

## **Bougainville Health Study**

### SUMMARY PROJECT COMPLETION REPORT

#### **Key Findings**

The Bougainville Health Study is one of three studies in the Near North Area of Influence and contributes to the first wave of findings on the health of ADF personnel who deploy. Key findings from the study were:

- No statistically significant differences between the veterans and the comparison group in symptoms of posttraumatic stress.
- No clear differences in the symptoms self-reported or in measures of general health, limitations in work and other activities as a result of physical health and social functioning between the study groups.
- No statistically significant differences in smoking or alcohol consumption between the deployed and the comparison groups.
- No significant difference between cancer incidence and mortality rates associated with deployment on the Bougainville operations, although follow-up time is short.

#### **Background**

Bougainville, an island to the east of Papua New Guinea (PNG), has been administered as a province of PNG since 1975. The Bougainville Revolutionary Army formed in 1988 in opposition to the mining activities associated with a large copper mine and also sought unilateral independence from PNG, starting the most bloody and destructive conflict in the South Pacific Region since World War II.

Following peace talks in New Zealand in October 1997 military and civilian teams from Australia, New Zealand, Fiji and Vanuatu were deployed to Bougainville to facilitate the peace process.

Australian Defence Force (ADF) personnel were deployed to Bougainville as part of the Truce Monitoring Group (TMG) and Peace Monitoring Group (PMG). Operation BEL ISI I, the New Zealand-led TMG, lasted from November 1997 to April 1998 and was a non-warlike service. Operation BEL ISI II, led by the Australian PMG, was also a non-warlike operation and lasted from April 1998 to August 2003.

Preparation of Australian military support to the TMG was on short notice, with a rushed deployment for service personnel. ADF members deployed to Bougainville were exposed to potential hostilities without their weapons, and were in an unfamiliar operational environment.

## **Introduction**

The Department of Defence has an agreement with the Centre for Military and Veterans' Health (CMVH) to undertake health studies within the Deployment Health Surveillance Program. A study has been completed by CMVH for the Solomon Islands and another for East Timor in parallel to this study. Findings from the health studies will inform a long-term and ongoing health surveillance program to support the health and well-being of Defence personnel and veterans.

## **Aims**

To conduct an investigation of the health status of all ADF personnel who deployed to Bougainville between November 1997 and August 2003.

## **The Key Research Questions**

The following key research questions were asked in investigating the health status of deploying ADF personnel:

- a. Do Bougainville veterans have different rates of negative mental health outcomes relative to an ADF comparison group who did not deploy to Bougainville?
- b. Do Bougainville veterans have different general health problems from an ADF comparison group who did not deploy to Bougainville?
- c. Do Bougainville veterans have different health behaviours relative to an ADF comparison group who did not deploy to Bougainville? For example, were there different rates of tobacco smoking and alcohol consumption?
- d. What deployment issues and hazards were reported by Bougainville veterans?
- e. Do Bougainville veterans have different rates of mortality or cancer from an ADF comparison group who did not deploy to Bougainville?

## **The Study Design**

This study is of retrospective, cross-sectional design with a comparison group matched across strata of age, gender, Service (Navy, Army and Air Force) and service type (regular or reserve).

## **Methodology**

Following ethics approval, the study was undertaken in 2008. In answering the research questions the following sources of data were utilised:

- Mortality and Cancer Incidence registries
- A comprehensive self-reported health status questionnaire
- A deployment experiences self-report questionnaire
- Defence Health Records (from Unit Medical Records or Central Medical Records)
- Defence psychological screening records: Return to Australia Psychological Screen (RtAPS) and Post Operational Psychology Screen (POPS).

**Table1. Summary of data collection**

<b>Data Source</b>	<b>Veterans</b>	<b>Matched Comparison</b>
Identified on nominal roll as eligible	4,775	9,434
Mortality and cancer incidence registries	4,775	9,434
Invited to participate in study	4,775	2,363
Completed self-reported health questionnaire	2,342	860
Defence health data	1,534	771
Deployment questionnaire	1,999	N/A
RtAPS in database with scales used in current research	113	N/A
RtAPS and corresponding POPS data	34	N/A
Self-report data, consent, and RtAPS with screens	42	N/A

## Study Findings

### a. Do Bougainville veterans have different rates of negative mental health outcomes relative to an ADF comparison group who did not deploy to Bougainville?

No difference was found between the Bougainville veterans and the comparison group in the PCL-C scores. The PCL-C is a self report measure that asks about problems in relation to stressful experiences where a high score is a good predictor of PTSD.

Similarly there was no difference in the mean K10 scores or the proportions scoring in the highest category. The K10 is a scale measuring non-specific psychological distress. It aims to measure the level of anxiety and depressive symptoms a person may have experienced in the four weeks prior to the questionnaire completion.

When a comparison was made between CMVH and Defence post-deployment data increased rates of distress was evident in the CMVH self-report data. Further research will seek to discover the reason for the difference.

### b. Do Bougainville veterans have different general health problems from an ADF comparison group who did not deploy to Bougainville?

