defence Officers and Air Traffic Controllers)

• Use only black pen and/or stamps

Health facility			Number			Encl or folio	
Service							
Unit, ship or section			Rank				
Corps, category or mustering			Family name				
Reason for assessment			Given name(s)				
Current MEC	Current SPEC	Date allocated	Date of birth				Age
Date of last CPHE		Date of last SESAHA					

Patient to complete

General health

Have you had any illnesses since your last medical examination?

Yes No



Details of current or interim illnesses

Have you had any injuries since your last medical examination?

Yes No



Details of current or interim injuries

Have you undergone any operative procedures in the last 12 months?

Yes No



Details of operative procedures in the last 12 months

Are you presently taking prescription or non-prescription medication?

Yes No



Details of medication (Prescription, non-prescription, vitamins, etc)

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Family name	Given name(s)	Encl or folio
--------	------	-------------	---------------	---------------

Patient to complete

General health *(Continued)*

Have you experienced any of the following in the previous 12 months or since your last medical examination?

	Yes	No	Unsure		Medical Officer's comments <i>(If insufficient space use 'Additional comments' on page 4)</i>
1. Eye or vision problems					
2. Eye surgery or vision correction (Refractive) surgery					
3. Continual sneezing, runny nose, itchy eyes or hay fever					
4. Sinus pressure or infection					
5. Deafness, hearing problems or ringing in ear(s)					
6. Ear infections or discharge from the ear					
7. Problems with ears or sinuses when flying, diving or parachuting					
8. Ear surgery					
9. Severe motion sickness, seasickness or loss of balance					
10. Severe or frequent headaches or migraines					
11. Fainting, blackouts or unconsciousness					
12. Convulsions, fits or epilepsy					
13. Head injury or concussion					
14. Heart disease or history of rheumatic fever					
15. Palpitations or awareness of your own heartbeat					
16. High blood pressure					
17. Pain or discomfort in the chest on exertion					
18. Shortness of breath on exertion					
19. Bronchitis, pneumonia or lung abscess					
20. Coughing up blood or phlegm					
21. Chronic or persistent cough					
22. Positive TB skin test					
23. Pleurisy or severe chest pain					
24. Pneumothorax or collapsed lung					
25. Asthma or wheezing					
26. Need to use puffer or inhaler					
27. Chest, lung or heart surgery					
28. Indigestion, peptic ulcer or acid reflux					
29. Vomiting blood or passing red or black bowel motions					
30. Recurrent vomiting or diarrhoea					
31. Any change in bowel habits					
32. Jaundice, hepatitis or liver disease					
33. Hernia					
34. Back injury					
35. Joint problem or sports injury					
36. Limitation of movement					
37. Heat stress or heat illnesses					
38. Cold stress and cold injuries					
39. Fractures (Broken bones)					
40. Paralysis, muscle weakness, numbness or tingling					
41. Kidney or bladder disease (Including stones)					
42. Passing urine more or less frequently than usual					
43. Discharge from penis or vagina					
44. High blood sugar (Diabetes)					
45. Blood diseases or bleeding problem					

MEDICAL-IN-CONFIDENCE (After first entry)

Number	Rank	Family name	Given name(s)	Encl or folio
--------	------	-------------	---------------	---------------

Patient to complete

General health (Continued)	Yes	No	Unsure	Medical Officer's comments <i>(If insufficient space use 'Additional comments' on page 4)</i>	
46. Skin disease, rashes or skin lesions					
47. Any chronic or contagious disease					
48. Depression or mental illness					
49. Claustrophobia or panic attacks					
50. Experienced weight gain or loss in excess of 5kg					
51. Wires, pins, plates, rods or any surgical implants					
52. Allergies or reactions to medications or foods					
53. Diving, flying or parachuting injuries (Ear or sinus squeeze, barotrauma)					
54. Symptoms of decompression illness (DCI)					
55. Any other problem related to diving, flying or parachuting					
56. Have you received medical care outside the ADF since your last health assessment?					
57. Any possibility of being pregnant? (Females only)					
58. Any incapacity during menstrual periods? (Females only)					
59. Do you smoke?			Quantity		
60. Do you drink alcohol?			Amount per day	How often do you drink	

