MONASH University

HEALTH STUDY 2005

AUSTRALIAN VETERANS of the KOREAN WAR

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June 2005

Australian Government
The Repatriation Commission

30 June 2005

The Hon De-Anne Kelly
Minister for Veterans' Affairs
Parliament House
CANBERRA ACT 2600

Dear Minister

I have pleasure in submitting the final report of the *Health Study2005: Australian Veterans of the Korean War*. This study has investigated the level of physical and psychological health, quality of life and life satisfaction, among Australian male veterans of the Korean War, and compared these to the corresponding levels found within a comparison group of similar aged Australian males who did not serve in Korea.

The study further aimed to investigate whether specific service-related characteristics of the Korean War deployment were associated with current health. The study is the third and final concerning Australian Veterans of the Korean War. The Mortality, Cancer Incidence and the General Health studies combined represent a significant contribution to the understanding of the health and wellbeing of Australia's Korean Veteran community.

The report's preparation was supervised by the Study Scientific Advisory Committee, the membership of which is set out at Appendix B.

I would like to take this opportunity to thank the members of the Korean War Veterans Health study Consultative Committee for their assistance and cooperation during the conduct of this study. Due to the length of time over which the combined studies were conducted, a number of changes in membership took place. A full list of members, and the ex-Service organisations they represented, is at Appendix C of the report.

I would also like to thank the Australian Institute of Health & Welfare, for their considerable assistance over the course of the study, Dr Keith Horsley, Specialist Adviser Health Studies and the other departmental staff who worked on this study.

Yours sincerely

Simon Harrington
COMMISSIONER

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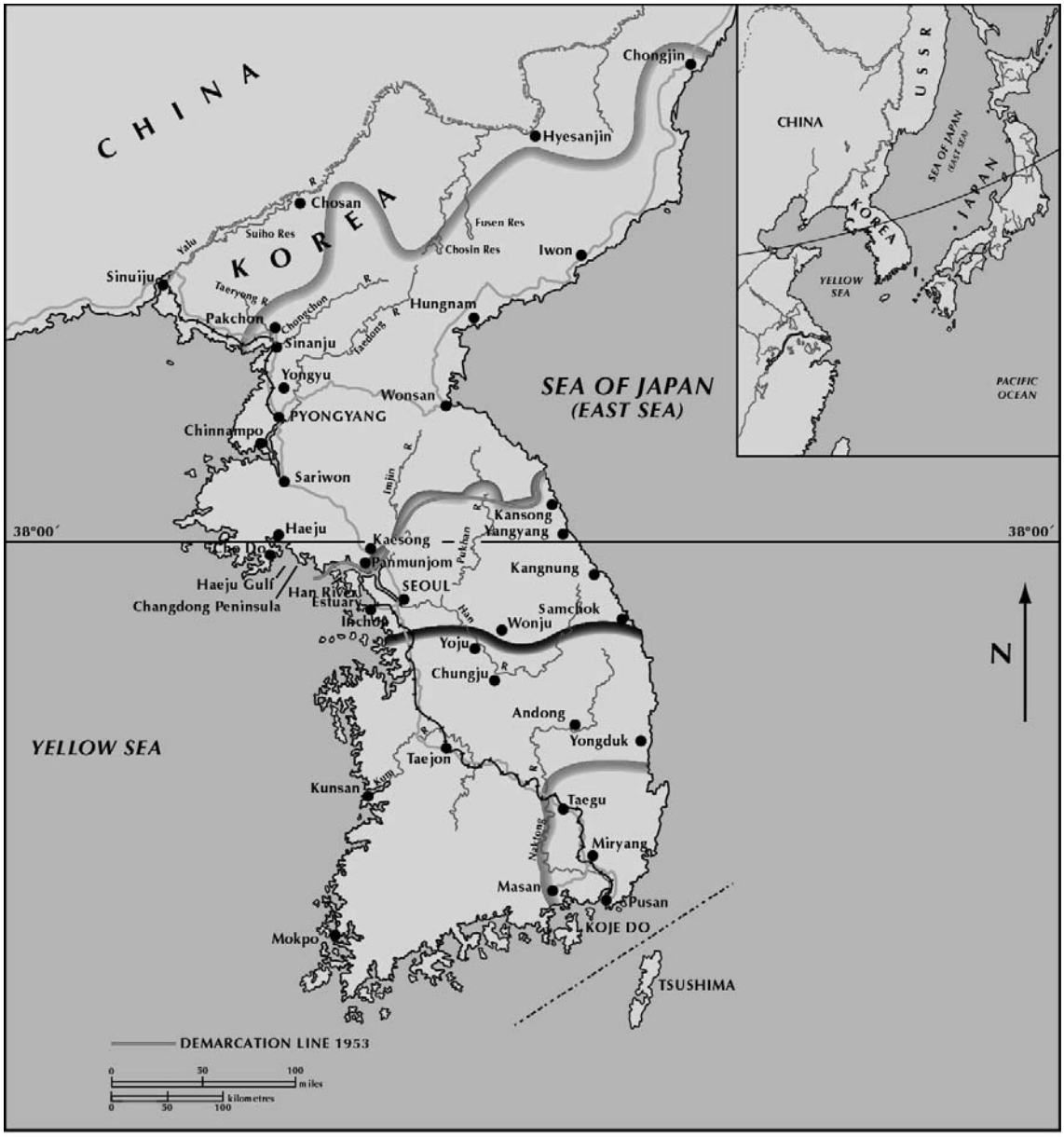

The Korean peninsula and the four stages of the war

i. Pusan Perimeter – limit of the North Korean advance to September 1950

ii. Furthest advance of UN forces to end October 1950

iii. Limit of Chinese advance to end January 1951

iv. Battle front June 1951 – July 1953 and ultimate demarcation line

Professor Priscilla Kincaid_Smith
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31 May 2005

Rear Admiral C S H Harrington AM RAN (Retd)
Repatriation Commissioner
PO Box 21
Woden ACT 2606

Dear Rear Admiral Harrington,

I have great pleasure in providing you with a copy of the *Health Study 2005: Australian Veterans of the Korean War*, which has been completed by Monash University on behalf of the Department of Veterans' Affairs. The Scientific Advisory Committee has endorsed this study and congratulates Monash University on the excellent response.

The combined results of the Mortality, Cancer Incidence and Health studies show that Korean War veterans have experienced post-war mortality and some cancers at excessive rates. The surviving Korean War veterans continue to experience extremely poor psychological and physical health and a low level of life satisfaction and quality of life.

As is noted in the Report, we can not change their war-related experiences, and lifestyle risk factors, of the past, but health interventions have been shown to be effective in alleviating significant ill health experienced by ageing veterans. The results of this study should be useful in identifying the most appropriate health interventions, and level of service provision, required by surviving Korean War veterans.

As the Report also notes, the study has demonstrated that the long-term health effects of war service can be severe, and can still be present fifty years after the end of hostilities. The results will assist in identifying risk factors of younger veterans from more recent conflicts and provide valuable information about the long-term effects of war-related activities that may assist the Department of Defence in developing better safeguards against future health threats to Australia's armed forces overseas.

Kind regards.

Yours sincerely,

Priscilla Kincaid-Smith AC
Chair
Scientific Advisory Committee
Korean War Veterans' Medical Studies

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DEFINITIONS

For the purpose of this study:

Korean War veterans are defined as members of the Australian Army, Royal Australian Navy or the Royal Australian Air Force who landed in Korea or who entered the waters surrounding the coast of Korea within a distance of 185 kilometres seaward, including those who were seconded to the Army of the Republic of South Korea, the United States Air Force or Navy, the British Army, Navy or Air Force and any other allied Service; members of philanthropic organisations; members of the Australian Forces Overseas Fund and official entertainers and war correspondents who saw service in Korea between 27 June 1950 and 19 April 1956.

This definition excludes:

- members of the diplomatic corps;
- entertainers other than those who were regarded as 'official';
- members of the Army of the Republic of Korea or of any other army who have become Australian citizens subsequently;
- Australian citizens employed in Korea by overseas business organisations or governments; and
- civilian non-medical aid and charity workers other than members of philanthropic organisations who were accredited to the Australian Defence Force; and merchant mariners.

The term ***Service branch*** is used in this report to mean one or more of the three distinct arms of the Australian armed forces, namely the Royal Australian Navy, the Australian Army and the Royal Australian Air Force.

The ***population sample*** is a sample of Australian men aged 65 years and above, drawn randomly from the Australian Electoral Roll, and invited to participate in this study.

The ***comparison group*** is the subgroup of participating population sample subjects who reported that they were residing in Australia in 1953 or earlier. It is against this group that the health outcomes of the Korean War veteran participants are compared in the first Participant Results chapter (Chapter 6) of this report.

ABBREVIATIONS

ABS	Australian Bureau of Statistics
adj OR	statistically adjusted odds ratio
adj mean diff	statistically adjusted difference between means
adj median diff	statistically adjusted difference between medians
AEC	Australian Electoral Commission
AIHW	Australian Institute of Health and Welfare
Air Force	Royal Australian Air Force (unless otherwise specified)
Army	Australian Army (unless otherwise specified)
AUDIT	Alcohol Use Disorders Identification Test
AUDIT-C	Alcohol Use Disorders Identification Test - Consumption
BCOF	British Commonwealth Occupation Force (Japan)
CAGE	Cut-down, Annoyed by criticism, Guilty about drinking, Eye-opener drinks (alcohol use questionnaire)
CES	Combat Exposure Scale
CI	confidence interval
DVA	Australian Government Department of Veterans' Affairs
DSM-III-R	3rd edition of the Diagnostic and Statistical Manual of Mental Disorders - Revised
DSM-IV	4th edition of the Diagnostic and Statistical Manual of Mental Disorders
et al	and others
HAD scale	Hospital Anxiety and Depression scale
HMAS	His/Her Majesty's Australian Ship
KWV	Korean War veteran
KWVHS	Korean War veterans' Health Study
multiv	multivariate (when referring to statistical adjustment for multiple covariates)
N (or n)	number
NAS	Normative Aging Study
Navy	Royal Australian Navy (unless otherwise specified)
NSHWB	Australian Bureau of Statistics 1997 National Survey of Health and Well-being
OR	odds ratio
P value	probability value
PCL	Posttraumatic stress disorder Check List

PCL-S	Posttraumatic stress disorder Check List - specific
PLS	Percent Life Satisfaction score derived from the Life Satisfaction scale
POW	prisoner of war
PS	population sample
PTSD	posttraumatic stress disorder
RAR	Royal Australian Regiment
SAC	Scientific Advisory Committee
SD	standard deviation
SF-12	12 item Short Form Health Survey
SF-36	36 item Short Form Health Survey
SMHA	Survey of Men's Health and Ageing
SMR	standardised mortality ratio
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom
UN	United Nations
US or USA	United States of America
WHO	World Health Organisation
WHOQOL-Bref	26-item World Health Organisation brief Quality of Life questionnaire
WIA	Wounded In Action
WWII	Second World War

ACKNOWLEDGMENTS

The study was commissioned and funded by the Australian Government Department of Veterans' Affairs. We are grateful for the advice of the Study Scientific Advisory Committee and the Veterans Consultative Committee whose memberships are outlined in Appendices B and C of this report. Staff at the Department of Veterans' Affairs provided advice in relation to the study design and comments on drafts of this report, they conducted the contact and recruitment of study participants, and provided some extracts for the report in relation to the Korean War and other military operations. The final report was peer reviewed by the Scientific Advisory Committee. The Korean War veterans and those subjects selected for the comparison group are expressly thanked for their participation in the study.

In commemoration of the fiftieth anniversary of the signing of the Armistice, in 2003 an Australian delegation, including Australian Veterans and of the Korean War, returned to the Republic of South Korea. From left to right, Mr Norm Goldspink MBE, Mrs Eve Taylor, Mr Geoffrey Lushey AO DSC (Retd) and Mr Andrew Robertson RADM , Mrs Eve Taylor's husband was one of 339 Australians who gave their lives in Korea.

Kimpo, South Korea. 18th August 1951. Pilots of No. 77 Squadron RAAF being briefed by their commanding officer. *(Australian War Memorial (AWM) image JK0025)*

Unidentified crew members of the RAN destroyer HMAS Bataan relaxing in their mess.
(AWM image HOBJ3393)

EXECUTIVE SUMMARY

Study background and methods

- The Australian Korean War veterans' Health Study was designed to complement the recently completed Australian Korean War veterans' Mortality and Cancer Incidence Studies. Together, these three studies constitute a major study program of health in this Australian veteran population. This study program represents one of the most comprehensive investigations of health in an entire veteran group ever conducted internationally.
- The major aim of the Health Study was to compare Australia's surviving, male Korean War veterans with similarly aged Australian men, who resided in Australia at the time of the Korean War, on several measures of physical and psychological health, quality of life and life satisfaction. Further, the study aimed to investigate whether specific service-related characteristics of the Korean War deployment were associated with current health.
- The Health Study was commissioned by the Department of Veterans' Affairs (DVA) and was undertaken by Monash University in consultation with the Study Scientific Advisory Committee and Consultative Committee. The DVA and Monash University Human Research Ethics Committees provided approval for the research.
- The study commenced in March 2004 and included 7,525 male Korean War veterans thought to be alive and residing in Australia. Approximately 57% of Australia's original 17,872 Korean War veterans were deceased at this time. The study also included a general population sample of 2,964 Australian men aged 65 years and above drawn from the Australian Electoral Roll.
- Participants completed a self-report questionnaire which included instruments measuring life satisfaction, depression, anxiety and posttraumatic stress disorder, smoking and alcohol consumption, several dimensions of quality of life, medical conditions and hospitalisations, and Korean War service characteristics including severity of combat experience, and war-related injury. Data on additional Korean War service characteristics such as Navy, Army or Air Force Service, rank, age and duration of deployment, were obtained from the DVA Korean War Nominal Roll.
- Australia's surviving Korean War veteran population enthusiastically supported the Health Study, with over 81% participating and providing high quality, complete questionnaire data. Recruitment in the population sample was lower at 64%, but also satisfactory and their data quality was excellent.
- Study participants ranged in age from 66 to just under 100 years old.

Results

- Overall, the results of the study showed that surviving Australian Korean War veterans, approximately five decades after the Korean War, are experiencing significant excesses in several measures of psychological ill health, lower life satisfaction and poorer quality of life, and excess medical conditions and hospitalisations compared with a group of similarly aged Australian men who were residing in Australia at the time of the Korean War.
- Korean War veterans have also experienced a lifetime pattern of alcohol and cigarette consumption in excess of that reported by the comparison group. 79% of Korean War veterans report being current or former smokers, compared with 60% of the comparison group. Korean War veterans are one and a half times more likely to meet criteria for

current hazardous alcohol consumption, and three times more likely to meet criteria for a history of alcohol related problems at some point in their lifetime.

- The proportions of veterans meeting criteria for posttraumatic stress disorder (PTSD), anxiety, and depression are substantially elevated, with veterans five or six times more likely to have these disorders than the comparison group. Up to 33% of Korean War veterans meet criteria for PTSD, 31% meet criteria for anxiety and 24% meet criteria for depression.
- Korean War veterans report poorer overall life satisfaction than the comparison group. Taking into account what has happened to them in the last year and what they expect to happen in the future, Korean War veterans are less likely than the comparison group (18% versus 40% respectively) to report feeling delighted or pleased about their life as a whole, and more likely (11% versus 3%) to report feeling unhappy or terrible.
- Korean War veterans also report poorer quality of life on multiple dimensions, including physical health, psychological functioning, social relationships and environment. Korean War veterans are more likely than the comparison group (22% versus 6% respectively) to report their quality of life as poor or very poor, and less likely (45% versus 80%) to report their quality of life as good or very good.
- Fifteen medical conditions investigated in the study are all reported one and a half to three times more frequently by Korean War veterans than the comparison group. These include asthma, high blood pressure, stroke (or after effects of stroke), heart attack or angina, rapid or irregular heart beat, liver disease, arthritis, kidney disease, diabetes, melanoma, other skin cancer, other cancer (not skin), stomach or duodenal ulcer, partial or complete blindness (not corrected by glasses) and partial or complete deafness. The study did not attempt to independently validate the self-reported medical conditions, however the overall pattern of excess medical conditions reported by Korean War veterans is consistent with the findings of the Australian Korean War veterans' Mortality and Cancer Incidence Studies, and also with the likely health effects of excessive lifetime exposure to cigarettes and alcohol.
- Korean War veterans report an increased rate of hospitalisation in the previous 12 months, consistent with their overall pattern of increased psychological and physical ill health.
- Two service-related characteristics of the Korean War deployment are most strongly associated with poorer psychological health, lower life satisfaction and poorer quality of life in Korean War veterans. They are:

  Combat exposure: Veterans who reported experiencing heavy combat during Korea, using the Combat Exposure Scale (CES), were 15 times more likely to meet criteria for PTSD, six times more likely to meet criteria for anxiety, or depression, and two times more likely to meet criteria for a history of alcohol problems, compared with veterans who report no combat exposure. Further, veterans reporting heavy combat also report lower life satisfaction, and poorer quality of life, than veterans reporting no combat exposure.

  Rank during the Korean War: Lower ranked Korean War veterans are much more likely, than higher ranked veterans, to have poor health. There is a 54% increase in the prevalence of PTSD, a 56% increase in the prevalence of anxiety, a 43% increase in the prevalence of depression, and a 26% increase in the prevalence of having a history of alcohol problems, per categorical decrease in rank from officer, to non-commissioned officer, to enlisted rank. Further, veterans who served with an enlisted rank report lower life satisfaction, and poorer quality of life than veterans who served as non-commissioned officers, or officers. These findings are independent of the effects of age and education.

These associations between Korean War related combat exposure, and rank, and current PTSD, anxiety and depression are demonstrated in Figures A and B.

Figure A. Percentage of Korean War veterans with PTSD, anxiety, or depression across levels of combat exposure

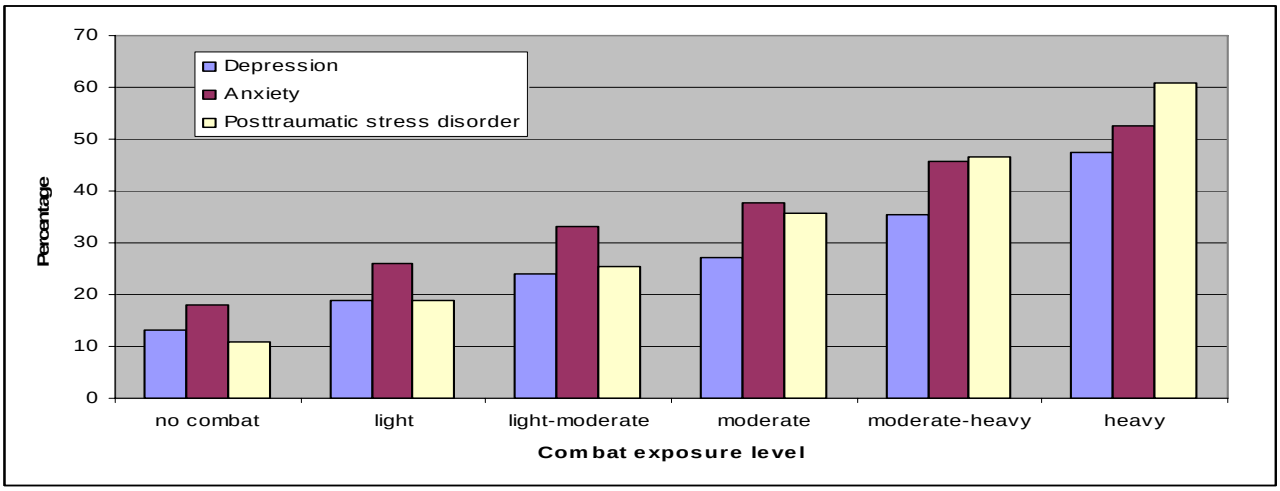
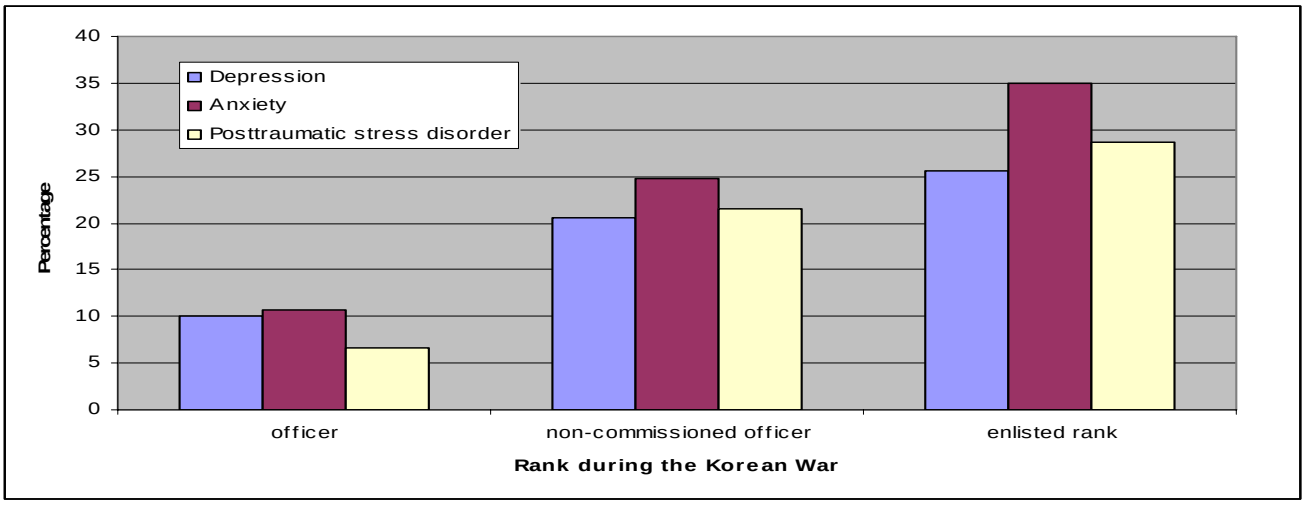


Figure B. Percentage of Korean War veterans with PTSD, anxiety, or depression across levels of rank



- There are also other service-related characteristics of the Korean War associated with some health outcomes: They include:

  Service branch: PTSD, anxiety, depression and history of alcohol problems are most prevalent in Army veterans (prevalences of approximately 30%, 34%, 26% and 39% respectively), less prevalent in Navy veterans (22%, 29%, 21% and 36%), and least prevalent in Air Force veterans (14%, 22%, 17% and 29%). Army veterans also consistently report the poorest life satisfaction and quality of life, however the magnitude of these differences across Service branches is small.

  Being wounded in action: Veterans who report being wounded in action during Korea are approximately two times more likely to have PTSD, and 1.6 times more likely to have anxiety or depression, than veterans who report not being wounded. The type of evacuation reported for the injury or illness, which may be indicative of severity, was not associated with these health outcomes.

Age at time of deployment: Veterans who were aged 20 years or less at the time of deployment to the Korean War are approximately two times more likely to have PTSD, and 1.4 times more likely to have anxiety or a history of problem drinking, than veterans who were aged 31 years or older.

