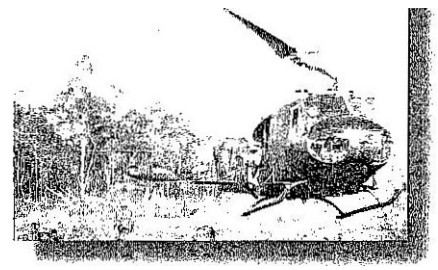
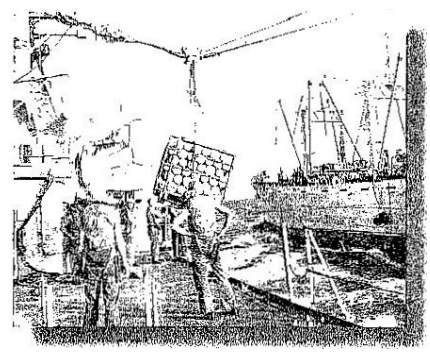
Australian Government
Department of Veterans' Affairs
Australian Institute of Health and Welfare

Australian National Service Vietnam Veterans

Mortality and Cancer Incidence

2005





Executive Summary

Study initiation

A key recommendation of the 1997 *Mortality of Vietnam Veterans: The Veteran Cohort Study* was to monitor the mortality of Vietnam veterans and repeat the study after 2000. In 2002, the then Minister for Veterans' Affairs agreed that the Repatriation Commission should undertake the *Third Vietnam Veterans Mortality Study* and *Cancer Incidence in Vietnam Veterans Study*. The Commission asked the Australian Government Depmiment of Veterans' Affairs (DVA) to conduct these studies which were undertaken with assistance from the Australian Institute of Health and Welfare (AIHW).

This report is the third of four volumes published in this study on Vietnam veterans. The other volumes are:

- *Cancer Incidence in Australian Vietnam Veteran Study 2005;*
- The *Third Australian Vietnam Veteran Mortality Study 2005;* and
- *Dapsone exposure and Australian Vietnam Service: Mortality and Cancer Incidence 2005.*

Study objectives

The objectives of the National Service study were to:

- identify all deaths among the male Australian National Service Vietnam era cohort from the time of completing service to 31 December 2001;
- identify all cancers diagnosed among the male Australian National Service cohort from 1982 to 31 December 2000;
- compare mortality and cancer incidence among the National Service cohort with the expected mortality and cancer incidence of the Australian community; and
- compare mortality and cancer incidence of National Servicemen who went to Vietnam to that of National Servicemen who served only in Australia.

Study design

This study was a retrospective cohort study of male National Service personnel who served in the Vietnam era between 1966 and July 1973. The study examined all deaths identified from the end of service to 31 December 2001 and all cancers diagnosed from 1982 to 31 December 2000. Relative mortality and cancer incidence rates were calculated for National Servicemen who served in Vietnam compared to those National Service personnel who served only in Australia during the Vietnam era. Standardised ratios comparing the National Service cohort to the Australian population were also calculated.

Report structure

Chapter One of the report provides a brief background to the Vietnam War and the National Service scheme. **Chapter Two** details the methods used for this study. In brief, the study roll of National Servicemen was matched to a number of databases to determine vital status, the number of deaths and their causes and the number and types of cancers diagnosed. The mortality and cancer incidence experience of National Servicemen who went to Vietnam was compared to that of those that served in Australia. Comparison of mortality and cancer incidence for both groups was also made to the Australian population.

Chapter Three presents the results of the analysis and the findings are discussed in **Chapter Four**.

Features of the study

A great strength of this study is that it controls for the healthy worker or healthy soldier effect. The study compares Mortality and cancer incidence among National Servicemen with and without service in Vietnam. The two populations appear to have been very similar at the time of recruitment. Hence any differences in their mortality or cancer incidence are likely to be related to whether or not they went to Vietnam. The study approximates a natural experiment with individuals assigned to service in Vietnam essentially at random. Both groups were composed of equally healthy, fit soldiers who at the time of entry into the study differed essentially only by their Vietnam service.

The study does, however, have some limitations. It does not have information about individual exposure to specific chemical or environmental hazards, either at

the time of military service or subsequently. Variations in the nature of deployment or subsequent lifestyle or events for an individual are not known.

A second limitation is that there were no good measures of dose. Although information regarding time in Vietnam was available for the veteran group, this was not necessarily indicative of intensity of experience.

Furthermore, the Servicemen in the study cohort were generally middle aged by the end of the study (the majority was under 56 years old). As such, there are diseases of old age such as prostate cancer or degenerative mental disorders such as dementia, where few cases or deaths would be expected and meaningful observations on these conditions cannot be made.

Findings

This report presents the results of both indirect and direct comparison of mortality and cancer incidence. The indirect comparison analysis compares the mortality and cancer incidence of National Service veterans and non-veterans to the Australian community norms. The direct comparison analysis compares the rate of mortality and cancer incidence among National Service veterans to National Service non-veterans. This direct comparison examines the Vietnam effect and controls for the healthy worker effect.