61. How often do you feel that your current lifestyle is putting you under too much stress?
 Often Sometimes Seldom Never

62. During the past two weeks, how much stress have you experienced?
 A lot of stress A moderate amount of stress Relatively little stress Almost no stress at all

63a. Do you have any concerns about occupational or workplace exposure hazards (eg radiation, noise, asbestos, solvents, etc)?
 Yes No

63b. Are you enrolled in an occupational health surveillance program?
 Yes No

64. Have you been deployed overseas within the last 12 months?
 Yes No

↓

Details of deployment

Date	Location	Date	Location

65. Do you wear glasses or contact lenses?
 Yes No

↓

Date of last optometry or ophthalmology examination (Month and year)

66. What was the date of your last dental examination? (Month and year)

67. Have you passed your annual fitness test?
 Yes No

MEDICAL-IN-CONFIDENCE *(After first entry)*

Number	Rank	Family name	Given name(s)	Encl or folio
--------	------	-------------	---------------	---------------

Patient to complete

<p>Aircrew only</p> <p>68. Type of aircraft currently being flown</p> <p>69. Type of aircraft that you have the most flying hours with</p> <p>70. Total flying hours</p> <p>71a. Total military flying hours for the last six months</p> <p>71b. Total civilian flying hours for the last six months</p> <p>72a. Total aided night flying hours for the last six months</p> <p>72b. Total unaided night flying hours for the last six months</p> <p>73. Date of last CASA medical examination <i>(If applicable)</i></p> <p>Parachutists only</p> <p>74. Approximate date of your first jump</p> <p>75. Current level of jump qualification</p> <p>76a. Approximate number of military jumps</p> <p>76b. Approximate number of civilian jumps</p> <p>77. Date of last chamber run <i>(Free fall parachutists only)</i></p> <p>Divers only</p> <p>78. Date you obtained your dive qualification</p> <p>79a. Number of military hours logged</p> <p>79b. Number of civilian hours logged</p> <p>80. Maximum diving depth</p> <p>81. Date of maximum dive</p>	<p>Additional comments</p>
---	----------------------------

Member's certification

I certify that this is an accurate record of my medical history since my last examination and I will immediately report any changes in my medical status to ADF medical personnel.

Signature	Phone number	Date
-----------	--------------	------

MEDICAL-IN-CONFIDENCE (After first entry)

Number	Rank	Family name	Given name(s)	Encl or folio
--------	------	-------------	---------------	---------------