Years of previous Australian armed forces service: Veterans who had fewer years of service experience prior to the Korean War are more likely to have PTSD, anxiety, and a history of alcohol problems than veterans who were more experienced. There is a 14%-16% increase in the prevalence of these disorders per categorical decrease in years of previous service experience from 4 or more years, to 1 to < 4 years, to < 1 year.

Duration of Korean War deployment: Veterans who deployed for more than 12 months are 1.5 times more likely to have PTSD, 1.2 times more likely to have anxiety, and 1.3 times more likely to have a history of alcohol problems, than veterans who deployed for less than 6 months.

Korean War deployment era: Veterans who first deployed to Korea during the mobile, or static, phases of the Korean War are more likely to have PTSD, anxiety and depression than veterans who first deployed after the armistice.

Discussion and conclusions

- The Health Study has demonstrated that the long-term health effects of war service can be severe, and can still be present fifty years after the end of hostilities.
- The combined results of the Australian Korean War veterans' Mortality, Cancer Incidence and Health Studies show that Korean War veterans have experienced post-war mortality and some cancers at excessive rates compared with similarly aged Australians, and that survivors continue to experience extremely poor psychological and physical health and a low level of life satisfaction and quality of life.
- Our observed group differences in the direction of poorer health in veterans in the study are likely to represent an underestimation of the true magnitude of the health differences which could be attributable to Korean War service. This is due to two possible factors. Firstly, the "healthy soldier" effect literature suggests that veterans are likely to have been healthier than the comparison group prior to the Korean War. Secondly, because it was limited to survivors, this Health Study has been unable to detect excess morbidity and adverse health outcomes likely to have been experienced by deceased veterans.
- Smoking and alcohol consumption data collected in the Health Study assist in the interpretation of the findings of the Australian Korean War veterans' Mortality and Cancer Incidence Studies. For example some, but not all, excesses in cancer incidence observed in Korean War veterans in the Cancer Incidence Study, can be explained by the level of smoking reported by veterans in the Health Study. A pattern of excessive alcohol consumption may also partly explain increased mortality among veterans from specific causes including accidents and suicide, alcoholic liver disease and other digestive diseases found in the Mortality Study.
- The major methodological strengths of the study relate to the inclusion of the entire population of surviving Australian male Korean War veterans residing in Australia, the direct comparison of their health with that of an appropriately matched comparison group, and the use of well-validated data collection instruments, where possible.
- Methodological weaknesses in the study include the reliance on self-reported health measures, particularly self-reported medical conditions which could not be medically validated, and the necessity for retrospective assessment of some lifestyle and deployment-related factors fifty years after the Korean War. The study was also unable to investigate possibly important Korean War environmental and chemical risk factors, and

additional military and non-military characteristics, which may have contributed to post war illness. These limitations highlight the advantages of utilising longitudinal study designs which commence shortly after war deployment and follow veterans forward in time.

- The adverse impact of psychological disorders, such as PTSD and depression, and chronic medical conditions, upon the lives of sufferers can be severe. Effective treatment in the elderly will require integrated intervention approaches which reflect the complexity of veterans' prevailing symptoms. Importantly, elderly sufferers from long-standing conditions can achieve symptomatic and functional improvement.
- It is clear that some of the ill-health experienced by veterans is attributable to the severity of combat associated with Korean War service. Other service-related factors include lack of seniority, inexperience, perhaps youthfulness and war-related injury. Other military, and non-military factors such as socioeconomic disadvantage, may have also contributed to veterans' vulnerability to illness and the persistence of symptoms over time. Excessive consumption of cigarettes and alcohol in the post-war period has also contributed to poor health, including cancer, and excess mortality.
- While we cannot change the war-related experiences, and lifestyle risk factors, of the past, health interventions have been shown to be effective in alleviating significant ill health experienced by ageing veterans. The results of this study should be useful in identifying the most appropriate types of health interventions, and levels of service provision, required by surviving Australian Korean War veterans.
- Importantly, the results of the study should also be useful in identifying those veterans of more recent conflicts who may be at greatest risk of adverse health outcomes, and in developing appropriate strategies to prevent or reduce long-term ill-health in these younger veteran groups.
- More than fifty years after the war, less than 45% of Australia's Korean War veterans remain alive. The deceased Korean War veterans cannot benefit from health interventions, or changes to health service provisions, which may arise from the findings of this study. Younger veterans of more recent conflicts, however, may benefit more from future studies if these can investigate deployment-related risk factors and health outcomes in closer proximity to the time of the deployment.
- Combined, the Australian Korean War veterans' Mortality, Cancer Incidence, and Health Studies contribute substantially to the existing international body of knowledge on the long-term health effects of war deployment. The results should assist in improving the health of future generations of military personnel, both in Australia and abroad.

Korea, December 1950. Men and vehicles of 3RAR, attempt to make their way through a deep snowdrift in the Korean countryside. *(AWM image PO2201.077)*

Korea, June 1952. The troops of 1RAR, take time for a welcome cup of tea at the end of their task of shifting camp.
(AWM image HOBJ3191)

Hill 335 area, Korea. March 1952. Members of A Company 3RAR wait in line to attend a church service at the Company Aid Post which consists of a simple thatched structure erected on a crude timber frame on Cemetery Ridge. *(AWM image PO2208.022)*

Korea, 21st June 1952. The whaler from the destroyer HMAS Warramunga.
(AWM image 302083)

1. INTRODUCTION

The Korean War saw Australia commit its armed Services to the first collective, aggressive United Nations (UN) Force, which involved 20 other member countries. Nearly 18,000 Australian armed forces personnel served in combat from 1950 to 1953, or as part of the UN Command to preserve the independence of the Republic of Korea (South Korea) after the 1953 cease-fire, until the final Australian units were withdrawn in 1956.

The Korean War is notable for several significant battles, a severely hostile climate and a lack of public interest despite a total of over four and a half million casualties from both sides. Despite first initiatives to end the war in 1951, many long months of hazardous static warfare ensued while armistice negotiations dragged on.

As with veterans of other major military conflicts throughout history, Korean War veterans are likely to hold mixed memories of painful losses and life benefits associated with their military experiences. Various studies have shown that the experience of war, and the subsequent transition from military to civilian life, can have legacies that manifest in a variety of physical health and psychological health problems.[1]

Literature on physical health problems in Korean War veterans includes investigations of combat injury and other service-related disabilities,[2, 3] frostbite,[4] Korean haemorrhagic fever,[5, 6] and malaria.[7] Prisoner of War (POW) status, in particular, is associated with tuberculosis and liver cirrhosis,[8] hepatitis B infection,[9] duodenal ulcers,[10] strongyloidiasis [10, 11] and various other disorders of the nervous system and sense organs, and gastrointestinal, genitourinary, circulatory and musculoskeletal systems.[12]

The adverse psychological health effects of combat experience through WWII and in to the 1950's were frequently measured according to such global terms as combat fatigue,[13] shell shock,[14] battle exhaustion[15] and combat stress reaction.[16] The symptoms of these disorders can be described in contemporary terms under a syndrome known as posttraumatic stress disorder (PTSD), a type of anxiety disorder.[17] Symptoms include emotional numbing, behavioural changes and re-experiencing of similar or related events (such as flashbacks).[17] As post war syndromes have been investigated further it has been found that depression, other anxiety disorders and substance abuse also appear to be elevated in combat-exposed populations.[18]

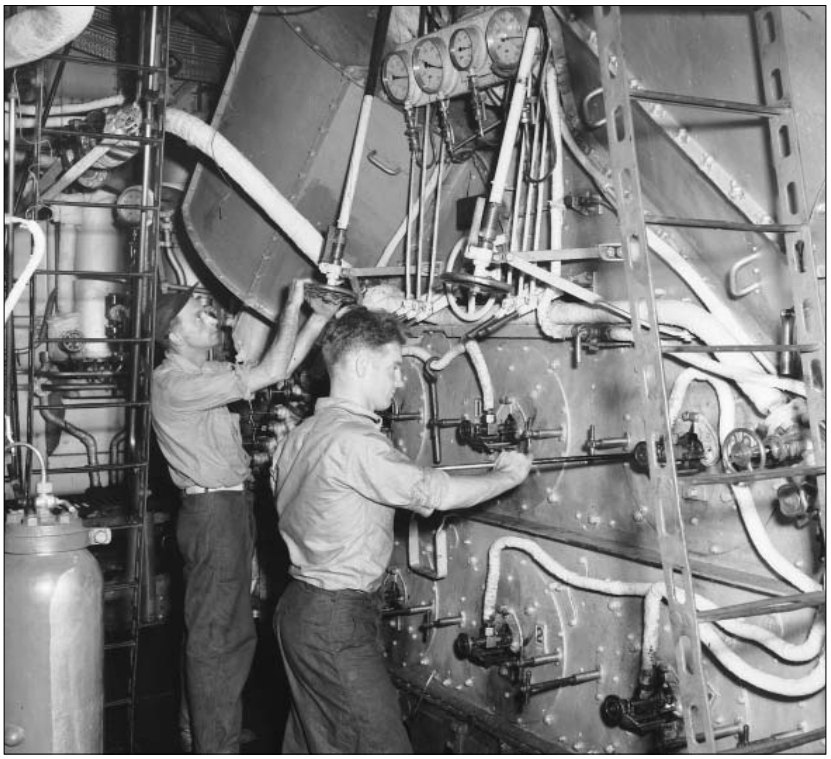
Until now, no studies have thoroughly investigated the adverse effects of Australia's involvement in the Korean War on the burden of illness in surviving Australian veterans. This report describes the results of a new study comparing the general physical and psychological health of Australian male Korean War veterans with that of a comparison sample of similarly aged, Australian men who lived in Australia at the time of the Korean War but who did not serve in that conflict. More specifically, the study compares the two populations on measures of general physical functioning, quality of life including level of life satisfaction, hospitalisations, general psychological functioning, anxiety including posttraumatic stress disorder, depression, alcohol disorders and common medical conditions. Further, the study investigates whether Korean War deployment characteristics, such as Service branch, age and level of rank at deployment, duration and era of deployment and combat severity, are associated with current health. Female Korean War veterans comprised 0.3% of the total Australian deployment, and were excluded from the study due to their extremely small numbers and because health patterns in men and women can be quite different.

This study was designed to complement the Korean War veterans' Mortality[19] and Cancer Incidence[20] Studies and is a cross-sectional study including the entire cohort of surviving Australian male Korean War veterans and a smaller sample of community based, age matched

Australian men. Participants were invited to partake via mailed invitation and health data was obtained primarily via self-administered questionnaire.

Prior to the main study commencing, a pilot study was conducted to evaluate various aspects of the main study protocol including participation rates and quality of returned data. The results of the pilot study are presented in Appendix M. The final design of this main study was based on several recommendations arising from the pilot study results.

Korea, 1951. A Hawker Sea fury F.B. 11 aircraft of the 20th Carrier Air Group landing on the flight deck of HMAS Sydney. *(AWM image 306840)*



Korea, 1st August 1952. Two unidentified crew members work in the boiler room of a ship. The seaman in the foreground is punching sprayers in order to add fuel oil into the face of the boiler. *(AWM image HOBJ3431)*

2. OVERVIEW OF AUSTRALIA'S INVOLVEMENT IN THE KOREAN WAR

The following text is a very brief summary of the chronology of the Korean War, participation by Australia's different Services, their involvement in significant military operations and the environmental conditions and threats to health. The sources for this summary are the previously published Mortality Study[19] and Cancer Incidence Study[20] reports, and also the texts of Odgers (2003),[21] Evans (2000),[22] and O'Neill (1985)[23] and the reader should refer to these texts for a more detailed overview of Australia's involvement in the Korean War.

On 25 June 1950 the North Korean People's Army launched a surprise invasion of the Republic of Korea, leading to the retreat of South Korean troops and surrender of the South Korean capital, Seoul. Within two days the United Nations (UN) Security Council, fearing a chain reaction leading to a third world war, called on all UN member states to act collectively to assist the Republic of Korea to repel the aggression and restore peace and security. This represented the first world organisation of sovereign states to take up arms to oppose an aggressor and maintain the peace. Australian armed forces personnel were committed to the war as early as 29 June 1950. The conflict continued until 27 July 1953, when an armistice was signed.[21, 22] Significant numbers of United Nations forces, including Australian units, continued to serve in Korea after July 1953 to enforce the cease-fire. Indeed, to date a formal end of the war is yet to be declared.

In its conduct, the war can be divided into three phases. The first consisted of a "mobile" phase with offensives and counter-offensives taking place over long distances in line with changing strategic circumstances. In July 1951 negotiations began between the UN and Chinese commanders concerning an armistice and the second phase commenced, referred to as the "static" phase. In late August 1951, however, the Chinese suspended negotiations and the UN launched a series of offensive operations to gain better defensive positions in anticipation of an eventual armistice. These continued until November 1951. The subsequent 20 month period of the static phase, until the cease-fire, was characterised by the maintenance of relatively static positions along a front that eventually became the cease-fire line. This period of the static phase commonly involved raids against deeply entrenched Chinese positions and nightly fighting patrols to dominate no-man's land. Actions during this period were largely aimed at gaining local tactical advantage and retaining the initiative over the enemy.[23] With no permanent peace treaty ever signed military tensions still existed in the third phase, after the July 1953 armistice, and the living conditions and environmental exposures of individuals maintaining defensive positions or on cease-fire enforcement duties were held to be somewhat comparable to those existing prior to the armistice.[19]

The war was fought over a peninsula flanked by the Yellow Sea and the Sea of Japan, with rugged mountainous terrain, and under climatic conditions that varied from extreme heat and monsoonal rain during summer to near-arctic temperatures during the winter.[20]

Nearly 18,000 Australians served in Korea from late June 1950 to April 1956, when the last Australian units were withdrawn.[19, 20] All Australian armed forces personnel were volunteers, with no Australian personnel serving in Korea during their conscript service.[19] Australian casualties during 1950–1953 were 340 killed, 1,216 wounded and 29 taken prisoner of war.[23, 24] A further 10 Australian Service personnel died in Korea between the cease-fire in July 1953 and final withdrawal from Korea in April 1956.[20]

2.1 Military activities

2.1.1 Royal Australian Navy (Navy)

On 29 June 1950 the Australian Government placed naval ships, namely His Majesty's Australian Ships (HMAS)[i] *Shoalhaven* and *Bataan* then present in Far Eastern waters, at the disposal of the Security Council in support of the Republic of Korea. HMAS *Shoalhaven* commenced convoy escort duty as early as 1 July 1950. Eventually ten Navy vessels and three Fleet Air Arm squadrons served in Korea by the time of final withdrawals in late 1955; they included the aircraft carrier HMAS *Sydney*, destroyers HMAS *Anzac, Arunta*, *Bataan*, *Tobruk* and *Warramunga*, frigates HMAS *Shoalhaven*, *Murchison*, *Condamine* and *Culgoa* and Fleet Air Arm squadrons 805, 808 and 817.

The Korean War was fought over a peninsula surrounded by the sea on three sides. Navy ships were employed in patrolling, engaging shore batteries, gun-fire support, carrier screening, operations with South Korean guerrillas and cover for evacuations. Navy ships operated in a threat environment from mining, air attack and counter bombardment.[22]

Major operations included participation in the covering force for the amphibious assault on Inchon, and a subsequent assault on Wonsan, and assisting in the evacuation of Chinnampo. In HMAS *Sydney's* first deployment, Fleet Air Arm squadrons attacked enemy supply lines and supported allied forces.

One of the most notable individual operations involved HMAS *Murchison* from July to November 1951 in a number of bombardment actions in the Han River estuary. Hazards to the ship included high tide ranges, shifting mud flats, lack of navigation marks, limited sea room for turning and heavy fire from enemy forces in close proximity.[20, 22] HMAS *Murchison* accumulated more time in the estuary than any other allied ship and engaged enemy forces at close range on many occasions.[20]

2.1.2 Australian Army (Army)

At the outbreak of the war the Third Battalion of the Royal Australian Regiment (3RAR) was stationed in Japan as part of the British Commonwealth Occupational Force (BCOF). 3RAR was preparing to return to Australia, its BCOF duties at an end, and its platoon levels low.[22] On 26 July 1950 the announcement was made that Australia would commit a ground force to Korea. The battalion was quickly replenished with reinforcements, and a small series of exercises were held to refine command and administrative procedures. 3RAR commenced operations in September 1950 and remained in Korea throughout the war until November 1954, with men rotated out and replaced on an individual basis.

In July 1951 all British Commonwealth units were consolidated in the 1st Commonwealth Division. After commencing their first tour of Korea in April 1952, Australia's 1RAR subsequently joined the 28th Brigade (28 Bde), part of the 1st Commonwealth Division, which included 3RAR. To reflect the Australian content of the Brigade it was agreed that 28 Bde would be commanded by an Australian. The battalion 1RAR was relieved by 2RAR in March 1953. 2RAR stayed in the region until March 1954, at which time 1RAR returned and stayed until April 1956.[23]

Infantry action in Korea was sustained with the additional support of individual soldiers and sub-units of other Australian arms and services who served with various Commonwealth units and nurses from the Royal Australian Army Nursing Corps who served in Japan and Korea during the period of the war.

[i] After the coronation of Her Royal Highness Queen Elizabeth II in 1953, HMAS came to represent Her Majesty's Australian Ship.

Australia's 3RAR participated in a number of major actions both while advancing towards the Chinese border and subsequently, following the entry of China into the war in November 1950, during various withdrawals and advances as military fortunes changed. These included the battle of Kapyong, where 3RAR held off an attack by a Chinese division, resulting in the battalion's loss of 32 men killed, 59 wounded and three captured.[20]

The second major Australian infantry battle, the Battle of Maryang San in October 1951, also involved 3RAR and resulted in the capture of Hill 317. The action led to the destruction of at least two Chinese battalions, and 3RAR lost 20 men killed and 89 wounded.[20].

During the last years of the war, before the cease-fire, Australian battalions built and occupied strongly fortified underground defensive positions on the front line. They mounted nightly fighting patrols to seize the initiative and dominate no man's land, conducted raids against entrenched Chinese positions and fought a number of offensive and defensive actions. One of the more significant of the latter was the defensive action on 'the Hook' by 2RAR in July 1953.[20]

Compared with the Australian Navy and Air Force Services, the Army suffered the heaviest casualties during Korea, including 293 killed, 1,210 wounded and 23 taken prisoner of war.

2.1.3 Royal Australian Air Force (Air Force)

Upon the outbreak of war, the Royal Australian Air Force's 77 Fighter Squadron were also in Japan preparing to return to Australia. As the North Korean Air Force was not considered a strongly influential force in the war, an important initial role for UN airpower was to prevent North Korean ground movements. The US Air Force-owned jet fighters were not ideal for this task; they lacked range, consumed too much fuel and were too fast to make useful tactical strike aircraft. Further, at the outbreak of the war only four runways in Japan were long enough to allow fully laden jets to take off, and there were none long enough in Korea. The long range, propeller driven Mustang fighters, which had been impressive in WWII, were much more suitable and the Australian 77 Fighter Squadron was the only immediately available unit in the region equipped with them. The Squadron was thus rapidly re-mobilised and flew its first Korean War combat mission on 2 July 1950.[22] From this time, up until April 1951, the Squadron flew 1,105 missions in P-51D Mustang piston-engine fighters in ground attack and air support roles.[20]

The entry of China into the war in November 1950 led to the appearance of MiG-15 jet fighters. These fast, well armed aircraft directly threatened UN Command air superiority. The Australians decided to purchase British Meteor jets for 77 Squadron despite the Meteor's known inferiority to the MiG-15.[22] The Squadron's first jet operational mission was flown on 29 July 1951. Combat experience quickly confirmed the Meteor's inferiority, particularly at high altitude. However, the aircraft proved its worth in the ground attack role. By May 1952 the 77 Squadron was employed escorting fighter-bombers at lower altitudes where MiG-15 superiority was much less marked.[20]

The Royal Australian Air Force also provided transport support using C-47 Dakota aircraft. The transport role was expanded several times as demand increased and eventually 36 Transport Squadron was formed. In addition to general transport duties, unit aircraft carrying Air Force nurses flew some 12,000 sick and wounded from the war zone in medical evacuation flights.[20]

Technical support for Air Force aircraft was provided by 91 (Composite) Wing located at Iwakuni in Japan, but with maintenance elements located in the 77 Squadron area in Korea.[20]

2.2 Civilian groups

War correspondents, official entertainers, photographers and philanthropic organisations also served in Korea. War correspondents were accredited by the Army but represented their own media interests. Tours varied in length from months to years. The major philanthropic organisations represented were the Red Cross and the Salvation Army.[19]

2.3 Health and environmental threats

With the authors' permission, the following account of health and environmental threats is summarised directly from the Korean War veterans' Cancer Incidence Study[20] and Mortality Study[19] reports.

2.3.1 Temperatures

The temperature extremes from summer to winter months were severe, and presented a range of threats to Australian armed forces members. In the region encompassing the North Korean capital, Pyongyang, summers (June through to September) have mean daily maximum temperatures of approximately 26°C and mean daily minimums of about 19°C. Daily extreme highs occasionally reach 37°C, while extreme lows occasionally drop to 0°C. Winters in the same region last from November through to March. Mean daily minimum temperatures are approximately –4°C and mean daily maximum temperatures are about 2°C. Daily wind-chill temperatures commonly reach –31°C.

The Australian servicemen's cold weather clothing was not adequate, contributing to significant discomfort and problems due to frost-bite and injuries arising from flesh sticking to frozen weapons, vehicles, aircraft parts and other metallic objects. In the Army, standing and ambush patrols in particular required participants to remain motionless for long periods in conditions of extreme cold. Freezing temperatures also meant that fresh water for drinking, cooking or washing was in short supply. Drinking water was sometimes obtained by heating snow. For the Air Force, temperatures plummeted to even more extreme lows as aircraft gained altitude.

Navy ships were built for temperate conditions. Thin steel hulls in direct contact with freezing sea water, combined with the lack of insulation and minimal heating, meant that crews had to endure severe, freezing conditions, particularly those in exposed positions such as open bridges and gun positions. To minimise heat-loss, ships were often closed up. The presence of relatively large numbers of crew confined within a small, poorly ventilated space presented a significant risk of the spread of diseases by contact or aerosols. Sometimes, to warm up the living quarters, steam from the boilers would be vented directly in to the ship. This provided only short-term relief, with temperatures falling again rapidly and the resulting moisture increasing the risk of mould and other disease sources.

Navy steam-engine operated ships were also not air-conditioned. In summer months crew serving in areas such as engine and boiler rooms were exposed to extreme heat. Air Force aircrew had to contend with the heat on the ground, while kitted out to cope with the cold experienced at high altitudes.

2.3.2 Rainfall

The summer season in North Korea is also monsoon season and severe flooding occurs frequently. For troops living in trenches and underground dugouts without adequate drainage, periods of high precipitation meant living with water underfoot, the threat of collapsing trench walls, constantly damp clothing and the threat of conditions such as trench feet. During such periods, soldiers on 'stand-to' could be up to their knees or waist in mud and water. The end

result was that soldiers could not get dry for weeks at a time. Damp conditions, including stagnant pools of water, also provided a breeding ground for diseases and disease vectors; a health threat for all Services.