Direct comparison of National Service veterans to non-veterans

- National Service veterans experienced a 23% higher overall mortality than non-veterans, RR= 1.23 (95% CI 1.13, 1.34).
- Mortality from digestive system diseases (primarily alcoholic liver disease) was more than double that observed in non-veterans.
- Deaths from motor vehicle accidents and suicide were significantly elevated among veterans by 31%and43%, respectively.
- Mortality from mental disorders and neoplasms was also elevated among veterans, but of borderline statistical significance, RR= 2.75 (95% CI 0.98, 8.83) and
  RR= 1.16 (95% CI 0.98, 1.36), respectively.
- National Service veterans had a significant 14% elevation in their rate of cancer incidence compared to non-veterans, RR= 1.14 (95% CI 1.04, 1.26).
- National Service veterans experienced more than double the incidence of lung cancer, RR= 2.35 (95% CI 1.60, 3.49), head and neck cancer, RR= 2.02 (95% CI 1.23, 3.37) and cancer of the pancreas, *RR* == 2.46 (95% CI 1.04, 6.27).

- Lung cancer mortality was 79% higher than expected, RR;:::: 1.79 (95% Cl 1.22, 2.65) and death from cancer of pancreas was more than three times higher than expected, RR;:::: 3.13 (95% Cl 1.31, 8.26).

- There were no causes of death analysed for which National Servicemen who served in Vietnam had a statistically significant lower mortality rate than National Servicemen who did not serve in Vietnam. Furthermore, no specific cancer investigated had a statistically significant lower than expected incidence or mortality among veterans compared to non-veterans.

Indirect comparison to the Australian community norms

This study has shown that National Servicemen of the Vietnam War era exhibit a strong healthy worker effect. Overall mortality was 27% lower than expected, 19% lower for those that served in Vietnam and 33% lower for those who did not serve in Vietnam. For the over 60 specific causes of mortality investigated, no cause of death was significantly more common than expected within the Australian community and many were significantly less common than expected.

Summary and Conclusion

Taken together, the results showed that due to the healthy worker effect, National Servicemen as a group had lower mortality and cancer incidence rates than the general population. However, veterans who served in Vietnam experienced a higher than expected mortality and cancer incidence compared to their colleagues who did not serve in Vietnam. Specific causes of death that contributed to the higher than expected mortality include death from diseases of the digestive system (primarily liver diseases), lung and pancreatic cancer and death from external causes such as suicide and motor vehicle accidents. The incidence of lung, pancreatic and head and neck cancers was also higher than expected.

4;5 Summary and Conclusions

This study compared the mortality and cancer incidence of two groups of military personnel who at the time of enlistment were a similar age and at similar levels of health and fitness. The study, therefore, controlled for the healthy worker effect and analysed the effect of Vietnam service for National Service veterans.

The study showed that as a group National Servicemen were generally healthier than the same aged Australian male population. However those who served in Vietnam had significantly greater mortality for a number of conditions compared to their non-veteran counterparts. These included overall mortality, mortality from digestive disease, particularly alcoholic liver disease, and deaths from external causes, particularly motor vehicle accidents and suicide. In addition, overall cancer incidence was elevated and specifically the incidence of cancer of the lung, head and neck and pancreas was elevated. Mortality from cancer of the lung and pancreas was also significantly elevated. There was no condition analysed for which National Service veterans had a significmtly lower rate of mortality or cancer incidence than the non-veteran group.

There were also a number of conditions for which the relative rates were higher than expected but the results were of borderline statistical significance. These conditions included mortality from neoplasms, mental disorders, motor neurone disease and to a lesser extent, mortality from ischaemic heart disease and the incidence (but not mortality) from melanoma.

For some conditions the pattern of relatively higher i

ncidence but lower than expected mortality among the veterans may suggest that their conditions and/or their risk factors were detected earlier and appropriately managed. These include a number of cancers such as melanoma and colorectal cancer and to a lesser extent
a proportionally lower mortality from cerebrovascular disease and prostate cancer.

The study showed contradictory results for those conditions associated with herbicide/dioxin exposure. The incidence for a number of cancers strongly associated with herbicide exposure> such as connective soft lissue cancer, Hodgkin's disease, chronic lymphoid leukaemia and non-Hodgkin's lymphoma did not differ significantly between the National Service gro:.ips. Two of the three cancers which have been categorised as having suggestive evidence of an association, that is lung cancer and multiple myeloma, were more frequent amongst veterans, whereas the third cancer in this category, prostate cancer, did not differ between the groups.

In conclusion, two groups of fit healthy men who were enlisted into military service more than 30 years previously were compared. Those who served in the Vietnam War experienced higher levels of mortality and cancer incidence than those who served in Australia. Furthermore, for the period under study this cohort of National Servicemen was generally younger than the peak age of incidence for many of the diseases of interest. As this cohort ages clearer patterns of disease may emerge.