NO, AMA, SMA or authorised delegate to complete

Height	Weight	BMI	BP (Sitting)	Aircrew only Date of last eye prescription and refraction <hr/> Urinalysis <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">SG</th> <th style="width: 15%;">Protein</th> <th style="width: 15%;">Glucose</th> <th style="width: 15%;">Blood</th> <th style="width: 15%;">Other</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		SG	Protein	Glucose	Blood	Other					
SG	Protein	Glucose	Blood			Other									
Pulse rate	Faecal occult blood test (Result)		FOBT date												
Females only				Divers and Free fall parachutists only Sharpened romberg test <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">1 min</th> <th style="width: 15%;">2 min</th> <th style="width: 15%;">3 min</th> <th style="width: 15%;">4 min</th> <th style="width: 15%;">Total</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td style="text-align: right;">/240</td> </tr> </table>		1 min	2 min	3 min	4 min	Total					/240
1 min	2 min	3 min	4 min			Total									
				/240											
Pap smear date	<input type="checkbox"/> Not applicable	Mammogram date	<input type="checkbox"/> Not applicable												
Pap smear result		Mammogram result													
Serology (if required by HD 210)															
HIV		Hep C		Spirometry <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">FEV1</th> <th style="width: 20%;">FVC</th> <th style="width: 20%;">Ratio %</th> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>		FEV1	FVC	Ratio %							
FEV1	FVC	Ratio %													
<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative												
Hep B		Date serology performed													
<input type="checkbox"/> Positive	<input type="checkbox"/> Negative														
G6PD (Once only)		G6PD date	Blood type												
<input type="checkbox"/> Normal	<input type="checkbox"/> Deficient														
Are all routine vaccinations up to date?															
<input type="checkbox"/> Yes		<input type="checkbox"/> No													
↓															
List vaccinations required															
Hearing															
<ul style="list-style-type: none"> Refer to form PM 139 - Hearing Conservation Report. If there is a 10dB or greater difference between the left and right ears at any one frequency refer to a Medical Officer. 															
Date of hearing test															
	500	1000	1500	2000	3000	4000	6000	8000	Hearing standard						
R															
L															
Visual acuity															
Distant			Near (N5)												
R 6/	Corr to 6/	R	Corr to												
L 6/	Corr to 6/	L	Corr to												

NO, AMA, SMA or authorised delegate conducting health assessment

Signature	Printed name	Rank	Phone number	Date
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MEDICAL-IN-CONFIDENCE (After first entry)

Number	Rank	Family name	Given name(s)	Encl or folio
--------	------	-------------	---------------	---------------

MO to complete

Targeted physical examination findings	Normal	Abnormal	Comments
Respiratory			
Cardiovascular			
Gastrointestinal			
Neurologic			
Dermatologic			
Orthopaedic			
ENT			
Other			

Army only (Refer DI(A) PERS 159-1)

P	U	L	H	E	E	M	S	MEC	Specialist employment classification

Does the member require medical reclassification?

Yes No

Medical fitness recommendation

Is the member cleared for full specialist duties without restrictions?

Yes No

Has the unit been notified by either PM 101 - Medical or Dental Fitness Advice, PM 064 - Notification of Medical Assessment or by a Diver's Log Book?

Yes No

The member requires the following restrictions

Have all outstanding vaccinations been completed?

Yes No

Has post deployment screening been conducted (If applicable)?

Yes No

Is a continuation sheet attached?

Yes No

Has UMR been reviewed?

Yes No

Individual readiness status

Ready Not ready

Medical Officer conducting health assessment

Signature	Printed name	Rank	Phone number	Date
-----------	--------------	------	--------------	------

Confirming authority (If required)

Is MEC valid?

Yes No

Recommendations

Signature	Printed name	Rank	Phone number	Date
-----------	--------------	------	--------------	------

MEDICAL-IN-CONFIDENCE (After first entry)

- Reporting is required in accordance with DGDHS Health Directive 224 Notifiable Condition Reporting in the Australian Defence Force

Service number		Encl or Folio
Rank		
Family name		
Given name(s)		
Date of birth	Gender	

Pregnancy test (If directed by Medical Officer)

Serum BhCG test
 Positive Negative

Date of pregnancy test

Blood screening

G6PD
 Normal Deficient

Date of blood screening Place of blood screening

Has a previous Primaquine course been completed?

Yes No

Glasses or contact lenses

Does the member wear glasses?

Yes No

Is member in possession of spare spectacles and corrective refraction inserts for NBC masks? (Copy of prescription in UMR)

Yes No

Does the member wear contact lenses?

Yes No

Current medications

The member will require sufficient supply of the listed medications for the entire duration of deployment

Medications	Script written	
	Yes	No

Has pre-deployment operational stress management training been completed?

Yes No

Has a dental check been completed?

Yes No

Dental class

Medical Officer confirmation (To be signed within 7 days of deployment date)

Is member fit to be deployed?

Yes No

Is a waiver required?