2.3.3 Specific infectious disease risks

Due to the climate, geographical location, and living conditions, servicemen and nurses were at risk of a number of infectious diseases. These include typhoid and paratyphoid fevers transmitted through ingestion of food or water contaminated by urine or faeces from infected humans; mite-borne scrub typhus; rodent-borne hantaviral diseases such as Korean haemorrhagic fever; mosquito-borne Japanese encephalitis and malaria; sexually transmitted diseases such as gonorrhoea and chlamydial cervicitis/urethritis; leptospirosis transmitted primarily through skin or mucous membrane contact with water, moist soil or vegetation contaminated with urine from infected animals (particularly mice); and meningococcal meningitis, viral hepatitis A, B, C, D and E, and tuberculosis, each transmitted by various person to person pathways.

2.3.4 Other environmental and chemical threats

In addition to temperature and rainfall extremes, climatic threats included storms and typhoons. Other environmental dangers for the Navy included high tidal ranges, fast local currents, shifting mud flats and a rapidly changing sea-bed. At various times floating sea-mines were also a serious threat. For the Army, extended trench warfare included constant infestation with rats and lice.

Anecdotal evidence suggests the level of exposure to both DDT and other insecticides was extreme, particularly among medical orderlies and others who were responsible for mixing and spraying them, and who were often inadequately trained for the task. DDT and other insecticides were used extensively in unit areas where fogging machines were used to treat bunkers, tent-lines and other living areas. Individual application was in the form of insecticide powders applied directly to the body or clothing.

Another environmental threat faced by all three Services was exposure to cigarette smoke. Cigarettes were freely available in large numbers and smoking was widespread among Australian armed forces members. Even non-smokers were exposed to high levels of cigarette smoke, particularly in Army front-line areas where soldiers lived in confined and poorly ventilated underground areas.

Alcohol and morphine abuse were other possible threats to health. Whilst access to alcohol was strictly controlled in combat areas, it was readily available to personnel on leave in Japan. Morphine was available in the combat zone to treat combat casualties as they occurred. Anecdotal evidence suggests some limited abuse or the potential for abuse, however it was not considered a widespread problem.

Army members during winter were also exposed to high levels of hydrocarbon combustion products produced by the petrol-fed heaters known as ‘choofers’ and by the solid-fuel ‘hexamine’ heating blocks used for cooking. Both were utilised within the confined and poorly ventilated underground space of individual ‘utchies’ (underground sleeping bunkers) and subsequently tent-lines.

Common to all ships of the period, asbestos was present aboard all Navy ships. During the engagement of shore targets the concussion from main and secondary armament fire could release below-deck asbestos-treated lagging in the vicinity of the mountings. The risk of exposure to asbestos was elevated during maintenance periods, when it would have been necessary to disturb or repair lagging or bulkheads, and also when ships were closed down during action stations or while trying to conserve heat in winter. During these latter periods,

reduced airflow could lead to a rise in the concentration of airborne asbestos dust particles. Exposure to asbestos dust from brake pads was also a risk to maintenance personnel from all Services.

A further potential threat to health arose from the low-pressure vapour distillation of seawater to produce ‘fresh’ water for use in ships’ boilers and by their crews. It has been shown that this process has a potential to concentrate volatile contaminants, including organic wastes, herbicides or pesticides that may have washed from the rivers in to the relatively shallow waters off the western and southern coasts where Navy ships spent much of their time.

Other exposures of interest include exposure to petroleum fuel and lubricants, particularly by transport personnel and aircraft ground crews.

Korea, 1951. Informal group portrait of RAN armourers crowded together in the H.8 mess of the aircraft carrier HMAS Sydney. *(AWM image PO1838.006)*

Korea, December 1950. Four unidentified members of 3RAR, sit around a small fire to warm themselves and catch up on writing letters and reading newspapers and 'GHOSTRIDER' comics (Western 1950-1954). *(AWM image HOBJ1970)*

Korea, January 1952. Rugged up against the cold, crew members of the HMAS Sydney brave the snow and ice which is covering the ship's flight deck. (AWM image PO1838.015)

Korea, December 1950. Three members of 3RAR enjoy a hot brew of tea at a camp in snow-covered countryside. (AWM image PO1813.494)

3. VETERANS' HEALTH LITERATURE

This literature review provides a guide to the scope of recent health studies with elderly veterans, the types of health outcomes investigated and findings related to these, any associations found with war-related exposures, and the data collection methods employed. This review focuses primarily on health investigations of Korean War and World War II (WWII) veterans from Australia, the United Kingdom (UK) and the United States (US). The WWII veterans' research is included because of the relative age similarity of this veteran group to the Korean War group (the latter group is estimated to average approximately nine years younger),[25] the relative proximity of the two wars in time (compared with other wars), the fact that approximately one third of Australia's Korean War veterans participated in WWII,[19] the apparent larger number of WWII veteran studies compared with Korean War veteran studies, and because, unfortunately, many health studies have combined WWII and Korean War veterans in to the same study group, rather than treating them as separate cohorts.

Most attention in this review is given to research conducted since 1990; the findings from this more recent research considered most relevant to the design of, and findings expected from, this new study of Australia's Korean War veterans. Only a brief summary is provided in relation to earlier (pre 1990) investigations of these veteran groups. Also, only a short introduction is made to investigations of the health of veterans from more recent conflicts such as the Vietnam War and the 1991 Gulf War.

Pre 1990 investigations of Korean War and WWII veterans' health

As early as the 1950's there was already a massive literature debating the syndrome of "combat fatigue" or "stress reaction" in WWII veterans, a condition similar to what today is recognised as posttraumatic stress disorder (PTSD). In 1954, for example, Lewis and Engle reviewed some 1,166 articles on the subject (cited in Archibald & Tuddenham[26]). Whilst the volume of research subsided after the 1950s, studies after that time have continued to note the persistence of symptoms in these combat veterans in to the 1960s,[26, 27] 1970s[28] and 1980s.[29, 30]

Whilst other psychosocial sequelae of war have received less attention than PTSD-type symptomatology, there has still been an extensive literature on excesses of other disorders such as psychoneuroses and schizophrenia,[12] depressive disorders,[31] and alcohol disorders[32] in veterans of WWII and Korea.

Research in relation to physical morbidity, cancer, and mortality, while still substantial, is less abundant in the literature compared with the massive volume of psychiatric research. In terms of veterans' overall mortality, rates have often been found to be low when compared to the general population. Such results are typically explained in terms of a "healthy soldier effect" due to the selective recruiting, by Defence Forces, of very fit, healthy applicants, followed by rigorous fitness programs, ongoing screening for certain diseases and superior access to medical treatment.[19] Seltzer and Jablon (1974) demonstrated a healthy soldier effect in 85,491 US Army WWII veterans, persisting in relation to some causes of death for 23 years after service.[33] The effect varied considerably according to the nature of the cause of death. The largest deficit of observed mortality was for tuberculosis, for which only one-third of the expected deaths occurred in the WWII group. Death from ulcers remained at half of that expected, and death from some cardiovascular diseases including rheumatic heart disease, hypertension and hypertensive heart diseases were two-thirds of that expected, 23 years after war service. Death from diabetes in the WWII group was also much lower than expected, especially in the first 15 years after return from war, but this rose to expected levels by 23 years. Mortality from malignant neoplasms was low for the first 5 years, and rose thereafter to match population expectations. A similar attenuating effect was shown for cerebrovascular

accidents and for arteriosclerotic heart disease. Unlike death from diseases, however, death rates from trauma showed no difference from population levels.[33] In 1977 Seltzer and Jablon re-examined the cohorts' mortality experience according to military rank, and found that it was the mortality of WWII officers and non-commissioned officers that was significantly lower than expected, whilst the mortality of privates was very close to population rates.[34]

In former prisoners of war (POWs), studies show some increases in mortality rates particularly in the first years after repatriation. Deaths from motor vehicle accidents evident up to five years after repatriation, and deaths from suicide, pulmonary tuberculosis and liver cirrhosis up to 18 years after repatriation, have been shown to be elevated in Australian former POWs of WWII.[35] A US study of WWII and Korea POWs found similar patterns of increased mortality during the first decade after imprisonment, particularly deaths from trauma and tuberculosis in WWII POWs, and from trauma in Korea POWs, and an excess of deaths due to liver cirrhosis appearing after about the 10th year of follow-up in both POW groups.[8] In relation to deaths from other disease types, however, such as circulatory diseases[8, 35] and malignant neoplasms,[8] POWs show low death rates compared with comparison groups.

POW studies also show excesses in the number of hospital admissions, and also hospital admission rates for non-specified infective and parasitic diseases, diseases of the nervous system and sense organs, pulmonary tuberculosis, and diseases of the gastrointestinal, genitourinary, circulatory and musculoskeletal systems.[12] Excesses in markers of hepatitis B infection,[9] duodenal ulcers[10] and strongyloidiasis[10, 11] have also been demonstrated in former POWs.

More recent investigations of Korean War and WWII veterans' health

In to the 1990s and 2000s only a few researchers have continued to investigate the health of the surviving Korean War and WWII veterans. The relative scarcity of research studies in these elderly groups may be partly because the numbers of surviving veterans from these wars are quickly decreasing as their average age exceeds the average life span for males, and because the health patterns of the survivors are becoming increasingly complicated by age-related illness.

There are several major limitations to the available literature. Unfortunately, recent studies have often relied on small study groups drawn from medical clinics[36-39] or self referred populations,[40] rendering it difficult to generalise their findings to the broader Korean War veteran population. Further, any comparison of results across existing studies is limited by wide heterogeneity in the population groups recruited, and the range of different instruments utilised to measure health outcomes and exposures. Finally, we found few studies which recruited their own non-veteran comparison group against which to compare veterans' results, and few studies make any reference to the expected results in the general population. The reader, therefore, is required to seek alternatives sources of comparable normative data to determine whether Korean War veterans are experiencing better, similar or poorer health than their similarly aged, community peers. Despite these limitations, the findings in these studies generally suggest that adverse health effects of war exposure may be persisting well in to later life.

The recent literature is dominated by studies specifically investigating PTSD and associated variables,[36-38, 41-43] with only a few studies measuring other dimensions of psychological functioning[25, 40, 44-46] including alcohol use,[43, 47-50] a few investigating physical conditions[44, 51] including cancer,[20] self-rated physical functioning or general health,[44, 47] and a few investigating mortality.[19, 52]

Studies of PTSD

Since 1990 the prevalence of current PTSD reported in the health literature, for Korean and/or WWII veterans, has ranged from less than 1% in 921 veterans (67% of whom were Korean War veterans) drawn from the US Normative Aging Study (NAS)[47, 53] to 88% in 26 Korean War POWs.[46] Lifetime prevalence of PTSD for the latter POW group was reported as high as 96%. Other studies report current PTSD prevalences of 59% in 56 WWII Japanese-held POWs,[41] 45% in 108 Australian WWII veterans attending a psychiatric outpatient clinic,[38] 43% in US Korean War veterans (n=30), and 29% in WWII veterans (n=83), attending medical or psychiatric outpatient clinics in a Georgia Veterans' Affairs Medical Clinic,[37] 32% in 363 community based mustard gas-exposed US WWII veterans,[43] 29% in 721 self-referred community drawn British veterans (9% of the recruited group were Korean War veterans)[40] and 30% in US Korean War veterans (n=21), and 18.5% in US WWII veterans (n=113), drawn from non-psychiatric medical units at the Boston Veterans Administration Medical Centre.[54]

PTSD has most commonly been associated with increasing severity of combat or trauma exposure,[40, 41, 46, 53] including level of casualties,[38] and responsibility for killing someone.[25] Various other variables shown to be associated with PTSD include current physical illnesses,[40] self report of poor health status,[47] comorbid anxiety, depressive or alcohol disorders,[38, 46, 47] increased rates of smoking,[38] lower rank,[40] and age at captivity for POWs[41] or weight loss during captivity.[46]

In a US longitudinal study of 165 WWII and 12 Korean War community dwelling POWs, Port et al (2001)[42] reported that 27% of participants met criteria for PTSD at first assessment, and that a larger proportion (34%) met criteria at second assessment; the two assessments averaged 50 months apart (range 33-68 months). A retrospective investigation of subjects who participated in the first assessment, indicated that PTSD symptoms were highest shortly after the war, then declined for several decades and increased in the two decades prior to the study (since the 1980's).[42] The authors speculate that the 'developmental milestone' of retirement could be associated with the PTSD symptom increases in the 1980s for this veteran group.

An accurate estimation of the expected prevalence of PTSD, across the entire cohort of surviving Australian Korean War veterans, is difficult to gauge from the diverse findings of the studies cited above. The studies utilise quite heterogeneous study populations, none of which would be considered representative of the wider surviving veteran population. For example, Spiro et al (1994) report that their NAS veteran group included fewer combat exposed veterans and more higher ranked veterans than a 1987 US national sample surveyed by Veterans' Affairs, and that as a result of the physical and mental health screening which NAS men underwent at the time of study entry, those most likely to then have or later develop PTSD may have been excluded.[53] Hunt & Robbins (2001) concede that it is unknown whether their self-referred sample was representative of the surviving veteran population, and therefore it was unclear whether their PTSD figures over- or under-represent the population.[40]

The studies cited also utilise heterogeneous measures of PTSD, making it difficult to compare results across populations or to predict expected findings in the wider Australian population. Examples of the different measures include self-administered PTSD questionnaires such as the Impact of Events Scale used by Hunt & Robbins (2001)[40] and the Mississippi Scale for Combat-Related PTSD and the MMPI-2 Pk scale used by Spiro et al (1994),[53] structured clinician administered interviews such as the Clinician-Administered PTSD Scale (CAPS-1) as used by McCranie and Hyer (2000),[37] or combinations of clinical assessment and self-administered data as described by Kidson et al (1993).[38] Within a single study population Spiro et al (1994) reports a PTSD prevalence of less than 1% using the Mississippi Scale and close to 7% using the MMPI-2 Pk scale; this example demonstrating the difficulty of comparing results drawn from different data collection methods.

None of the studies cited include a non-veteran reference population against which to compare results and few make any reference to the prevalence of PTSD expected amongst the veterans' community peers. Eberly and Engdahl (1991)[50] cite a US population study which reported a lifetime PTSD prevalence rate of 0.5% in 965 men aged 18 and older,[55] a figure markedly lower than the 70.9% lifetime PTSD prevalence which Eberly and Engdahl found in their population of 426 former POWs. The Australian 1997 National Study of Health and Well-being (NSHWB) reported the 12-month prevalence of anxiety disorders (of which PTSD is one) in Australian men aged 65 and over, to be 3.5%.[56] This Australian general population figure is also markedly lower than the prevalences of PTSD reported in the vast majority of the veteran literature. Whilst these comparisons with general population data are limited, they suggest that WWII and Korean War veterans are experiencing markedly elevated levels of PTSD in to their later life.

Studies of alcohol use

We found only a few studies since 1990 reporting alcohol problems in WWII or Korean War veterans. Most studies report lifetime estimates of the prevalence of alcohol related disorders or problem drinking. Using a computerised diagnostic interview and criteria from the 3rd edition, revised, of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R),[57] Sutker and Allain (1996) reported lifetime alcohol abuse or dependence in 42% of 26 Korean conflict POWs and in 34% of 112 non-POW combat veterans of Korea and WWII.[46] In a rare study which included its own non-veteran comparison group, Norquist et al (1990)[48] reported lifetime DSM-III alcohol abuse/dependence prevalences of 25.3% in 342 US Korean War era veterans and 23.6% in age-matched non-veteran controls, also using structured diagnostic interviews. The lifetime prevalences in WWII veterans and their controls were 19.1% and 18.1% respectively.[48] A similar lifetime prevalence of 21.1% for alcohol abuse or dependence in US former POWs is reported by Eberly and Engdahl (1991)[50] based on detailed medical histories, and medical and psychiatric examinations. These authors cite a comparable general population study which reported a lifetime prevalence of 18.2% in US men aged 45 and older.[58] Neither Norquist's, nor Eberley's, study found statistically significant differences between the veteran groups and their comparison populations.

Three additional veteran studies used a cut-point of two or more endorsed items in the self-report CAGE questionnaire[59, 60] to identify subjects with a history of problematic alcohol use. In mustard gas-exposed US WWII veterans, a history of alcohol problems were reported in 16% of veterans who also had PTSD, 15% of those with partial PTSD and 9% of those without PTSD.[43] Amongst the WWII and Korean War veterans drawn from the NAS, 16% had a CAGE score indicating a history of problem drinking.[47] Further, Reid et al (2003) found that 19% of 303 Veterans' Affairs Primary Care Clinic patients classified as current drinkers (average age 73.1 years, 97% men), met CAGE criteria for lifetime problem drinking.[49] Reid et al, however, also employed a non-veteran community dwelling comparison group and reported lifetime problem drinking in only 4% of 511 US Medicare beneficiaries, (average age 75.8 years, 40% men), using the CAGE at the same cut-point described above.[49] Whilst this community prevalence would presumably be higher if the study population had been limited to male subjects, Reid's study nonetheless casts doubt over previous suggestions that lifetime alcohol related disorders do not differ between WWII or Korean War veterans, and their community peers.

Of the studies cited above, only Norquist et al[48] and Sutker and Allain[46] estimated 'current' prevalence of alcohol disorders. Norquist et al reported six-month prevalences of 6.6% and 7.4% respectively for Korean War era veterans and their controls, and 5.3% and 4.8% respectively for WWII era veterans and their controls; in neither comparison did the veteran groups differ statistically significantly from their controls.[48] The figures are higher than the one year prevalence of 2.6% (95%CI 2.2-3.0) reported for the US general population aged

These elevated cancer rates were evident in both Army and Navy personnel, but not in those who served in the Air Force. These cancers are believed to be partly, but not fully, explained by a higher smoking prevalence in the veteran population compared with their community peers. Army veterans also demonstrated elevated rates of prostate cancer, whilst Air Force veterans demonstrate elevated rates of melanoma.

Few other recent studies, however, continue to measure physical conditions in elderly WWII and Korea War veterans. Villa et al (2002) investigated self-reported medical conditions and found that 94% of US WWII veterans and 93% of Korean War veterans reported being diagnosed with at least one disease from a provided list of ten common conditions.[44] The authors, however, did not suggest what the expected prevalence would be in the similarly aged non-veteran US community. In the Australian NSHWB, 74% of community-based men aged 65 and above reported having at least one condition, from a similar list of 12 common chronic and current physical conditions.[56]

Hovens et al (1998) investigated the presence of chronic diseases in 147 Dutch WWII Resistance veterans (aged 60-65 years) and compared them to 252 men (aged 54-65) who participated in Holland's 1984 Central Bureau of Statistics Study.[51] 95% of the veterans, compared with 61% of the population subjects, reported at least one chronic disease. Individual diseases reported significantly more often by veterans ($p<0.01$) included haemorrhoids, stomach complaints, migraines or headaches, prostate problems, skin diseases, heart disease, varicosis, large bowel problems, hypertension, arthrosis, back pain, bronchitis and inguinal hernia. Physician-prescribed medication was more often used by veterans ($p<0.001$). Weekly tobacco use was comparable between study groups, and alcohol use was lower in the veteran group, and therefore these lifestyle measures could not explain the differences in medical conditions reported by the two study groups. The authors, however, discuss several weaknesses in the study which limit their ability to conclude that the WWII veteran population is suffering poorer health than their community peers. The authors recognise that the population subjects are younger than the veteran group. Also, the authors point out that the Resistance veteran group, by definition, includes only WWII veterans who received a special war pension based on demonstrated physical disabilities and, in later years, on psychological problems. Thus, this veteran group may be a biased sample in which the prevalence of illness is higher than among other Dutch WWII veterans.[51] Further, the study is limited by the reliance on self-reported medical conditions, and no evidence of a physician's diagnosis was sought or other objective evidence collected.

In summary, cancer incidence appears to be clearly higher in Australian Korean War veterans compared to their community peers, however there is no reliable research from which conclusions about other physical conditions can be drawn.

Studies of physical functioning or general health

Useful recent studies of physical functioning or general health in WWII or Korean War veterans appear to be even more scarce than studies of physical conditions. In their NAS veteran population, Schnurr and Spiro (1999)[47] reported that mean Short Form-36 (SF-36) scores were approximately 0.5 of a standard deviation (SD) higher (healthier) than comparable normative scores for US men aged 65-69.[65] This global SF-36 score includes both physical functioning and psychological functioning components. Further, Korean War veterans participating in the Villa et al (2002) study self-rated their health as very good or excellent in 47% of cases, good in 31% of cases and only poor or fair in 22% of cases. These authors do not provide comparable US population data. Their results, however, could be loosely compared to the Australian Institute of Health and Welfare's (AIHW) analysis of the NSHWB data, which showed that a larger proportion of elderly Australian men, 30% of those aged 65-74 years and 34% of those aged 74+ years, self-rated their health as poor or fair.[66]

Both of these veteran studies weakly imply that the general physical functioning of these elderly, surviving veteran groups may be better than that expected amongst their peers.

Studies of mortality

Of considerable interest to this review are the results of the first mortality study of all Australian Korean War veterans, completed in 2003 by the Australian Government Department of Veterans' Affairs in collaboration with the AIHW.[19] Because only 58 Australian women served in the Korean War, mortality rates were derived for male veterans only. Overall, the Korean War veterans experienced a 21% higher mortality rate than an equivalent Australian population. Elevated mortality rates for specific causes of death were found for a number of conditions; the death rate from diseases of the circulatory system was elevated by 13%, cancer by 31%, external causes (homicides, accidents and suicides) by 37%, respiratory diseases by 32% and digestive diseases by 35%. Among the cancers, lung cancer was elevated by 47%, head and neck by 96%, gastrointestinal by 18%, larynx by 95%, oesophagus by 59%, and cancer of unknown primary site by 51%. Of the three Services, Army veterans experienced the highest level of mortality followed by Navy then Air Force. Air Force veterans showed a statistically significantly lower mortality rate than the Australian male population.

Investigating mortality by period of service revealed that Australian Army veterans who completed their service prior to 1952 (when the offensive and counter offensive phase of the war ended) had a significantly lower mortality rate from suicide compared with Australian males. However, those who served in Korea after the start of 1952 (after the static defensive phase commenced) had a higher mortality rate from suicide compared to Australian males. The authors describe this as an unexpected and possibly chance post hoc finding.[19] The study, however, did not have data on exposure to occupational and environmental hazards, or risk factors such as cigarette smoking and alcohol intake, and therefore the contribution of these factors to increases in mortality could not be determined.

Other large studies of mortality in overseas veterans have demonstrated elevated rates of death related to external causes. In a study of 40,681 US Korean War Navy technicians with potential exposure to high-intensity radar, Groves et al (2002) found elevated mortality rates from air transportation accidents and war-related injuries. In contrast to the Australian findings, however, overall veteran deaths from diseases and cancers were significantly below mortality rates for comparable white US men, more than 40 years after the war (standardised mortality ratio (SMR) 0.74, 95%CI 0.73-0.76).