The research showed 41% of both Bougainville veterans and the comparison group perceived their health to be either 'very good' or 'excellent'. A further 41% of Bougainville veterans and 38% of the comparison group rated their health in the middle category of 'good'. Sixteen percent of veterans and 18% of the comparison group rated their general health as 'fair'. 'Poor' health was endorsed by 2% of veterans and 3% of the matched comparisons.

The most common symptoms reported by respondents were fatigue, feeling unrefreshed after sleep and sleeping difficulties, with approximately 60% of respondents recording these events. The prevalence of the top 15 symptoms was similar between the veterans and matched comparison. The mean total number of self-reported symptoms was the same in the study groups.

Overall, Bougainville veterans were not shown to have any increased negative health outcomes. There were no clear differences in the measures of general health, limitations in work and other activities as a result of physical health and social functioning between the study groups.

**c. Do Bougainville veterans have different health behaviours relative to an ADF comparison group who did not deploy to Bougainville? For example, were there different rates of tobacco smoking and alcohol consumption?**

The research found that deployment had no effect on smoking or alcohol consumption. There were proportionally fewer Bougainville veterans in the highest risk category for alcohol consumption compared with the comparison group (1% vs. 2%, from the Defence Health data).

An investigation into the Body Mass Index (BMI), which is used as a measure of healthy weight, found that 33% of Bougainville veterans and 31% of the comparison group were in the healthy weight range (18.5-25.0). In the higher range (25.0-30.0) the study found 46% of veterans and 48% of matched comparisons while 20% of veterans and 21% of comparisons had a score higher than 30. Since June 2006 applicants with a BMI of 30.0-33.0 who satisfy all other health standards have been deemed fit for entry, irrespective of their body fat percentage.

**d. What deployment issues and hazards were reported by Bougainville veterans?**

An analysis of vaccination data showed that approximately one quarter of individuals, for whom data were available, required four or more vaccinations in the three months prior to deployment. It is currently unclear whether any specific combination or timing of administration of vaccinations required for deployment to Bougainville has a relationship to any particular health effects.

Most respondents used some form of insect repellent at least daily or weekly, and over half had their clothing and tent treated with pesticide. Ninety-four percent of deployed participants reported using some form of antimalarial medication, and 69 % reported taking Primaquine on return to Australia. Most of these (98%) reported good compliance with the regimen with very few reporting a reaction to Primaquine. Primaquine is used to treat malaria and to prevent the disease from coming back in people that are infected with malaria.

Sixty percent of participants reported their health was the same at the time of the survey compared with their recollection of their general health before deployment to Bougainville, and over 34% stated that it was worse now.

A wide variety of exposures to hazards on deployment were reported by Bougainville veterans. Most respondents reported: swimming or bathing in local lakes, rivers or the sea (89%); being bitten by a variety of insects (78%); and living in an area recently treated with pesticides (75%). Additionally, 36% of Bougainville veterans reported exposure to chemical spills or chemically

contaminated sites, and 72% of these respondents reported that this exposure occurred weekly or more often.

The major stressors reported by veterans included separation from family and friends (66%) and the behaviour of others (59%), but most felt that they had made a useful contribution to the local population (79%) and the military mission (95%).

**e. Do Bougainville veterans have different rates of mortality or cancer form an ADF comparison group who did not deploy to Bougainville?**

The death rate from all causes in the Bougainville veterans was lower than that observed in the comparison group and both the veteran and comparison groups had lower mortality rates, from all causes, than the general population of the same age.

The overall rate of new cases of cancer that were detected in the Bougainville veteran group was similar to that observed in the comparison group. Bougainville veterans and the comparison group both had similar overall rates of detection of new cases of cancer to those observed in the general population of the same age.

**Study strengths and limitations**

The study obtained a 45% response from personnel invited to complete the self-report questionnaire.

Longer follow-up times and additional alternative methods for contacting, particularly ex-serving members, have the potential to increase response rates in future studies.

A higher response rate would have increased the study's ability to detect small to modest differences between the veteran and comparison groups. However, the questionnaire response does represent 3,202 individuals.

Without an electronic health information system being used consistently throughout Defence the researchers were required to seek information from paper Unit Medical Records or Central Medical Records. Such a process was limiting in the number of Defence records that could be utilised.

Defence protocols for data collection for health and psychological screening changed over the long period of the Bougainville operations. This limited the comparable data for the veteran and comparison groups and before and after deployment data for the veteran group.

Members of the comparison group may have deployed to locations other than Bougainville and all participants may have deployed to other and in some cases many other locations.

**Future research**

The Near North Area of Influence (NNAI) Study will be analysing results from the Bougainville, East Timor and Solomon Islands studies to answer research questions in relation to the effect of multiple deployments on health, differences in mental health

findings that correlate to different research approaches, and patterns in self-report symptoms.

There are many specific research questions that can and should be explored to inform Defence, the Department of Veterans' Affairs and the public audience about potential consequences on mental and physical health of deployment. CMVH will be engaging the members of Defence advisory committees and their Scientific Research Team in identifying, analysing and preparing papers to identified questions.

### **Conclusion**

This is the first wave of data collection on important self-reported exposure data. Health outcome measures are short to mid-terms at this wave. Longer term follow-up is warranted on the entire cohort.