Yes No

Waiver is to be granted by FMO MHQ/SOH HQAC/COLHLTH and SO1 DENT LHQ (Please attach a copy)

Signature	Printed name	Rank	Unit	Date
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Distribution

Original – To be attached to the member's Unit Medical Record.

Copy 2 – To be forwarded to:
 Defence Health Service
 Operational Health Surveillance
 CP2-7-158
 Canberra ACT 2600

Annex M - Post-deployment Health Screen

MEDICAL-IN-CONFIDENCE (After first entry)

AD 392 - Revised

28 October 2005

Department of Defence

Post Deployment Health Screen

GUIDANCE NOTES ON OBTAINING EXPOSURE HISTORY

The exposure history attempts to broadly determine exposure risk. The exposure to any hazard should be greater than normally encountered in a work setting.

Exposure Risk Assessment Guidance Notes Describe the circumstances of exposure. Where, how often and how much exposure occurred? Were there any symptoms following exposure? Was any personal protective equipment worn?

Hazardous Situation	Situation	Advice
Entry to Industrial or Chemical Manufacturing / Storage Sites	Look for genuine exposure to chemicals eg entry to areas where large amounts of chemicals were stored. Note presence of strong odours	No Specific Action For documentation
Oil Fire Smoke /Smoke from waste incineration	How close was the subject to the source? How long was spent within the smoke blanket? Any symptoms noted at the time or shortly after? What type of smoke? Oil, waste or unknown chemical.	No Specific Action For documentation Seek DPH advice if required
Exposure to Diesel Exhaust Fume	This is a common environmental hazard, persons at higher risk are those regularly exposed in poorly ventilated areas, or those subjected to conditions of increased fume density.	No Specific Action For documentation
Fuels (aviation, marine or automotive)	Odour from fuels and small splashes are common and of no significance. Persons at increased risk are those working with fuels in confined spaces for prolonged periods, those who developed symptoms after fuel handling, and those doused in fuel and unable to shower.	No Specific Action For documentation Seek DPH advice if required
Solvents (eg thinners, glues, sealants) and Paints	The type, quantity and frequency of exposure should be noted. Any symptoms experienced during or shortly after use. Aerosolised paints are of particular concern, especially with indoor use. Note the use of a respirator or otherwise.	No Specific Action For documentation Seek DPH advice if required
Pesticides /Herbicides	Thermal Pesticide Foggers — being exposed to the pesticide fog/mist	No Specific Action For documentation
Dusts or Fibres	Exclude sandstorms. The nature/source is important to determine if possible e.g. insulation/building materials/chemicals	No Specific Action For documentation
Non-ionising Radiation (eg Radar or Microwave Transmitters)	Known incidents of close proximity to powerful transmitting sources whilst transmitting. Generally being in front of or to one side is a particular risk.	No Specific Action For documentation Seek DPH advice if required
Excessive Noise and Vibration	Noise hazards are very common especially in combat areas. All personnel claiming exposure to loud noise should undergo an audiogram.	Audiogram
Lasers	Known or suspected incidents of laser exposure. Note any ocular symptoms.	Measure V/A and visual field. Refer Ophthalmologist
Ionising radiation or radioactive materials	Known contact or proximity to an unshielded IR source. Look for acute health effects which may occur up to several weeks later.	Seek specialist advice re long term health monitoring
Potentially Contaminated Water – either through drinking or swimming	Note any exposure to potentially contaminated water. Note the possible source and type of contamination.	No Specific Action For documentation
Other Incidents or Concerns	An opportunity to raise any other issues of concern to the member.	
Directorate Preventive Health (DPH) contacts	Consultant in Occupational Medicine: (02) 6266 3830 SO2 Occupational Health: (02) 6266 4194	

AD 392 - Revised

28 October 2005

MEDICAL-IN-CONFIDENCE (After first entry)

Page 1 of 4

MEDICAL-IN-CONFIDENCE (After first entry)

Department of Defence Post Deployment Health Screen

Operation Name

PMKeys number	
Service number	
Rank	
Family name	
Given name(s)	
Date of birth	Gender

Encl or Folio

Reporting is required in accordance with DGDHS Health Directive 224 - Notifiable Condition Reporting in the Australian Defence Force.