A study of 30,619 UK servicemen who were serving abroad in the 1950's and 1960's also found a significant increase in deaths from accidents and violence but, like Groves et al,[52] this UK study found deficits in death rates from cancers of the lung (SMR=73; $p<0.001$), stomach (SMR=66; $p=0.002$), bladder (SMR=53; $p=0.02$), other specified neoplasms (SMR=48; $p=0.001$), coronary heart disease (SMR=76; $p<0.001$), bronchitis, emphysema, and chronic obstructive lung disease (SMR=42; $p<0.001$), and for five further groups of diseases unrelated to smoking or alcohol. There were two cancer related causes of death which were in significant excess; these were deaths from cancers of the oesophagus (SMR=146; $p=0.03$) and prostate (SMR=156; $p=0.03$).[67]

Veterans of more recent conflicts

Literature in relation to more recent conflicts is dominated by studies of Vietnam War veterans, and veterans of the 1991 Gulf War. These are reviewed briefly below.

Vietnam War veterans

A brief review of the medical literature on veterans of the Vietnam War reveals a massive volume of scientific research covering a broad array of health outcomes and exposures. The

55+,[61] and comparable to Australian population estimates of current risky alcohol consumption in 7.7% and 3.3% of Australian men aged 65-74 and 75+ respectively.[62] Sutker and Allain, however, report current DSM III-R alcohol abuse or dependence in 0% of their 26 Korean conflict POWs and in only 1% of their 112 non-POW combat veterans.[46] This latter study does not utilise a non-veteran comparison group.

Studies of other psychological functioning

In addition to measuring PTSD, Hunt and Robbins (2001)[40] measured psychiatric caseness using the 20-item version of the General Health Questionnaire (GHQ). The authors found that approximately one third (35%) of their self-referred study participants scored above the standard cut-off point (> 4) for the GHQ; a figure well in excess of the 8-21%, of people in this age group, reported by Goldberg (1978)[63] as expected to meet criteria for GHQ caseness. As with PTSD in this study, psychiatric caseness was associated with lower rank, current war-related physical illnesses and "high" combat exposure.[40]

Villa et al (2002)[44] report mean SF-12 mental component summary (MCS) scores of 47 (standard deviation (SD) not given) in both Korean War (N=983) and WWII veterans (N=674) from the US. This mean is approximately 0.5 of a standard deviation below (less healthy than) US population norms reported for 65-74 year olds (mean SF12 MCS 52.10, SD 9.53) and those aged 75+ years (mean SF-12 MCS 50.06, SD 10.95).[64]

Sutker and Allain (1996) investigated a number of current DSM-III-R mental disorders in 112 US combat veterans of WWII or Korea.[46] The authors diagnosed 10% with dysthymia, 8% major depression, 8% simple phobia, 7% somatoform pain, 4% social phobia, 3% generalised anxiety disorder, 3% agoraphobia and 1% or less with bipolar disorder, panic, obsessive-compulsive disorder or somatization. 71% of this veteran group had no diagnosis of a mental disorder. To loosely compare these figures with general community figures, in the Australian 1997 NSHWB only 3% of men aged 55-64, and less than 1% of men aged 65 and over, met criteria for affective disorders including depression and dysthymia.[56] Furthermore, 94% of Australian men aged 65 or above had no diagnosis of a mental disorder.

Whilst none of the three veteran studies described above recruited a comparison group, their results all suggest that WWII and Korean War veterans are, in their later life, experiencing poorer psychological functioning than their community peers. In an exception, however, O'Donnell (2000)[45] reports no statistically significant difference in self-assessed mental health between veterans and non-veterans recruited as part of a national US survey of the non-institutionalised population. The study included approximately 641 veterans (71% WWI or WWII, and 23% Korean War of whom one-third also served in WWII) and approximately 427 non-veterans, all male and aged 65 or above, who were asked to rate their mental health on a Likert scale of 1 (excellent) to 5 (poor). The results suggested no independent association between self-appraised mental health and service in the armed forces, after adjustment for demographic, socio-economic and other health-related characteristics. Instead, the authors conclude that mental well-being in later life is largely a function of an individual's economic circumstances and health status.[45]

Studies of physical conditions

The Cancer Incidence Study 2003 of Australian Veterans of the Korean War[20] provides a comprehensive investigation of the cancer incidence pattern from 1982 to 1999 amongst Australian male Korean War veterans who were alive in 1982, and compares these patterns to those experienced by Australian population males of the same age. The overall incidence of cancer experienced by veterans ranged from between 13% and 23% higher than the expected population incidence based on two analysis scenarios described by the authors. Head and neck, lung, oesophagus and larynx cancers were all elevated using both analysis scenarios.

literature is dominated by investigations of PTSD symptoms and associated severity of combat exposure. Indeed, Vietnam conflict research is said to have led to the inclusion of PTSD as a specific diagnostic entity in the American Psychiatric Association's 1980 DSM version III.[68, 69] Also, the Combat Exposure Scale (CES) was constructed specifically as a systematic assessment of Vietnam veterans' combat experiences.[70]

The US National Vietnam Veterans Readjustment Study (1990), cited in Schnurr et al (2003),[71] estimated that over 960,000 men (30.6%) who served in the Vietnam War had experienced PTSD at some point since the war and that 15.2% currently had the disorder. In a preliminary investigation of 375 Australian help-seeking Vietnam veterans, Creamer et al (1996) estimated the prevalence of PTSD to fall somewhere between their own findings of 42% diagnosed by counsellors and 67% identified through self-report diagnostic questionnaire.[72]

Alcohol and other substance use have also been widely studied in Vietnam veterans. In an early study by Goodwin et al (1975) nearly one-third of surveyed Vietnam veterans had problems related to excessive drinking within eight to twelve months of their return from war.[73] Within two years of return, Nace et al (1977) observed that 39% of veterans had developed at least one alcohol related problem and that 16% could be diagnosed as alcoholic.[74] This latter research also indicated that 85% of veterans who were problem drinkers had been addicted to heroin in Vietnam.

In regard to other behavioural disturbances, Vietnam veterans returning from combat have been found to have higher levels of depression, anxiety, irritation, and feelings of helplessness, than non-combat peers.[75]

The herbicide mixture Agent Orange was widely used in the Vietnam conflict[76] and a vast literature has been generated investigating the possible health outcomes amongst veterans exposed to this mixture. They particularly include studies of possible adverse reproductive health outcomes such as birth defects[77] and miscarriages[75] and studies of various malignancies.[76, 78, 79] Results have frequently been inconclusive.

The Vietnam War medical literature also includes many studies of treatment methods for, and long term health effects of, physical trauma such as amputation,[80] shrapnel injury,[81] and head trauma.[82, 83]

Vietnam War veteran researchers have been assisted by the establishment of large registries of monozygotic and dizygotic male-male twin pairs, such as the Vietnam Era Twin registry[84] where both twins served in the military during the Vietnam War era. The recruitment of veterans from these registries have assisted researchers to better explore associations between exposures and health (for example, in pairs where one twin was exposed to an agent of interest and the other was not) and also to explore familial and genetic factors.[85-87]

1991 Gulf War veterans

It has been suggested that veterans of the 1991 Gulf War represent one of the most studied adult populations.[88] The vast literature is being reviewed by teams at the US Institute of Medicine (for example [89]). Soon after returning from deployment, Gulf War veterans were reporting a variety of symptoms and illnesses which could not readily be explained.[90] The media coined the term "Gulf War Syndrome" shortly after.[91] Most early research was carried out on US veterans,[92-94] however other Coalition nations have followed with studies of veterans of the United Kingdom,[95] Canada,[96] Denmark[97] and Australia.[98-101]

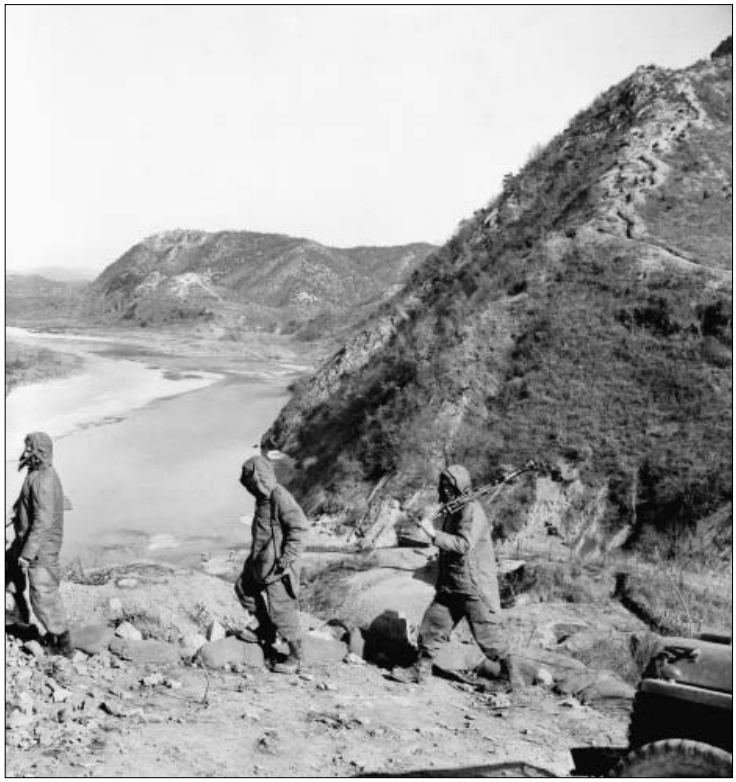
The health complaints reported by veterans have been varied; the most common symptoms being fatigue, rash, headache, muscle and joint aches, difficulty concentrating, forgetfulness and irritability.[93] Cross-sectional studies have consistently found increased symptom

reporting across a wide range of body systems by Gulf War veterans compared to non-Gulf War control groups.[95, 99, 102] However, factor analyses indicate that only the frequency or degree of expression of the symptom reporting, and not the pattern, varies between Gulf War veterans and controls[101, 103, 104] suggesting that a unique Gulf War syndrome does not exist.

Increased risk of psychological disorders have consistently been demonstrated.[94, 96, 98, 105] Australian Gulf War veterans, for example, demonstrated considerably greater risk of developing post-Gulf War anxiety disorders (adj OR 2.9; 95% CI 2.0-4.2) including posttraumatic stress disorder (adj OR 3.9; 95% CI 2.3-6.5), affective disorders (adj OR 1.7; 95% CI 1.3-2.1) and substance-use disorders (adj OR 1.5; 95% CI 1.2-2.0) compared to an age-matched military comparison group who did not deploy to that war. The prevalence of these disorders remained elevated in the Gulf War group a decade after deployment. Further, increased risk of psychological disorders within the Australian Gulf War veterans was associated with increased reporting of war-related stressors.[98] Commonly reported stressors included fear of death or injury, and threat of attack including biological or chemical weapons attack.[106] Other studies of overseas veterans have also associated increased psychological morbidity with stressful war-related experiences including combat severity,[107] injury, dealing with prisoners of war, and seeing maimed soldiers and dismembered bodies,[95] or seeing friends killed or wounded,[96] and the sounding of chemical alarms.[95, 96]

Other Australian health findings include increased reporting by veterans of medical conditions diagnosed after 1991, poorer self-perceived physical health status and increased functional impairment,[99] and poorer self-perceived mental health status.[100] Australian Gulf War veterans also reported more neuropathic symptoms than the comparison group, however a medical examination of the neurological system showed little difference between the two study groups.[108] Some respiratory symptoms were also reported more often by veterans, wheeze was more commonly found on examination, but spirometry revealed no consistent differences between veterans and controls.[109] There were also few differences between groups in regard to laboratory tests of blood cells, function of the liver and of the kidneys, biochemical indicators in the blood, measures of chronic inflammation and indicators of previous infection.[110]

Chemical and environmental agents, implicated in various Gulf War veteran studies as possible causes of ill-health, include smoke and oil from burning oil wells, airborne particulate matter such as sand and dust, immunisations received by veterans upon deployment, prophylactic medications including the anti-nerve agent pyridostigmine bromide, personal insecticides and pesticides used in living quarters and on bedding and clothes, chemical weapons including sarin and mustard gas, and biological weapons including anthrax and botulinum. A review of all of these agents can be found in the Australian Gulf War veterans' Health Study report to the Department of Veterans' Affairs.[110]



Korea, 20th October 1953. Troops from 2RAR, in their winter protective gear move into position during training exercise Scram. *(AWM image 157770)*

Korea, June 1952. Several jeeps towing trailers laden with supplies have pulled up in a camp in Korea. 1RAR are unloading equipment and supplies. Dugouts have been built into the surrounding hillside and reinforced with sandbags, ammunition boxes and wooden crates. (AWM image HOBJ3232)

4. THE AUSTRALIAN KOREAN WAR VETERANS' HEALTH STUDY

4.1 The research team

The study was conducted by researchers from the Monash University Department of Epidemiology and Preventive Medicine, in collaboration with project staff and a contact and recruitment team at the Australian Government Department of Veterans' Affairs (DVA). The Monash University and DVA staff members are listed in Appendix A.

4.2 Scientific Advisory Committee

A Scientific Advisory Committee (SAC) was appointed by DVA to oversee the development, conduct and analysis of the study. The SAC met regularly with the Monash researchers and DVA representatives. The SAC members are listed in Appendix B.

4.3 Veterans Consultative Committee

A veterans' Consultative Committee was also appointed by DVA to represent the interests of the veteran community. The Committee consulted with the veteran community in order to provide the study team with advice on all aspects of the study design and conduct and, in turn, fed information back to its constituent members. The Consultative Committee members are listed in Appendix C.

4.4 Study aims

This study aimed to compare the general physical and psychological health of surviving Australian male Korean War veterans with that of a comparison sample of similarly aged, Australian men who lived in Australia at the time of the Korean War but who did not serve in that conflict. More specifically, the study aimed to compare the two populations on measures of current general physical functioning, quality of life including level of life satisfaction, recent hospitalisations, general psychological functioning, anxiety including posttraumatic stress disorder, depression, alcohol disorders and current common medical conditions. Further, the study aimed to investigate the differential health effects within Korean War veterans as a function of several war-related factors, including Service branch, age and level of rank at deployment, duration and era of deployment, and an estimated measure of combat severity.

4.5 Research questions

The study addressed the following research questions:

1. Do surviving male Korean War veterans differ significantly, in their general physical health and functioning, from a comparison population of similarly aged Australian men?

Specific comparisons include measures of hospitalisations, self-rated quality of life and life satisfaction, self-rated physical health and reported medical conditions.

2. Do surviving male Korean War veterans differ significantly, in their general psychological health, from a comparison population of similarly aged Australian men? Specific comparisons include indicators of depression, alcohol misuse and anxiety including Posttraumatic Stress Disorder (PTSD).

3. Amongst surviving male Korean War veterans, do war-related factors including Service branch, age at deployment, rank at deployment and severity of combat experience predict differences in general physical health and functioning and general psychological health?

4.6 Study design

The study was a cross-sectional survey of the entire cohort of surviving male Korean War veterans who were residing in Australia, and a smaller comparison sample of similarly aged Australian men who were registered on the Australian Electoral Roll. The study design included two major sources of data:

1. Data collected via a postal questionnaire investigating the health and military experiences of study subjects.

2. Deployment related data collected from the DVA Korean War Nominal Roll.

4.7 Pilot study

A pilot study was conducted in 2002, with the aim of evaluating the efficacy of a larger, cross-sectional survey. A complete report in relation to the design and conduct of the pilot study, including the recommendations arising from its results, is included at Appendix M.

In summary, the pilot study aimed to evaluate the following aspects of the main, cross-sectional survey design:

1. The ability of the main, cross-sectional study to answer the posed research questions.

2. The suitability of the Electoral Roll as a source from which to draw a comparison group for the Korean War veterans.

3. Currency and completeness of address information available for both the Korean War veterans and comparison group.

4. Anticipated participation rates and reasons for refusal.

5. The proportion of recruited comparison group subjects who would be similar to the Korean War veterans in relation to country of birth, or residence in Australia at the time of the Korean War.

6. Any aspects of the proposed study materials which might inhibit study participation or contribute to poor data quality.

7. Any important health concerns of Korean War veterans which might have been missed in the proposed questionnaires.

8. Ease of completion of the questionnaires.

The pilot study included 125 Korean War veterans and 125 age-matched men drawn from the Australian Electoral Roll. Recruitment was carried out by mailed invitation. Subjects received all of the invitation and questionnaire materials proposed for the main study. The pilot study questionnaire included some questions aimed at evaluating the readability of the invitation materials and questionnaire, ease of, and approximate time to, completion, and any omission of health concerns which were of importance to the recipients. Subjects wishing to decline participation were invited to complete a Voluntary Refuser Notification Form which included a question about their reasons for non-participation. Upon receipt of the returned, completed questionnaires from participants, Monash project staff evaluated all sections for completeness and the quality of responses.

In relation to the aims of the pilot study, and to ensure the success of a main study, the following conclusions and recommendations were made:

1. With some straight forward modifications to the existing study protocol, invitation materials and questionnaire content, a main, cross-sectional study would be sufficiently methodologically sound to effectively address research questions in relation to the current physical and psychological health of Korean War veterans.

2. The Australian Electoral Roll was a very suitable source from which to draw an appropriate comparison group for a Korean War veterans' health study. A male, age-matched comparison group was easily extracted, Korean War veterans were well represented on the Roll, and address information was very accurate.

3. Of the recruited comparison group subjects, approximately 18% arrived and settled in Australia after the time of the Korean War, and therefore differed from the Australian Korean War veterans in relation to ethnic background and eligibility to have served in the Australian armed forces at the time of the war. Thus, it was anticipated that a similar percentage would be ineligible for participation in the main study comparison group.

4. There were some existing inaccuracies in the address information held by DVA in relation to the Korean War veterans and, in anticipation of the main study, a comprehensive address search strategy should be conducted to identify current address details.

5. Participation rates in the pilot study were 70% for the Korean War veterans and 49% for the comparison group. Non-participation was highest in the comparison group where some subjects mistakenly believed that they were supposed to be Korean War veterans in order to participate. Other reasons for non-participation in both groups included ill-health and old age, with few questionnaires being completed by proxy on behalf of these subjects. Recommendations to minimise non-participation in these groups, and maximise overall participation, included:

    - modifying the comparison group invitation package materials to reduce the focus on Korean War veterans and increase the focus on the non-veteran Australian population;
    - revising all invitation materials to encourage participation by the very old and very unwell and to encourage participation by proxy;
    - improving the overall presentation and packaging of invitation materials; and
    - ensuring comprehensive media promotion of the study to the Korean War veteran community and to the general community.

6. It was anticipated that a main, cross-sectional study could successfully achieve participation rates of 75% in the Korean War veterans' group and 65% in the comparison group.

7. In order to maximise data quality in the main study, it was recommended that some specific areas of the questionnaire should be revised or replaced where pilot study data quality had been poor; these included the Posttraumatic Stress Disorder Checklist, 12-item Short Form Health Survey, medical conditions questions, and proxy questions.

8. There were few other aspects of the study materials or design which seemed to be responsible for inhibiting participation in the study, the quality and completeness of questionnaire data was very good in most sections, and the format, level of complexity and coverage of the questionnaires proved to be very acceptable to most respondents, and there were few problems reported.

9. There were few consistent themes in regard to 'other important health concerns' which were reported to be missing from the content of the existing questionnaire. Some participants reported sight and hearing problems, which are common to aging populations, and these could be considered for inclusion in a main study.

4.8 Study populations

4.8.1 The Korean War veteran study group

Australia's Korean War veterans are defined as all members of the Australian Army, Royal Australian Navy or the Royal Australian Air Force who landed in Korea or who entered the waters surrounding the coast of Korea within a distance of 185 kilometres seaward, including those who were seconded to the Army of the Republic of South Korea, the United States Air Force or Navy, the British Army, Navy or Air Force and any other allied Service; all members of philanthropic organisations; all members of the Australian Forces Overseas Fund and all official entertainers and war correspondents who saw service in Korea between 27 June 1950 and 19 April 1956. These total 17,872 persons listed on the DVA Nominal Roll for that conflict, including 5,769 (32%) Navy, 10,848 (61%) Army and 1,226 (7%) Air Force personnel, 19 members of philanthropic organisations and 10 civilians. The Nominal Roll comprises 17,814 men (99.7%) and 58 women (0.3%).

Minimum eligibility criteria for service with the Australian armed forces in the 1950s included that applicants be:

- aged 18 years or older; and
- an Australian citizen or British subject.

For this health study, the Korean War veterans included in the Korean War veteran study group were those who were:

- male;
- known or assumed to be alive at 1 February 2004; and
- known or assumed to be residing in Australia during the data collection period.

Sex, country of residence and live status were determined from several databases maintained by DVA.

Female Korean War veterans were excluded from the study due to their very small numbers and because health patterns in men and women can be quite different. If data for female veterans was collected and included with the men's data, patterns specific to women would be difficult to identify.

4.8.2 The comparison population

The comparison population was defined with two primary purposes:

1. To identify a sample of men representative of the Australian, elderly male population in regard to age pattern and ethnic background. This sample will be referred to as the *population sample* in this report.

2. To identify a group, drawn from the *population sample* described at point 1 above, similar to the Korean War veterans in regard to age pattern and residence in Australia at the time of the Korea War. It is the health results of this group that will be compared with those of the Korean War veterans, and this group is to be referred to as the *comparison group* in this report.

In accord with the comparison population's two primary purposes, the suitable subjects were defined and identified in two stages.

Stage 1: Defining and identifying the *population sample*

A sample of men representative of the Australian, elderly male population was drawn from a complete extract of men registered on the Australian Electoral Roll at 15 December 2003, aged 65 and above.

Because voting and Electoral Roll registration is compulsory in Australia, the Australian Electoral Roll provides a fairly complete sampling frame of adult Australians. With the exception of an estimated 5% of eligible voters who do not register to vote, and some additional exclusions based on ineligibility to vote (outlined below), the Australian Electoral Roll includes all persons who are:

- alive;
- 18 years of age or older; and
- Australian citizens (or British subjects who were on a Commonwealth of Australia Electoral Roll on 25 January 1984).

Australians classified as ineligible to vote and therefore excluded from the Electoral Roll are:

- people, who by reason of being of unsound mind, are incapable of understanding the nature and significance of enrolment and voting;
- prisoners serving a sentence of five years or more;
- people who have been convicted of treason and not pardoned;
- Australian citizens living permanently overseas who do not have a fixed intention of returning to Australia; and
- any persons who renounce their Australian citizenship.

The Electoral Roll extract included address upon enrolment (except for silent voters whose addresses are removed) and age given in two-year age bands. The Monash Study team selected a random sample of men from the extract to achieve the desired age-distribution and sample size described below at section 4.8.3. From this sample Korean War veterans were identified and removed. The resulting *population sample* was invited to participate in the study.

Stage 2: Defining and identifying the *comparison group*

To identify a group, from the *population sample* described at stage 1 above, similar to the Korean War veterans in regard to age pattern and residence in Australia at the time of the Korea War, the Monash Study team used participant questionnaire responses to identify *population sample* participants who were:

- aged at least 18 years old by the year 1955[ii];

AND

- Australian born; or
- If not Australian born, then first settled in, or a citizen of, Australia by 1955.

Population sample participants meeting these criteria were identified as the study *comparison group*, and it is against this latter group that the health outcomes of the Korean War veteran participants are compared in the Participant Results chapter (Chapter 6) of this report.

4.8.3 Determination of study group sizes

Korean War veteran study group size

The health study was required to include all surviving male Korean War veterans who were residing in Australia during the data collection period. At commencement of the study there were 7,663 male veterans known or assumed to be alive, based on information collected for the Australian Korean War veterans 2003 Mortality Study[19] and subsequent checks of the Australian Electoral Roll and National Death Registry data. They represented 43% of the total number of male Korean War veterans listed on the Nominal Roll. They excluded some veterans for whom live status was classified as 'unknown' in the Mortality Study,[19] despite the extensive searches undertaken for that Study.

Of the 7,663 surviving veterans, 51 with overseas residential addresses were excluded from the group. Therefore the final number of eligible Korean War veterans included in the Health Study was **7,612**. They represented 42.7% of the total number of male Korean War veterans listed on the Nominal Roll.

Based on the recruitment results achieved in the pilot study, and the subsequent implementation of the associated recommended strategies for maximising participation, it was estimated that an 80% participation rate would be achievable in the Korean War veteran study group. Based on this estimate, the study would yield approximately 6,090 Korean War veteran participants.

Population sample size

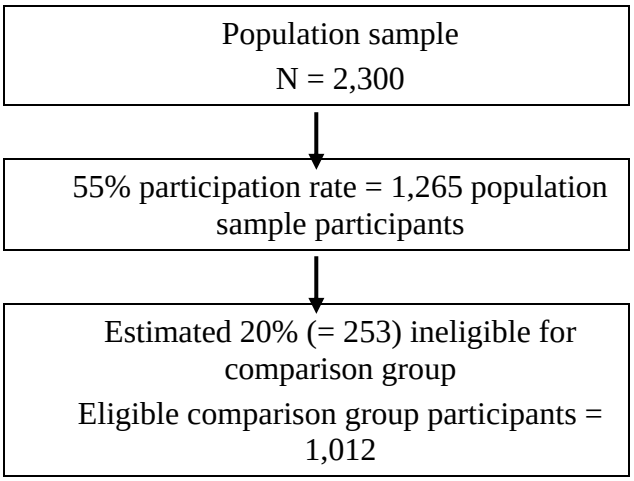
The final population sample size was **3,022**. This number was derived from several calculations and considerations according to the following four steps:

1. A population sample size was required which would yield approximately 1,000 eligible participants who could provide useful, generalisable information about the average Australian male population aged 65 and above.

2. The 2002 pilot study (see Appendix M) resulted in a poor recruitment rate of 49% for the population sample and, of these, approximately 18% did not meet criteria for comparison group selection (for these criteria see section 4.8.2). Whilst it was considered that in the main study the recruitment rate would improve, the number of comparison group subjects expected to participate was based on conservative estimates of a 55% participation rate in the population sample and, amongst those, the exclusion of up to 20% identified as ineligible for inclusion in the comparison group. Using these estimates, it was calculated that the population sample would need to total at least 2,300 subjects to yield 1,000 comparison group participants. This calculation is shown in Figure 1.

[ii] 1955 was estimated as likely to be the latest year in which a subject could have joined the Australian armed forces and seen Korean War service prior to April 1956; that being the end service date on the Korean War Nominal Roll.

Figure 1.



3. The age distribution of the Korean War veterans is somewhat different to that of the Australian male population on the Electoral Roll aged 65 and over, and these two populations are shown in 2-year age bands in the 2nd and 4th columns in Table 1. In order that the population sample could be used for its two designated purposes (see 4.8.2), the study required at least 2,300 subjects who matched the age distribution of the surviving Korean War veterans (the number required in each age-band is shown in the 3rd column in Table 1), and at least 2,300 subjects who matched the age distribution of the Australian male population on the Electoral Roll aged 65 and above (shown in the 5th column in Table 1).

   The largest number from each row of columns 3 and 5 were taken to represent the maximum number of subjects required in each age band, such that the age distribution of the final population sample, and resulting comparison group, could reflect both that of the surviving Korean War veterans, and the Australian male community aged 65 and over. These final numbers for each age band are shown in the 6th (final) column in Table 1.

   When summed, the final number of population sample subjects required totalled 3,042.

4. Once the 3,042 population sample subjects were randomly selected from the Electoral Roll, the sample was then matched against the Korean War Nominal Roll so that any Korean War veterans in the sample could be identified. This process identified 20 Korean War veterans who were subsequently removed from the sample, leaving a final population sample totalling **3,022** members.

Table 1. Age distribution of the Korean War veterans (KWV), and of the Australian male population aged 65+ on the Electoral Roll, and number of population sample (PS) subjects needed to match these age distributions assuming a minimum of 2,300 subjects required

Age band	% KWV population	Number of PS subjects required to match KWV age distribution	% male 65+ population on Electoral Roll	Number of PS subjects required to match Electoral Roll age distribution	Maximum PS subjects required to match both age distributions
66-67	0.45	10	13.89	319	**319**
68-69	7.54	173	12.42	286	**286**
70-71	18.24	420	11.57	266	**420**
72-73	22.42	516	11.45	263	**516**
74-75	20.82	479	10.73	247	**479**
76-77	14.10	324	9.63	221	**324**
78-79	7.31	168	8.24	189	**189**
80-81	4.29	99	6.81	157	**157**
82-83	2.51	58	5.36	123	**123**
84-85	1.06	24	3.47	80	**80**
86-87	0.77	18	2.56	59	**59**
88-89	0.27	6	1.78	41	**41**
90-91	0.09	2	1.07	25	**25**
92-93	0.06	1	0.57	13	**13**
94-95	0.06	1	0.29	7	**7**
96-97	0.00	0	0.12	3	**3**
98-99	0.00	0	0.05	1	**1**
Total	100%	2,299	100%	2,300	**3,042**

4.9 Contact strategy and recruitment procedures

4.9.1 DVA-based contact and recruitment team

A DVA-based contact and recruitment team was established to:

- Store and maintain current contact details for the Korean War veteran group and the population sample.
- Arrange printing, packaging and mailing of invitation packages and follow-up letters.
- Identify incorrect or incomplete addresses amongst the data set, including recording return-to-senders and undertaking designated search strategies for identifying new contact details where available.
- Follow-up subjects, who did not respond to the initial mail contact, by sending reminder mailout packages.

- Respond appropriately to the queries and concerns of eligible subjects who phoned or contacted DVA requesting further information about participating in the study.
- Mail Korean War commemorative coins to all study respondents.

4.9.2 Contact strategy

Study subjects were contacted via mail only. During the 2002 pilot study, it became apparent that some population sample subjects declined their invitation to participate in the Korean War veterans' Pilot Health Study, because they misunderstood their role as a comparison participant and thought that they had been mistakenly invited as a veteran of the Korean War. To eliminate the potential for this same misunderstanding to occur in the main study, the invitation materials for the population sample were labelled "Survey of Men's Health and Ageing", and it was explained that this Survey was being conducted as part of the Korean War veterans' Health Study. All invitation materials for the Korean War veterans were labelled "Korean War veterans' Health Study".

Preliminary letter

Subjects were initially sent a single page preliminary letter, advising them that the study was commencing and that they would soon receive an invitation package. Korean War veterans received a letter signed by the, then, Minister for Veterans' Affairs, the Honourable Danna Vale (letter shown in Appendix D) whilst the population sample received a letter signed by Associate Professor Malcolm Sim of Monash University (letter shown in Appendix G).

First-invitation package

Subjects were sent a first-invitation package, no earlier than four weeks, and no later than nine weeks, after the preliminary letters were sent.

Invitation packages were mailed in batches of approximately 2,000 per week (1,400 to Korean War veterans and 600 to the population sample) across a period of five weeks.

The first-invitation package for the Korean War veterans contained:

- A personally addressed letter of invitation to participate in the Korean War veterans' Health Study from the Monash University study team (Appendix D).
- A letter of endorsement from the Minister for Veterans' Affairs (Appendix D).
- A letter of endorsement from the chair of the Consultative Committee (Appendix D).
- The Korean War veterans' Health Study Explanatory Statement (Appendix E).
- A Voluntary Refusal Notification Form (Appendix J).
- The Korean War veterans' Health Study participant questionnaire (Appendix F).
- A Reply-paid envelope.

The first-invitation package for the population sample contained:

- A personally addressed letter of invitation to participate in the Survey of Men's Health and Ageing from the Monash University study team (Appendix G).
- A letter of endorsement from the Minister for Veterans' Affairs (Appendix G).
- The Survey of Men's Health and Ageing Explanatory Statement (Appendix H).
- A Voluntary Refusal Notification Form (Appendix J).
- The Survey of Men's Health and Ageing participant questionnaire (Appendix I).
- A Reply-paid envelope.

First-reminder letter

A first reminder letter was sent to subjects who did not respond to the first-invitation package within three weeks of its dispatch. Such non-responders were defined as those subjects who

had not returned their completed questionnaire or Voluntary Refusal Notification Form, and for whom the invitation package had not been returned-to-sender from an incorrect address. The reminder letter was a single page letter from the Monash University study team, and was differently worded for the Korean War veterans' group (Appendix D) and the population sample (Appendix G).

Second-reminder package

A second reminder package was sent to those subjects who did not respond to the first reminder letter within three weeks of its dispatch, and for whom previous invitations had not been returned-to-sender from an incorrect address.

The second reminder package for the Korean War veterans contained:

- A personally addressed letter of reminder from the Monash University study team (Appendix D).
- The Korean War veterans' Health Study Explanatory Statement (Appendix E).
- A Voluntary Refusal Notification Form (Appendix J).
- The Korean War veterans' Health Study participant questionnaire (Appendix F).
- A Reply-paid envelope.

The second reminder package for the population sample contained:

- A personally addressed letter of reminder from the Monash University study team (Appendix G).
- The Survey of Men's Health and Ageing Explanatory Statement (Appendix H).
- A Voluntary Refusal Notification Form (Appendix H).
- The Survey of Men's Health and Ageing participant questionnaire (Appendix I).
- A Reply-paid envelope.

Source of contact details

The initial set of addresses for the Korean War veteran group were drawn from the Korean War veterans' Study Roll compiled by the DVA from Ad hoc Information Systems maintained by DVA. Where individual Korean War veterans could not be matched with the DVA database, their addresses were sought from the Australian Electoral Commission (AEC). The initial set of addresses for the population sample were drawn directly from the Australian electoral roll maintained by the AEC.

Where addresses proved to be incomplete, incorrect or out of date, alternative addresses were sought from such sources as the Health Insurance Commission and the Telstra White Pages directory.

4.9.3 Recruitment outcomes

Upon cessation of the contact and recruitment effort, subjects were classified as belonging to one of the following recruitment outcomes:

Participant: these persons completed, or part completed, and returned their Study consent form and questionnaire.

Refuser: These persons refused participation in the Study by either returning their Voluntary Refusal Notification Form or notifying the recruitment team by phone, email or post.

Overseas: These persons were identified as being overseas for the duration of the study.

Not contactable: The addresses for these subjects proved to be incomplete or incorrect and no alternative addresses could be located.

Non-responder: These persons had not responded to their invitation packages by the time of the study's closure, and the DVA Contact and Recruitment team had not received a 'Return To Sender' or 'Not Known at this Address' notification.

Deceased: There was evidence to suggest that the subject was deceased.

Ineligible: There was evidence to suggest that the person did not meet the eligibility criteria for participation as either a Korean War Veteran group or population sample member (eg the person was found to be female).

4.9.4 Recruitment tracking

A subject tracking procedure and database, designed by the Monash University Study team and written in collaboration with programmers at DVA, was used to manage and monitor the progress of the contact strategy and recruitment procedures. Response and participation rates were monitored at each stage of the contact strategy.

4.9.5 Methods to maximise participation

Strategies employed to maximise participation included:

- Brief introductory letter sent to all subjects, informing them that the study invitation package was pending.
- Letters of endorsement for the Study from the Minister for Veterans' Affairs and the Consultative Forum.
- Contents of the invitation letters and Explanatory Statements individually tailored to the Korean War veteran group and the population sample separately.
- Offer of Mint Issue 2003 Coin, commemorating the 50th anniversary of the signing of the armistice to the Korean War, to all respondents.
- Promotion of the Study via the media including Ministerial press releases in addition to articles within Veteran and Defence-related publications.
- Informed promotion of the Study by the Consultative Forum to the members of the organisations they represent, and networking through the memberships of these organisations.

4.10 Data collection

The data collected throughout the study was derived from several sources, including the self-report questionnaires completed by participants, the Voluntary Refuser Notification Form completed by some refusers, and the DVA Nominal Roll for the Korean War deployment.

4.10.1 Participant questionnaire

Demographic, quality of life and health data were collected via questionnaires which were mailed to all study subjects. Korean War veterans received the Korean War veterans' Health Study (KWVHS) participant questionnaire (Appendix F) whilst the population sample received the Survey of Men's Health and Ageing (SMHA) participant questionnaire (Appendix I).

Instrument selection

Selection of the appropriate questionnaire items and instruments was based on the following considerations:

- Instruments were required which addressed the study research questions; namely instruments which provided indications of physical and psychological functioning, also quality of life and instruments which covered suitable demographic and exposure issues.
- Evidence of instrument validity when used with elderly and Australian populations.
- The availability of Australian normative comparisons and comparisons with previous studies of Korean War or other elderly veterans.
- Appropriateness of questions for an elderly, primarily retired population (eg questions about functionality which relate to the work-place were considered inappropriate).
- Appropriateness of instrument length for completion by an elderly population, with preference given to instruments which were brief.
- As the survey was to be sent via the post, preference was given to instruments which were designed to be self-administered.
- Instruments which performed well in the Korean War veterans' pilot Health Study, or would be expected to perform well, with appropriate modifications, based on results of that study.
- Questions were not required which addressed information which was already available to the researchers. For example, some Korean War deployment information, such as rank at deployment, did not need to be collected from Korean War veterans as this information was available on the DVA Nominal Roll for that conflict. Address and postcode was not requested of the comparison group as this information was provided by the AEC.

Overview of the study questionnaire contents

The study questionnaires were sent by post and were designed to be self-administered in a period of approximately 30 minutes. It was anticipated that participants would complete the questionnaires in their own time, with access to a study free-call number if assistance was required.

The questionnaires included the following sections:

- Informed Consent.
- Contact Details.
- Proxy administration ("Who is completing the questionnaire?").
- Demographic and socioeconomic information.
- Current quality of life measured using the World Health Organisation brief Quality of Life questionnaire.
- Current life satisfaction measured using the Life Satisfaction Scale.
- Number of nights of hospitalisation in the previous year.
- Anxiety and depression symptoms in the past week, measured using the Hospital Anxiety and Depression scale.
- Lifetime tobacco consumption.
- Current alcohol use and history of alcohol-related problems.
- Posttraumatic stress disorder symptoms in the past month, measured using the Posttraumatic Stress Disorder Checklist.

- Military service experience.
- Korean War experience: wounded in action.
- Korean War experience: fever.
- Korean War experience: combat exposure measured using the Combat Exposure Scale.
- Current medical conditions.
- Other health concerns.

These are described in more detail below.

Informed Consent
Page 1 in both the KWVHS and SMHA participant questionnaires.

The Informed Consent Statement was placed inside the questionnaire to ensure its completion and return with the questionnaire data.

Contact Details
Page 2 in both the KWVHS and SMHA participant questionnaires.

Korean War veterans were requested to provide their address and a day-time phone contact. Population sample subjects were requested to provide a day-time phone contact (Monash already had their addresses from the AEC).

Proxy administration ("Who is completing the questionnaire?")
Page 2 in both the KWVHS and SMHA participant questionnaires.

In order to maximise participation by the very old and/or very unwell, the study invitation letters and Informed Consent Statements informed participants that, if necessary, a relative, friend or carer could assist in completing the questionnaire on their behalf. Thus, a section of the questionnaire was designed to identify whether the questionnaire responses were indeed self-reported by the participant, or completed by a proxy (relative, friend or carer). If proxy completed, additional questions identified whether the proxy simply transcribed answers provided by the participant, or provided his/her own answers to the questions on behalf of the participant.

Demographic and socioeconomic information
Questions 1-5 in both the KWVHS and SMHA participant questionnaires.

Demographic and socioeconomic information collected included:

- Date of birth.
- Country of birth.
- (*SMHA questionnaire only*) If not Australian born, year of first settlement in Australia, whether Australian citizenship gained, and year of citizenship.
- Indigenous status.
- Current marital status.
- Highest educational qualification.

Specific demographic and socioeconomic variables were selected for several purposes. The demographic characteristics of date of birth, country of birth and indigenous status are included in the National Minimum Data Set, a core set of data elements agreed by the National Health Information Management Group for mandatory collection and reporting at a national level.[111]

Questions referring to date of birth, country of birth, and year of naturalisation and/or settlement in Australia were further designed to be used to determine true eligibility of population sample subjects to be included in the comparison group for comparison with Korean War veterans.

Marital status and educational qualifications were included because they are important predictors of health status.

World Health Organisation brief Quality of Life questionnaire (WHOQOL-Bref)
Questions 6-31 in both the KWVHS and SMHA participant questionnaires.

The WHOQOL-Bref is a self-administered, 26-item, abbreviated version of the 100-item World Health Organisation Quality of Life questionnaire (WHOQOL-100).[112] The questionnaire was developed by the WHO to measure quality of life; defined as "an individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".[112] The WHOQOL-Bref contains two individual questions exploring overall self-rated quality of life and satisfaction with health, and 24 questions that explore the four Domains of Physical Health (eg ability to perform activities of daily living and mobility), Psychological health (eg self-esteem, concentration, negative mood, and body image), Social Relationships (eg personal relationships and social support) and the Environment (eg financial resources, transport, safety, and access to information). All questions are asked in relation to the "last two weeks".

The Domain scores have been shown to demonstrate good discriminant validity (P values <= 0.001 for "ill" versus "well" subjects in each Domain), internal consistency (Cronbach's alpha values ranging from 0.66 for Social Relationships to 0.84 for Physical Health) and test-retest reliability (Pearson's r ranging from 0.66 to 0.87 for the four Domains).[113]

The WHOQOL-Bref's 26 questions comprise question numbers 6 to 31 in both the KWVHS and SMHA participant questionnaires. Therefore, WHOQOL-Bref question 1 corresponds with participant questionnaire question 6, WHOQOL-Bref question 2 corresponds with participant questionnaire question 7, and so on.

The instrument's 26 questions are answered on a five-point scale from 1-5.[112] Questions 3, 4 and 26 in the instrument are reverse scored before summation. Final scores are scaled in a positive direction such that higher scores denote higher quality of life.

WHOQOL-Bref question 1, representing overall quality of life, and question 2, representing health satisfaction, are examined separately and have total scores ranging from 1-5.

The four Domains are comprised of the following sets of questions:

Domain 1 Physical Health: questions 3, 4, 10, 15, 16, 17 and 18.

Domain 2 Psychological; questions 5, 6, 7, 11, 19 and 26.

Domain 3 Social Relationships: questions 20, 21 and 22.

Domain 4 Environment: questions 8, 9, 12, 13, 14, 23, 24 and 25.

The mean score of items within each Domain is used to calculate each Domain score. Mean scores are then multiplied by four, giving a total Domain score range of 4-20, in order to make Domain scores comparable with the scores used in the WHOQOL-100.

Where participants fail to provide a response to at least 21 (80%) of the WHOQOL_Bref's 26 questions, they are excluded from scoring. Further, if participants have two or more items missing from Domains 1, 2 or 4, or one or more items missing from Domain 3, the associated Domain scores are not calculated for those individuals.

Life Satisfaction scale
Question 32 in both the KWVHS and SMHA participant questionnaires.

The Life Satisfaction scale, also called the Delighted-Terrible scale, was used to assess satisfaction with life in general.[114] It is most commonly used in population settings and was included in the Australian Bureau of Statistics (ABS) 1997 National Survey of Mental Health and Wellbeing[56, 115] and in the 2001 National Health Survey (the results for this scale in the latter survey are yet to be published). Test-retest reliability has been reported to be approximately 0.70, with 92% of respondents providing an answer on retest that was identical or immediately adjacent to their previous answer.[114] Internal consistency reliabilities have been reported at 0.74 and 0.87 on a sample of chronic mental patients.[116] Cummins (1995) reported the scale's performance to be satisfactory in large population-based studies.[117]

The scale consists of a single question ("How do you feel about your life as a whole, taking in to account what has happened in the last year and what you expect to happen in the future?") with seven possible responses; 1-delighted; 2-pleased; 3-mostly satisfied; 4-mixed; 5-mostly dissatisfied; 6-unhappy; 7-terrible. Similar to Cummins (1995)[117] and Dear et al (2002)[115] the raw scores (S) were converted by applying the linear transformation 100(7-S)/6 and presented as "percent life satisfaction" (PLS). These transformed scores ranged from 0 (zero) to 100 with higher scores representing higher life satisfaction.

From his analysis including studies of life satisfaction from all major geographic regions in the world, Cummins (1998)[118] proposed a universal norm of 70 ± 5% on Likert scale-based measures of life satisfaction. Using the 1997 National Survey of Mental Health and Wellbeing data, Dear et al (2002)[115] estimated the mean PLS for the Australian adult population to be 70.4% (95% CI 70.0 – 70.8), with improved life satisfaction being associated with younger age, female sex, tertiary education, good physical and psychological health, moderate alcohol consumption, married or defacto status, and employment.

Hospitalisations
Question 33 in both the KWVHS and SMHA participant questionnaires.

Respondents were asked to estimate the number of nights of hospitalisation in the previous year.

Hospital Anxiety and Depression (HAD) scale
Questions 34-47 in both the KWVHS and SMHA participant questionnaires.

The HAD scale is a brief 14 item self-rating measure of anxiety and depression.[119] It has been widely used since its development in 1983. A recent review of 747 studies that used the HAD scale suggested that it performed well in assessing symptom severity and caseness of anxiety disorders and depression in both somatic, psychiatric and primary care patients and in the general population.[120] The HAD scale's psychometric properties are considered quite good in terms of factor structure, intercorrelation, homogeneity and internal consistency.[121] Using a sample which included 11,957 subjects aged 60-89, Mykeltun et al (2001) reported good Cronbach's alpha scores of 0.75 (depression subscale) and 0.82 (anxiety subscale) for subjects aged 60 – 79 years, and 0.73 (depression subscale) and 0.81 (anxiety subscale) for subjects aged 80 years or more.[121] With an Australian sample, Clarke et al (1993) found the depression subscale to have 95% specificity and 40% sensitivity to detect DSM-III-R depression using an empirically determined optimal cut-off score of 11 or more, and 92% specificity and 71% sensitivity to detect DSM-III-R major depression using a cut-off score of 10 or more.[122]

The HAD scale's 14 questions comprise question numbers 34 to 47 in both the KWVHS and SMHA participant questionnaires. Therefore, HAD scale question 1 corresponds with

participant questionnaire question 34, HAD scale question 2 corresponds with participant questionnaire question 35, and so on.