This form is to be attached to the front inside cover of member's Unit Dental Record.

Deployed Unit

Unit Location

The above-named member has served in the Operation during the following period:

Commencement date	Completion date
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During Deployment was the member admitted to a medical facility?

Yes No

Date of admission	Length of time in medical facility	Diagnosis or Clinical Features

At any stage, during or since returning from the Operation has the member had any of the following? *(tick those which are applicable)*

<table border="1" style="width: 100%; text-align: center;"> <tr><td>Yes</td><td>No</td></tr> <tr><td> </td><td> </td></tr> </table> <p>Unexplained fevers, flushes or sweating</p>	Yes	No			<table border="1" style="width: 100%; text-align: center;"> <tr><td>Yes</td><td>No</td></tr> <tr><td> </td><td> </td></tr> </table> <p>Haemoptysis</p>	Yes	No			<table border="1" style="width: 100%; text-align: center;"> <tr><td>Yes</td><td>No</td></tr> <tr><td> </td><td> </td></tr> </table> <p>Malaise/Lethargy</p>	Yes	No		
Yes	No													
Yes	No													
Yes	No													
<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Unexplained joint or muscle pain</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Unexplained loss of weight</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Commenced Smoking</p>								
<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>A persistant cough</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Skin rashes, lesions or ulcers</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Alcohol overuse</p>								
<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Sandfly or mosquito bites</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Animal bite or scratch</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Other unusual or unexplained symptoms or signs</p>								
<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Diarrhoea</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Since returning from the Operation has the member been sick?</p>			<table border="1" style="width: 100%; text-align: center;"> <tr><td> </td><td> </td></tr> </table> <p>Needle stick injury</p>								

Date	Diagnosis, Clinical Features or Comments

(if insufficient space attach comments on form PM 223 Continuation Sheet)

MEDICAL-IN-CONFIDENCE (After first entry)

Service number and Employee ID	Family name	Department of Defence	Initials	Date of Birth
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Civilian Populations in the Operation area may have been exposed to the health threats listed below, therefore the following diseases should be considered:

Amoebiasis	Diarrhoeal Diseases	Malaria	Shingellosis
Anthrax (endemic)	Filarial diseases	Onchocerciasis	Sindbis Fevers
Arbovirus Infections	Hepatitis (All types)	Plague	STDs (including HIV)
Brucellosis	Hydatid disease	Q Fever	Toxoplasmosis
Cholera	Intestinal worms/protozoa of various types	Rabies	Tuberculosis
Crimean-Congo Haemorrhagic Fever	Leishmaniasis	Rickettsial diseases	Typhoid
Dengue Fever	Leptospirosis	Schistosomiasis	

Targeted physical examination is specifically looking for evidence of Leishmaniasis. This examination should be performed after the examining Medical Officer has read Health Bulletin 06/2003 – Leishmaniasis.

Targeted physical examination				
Temperature:		Pulse:		Blood pressure:
Abnormalities detected	Yes	No	Comments	
Skin (scalp to toe examination)				
Ulcerated lesions				
Subcutaneous nodules				
Lymphadenopathy				
Liver enlargement				
Spleen enlargement				

Did the member experience any adverse effect associated with any of the pre-deployment vaccinations? If so what were the symptoms and how long after the vaccination did they experience them.