The HAD scale's 14 questions are answered on a four-point scale from 0-3. The scale's questions 1, 3, 5, 6, 8, 10, 11 and 13 are reverse scored before summation. Total scores range from 0-42. The anxiety subscale comprises questions 1, 3, 5, 7, 9, 11 and 13. The depression subscale comprises questions 2, 4, 6, 8, 10, 12 and 14. The scale's developers, Zigmond & Snaith (1983), determined that a score below eight, on both the depression subscale and the anxiety subscale, defined non-cases, scores from eight to 10 defined borderline cases, and scores equalling 11or above defined cases experiencing clinically significant depression and anxiety respectively.[119]

Tobacco consumption

Questions 48-48e- in both the KWVHS and SMHA participant questionnaires.

Tobacco smoking, reported as being "responsible for the greatest burden on the health of Australians", has been associated with diseases including cardiovascular diseases, cancers, emphysema, stroke and thrombosis.[123]

The participant questionnaire included six questions about the consumption of cigarettes, cigars and tobacco, and responses to these were used to determine:

- Smoking status: Ever smoker vs former smoker vs never/occasional smoker.
- Total number of years smoked.
- Approximate average number of cigarettes or cigars, or amount of rolled tobacco, smoked per year of smoking.
- Cumulative amount of smoking in 'pack-years'.

It was assumed that one pack contained 20 cigarettes, that one cigar was equivalent to three cigarettes,[iii] and that one gram of tobacco (0.035 of an ounce) was equivalent to two cigarettes.[iv] Pack years were calculated as total number of cigarettes (or equivalent) ÷ 20 ÷ 365. One pack year would be equivalent to smoking one pack of 20 cigarettes per day for one year. A person who smoked an average of 16 cigarettes per day for a duration of 12 years (the equivalent of 70,080 cigarettes) would receive a pack years score of 9.6 (i.e. 70,080 ÷ 20 ÷ 365 = 9.6).

There are limitations to interpretation of this data. A longer questionnaire would be required, with multiple smoking start dates and quit dates, if the investigators were to very accurately calculate pack years of cigarette consumption.

Alcohol Use

Questions 49-57 in both the KWVHS and SMHA participant questionnaires.

Alcohol use questions were drawn from the Alcohol Use Disorders Identification Test (AUDIT),[125] from the Australian Diabetes, Obesity and Lifestyle Study[126] and from the CAGE questionnaire.[60, 127] These several, brief instruments were used in an effort to broadly assess both past and current alcohol use in this elderly group. Reid et al (2003) suggested that the use of an individual measure may fail to detect many older adults with important alcohol exposures, having found only modest agreement between five alcohol measures, and recommended that a combination of measures be used when obtaining alcohol histories in older persons.[49]

[iii] Estimate based on the American Cancer Society report "Cigar smoking and cancer: Is cigar smoking on the rise?" Atlanta, Georgia, 2000; which indicated that "most cigars have as much nicotine as several cigarettes"

[iv] Estimate based on King, B. & Borland, R. (2004)[124] who gave the median tobacco weight for Australian cigarettes in 1994 as 536 milligrams.

The AUDIT scale was developed by the WHO as a screening instrument for current hazardous and harmful alcohol consumption.[125] The first three alcohol consumption questions from this scale were used in our study questionnaire. These have been referred to as the AUDIT-C[128] which has been shown to perform equally as well as the AUDIT (p=0.83) for detection of either heavy drinking and/or active alcohol abuse (area under receiver operating characteristic curve measured as 0.81) in a sample of 447 male general medical patients (83% aged 80 and over). The AUDIT-C's three questions, each with five possible responses, are each scored on a scale of 0-4. The three individual scores are then summed such that possible AUDIT-C scores range from 0-12, with higher scores representing greater levels of drinking. Bush et al (1998) recommended using a cut-off score of three or more to detect problem drinkers, this threshold being highly sensitive, detecting 90% of subjects with active alcohol abuse and 98% of patients with heavy drinking. This threshold, however, had rather low specificity of 60%. For a more specific test, a cut-off of four or more was recommended, which detected 86% of subjects with heavy drinking and/or active alcohol abuse, with a specificity of 72%. Rumpf et al (2002)[129] and Aertgeerts et al (2001)[130] also recommend the AUDIT-C as an efficient screening instrument in male subjects. In their studies, however, they recommend a cut-off score of five or more as providing the optimal combination of sensitivity, 88% and 78% in their studies respectively, and specificity, 81% and 75% in their studies respectively, for detecting alcohol dependence or abuse.

In our questionnaire we also included two questions drawn from the Australian Diabetes, Obesity and Lifestyle Study.[126] These were selected for their evaluation of whether the respondent considers that he has ever been a 'heavy' drinker or whether the respondent has ever been treated for alcoholism or a drinking problem.

Finally, the four-item CAGE (Cut-down, Annoyed by criticism, Guilty about drinking, Eye-opener drinks) questionnaire[127, 131] was included to evaluate the existence of alcohol related problems indicative of dependence and/or abuse, across the respondent's lifetime. Responses to the CAGE's four questions are simply scored, with a score of one (1) given for a YES response and zero (0) given for a NO response. Studies which have assessed the instrument's sensitivity and specificity to detect heavy drinking and drinking problems in the general population, in general hospitals, and in older patients, have produced mixed results.[132-134] Bush et al (1987)[135] recommended the CAGE as a simple, sensitive and specific screening test for alcohol abusers in a sample of 518 hospital patients. The authors reported sensitivity and specificity to be 85% and 89% respectively, at a cut-off score of one or more affirmative response. A cut-off score of two or more is most commonly used, and some studies have also found this threshold to have good sensitivity (eg 84%,[131] 75-85%,[136] 74%[137]) and specificity (eg 95%,[131] 86-96%,[136] 91%[137]). However, other studies have reported lower diagnostic performance of the CAGE.[130, 132, 134]

Posttraumatic Stress Disorder Checklist (PCL)
Questions 58-75 in both the KWVHS and SMHA participant questionnaires.

The PCL[138, 139] is a self-report rating scale for assessing the seventeen DSM-IV symptoms of PTSD. In investigations of it's reliability, validity, and diagnostic utility,[138, 139] it is shown to have excellent test-retest reliability over a 2-3 day period and high internal consistency for each of the three groups of items corresponding to the DSM-IV symptom clusters as well as for the full 17-item scale. Further, the PCL correlates strongly with other measures of PTSD, such as the Clinician Administered PTSD Scale,[139] Mississippi Scale and the Impact of Event Scale, and also correlates moderately with level of combat exposure.[138]

Since it was not developed until 1993, few studies of older veterans have used the PCL. However some data are available in relation to Australian Vietnam veterans,[140] Australian

Gulf War veterans,[100] US peacekeeping missions,[141, 142] several groups of US Gulf War veterans,[107, 143] as well as many civilian groups.[139, 144, 145]

Three versions of the PCL are available, although the differences are very minor. The PCL-M is a military version and questions refer to *"a stressful military experience"*. Our study uses the PCL-S, which is a non-military version that can be referenced to any specific traumatic event; questions refer to *"the stressful experience"*. The third version, the PCL-C is a general civilian version that is not linked to a specific event; the questions refer to *"a stressful experience from the past"*. The scoring is the same for all three versions.

Each of the 17 symptom items has five possible responses simply coded 1-2-3-4-5. A total score is computed by adding the scores from the 17 items, therefore possible total scores range from 17 to 85. Used as a continuous measure, the PCL has good diagnostic utility. In Australian Vietnam War combat veterans a cut-off of 45, or 50, on the PCL were both shown to be good predictors of a PTSD diagnosis with 97% sensitivity.[146]

The original stem question to the PCL-S was modified for the purpose of the Korean War veterans' Health Study participant questionnaires. This was due to the poor performance of this item in the Korean War veterans' Pilot Health Study (Appendix M) and similar poor performance when this item was used in the Australian Gulf War veterans' Health Study. The original stem question read as follows;

> *"Below is a list of problems and complaints that people sometimes have in response to stressful life experiences.*
>
> *Please consider the event in your life that you found <u>most</u> stressful or upsetting. Read the list of problems and complaints below and indicate <u>how much you have been bothered by each problem or complaint</u> <u>in the past month</u> in relation to that stressful experience.*
>
> *The event you experienced was ……in……"*

In our questionnaires, the more detailed, revised stem question reads;

> *"Below and on the next page is a list of problems and complaints that people sometimes have in response to stressful life experiences. We would like you to consider the event in <u>your life</u> that you found the <u>most</u> stressful or upsetting. Please nominate an event even if you don't think you have experienced anything particularly stressful or important.*
>
> *Once you have nominated an event in the space provided below, please read the list of problems and complaints and indicate how much you have been bothered by each problem or complaint in the PAST MONTH in relation to your nominated stressful event. If you have not been bothered by a particular problem or complaint, simply tick the 'Not at all' option available to you.*
>
> *The event in your life which you found the <u>most stressful or upsetting</u> was (please just nominate ONE event) ……..… in what year……?"*

Military service experience
Korean War veterans only: questions 76-79 KWVHS participant questionnaire.

These questions sought general information in relation to the military career of the Korean War veterans, including:

- The year of first full-time service with the Australian armed forces.
- Total duration, in years, of full-time service with the Australian armed forces, including National Service but not including service in Citizen Military or Reservist Forces.

- Highest rank achieved during their military career.
- Deployments to other major conflicts; including World War II 1939 – 1945; Malayan Emergency 1950 – 1960; Borneo/Malaysian Confrontation, Indonesia 1963 - 1966; Vietnam War 1962 – 1973; or participation in the British Commonwealth Occupation Force in Japan 1946 – 1952. A brief description of each of these conflicts is provided in Appendix K.

Comparison group only: questions 76-78 SMHA participant questionnaire

These questions sought general information in relation to any military career of the population sample participants, including:

- Whether ever served as a member of Australian armed forces or as an enlisted member of the armed forces of another country, not including service in Citizen Military or Reservist Forces.
- If served with Australian armed forces; year of first service and total duration of service.
- If served as an enlisted member of overseas armed forces; total duration of service.
- Highest rank achieved in military career.
- Any deployments to major conflicts.

Korean War experience: Fever
Korean War veterans only: question 80 KWVHS participant questionnaire.

This question investigated whether the Korean War veteran participants were ever told they had haemorrhagic fever, malaria or other fever, during the Korean conflict or as a result of the Korean conflict.

Korean War experience: Wounded in action
Korean War veterans only: question 81 KWVHS participant questionnaire.

This question investigated whether the veteran was ever wounded in action during the Korean War and, if so, the type of evacuation required for his worst injury. Veterans who reported being wounded were asked to select an evacuation type, for their worst injury, from the following categories:

1. Evacuated to a Regimental Aid Post, first aid post, sick bay or field ambulance, and then returned to unit/ship/squadron.
2. Evacuated to a local field hospital or hospital ship and then returned to your unit/ship/squadron.
3. Evacuated to a hospital in Japan and then returned to your unit/ship/squadron.
4. Evacuated to a hospital in Japan and then on to Australia for further medical attention.

It was assumed that each increase in category of evacuation, from item 1 through to item 4 above, was likely (though not always) to represent an increase in injury severity.

Korean War experience: Combat Exposure Scale
Korean War veterans only: questions 82-88 KWVHS participant questionnaire.

The Combat Exposure Scale (CES)[147] questions were asked exclusively in relation to the Korean conflict. The comparison group did not receive these questions. The CES is a widely used measure of combat exposure in war veterans.[36, 37, 39, 41, 47, 53, 54, 148]

The CES's seven questions comprise questions 82 to 88 in the KWVHS participant questionnaire. Therefore, CES question 1 corresponds with KWVHS participant questionnaire

question 82, CES question 2 corresponds with participant questionnaire question 83, and so on.

The seven questions each offer five possible response options, which are initially scored as 1-2-3-4-5 from left to right. These initial, raw scores are then given a severity weighting according the following transformations:

For CES questions 1, 6 and 7; subtract 1 from the raw score; then multiply by 2.

For questions 2 and 5; subtract 1 from the raw score.

For question 3; subtract 1 from the raw score and multiply by 2, or if the raw score is a 5, subtract 2 before multiplying by 2.

For question 4; subtract 1 from the raw score, or if the raw score is a 5, subtract 2.

The transformed scores for each of the seven questions are then summed to give a final score ranging from 0 to 41. The final score may be broken down into six categories ranging from no combat and light to heavy combat. CES scores of 0 are categorised as 'no combat' exposure; scores of 1-8 are categorised as 'light'; 9-16 'light-moderate'; 17-24 'moderate'; 25-32 'moderate-heavy'; and 33-41 'heavy'.[53]

In an Australian study of 277 Vietnam War veterans[72] the breakdown of scores was light 17%; light-moderate 18%; moderate 39%; moderate-heavy 20%; and heavy 8%, suggesting a near-normal distribution among this veteran group.

Current medical conditions
Questions 89a-89o in the KWVHS participant questionnaire and questions 79a-79o in the SMHA participant questionnaire.

Subjects were asked to report whether they currently had one or more of the following chronic medical conditions: asthma, high blood pressure, stroke (or after-effects of stroke), heart attack or angina, rapid or irregular heart beat, liver disease, arthritis, kidney disease, diabetes, melanoma, other skin cancer, other cancer (not skin), stomach or duodenal ulcer, partial or complete blindness (not corrected by glasses) and partial or complete deafness.

The selection of the medical conditions to be included was based on several considerations. Selected conditions were primarily those reported as prevalent in Australian men aged 75+ years, based on data from the ABS 1999 "Older people: a Social Report"[149] and 2001 National Health Survey.[150] Further, self-report of specific conditions including asthma, high blood pressure, arthritis, kidney disease, diabetes, and stomach or duodenal ulcer was included in the ABS 1997 Survey of Mental Health and Well-being in Adults.[56] Stroke (or after effects of stroke), heart attack or angina, and rapid or irregular heart beat were included in the ABS 2001 National Health Survey.[151] Liver disease was included as a single measure of this system. Partial or complete blindness and/or deafness were among those medical conditions most frequently reported by Korean War veterans as 'other health concerns' in the 2002 pilot study (Appendix M). Finally, even though cancer incidence in Korean War veterans was the subject of an extensive recent investigation[20] it was considered inappropriate to exclude cancer conditions from the major medical conditions section of the Health Study questionnaire, thus the inclusion of the items melanoma, other skin cancer and other cancer.

Other health concerns
Page 16 in the KWVHS participant questionnaire and page 14 in the SMHA participant questionnaire.

Respondents were asked an open question about any other important health concerns they wished to tell the investigators about.

4.10.2 Voluntary Refuser Notification Form

The complete Voluntary Refuser Notification Form is shown at Appendix J. Subjects wishing to decline participation in the study were offered the option of completing three brief questions on the Form in relation to their current health and any reasons for not participating. These included two health questions which were also in the participant questionnaire. They were:

- The second individual question from the WHOQOL-Bref representing satisfaction with health (*question 7 in both the KWVHS and SMHA questionnaires*). The item has a total score ranging from 1 to 5.
- The Life Satisfaction scale (*question 32 in both the KWVHS and SMHA participant questionnaires*). The scale's seven possible responses are scored 1-7, with the raw score (S) then converted by applying the linear transformation 100(7-S)/6 and presented as "percent life satisfaction" (PLS).

The third question on the Voluntary Refuser Notification Form was an enquiry as to the subject's reasons for declining participation. Subjects could select all that applied of the following listed reasons:

- You are too busy.
- You are not well enough.
- You don't think the study applies to you.
- The questionnaire is too long.
- You are not interested in participating in a health study.
- Another reason.

Where subjects selected "another reason", they were provided with text space and asked to specify the reason.

4.10.3 Korean War deployment data from the DVA Korean War Nominal Roll

Data drawn from the DVA Korean War Nominal Roll were used to categorise Korean War veterans according to:

- ***Service branch*** during the Korean War; Navy, Army or Air Force.
- ***Highest rank*** during Korean War service; officer, non-commissioned officer, or enlisted rank.
- ***Era of first Korean War deployment***; categories being the 'mobile phase' of the Korean War (approximated to be first deployed in the period 29 June 1950 to 30 June 1951), the 'static phase' of the Korean War (approximated to be first deployed in the period 1 July 1951 to 26 July 1953), or 'after armistice' (first deployed on or after the signing of the armistice on 27 July 1953).
- ***Number of Korean War tours/deployments***.
- ***Total duration of deployment in days***; the total number of days each individual was deployed, across one or more tours in Korea.

Using data available from the DVA Korean War Nominal Roll, in combination with data self-reported in the participant questionnaire, it was possible to further categorise Korean War veterans according to:

- ***Age*** in years at first Korean War deployment.

- ***Years of previous service*** with Australian armed forces, at time of first Korean War deployment.

Because only a small total number of Australian Korean War veterans were taken prisoner of war (POW) during Korea (n=29), the number of POWs estimated to participate in the study was too small for any useful investigation of the long-term health effects of this war experience. Therefore, the study team did not include POW status amongst the data drawn from DVA records.

4.11 Data quality, confidentiality and storage

4.11.1 Pre testing of study materials to ensure maximal participation and maximal data quality

The study materials were pre-tested in several ways at various stages during the development of the study.

The original pilot study materials, including the invitation packages, formal explanatory statement, consent form and participant questionnaire, were circulated to members of the Study Scientific Advisory Committee and Consultative Committee for their review and comments.

Subsequently a group of ten Korean War veterans were invited to form a focus group chaired by members of the Monash Study team. The purpose of this group was to assess the study materials in relation to:

- the suitability of the invitation package for attracting the study populations toward participation;
- the readability and comprehensiveness of the study explanatory statement and consent forms;
- the suitability of the participant questionnaire design in relation to it's length, readability and ease of completion; and
- the relevance of the questions in the participant questionnaire for the study populations.

As described earlier in section 4.7, all study materials and procedures were then piloted in a study of 250 subjects. The extent to which questionnaire items were fully and accurately completed by pilot study respondents was assessed. Pilot study respondents were also asked to provide comments on the format, level of complexity and coverage of the participant questionnaire items, and these were reported to be very acceptable by most subjects with few problems identified. Some revisions to the format of individual items within the questionnaire were implemented by the study team as a result of the pilot study. Similarly, some adjustments to the mailout materials and recruitment protocol were also made as a consequence of information drawn from the results of the pilot study.

The revised study materials were subsequently re-circulated to the Scientific Advisory Committee and Consultative Committee for their review and approval for inclusion in the main study. Finally, all materials were submitted to the Monash University and DVA Human Research Ethics Committees for their review and approval.

4.11.2 Missing questionnaire data

Phone follow-up of study participants was conducted where specific fields of data were missing from their returned participant questionnaires.

In particular, phone follow-up was conducted when:

- sufficient responses were missing from the smoking questions rendering it not possible to calculate pack years of cigarette consumption;
- more than 20% of responses were missing from the WHOQOL-Bref, HAD scale or PCL; or
- whole sections of the questionnaire, such as complete pages, were blank and presumed missed by the respondent.

4.11.3 Data entry and cleaning

Data entry was undertaken by Datatime Services Pty Ltd, predominantly using electronic data capture (data scanning) technology for all tick-box fields in the questionnaires, and manual keyboard data entry for text fields. Careful checking of the questionnaire responses by the Monash study team, upon receipt of the questionnaires and prior to the data capture processing by Datatime, ensured that the self-reported data was as clear and unambiguous as possible prior to data entry.

Upon return of the entered data from Datatime, the Monash study team tested the accuracy of the data entry by manually checking the data entered for 50 Korean War veteran and 50 comparison group participant questionnaires. Detected errors were classed as either text field errors (data that was manually entered) or tick-box errors (data that was electronically scanned and coded).

The electronic data was then subjected to a series of statistical checks to detect invalid, inconsistent or outlying results. This included range checks for participant's age at time of questionnaire completion, or at time of war deployment, and checks for questionnaire responses within the ranges allowed by individual instruments.

4.11.4 Methods to ensure privacy of study data

Upon completion of the processing of the data at Monash University all identifying information such as participants' names, signatures and address details were separated from the remaining self-reported questionnaire data, and from the DVA-provided deployment data. This deidentification process was undertaken for both the paper-based questionnaire data and any electronic data.

Paper-based questionnaire data was stored with a unique identifying code attached and kept in locked filing cabinets. Paper-based identifying information was stored equally securely but separately from the remainder of the questionnaire.

Electronic and paper-based data were accessed only by approved Monash University staff. All such staff were required to sign a confidentiality agreement protecting the security of any data they processed. All electronic files stored on Monash University computer networks were password protected.

4.11.5 Storage of data

Monash University will keep copies of the data for the seven year period required under the National Health and Medical Research Council guidelines for epidemiological research.

4.12 Statistical analysis

Statistical analyses and data transformations were predominantly performed using the Statistical Package for the Social Sciences (SPSS) version 11.5 software package,[152] with some specified analyses performed using Stata version 8.0.[153]

4.12.1 Weighting of comparison group results

Weighting factors were applied to the results of the comparison group participants to correct for the difference in age distribution between these participants and the participating Korean War veterans which resulted from the sampling strategy. To calculate the value of the weighting factor to be applied to the results of each comparison group participant, the frequencies of Korean War veteran and comparison group participants in five-year age bands between 65 and 99 years (65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95-99) were calculated. For each comparison group participant within an age band, the value of the weighting factor equalled the number of Korean War veteran participants in that age band, as a fraction of the total number of Korean War veteran participants, divided by the number of comparison group participants in that age band, as a fraction of the total number of comparison group participants.

For example, if there were 200 Korean War veteran participants in the 65-69 year age band, of a total of 6,000 Korean War veteran participants, and 100 comparison group participants in the 65-69 year age band, of a total of 1,500 comparison group participants, then the weighting factor to be applied to the results of each of these 100 comparison group participants would be equal to $200/6000 \div 100/1500 = 0.5$

4.12.2 Comparison of Korean War veterans and the comparison group

The statistical analyses included the cross-sectional comparison of the Korean War veterans and comparison group with respect to several health outcomes.

Differences between the two groups on health outcomes measured on dichotomous (eg cases vs. non-cases), ordinal (eg ‘never’, ‘monthly’, ‘weekly’), or categorical (multinomial) scales (eg ‘married’, ‘widower’, ‘single, never married’) were firstly presented as prevalence percentages, after applying the weighting factors to the results of the comparison group participants. The group differences were then quantified using non-weighted, but age adjusted, prevalence odds ratios.

Odds ratios and their confidence intervals[154] and significance tests were obtained using binary logistic regression[155] for dichotomous health outcomes, multinomial logistic regression for categorical health outcomes, and ordinal regression for ordinal scaled outcomes, all performed using SPSS version 11.5. Korean War veteran versus comparison group odds ratios were first estimated after accounting for current age (labelled ‘age adj. OR’) and secondly estimated after accounting for the additional potential confounding factors of highest education, current marital status, and country of birth, as well as current age (labelled ‘multivariate (multiv.) adj. OR’).

The odds of a particular symptom or health outcome may be defined as the number of persons who have the particular outcome present (eg depression), divided by the number of persons who do not have that particular outcome present.[156] An odds ratio (labelled OR in the tables) is therefore defined in this study as the odds of having an outcome or symptom present in one group (in this case the Korean War veterans) divided by the odds of having that outcome or symptom present in another group (in this case the comparison group).

An odds ratio may range in value from zero to infinity. In terms of the present study, an odds ratio that is larger than one occurs when the odds of having a particular outcome present are higher in the Korean War veterans than in the comparison group; in this situation the prevalence of the condition is also greater in the Korean War veterans. An odds ratio that is less than one has the reverse interpretation. An odds ratio equalling one would indicate that the Korean War and comparison groups had equal odds and prevalence of an outcome.

Continuous outcomes, and sums of dichotomous or Likert scaled items (eg total score on each of the WHOQOL-Bref domains) were initially compared between groups using descriptive statistics (eg typically mean and standard deviation (SD) scores) after applying the weighting factor to the results of the comparison group participants. Differences between unweighted means were then analysed using multiple linear regression[157] performed using Stata version 8.0, first adjusting for current age (labelled 'age adj mean diff') and subsequently adjusting for the additional potential confounding factors of highest education, current marital status, and country of birth, as well as current age (labelled 'multiv. adj mean diff'). If distributional assumptions were not satisfied then median regression[158] was performed which models the median of the distribution of the outcome rather than the mean (or equivalently minimises the sum of the absolute value of the residuals). Confidence intervals and significance tests for median regression parameters were computed using 1,000 bootstrap[159] replications.

4.12.3 Investigation for any association between Korean War deployment characteristics and health in Korean War veterans

More detailed comparisons of health outcomes across subgroups of Korean War veterans were performed, utilising the Korean War deployment characteristics of highest rank during the Korean War (officer; non-commissioned officer; enlisted rank), Service branch (Navy; Army; Air Force), age at deployment (<=20; 21-25; 26-30; >=31 years), years of previous military service experience at deployment (<1 year; 1 to < 4 years; 4 or more years), total duration of deployment (< 6 months; 6 to 12 months; > 12 months), whether wounded in action during Korea (No; Yes, evacuation types 1 or 2; Yes, evacuation types 3 or 4), era first deployed (mobile phase; static phase; after armistice) and Combat Exposure Scale score (none; light; light-moderate; moderate; moderate-heavy; heavy).

Differences across subgroups of each deployment characteristic were modeled using binary logistic regression for dichotomous health outcomes performed using SPSS version 11.5, and linear regression for continuous outcomes performed using Stata version 8.0. Odds ratios (OR), or mean differences (mean diff), and their associated 95% confidence intervals (95% CI) and significance tests were first obtained using raw symptom/outcome counts, and then calculated with adjustment for the potential confounding factors of current age, highest education, current marital status, and country of birth (labelled 'adj OR' or 'adj mean diff'). In the regressions modelling differences across subgroups of Combat Exposure Scale score and wounded in action category, the two deployment characteristics of rank and Service branch at Korea were entered as additional covariates.

In relation to the deployment characteristics (exposures) of highest rank, age at deployment, years of previous service, duration of deployment, whether wounded in action, and combat exposure, the existence and magnitude of response trends in symptom/outcome prevalence across exposure categories were also computed, using the exposure categories as linear variables in the regressions.

4.12.4 Covariates

When entered as covariates in the regressions current age, education, marital status, country of birth, and rank and Service branch during the Korean War, were each entered as categorical variables. Unless otherwise specified in the results tables, current age as a covariate was entered as five categories (65-69; 70-74; 75-79; 80-84; 85+ years), highest education as four categories (primary; any secondary up to grade 10; grades 11 or 12 or certificate; diploma or university), marital status as four categories (married or defacto; widowered; divorced or separated; single, never married), country of birth as two categories (Australia; other), rank as

three categories (officer; non-commissioned officer; enlisted rank) and Service branch as three categories (Navy; Army; Air Force).

4.12.5 Interpreting tables in the results chapters

The following guide to interpreting tables in the results chapters is provided for the lay reader who may be unfamiliar with interpreting statistical analysis results.

The results of the statistical analyses comparing the Korean War veterans with the comparison group, and comparing subgroups of veterans across different Korean War deployment characteristics, are predominantly shown in tables accompanied by summary text in Chapters 6 and 7 respectively.

Differences between the Korean War veterans and the comparison group, or differences between subgroups of veterans, are typically presented in tables using odds ratios, mean (or median) differences, dose response slopes, and their 95% confidence intervals and P values. Some examples of these are presented in hypothetical tables below along with a guide to their interpretation.

Examples

Example Table 1. Prevalence of condition A in Korean War veterans and the comparison group

	Korean War veterans N=6,122		**Comparison group N=1,510**					
	n	**(%)**	**n**	**weighted (%)**	**Age adj OR***	**Multiv. adj OR†**	**95% CI**	**P value**
Condition A	1,009	(16.5)	170	(11.2)	1.75	1.69	1.41-2.03	<0.001

In Example Table 1, 6,122 Korean War veterans and 1,510 comparison group subjects answered the section of the questionnaire pertaining to a health condition labelled “Condition A”. Of those, 16.5% of the Korean War veterans and 11.2% of the comparison group (after applying a weighting factor, as described in section 4.12.1) were found to have condition A.

The value of the age adjusted odds ratio (age adj OR) means that Korean War veterans were 1.75 times more likely than the comparison group to have Condition A, after controlling for age differences between the two groups.

Other factors (called covariates), such as education, country of birth and marital status, can also differ between the two groups, and it can be important to control for differences such as these. The value of the multivariate adjusted odds ratio (multiv. adj OR) means that Korean War veterans were 1.69 times more likely than the comparison group to have Condition A, after controlling for multiple covariates.

The observed odds ratios are derived from the results of the 6,122 Korean War veterans and 1,510 comparison group subjects who participated in the study and who answered this section of the questionnaire. If more, or fewer, or different subjects had participated in the study, the resulting odds ratios are likely to differ from those shown in Example Table 1. Therefore, a 95% confidence interval (CI) is calculated to indicate a range of values within which the true odds ratio is likely to fall, 95% of the time. In Example Table 1 the 95% CI is calculated around the multiv. adj OR, and the values indicate that Korean War veterans are likely to be

somewhere between 1.41 and 2.03 times more likely than the comparison group to have Condition A.

The probability (P) value is a measure of whether the observed difference between the two groups, in Condition A, was likely to have occurred by chance. A P value of less than or equal to 0.05 is conventionally regarded as being 'statistically significant' and means that there is a less than or equal to one in twenty (5%) probability of the result occurring by chance. In Example Table 1, the P value of <0.001 is highly statistically significant and indicates that there was a less than one in 100 (1%) chance that the difference between the Korean War veterans and the comparison group in Condition A was observed by chance.

In summary, the results presented in Example Table 1 could be described as showing that Korean War veterans were approximately 1.7 times more likely than the comparison group to have Condition A, and that this difference was statistically significant and unlikely to have occurred by chance.

Note, if the odds ratio and its entire confidence interval were below one (1) (eg adj OR=0.51, 95% CI 0.25 – 0.78) then this would mean that Korean War veterans were less likely than the comparison group to have Condition A. Alternatively, if the 95% CI were to include the value one (1) in its range (eg adj OR=1.49, 95% CI 0.81 – 2.13) then this would mean that the Korean War veterans were no more likely to have Condition A (i.e. the two groups were the same). This latter result would usually be accompanied by a large, non-significant P value greater than 0.05.

Example Table 2. Mean scores on Scale B for Korean War veterans and the comparison group

	Korean War veterans N=6,062		**Comparison group N=1,506**					
	Mean	**(SD)**	**weighted Mean**	**(SD)**	**Age adj mean diff***	**Multiv. adj mean diff†**	**95% CI**	**P value**
Scale B	55.81	(21.75)	68.96	(19.15)	-12.77	-12.03	-13.27, -10.79	<0.001

Example Table 2 shows that 6,062 Korean War veterans recorded an average (mean) score of 55.81 on Scale B, whilst 1,506 comparison group subjects recorded an average score of 68.96. The standard deviation (SD) values are an indication of the scatter of individual group members scores around the group mean.

The value of the age adjusted mean difference (age adj mean diff) means that the Korean War veterans scored, on average, 12.77 points lower on Scale B than the comparison group, after age differences between the two groups were statistically controlled for. After controlling for additional important factors (covariates), which might differ between the two groups, the value of the multivariate adjusted mean difference (multiv. adj mean diff) means that the difference between the two groups on Scale B is 12.03 points, with Korean War veterans lower on the scale.

As explained in Example Table 1, the magnitude (or size) of the difference in average Scale B scores between groups may have varied if more, or fewer, or different subjects had participated. The 95% CI values in Example Table 2 indicate that the true multivariate adjusted mean difference between the Korean War veterans and comparison group is likely to lie somewhere between 13.27 and 10.79 points on Scale B (again with Korean War veterans lower on the scale).

The difference between the two groups on Scale B is shown to be statistically significant (i.e. the P value is smaller than 0.05). In this example there is a less than one in 100 (1%) chance of the result having occurred by chance.

Note, if the mean difference and its entire confidence interval were above zero (0) (eg adj mean diff=12.03, 95% CI 10.79-13.27) then this would indicate that the average Scale B score was higher for the Korean War veterans than for the comparison group. Alternatively, if the 95% CI were to include the value zero (0) in its range (eg adj mean diff=5.5, 95% CI -2.57, 10.68) then this would indicate that the difference in average scores on Scale B may equal 0, indicating no difference between the two groups. This latter result would usually be accompanied by a large, non-significant P value greater than 0.05.

Sometimes, particularly when dealing with large study groups, a statistically significant P value, and a 95% CI which excludes zero, arise even when the difference in average scores between two groups is very small and unlikely to represent a meaningful or important difference. Cohen (1988)[160] recommends calculating 'effect' sizes to estimate whether a mean difference between groups represents a large, medium or small difference. A large effect size is defined by Cohen as a mean score difference equalling 0.8 of the average standard deviation of the groups combined (pooled standard deviation), a medium effect size is defined as a mean difference equalling 0.5 of the pooled standard deviation, and a small effect size is defined as a mean difference equalling 0.2 of the pooled standard deviation.

In Example Table 2, the pooled standard deviation value is estimated to approximately equal 20 (part way between the Korean War veterans SD value of 21.75 and the comparison group SD value of 19.15). The difference, between the Korean War veterans and the comparison group, of 12.03 points in their averaged scores on Scale B, represents a difference of approximately 0.6 of the estimated pooled standard deviation. This would be interpreted as a medium effect size. Combined with a CI which clearly excludes zero, and a statistically significant P value, this difference between groups on Scale B would usually be considered an important or meaningful difference.

In summary, the results presented in Example Table 2 could be described as showing that Korean War veterans scored on average 12 points lower on Scale B than the comparison group, that this was likely to represent a meaningful difference on Scale B, and that the observed difference was statistically significant and unlikely to have occurred by chance.

Example Table 3. Mean Scale C scores for Korean War veterans across categories of age at deployment

Korean War veterans		Scale C					
		Mean	(SD)	Mean diff	Adj mean diff	95% CI	P value
Age at deployment							
<= 20	(N=1,371)	12.66	(3.47)	0.00	0.00	-	0.347†
21-25	(N=3,380)	13.04	(3.34)	0.37	0.17	-0.07, 0.41	
26-30	(N=1,035)	13.56	(3.17)	0.90	0.34	-0.04, 0.72	
>= 31	(N=246)	14.04	(3.17)	1.37	0.43	-0.32, 1.18	
Categorical dose response‡		-	-	0.45	0.16	-0.01, 0.34	0.072

Example Table 3 shows the mean scores on Scale C for veterans subgrouped in to categories of age at time of deployment to the Korean War. For example, 1,371 veterans who were aged

20 years or younger at deployment recorded an average score of 12.66 on Scale C, while 246 veterans who were aged 31 years or older recorded an average score of 14.04. In this Table the youngest age group is set as the reference group (category) against which the other age groups are compared.

The adjusted mean difference (adj mean diff) values show that, after statistical adjustment for covariates, veterans aged 21-25 scored on average 0.17 points higher on Scale C, veterans aged 26-30 scored on average 0.34 points higher, and veterans aged 31 or older scored on average 0.43 points higher, on Scale C compared with veterans aged 20 or younger. The 95% CIs show a range of values in which the true difference in average Scale C scores, between the subgroups of veterans, is likely to fall 95% of the time. In each case in this example the 95% CIs include zero in their range; this means that the difference in average Scale C scores, between each older category of veterans compared with the youngest category of veterans, may equal zero, meaning no difference on Scale C between age categories.

In Example Table 3 there are two types of test used, each giving rise to a P value. The first P value (labelled with a †) is obtained from an overall test which measures whether any of the adjusted mean differences, for each older age category of veterans compared with the younger category, are likely to differ from zero by chance. The large observed P value of 0.347 indicates that the mean differences do not statistically significantly differ from zero; i.e. the differences that were observed in average Scale C scores between categories of veterans may have occurred by chance alone.

The second P value is obtained from a test to see whether there is a 'dose response' relationship between age category and average scores on Scale C; that is, to see whether there is an expected increase or decrease in average Scale C score per increase in age category. The dose response values (shown in the bottom row in Example Table 3) indicate that for each increase in age category (from <=20, to 21-25, to 26-30, to >=31) there is an expected increase in average Scale C score of 0.45 points, or 0.16 points after statistical adjustment for covariates. The associated 95% CI includes zero in its range, which means that the expected difference in average Scale C score, per increase in age category, may equal zero, thereby indicating no increase or decrease in average Scale C score (or no dose response relationship). The large P value accompanying these results, confirms that the observed difference in average Scale C score, per increase in age category, was not statistically significant and may have occurred by chance alone.

As described at Example Table 2, an 'effect' size can be calculated to estimate whether a difference between groups, in mean scores on a scale, represents a large, medium or small difference. In Example Table 3, the pooled standard deviation is likely to approximately equal 3.2. The adjusted mean difference of 0.43 points on Scale C between veterans aged 20 or younger, and veterans aged 31 or older, equals approximately 0.13 of the pooled standard deviation. This would be defined by Cohen (1988)[160] as a small effect size, and could be interpreted as representing a small, or possibly unimportant, difference on Scale C between these groups.

In summary, the results presented in Example Table 3 could be described as showing that, whilst veterans who were older at deployment tended to score slightly higher on Scale C than veterans who were younger at deployment, these differences were small, not statistically significant, and possibly occurred by chance. The conclusion is that there is no difference in average Scale C score between veterans who were older at deployment compared with veterans who were younger.

As described in the previous examples, note that if the 95% CIs around the adjusted mean differences had been fully above, or fully below, zero, then this would mean that the average

Scale C scores did differ between the youngest, versus the older, age categories, or per change in age category.

4.13 Ethics Committees

The study was approved by the following Ethics Committees:

- The Monash University Standing Committee on Ethics in Research Involving Humans.
- The Department of Veterans' Affairs Human Research Ethics Committee.

Letters of endorsement from each of these Committees are provided at Appendix L.

5. RECRUITMENT RESULTS

Study recruitment commenced in March 2004 with the mailout of preliminary letters to all subjects. These were followed four weeks later by first-invitation packages, mailed in batches of approximately 2,000 per week (1,400 to Korean War veterans and 600 to population sample subjects). Non-responders received first-reminder letters three weeks after dispatch of their first invitation package, and second-reminder packages three weeks after dispatch of the first reminder letter. The last of the second-reminder packages were mailed in June 2004. Returned, completed questionnaires were accepted up until the end of August 2004, when recruitment closed.

5.1 Korean War veterans

The study commenced with 7,612 male Korean War veterans known or assumed to be alive and thought to be residing in Australia. During the recruitment period an additional 13 Korean War veterans, whose live status had been classified as 'unknown' in the Mortality Study,[19] contacted the study team. They included two members of the *population sample*. All 13 veterans were added to the Korean War veteran study group, bringing the total to 7,625. Of this total, one Korean War veteran was identified as residing overseas during the data collection period, and 95 were reported deceased; these were removed from the group. Finally four subjects who had been included in the study were identified as not having deployed to the Korean War; these subjects were also excluded, bringing the final total to **7,525**. The recruitment results for the 7,525 Korean War veterans are shown in Table 2.

Table 2. Recruitment results for the Korean War veterans

	Korean War veterans	
	Number	**(%)**
Final study group	**7,525**	-
Participants	6,122	(81.4)
Refusers	957	(12.7)
Non-responders	396	(5.3)
Not-contactable	50	(0.7)

6,122 Korean War veterans participated in the study by returning a completed questionnaire, representing an 81% participation rate in this study group. Whilst 957 veterans (13%) contacted the study team to indicate that they did not wish to participate, a further 396 veterans (5%) did not respond to their mailed invitations. Less than 1% of the posted questionnaires were returned to the study team as undeliverable (eg marked "not known at this address") and, if an accurate address could not be found, the subjects to whom these questionnaires were addressed were categorised as not-contactable.

5.1.1 Reasons for non-participation in the Korean War veteran group

Of the 957 Korean War veterans who declined participation in the study, 687 (76%) of these responded to a question on the Voluntary Refusal Notification Form asking them why they chose not to participate in the study. From a list of six options provided on the Form, to which refusers could select as many options as applied:

- 12 (2%) Korean War veterans selected “you are too busy”;
- 204 (30%) selected “you are not well enough”;
- 208 (30%) selected “you don’t think the study applies to you”;
- 115 (17%) selected “the questionnaire is too long”;
- 150 (22%) selected “you are not interested in participating in a health study; and
- 217 (32%) Korean War veterans selected “another reason” for non-participation and provided detail in relation to the latter option.

Reasons nominated by this latter group encompassed a number of different themes; including the assertion that the study was being conducted 50 years too late; that personal information was to remain private; that the items in the questionnaire were not of any use, or they were too intrusive, or that they favoured Army responders and not other Services; that the government could not be trusted; and that the individual’s service in Korea was too short to be of relevance, or not related to current health.

The reasons for non-participation by the 398 Korean War veteran non-responders is not known, however it is assumed that some may not have received a posted invitation at their correct address, and that others did not participate for similar reasons to those given above by the refusers.

5.2 Population sample

The study commenced with a population sample of 3,022 subjects. During the recruitment period one subject was identified as residing overseas, 43 were reported to be deceased, and these subjects were removed from the population sample. Two subjects were identified as Korean War veterans, and these two were removed from the population sample and added to the Korean War veteran group. An additional 9 subjects were removed as it was determined that they also did not meet eligibility criteria for inclusion in the population sample group; reasons for ineligibility included female sex and age less than 65 years. Recruitment results for the remaining 2,964 population sample subjects are shown in Table 3.

1,893 population sample subjects participated in the study by submitting a questionnaire, representing a recruitment rate of 64%. A further 21% of the population sample contacted the study team to decline participation, 13% did not respond to their mailed invitation, and 2% of the posted questionnaires were returned as undeliverable.

Table 3. Recruitment results for the population sample

	Population sample	
	Number	**(%)**
Final sample	**2,964**	-
Participants	1,893	(63.9)
Refusers	616	(20.8)
Non-responders	388	(13.1)
Not-contactable	67	(2.3)

5.2.1 Reasons for non-participation in the population sample

Of the 616 population sample subjects who declined participation in the study, 347 (62%) of these responded to a question on the Voluntary Refusal Notification Form asking them why they chose not to participate in the study. From a list of six options provided on the Form, to which refusers could select as many options as applied:

- 30 (9%) population sample subjects selected “you are too busy”;
- 73 (21%) selected “you are not well enough”;
- 82 (24%) selected “you don’t think the study applies to you”;
- 54 (16%) selected “the questionnaire is too long”;
- 113 (33%) selected “you are not interested in participating in a health study; and
- 78 (22%) selected “another reason”.

Reasons provided by the latter group included language difficulties and lack of English, that the requested information was too private or personal, or that the subject’s ill wife needed to be cared for. A few population sample subjects responded that they did not participate because they were not Korean War veterans.

It is assumed that amongst the 387 population sample non-responders, the reasons for non-participation are similar to those given by the refusers above, and that some non-responders may not have received a posted invitation at their correct address.

5.3 Investigation of possible participation bias

Participation bias can occur if participants differ from non-participants on characteristics which are associated with the study dependent measures, such as health status. A complete examination of participation bias would require the collection of comprehensive health, demographics and deployment information for all non-participating Korean War veterans and comparison group subjects. Whilst complete data was not available for all non-participants, we were able to conduct several comparisons of data available for both study participants, and non-participants, to assess the level to which participants were representative of the study groups from which they were drawn.

5.3.1 Comparison of participants and non-participants on demographic variables

Within each study group, participants and non-participants were compared on several available demographic variables. For Korean War veterans, these variables included:

- Age category based on date of birth in the DVA Korean War Nominal Roll.
- State or Territory of residence based on postal address.
- Service branch at the time of the Korean War.
- Service rank at the time of the Korean War.

For the population sample, these variables included:

- Age category drawn from the Electoral Roll.
- State or Territory of residence based on postal address.

As shown in Table 4, participating Korean War veterans were very representative of the invited population based on the known demographic variables, with participation rates across most categories of each variable staying close to the overall population participation rate of approximately 81%. There were some exceptions.

Participation rates were very consistent across most age categories, with the exception of a decrease in participation noted amongst the oldest invited veterans aged 80 years or older.

Participation rates across the States contributing the largest numbers of veterans were similar to each other, at close to 81%, but there was some variability in the rates noted for the States or Territories contributing smaller numbers of veterans.

The participation rates amongst former Navy and Army personnel were close to 81%, whilst amongst former Air Force personnel the rate was a little higher at 87%.

Finally, Korean War veterans who had served in the war with enlisted ranks had a participation rate close to 81% whilst officers and non-commissioned officers had slightly higher participation rates.