MEDICAL-IN-CONFIDENCE (After first entry)

Service number and Employee ID	Family name	Department of Defence	Initials	Date of Birth
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Hazardous Situation [For further assistance use the attached guidance notes]	Frequency of Exposure				Exposure above normal duty levels		The exposure history attempts to broadly determine exposure risk. The exposure to any hazard should be greater than normally encountered in a work setting
	Never	Once	Weekly	Daily	Yes	No	
	✓ appropriate box				✓ appropriate box		Medical Officer Comments
Entering or being in close proximity to recently destroyed military vehicles or structures							
Entry to industrial/chemical manufacturing/storage sites							
Oil Fire Smoke/Smoke from Waste Incineration							
Exposure to Diesel Exhaust Fumes							
Fuels (aviation, marine or automotive)							
Solvents (eg thinners, glues, sealants) or Paints							
Pesticides / Herbicides							
Dusts or Fibres							
Non-Ionising Radiation (eg Radar or Microwave Transmitters)							
Excessive Noise and Vibration							
Lasers							
Ionising radiation or radioactive materials							
Potentially Contaminated Water – either through drinking or swimming							
Other Incidents/Concerns							

N.B in all cases where there is a clear history of high risk exposure to hazardous agents seek specialist advice from the Directorate of Preventive Health (DPH) and note any advice given

Contacts in DPH:
 Consultant in Occupational Medicine: (02) 6266 3830 SO2 Occupational Health (02) 6266 4194

Signature	Medical Officer	Location	Date	Contact Number
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Distribution

Original:	Copy 2	Copy 3:	
	NAVY & RAAF to be forwarded to:	ARMY to be forwarded to :	To be forwarded to:
To be filed as an enclosure in the member's UMR	Navy and Air Force ADF Health Records Department of Defence Queanbeyan Annex 4 Canberra ACT 2600	ADF Health Records - Army GPO Box 1932R Melbourne VIC 3001 For inclusion on the member's CMR	Defence Health Service Branch Operational Health Surveillance CP2-7-158 Canberra ACT 2600

Annex N - Health/Medical Insert Slips

MEDICAL-IN-CONFIDENCE *(After first entry)* Department of Defence

AD 367
Amended 17 May 04

Health Insert Slip – Op ANODE

- Reporting is required in accordance with DGDHS Health Directive 224 Notifiable Condition Reporting in the Australian Defence Force

Service number and Employer ID	
Rank	
Family name	
Given name(s)	
Date of birth	Gender

Encl or Folio

Deployed Unit

The above-named member has served on Op Anode during the following period:

Commencement date	Completion date
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Post deployment, the following actions are to be completed and signed off by the member's treating medical facility. Navy personnel are to satisfy single service re-deployment requirements.

Action	Initials	Date	Results
G-6-PD screening has been confirmed prior to commencement of malaria eradication course or history of previous Primaquine course taken			
Doxycycline 100mg per day for 14 days on RTA. OR <i>(if contra indicated)</i> Mefloquine 250mg once weekly for two weeks			
Completed malaria eradication course of Primaquine <i>two tablets twice per day (To be taken concurrently with doxycycline) for 14 days on RTA</i>			
Return to Australia Psychological Screening on leaving area of operation			
Post Operational Psychological Screening within 3 months of RTA <i>(Ongoing support provided where indicated)</i>			
Mebendazole 100mg twice a day for 3 days <i>(Starting on the day of return to Australia depending on location of deployment or if clinically indicated)</i>			
Post Deployment Health Screen completed			
TST <i>(Depending on location of deployment and if clinically indicated)</i>			
AHA (at 3 months post RTA)			
HIV screening (at 3 months)			
HCV screening (at 3 months)			
Signature	Medical Officer	Location	Date
			Contact Number

Distribution

Original:

To be filed as an enclosure in the member's UMR

Copy: Navy

Navy Health Records
Department of Defence
Queanbeyan Annex 4
Canberra ACT 2600

Copy: Army

Army Health Records
GPO Box 1932R
Melbourne VIC 3001

Copy: Air Force

Air Force Health Records
Department of Defence
Queanbeyan Annex 4
Canberra ACT 2600