Table 4. Participation rates across age category, State or Territory of residence, Service branch and rank for Korean War veteran participants versus non-participants

	Korean War veterans				
		Participants (N=6,122)		Non-participants (N=1,403)	
	Total	n	(%)	n	(%)	Participation rate (% of total)
Age category						
66-69	599	486	(7.9)	113	(8.1)	(81.1)
70-71	1,371	1,137	(18.6)	234	(16.7)	(82.9)
72-73	1,699	1,419	(23.2)	280	(20.0)	(83.5)
74-75	1,567	1,284	(21.0)	283	(20.2)	(81.9)
76-79	1,607	1,288	(21.0)	319	(22.7)	(80.1)
80-95	682	508	(8.3)	174	(12.4)	(74.5)
State or Territory						
New South Wales	2,732	2,234	(36.5)	498	(35.5)	(81.8)
Queensland	1,745	1,402	(22.9)	343	(24.4)	(80.3)
Victoria	1,318	1,047	(17.1)	271	(19.3)	(79.4)
Western Australia	790	663	(10.8)	127	(9.1)	(83.9)
South Australia	425	373	(6.1)	52	(3.7)	(87.8)
Tasmania	241	191	(3.1)	50	(3.6)	(79.3)
Australian Capital Territory	199	176	(2.9)	23	(1.6)	(88.4)
Northern Territory	45	34	(0.6)	11	(0.8)	(75.6)
Service branch						
Navy	2,800	2,310	(37.7)	490	(34.9)	(82.5)
Army	4,178	3,335	(54.5)	843	(60.1)	(79.8)
Air Force	547	477	(7.8)	70	(5.0)	(87.2)

Table 4 continued over page

Table 4 continued

	Korean War veterans			
		Participants (N=6,122)	Non-participants (N=1,403)	
	Total	n (%)	n (%)	Participation rate (% of total)
Rank				
Officer	524	444 (7.3)	80 (5.7)	(84.7)
Non-commissioned Officer	1,364	1,141 (18.7)	223 (15.9)	(83.7)
Enlisted rank	5,632	4,532 (74.1)	1,100 (78.4)	(80.5)

Table 5 shows that the population sample participants were also fairly representative of the larger, invited sample, however there was some increase in participation evident amongst the younger subjects and a decrease in participation evident amongst the oldest subjects.

Participation rates across most States and Territories varied little, with all except Tasmania staying close to the overall population participation rate of 64%.

Table 5. Participation rates across age category and State or Territory of residence, for population sample participants versus non-participants

	Population sample			
		Participants (N=1,893)	Non-participants (N=1,071)	
	Total	n (%)	n (%)	Participation rate (% of total)
Age category				
66-69	500	399 (21.1)	201 (18.8)	(79.8)
70-71	414	287 (15.2)	127 (11.9)	(69.3)
72-73	501	320 (16.9)	181 (16.9)	(63.9)
74-75	464	299 (15.8)	165 (15.4)	(64.4)
76-79	497	303 (16.0)	194 (18.1)	(61.0)
80-99	488	285 (15.1)	203 (19.0)	(58.4)
State or Territory				
New South Wales	1,012	627 (33.1)	385 (35.9)	(62.0)
Victoria	737	458 (24.2)	279 (26.1)	(62.1)
Queensland	550	357 (18.9)	193 (18.0)	(64.9)
South Australia	271	179 (9.5)	92 (8.6)	(66.1)
Western Australia	258	175 (9.2)	83 (7.7)	(67.8)
Tasmania	93	70 (3.7)	23 (2.1)	(75.3)
Australian Capital Territory	34	22 (1.2)	12 (1.1)	(64.7)
Northern Territory	8	5 (0.3)	3 (0.3)	(62.5)

5.3.2 Comparison of participants and study refusers on health information provided on the Voluntary Refusal Notification Form

The Voluntary Refusal Notification Form, which subjects could complete to advise the study team of their intention to decline participation in the study, is described in section 4.10.2 of this report and shown in Appendix J. The Form included the option for refusers to provide answers to two brief questions about their health. The questions were item 2 from the WHOQOL-Bref in regard to level of satisfaction with health, and also the Life Satisfaction scale.

Of the 957 Korean War veteran refusers, 588 (61%) provided answers to the health satisfaction item from the WHOQOL-Bref, and 591 (62%) provided answers to the Life Satisfaction scale on the Voluntary Refusal Notification Form. Their responses to these questions on the Form were compared with the responses of the Korean War veteran participants who answered the same questions within the participant questionnaire (n=6,095; 99.6%, who answered the WHOQOL-Bref health satisfaction question, and n=6,062; 99.0%, who answered Life Satisfaction). The age distribution of the Korean War veteran refusers, was found to be very similar to that of the larger group of Korean War non-participants (the latter group is shown in Table 4), of which the refusers are a part.

Of the 616 population sample refusers, 273 (44%) provided answers to the WHOQOL-Bref health satisfaction question, and 277 (45%) provided answers to the Life Satisfaction scale on the Voluntary Refusal Notification Form. Their responses to these questions on the Form were compared with the responses of the population sample participants who answered the same questions within the participant questionnaire (n=1,877; 99.2%, who answered WHOQOL-Bref health satisfaction, and n=1,886; 99.6%, who answered Life Satisfaction). The age distribution of the population sample refusers, was found to be very similar to that of the larger group of population sample non-participants (shown in Table 5), of which the refusers are a part.

The results for both comparisons are shown in Table 6. The results for the WHOQOL-Bref item are expressed as mean WHOQOL-Bref health satisfaction scores, with higher scores representing greater satisfaction with one's health. The results for the Life Satisfaction scale are expressed as mean Percent Life Satisfaction scores, with higher scores representing greater life satisfaction.

Table 6. Comparison of participants with study refusers who provided health information on the Voluntary Refusal Notification Form

	Korean War veterans				Population sample			
	Participants		Refusers		Participants		Refusers	
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)
WHOQOL-Bref health satisfaction	3.0	(1.1)	2.7	(1.2)	3.7	(1.0)	3.5	(1.0)
Percent Life Satisfaction	55.8	(21.8)	49.8	(26.2)	68.4	(19.2)	63.1	(21.8)

The important comparison here is that between the participants and refusers within each study group, and not the comparison between groups. Within both the Korean War veteran group and the population sample, participants scored slightly higher on both the WHOQOL-Bref health satisfaction and Life Satisfaction measures than did the refusers. This finding implies

that in both study groups, there was a similar pattern of the least well subjects being least likely to participate in the study.

The slight differences between participants and non-participants in age (shown above at section 5.3.1) and in average level of reported health and life satisfaction, is likely to result in the study slightly overestimating the true health of the Korean War veteran and comparison group populations; i.e. the observed results based on participant data are likely to be healthier, on average, than those which would have been observed if full participation in each group had occurred. However, because a similar pattern of non-participation amongst the oldest and most unwell occurred in both study groups, it is unlikely that these will notably effect the magnitude or direction of any differences in health outcomes between study groups which are observed in the study.

5.4 Participation by proxy

On page 2 of the questionnaire, 5,650 (92%) Korean War veteran respondents and 1,725 (91%) population sample respondents provided information about whether the questionnaire was being filled in by the invited participant (by self-report), or by a relative, carer or friend on behalf of the invited participant (by proxy). Some respondents indicated that the questionnaire was being completed both by self-report and by proxy. The percentages for these outcomes are shown in Table 7 for both the Korean War veteran group and the population sample.

Table 7. Number and percentage of Korean War veteran and population sample participants who completed the questionnaire by self-report, by proxy, or both

Completed questionnaire by:	Korean War veterans N=5,650		Population sample N=1,725	
	n	(%)	n	(%)
Self report	5,129	(90.8)	1,485	(86.1)
Proxy	418	(7.4)	194	(11.2)
Both	103	(1.8)	46	(2.7)

Of the respondents shown in Table 7, 91% of Korean War veterans and 86% of population sample participants reported completing the questionnaire by self-report. Most of the respondents who reported that they completed the questionnaire by proxy, or by both self-report and proxy, then answered a question as to whether they transcribed answers provided by the participant, wrote their own answers on behalf of the participant, or both (transcribed and wrote own answers). These results are shown in Table 8.

Table 8. Number and percentage of proxy, or both self-report and proxy, respondents, who transcribed answers provided by the participant, wrote their own answers on behalf of the participant, or both transcribed and wrote own answers

	Korean War veterans N=504		Population sample N=233	
	n	(%)	n	(%)
Transcribed	430	(85.3)	184	(79.0)
Wrote own	70	(13.9)	44	(18.9)
Both	4	(0.8)	5	(2.1)

Only 70 Korean War veteran proxy respondents, and 44 population sample proxy respondents, reported that they wrote their own answers in the questionnaire on behalf of the invited participants. These represent only 1% and 2% respectively of all Korean War veteran and population sample participants.

An additional investigation was conducted to determine whether self-report respondents differed in age to those who responded by proxy. As shown in Table 9 for Korean War veterans, participants in the older age categories were less likely to participate by self-report and more likely to participate by proxy, compared with participants in the younger age categories. However even in the oldest age category, 85 years and older, a large majority of Korean War veteran participants (72%) responded by self-report. The results for the population sample followed a similar pattern, and are not tabulated.

Table 9. Korean War veteran participation rates across age category: self-report versus proxy participants

	All Korean War veteran participants	Korean War veterans participating by self-report (N=5,129)		Korean War veterans participating by proxy (N=418)	
Age category	**Total**	**n**	**(% participation rate)**	**n**	**(% participation rate)**
66-69	358	322	(89.9)	13	(3.6)
70-73	2,411	2,048	(84.9)	129	(5.4)
74-79	2,773	2,313	(83.4)	210	(7.6)
80-84	435	348	(80.0)	45	(10.3)
85+	105	76	(72.4)	17	(16.2)

Based on the above assessment of proxy participation it was determined that it was unlikely that misclassification of participant health, resulting from proxies erroneously estimating questionnaire responses, would notably impact upon the study results. This was because only a small proportion of questionnaire responses in both groups were provided by proxy, and because most proxy respondents transcribed answers provided by the invited participant, rather than estimating their own answers on behalf of the participant.

5.5 Identification of the eligible comparison group from the population sample participants

The responses provided by the 1,893 population sample participants to questions 2, 2a and 2b in their participant questionnaire, were reviewed to determine which participants were eligible for inclusion in the study's final comparison group. These questions pertained to country of birth, year of first settlement in Australia and citizenship status. Eligibility criteria for membership of the study comparison group is detailed in section 4.8.2 and included that participants be:

- Australian born; or
- if not Australian born, then first settled in, or a citizen of, Australia by 1955 or earlier.

Table 10 shows that 1,510 (80%) population sample subjects met criteria for comparison group membership. It is the results for these 1,510 comparison group participants which will be compared with the results of the Korean War veteran participants, and which will be reported throughout Chapter 6 *Participant results: Korean War veterans versus comparison group*.

Table 10 also shows that 357 (19%) of the population sample subjects were assessed as not eligible for the comparison group, being neither Australian born nor first settled in, nor citizens of, Australia by 1955 or earlier. In the case of a further 26 (1%) population sample subjects, insufficient information was provided at questions 2, 2a and 2b to determine eligibility.

Table 10. Population sample participants assessed as eligible or not eligible for comparison group inclusion

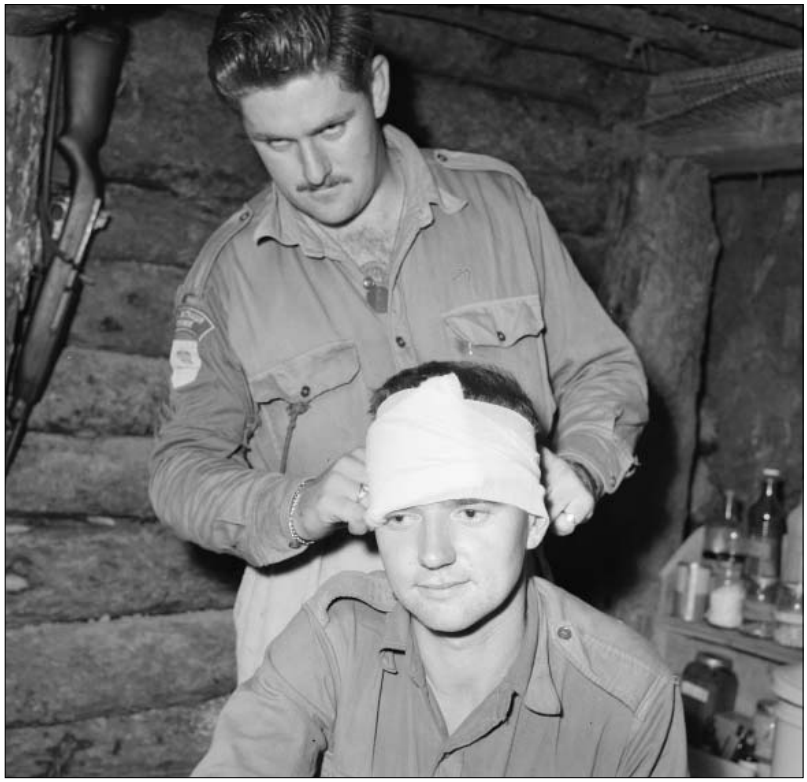
	Population sample (N=1,893)	
	n	**(%)**
Total eligible for inclusion in comparison group	**1,510**	**(79.8)**
Total not eligible for inclusion in comparison group	357	(18.9)
Eligibility undetermined	26	(1.4)

5.6 Questionnaire data completeness and quality

Participants in both study groups provided very complete questionnaire data with very few missing responses in most sections. Between 95% and 99% of all participants provided sufficiently complete data to be scored on measures of smoking and alcohol consumption, and on the HAD, Life Satisfaction and WHOQOL-Bref questionnaires. Approximately 91% of all participants could be scored on the PCL. Data provided in relation to self-reported medical conditions was less complete, with up to 17% of participants not providing answers in relation to some medical conditions.

Checking of the quality of Datatime Pty Ltd's electronically entered data for 50 Korean War veteran questionnaires revealed transcription errors in 2.4% of all entered text fields and in 0.3% of all scanned tick-box fields, whilst checking of electronically entered data for 50 population sample questionnaires revealed errors in 0.2% of entered text fields and 0.04% of scanned tick-box fields. Overall, checking of the electronic data entry revealed transcription errors in only 0.4% of all fields.

Statistical checks to detect invalid, inconsistent or outlying results included range checks for participant age at time of questionnaire completion, or at time of war deployment, and checks for questionnaire responses within the ranges allowed by individual instruments. It was observed that invalid, out of range data primarily resulted from text-field data entry error, and that these could often be corrected after referring back to the original questionnaires.



Korea, 13th-14th September 1951. An unidentified soldier from 1RAR, has a head wound bandaged by a medical orderly in a dugout. *(AWM image LEEJ0597)*

Korea, December 1950. Two members of 3RAR carry a wounded soldier from the Republic of Korea (ROK) Army along a snow covered track. *(AWM image PO2201.073)*

Korea, June 1952. 1RAR moved from their hilltop positions to some flat and low hilly country near the Commonwealth Division Headquarters. Here for a week, they will work on wiring The reserve line whose bunkers and trenches are being constructed by members of the 3RAR. *(AWM image HOBJ3194)*

South Korea, February 1951. These unidentified stretcher bearers of 3RAR, carry out their casualties near Hill 614, the freezing conditions make the quick evacuation of the wounded essential.
(AWM image HOBJ2082)

6. PARTICIPANT RESULTS: KOREAN WAR VETERANS VERSUS COMPARISON GROUP

Participant results are based on the 6,122 Korean War veterans, shown in Table 2, who completed and returned their questionnaire, and the 1,510 comparison group subjects, shown in Table 10, who completed and returned their questionnaire and who were subsequently assessed as being eligible for comparison group membership.

A brief guide to interpreting the statistical analyses results presented in the tables is provided at section 4.12.5 of this report.

6.1 Age distribution, and application of weighting factor to comparison group participants

The age distribution for the Korean War veteran and (unweighted) comparison group participants are shown in the left section of Table 11. The Korean War veteran group had a smaller proportion of participants under the age of 70, and over the age 80, than the comparison group. One half of the Korean War veterans were aged between 70 and 74 years. The mean age in both study groups was close to 75 years, and participants ranged in age from approximately 66 to just under 100 years old.

Table 11. Age distribution for Korean War veteran participants, unweighted comparison group participants, and weighted comparison group participants

	Korean War veterans N=6,122		Unweighted comparison group N=1,510		Weighted comparison group N=1,510	
	Mean	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**
Age in years	74.9	(3.7)	75.1	(5.6)	74.8	(3.9)
Age category	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
< 70	355	(5.8)	274	(18.1)	88	(5.8)
70-74	3,114	(50.9)	561	(37.2)	768	(50.9)
75-79	2,123	(34.7)	402	(26.6)	524	(34.7)
80-84	427	(7.0)	178	(11.8)	105	(7.0)
85-89	91	(1.5)	76	(5.0)	22	(1.5)
90-94	11	(0.2)	14	(0.9)	3	(0.2)
>=95	1	(0.02)	5	(0.3)	0	-

Using the proportions of Korean War veteran and comparison group participants in each age category shown, a weighting factor was calculated and applied to the results of the comparison group participants, as described in section 4.12. The right side of Table 11 shows the redistribution of comparison group participants in to age categories after application of the weighting factor. As expected, the weighted age distribution of the comparison group almost exactly matches that of the Korean War veteran participants.

The weighting factor has subsequently been applied to all descriptive results for the comparison group participants in the remaining results tables in this report.

6.2 Additional demographic measures

The breakdown of Korean War veteran and comparison group participants across additional demographic measures included in the participant questionnaire, are shown in Table 12.

Table 12. Demographic measures

	Korean War veterans N=6,122*		Comparison group N=1,510*		
			weighted		
	n	(%)	n	(%)	P value†
Country of birth					
Australia	5,454	(89.1)	1,293	(85.6)	<0.001±
New Zealand	74	(1.2)	1	(0.1)	
UK/Ireland	523	(8.5)	57	(3.8)	
Other	62	(0.9)	158	(10.5)	
Current marital status					
Married or de facto	4,338	(70.9)	1,167	(77.3)	<0.001
Widowered	766	(12.5)	151	(10.0)	
Divorced or separated	672	(11.0)	123	(8.1)	
Single - never married	303	(4.9)	54	(3.6)	
Highest educational qualification					
Primary	1,317	(21.5)	328	(21.7)	<0.001
Secondary grades 7, 8, 9 or 10	2,144	(35.0)	376	(24.9)	
Secondary grades 11 or 12	867	(14.2)	190	(12.6)	
Certificate	1,180	(19.3)	378	(25.1)	
Diploma	322	(5.3)	113	(7.5)	
University	245	(4.0)	111	(7.4)	

* Actual N from which each percentage score is derived varies by up to 1% fewer participants depending on the number of respondents to each question.
† Each P value refers to the effect of study group upon the dependent demographic measure, after adjustment for current age (65-69; 70-74; 75-79; 80-84; 85+ years) and adjustment for the other two demographic measures in the table, each entered as categorical variables. When entered as adjustment covariates, country of birth was recoded in to two categories (Australia; other), marital status was recoded in to two categories (married or defacto; other) and education was recoded in to three categories (grade 10 or below; grades 11, 12 or certificate; diploma or university).
± Due to small cell sizes, country of birth as a dependent measure was recoded in to three categories (Australia; New Zealand/UK/Ireland; other) to obtain this P value.

Small, statistically significant P values indicate that Korean War veteran and comparison group participants differ in their overall pattern of country of birth, current marital status and highest education level. The differences, however, appear to be subtle.

Both Korean War veteran (89%) and comparison group participants (86%) were predominantly Australian born. Other veteran participants were typically from the UK or Ireland (9%) or New Zealand (1%), whilst non-Australian born comparison group participants

were less likely to be from these countries (4%) and more likely to be from other countries (11%).

The two participating groups demonstrated a similar pattern of marital status, though the Korean War veterans were slightly less likely to be married or in a defacto relationship, and slightly more likely to be widowered, or divorced, or never married, than the comparison group.

The Korean War veterans were also slightly less likely to have post-secondary education qualifications than the comparison group.

The participant questionnaire also included a question about whether participants considered themselves to be Aboriginal or Torres Strait Islanders. The results were unclear; whilst 0.6% of the Korean War veterans (n=36) and 0.5% (weighted) of comparison group participants answered Yes, a further 6% and 26% of the two groups respectively, did not answer the question. The true number of Aboriginal or Torres Strait Islander participants, therefore, cannot be accurately assessed.

6.3 Military service experience

6.3.1 Korean War service experience and exposures

Self-reported data from the participant questionnaire, and data drawn from the Korean War Nominal Roll, are both presented in Table 13 to describe the participating Korean War veterans in terms of their age when first deployed to the Korean War; number of years of service in the Australian armed forces prior to Korean War deployment; Service branch and highest rank during Korean War service; whether they first deployed during the mobile phase of the war prior to the end of June 1951, during the following static phase from July 1951 to 26 July 1953, or after the 27 July 1953 armistice; and the total duration of their Korean War deployment.

More than one half of the participating Korean War veterans were aged between 21 and 26 years at the time of their first Korean War deployment. The youngest participating veteran was 16, the oldest 47, at the time of deployment. More than 60% of this group deployed to Korea within four years of service with the Australian armed forces. Just under 5% of the group were in their first year of service, and 24% were in their second year.

74% of all participants served in Korea with an enlisted rank, and only 19% and 7% respectively served with a non-commissioned officer, or officer, rank. More than half of the participants served with the Army in Korea, one third served with the Navy, and the Air Force was represented by the smallest proportion of participants.

Just less than 17% of participants first deployed to Korea during the mobile phase of the war prior to 30 June 1951. More than 50% first deployed some time during the static phase between July 1951 and late July 1953. An additional 30% of participating veterans first deployed to Korea after the armistice was signed on 27 July 1953.

The Nominal Roll data showed that participating Korean War veterans averaged a total of 285 days of deployment (approximately nine and a half months), with one day being the least number of days deployed, and 1,188 days (approximately three years and three months) being the largest number of days deployed. Additional analysis (not tabulated) showed that, on average, Army participants were deployed for the largest number of days in total (mean total 323 days, SD 143.6), followed by Navy (mean total 255 days, SD 109.7), and Air Force participants were deployed for the least number of days (mean total 159 days, SD 133.1). Most participating veterans (78%) undertook one tour of duty during the Korean War; the

highest number of tours recorded was six for Army veterans, five for Navy veterans, and 17 for Air Force veterans. The average duration of a tour was 245 days for the Army, 218 days for the Navy, and 108 days for the Air Force.

Table 13. Korean War deployment characteristics

	Korean War veterans N=6,122*	
	Mean	**(SD)**
Age in years at first Korean War deployment†	23.31	3.48
Age category†	**n**	**(%)**
<= 20 years	1,378	(22.7)
21-25 years	3,406	(56.0)
26-30 years	1,043	(17.2)
>= 31 years	253	(4.2)
Years of previous service with Australian armed forces‡		
< 1 year	274	(4.6)
1 to < 2 years	1,453	(24.4)
2 to < 4 years	2,029	(34.0)
4 to < 9 years	1,608	(27.0)
>= 9 years	600	(10.1)
Service branch		
Navy	2,310	(37.7)
Army	3,335	(54.5)
Air Force	477	(7.8)
Rank		
Officer	444	(7.3)
Non-commissioned officer	1,141	(18.7)
Enlisted rank	4,532	(74.1)
Era first deployed		
Mobile phase	1,018	(16.6)
Static phase	3,225	(52.7)
After armistice	1,872	(30.6)
Total duration of deployment		
< 3 months	483	(7.9)
3 to < 6 months	973	(15.9)
6 to < 12 months	2,663	(43.6)
12 to < 18 months	1,704	(27.9)
>= 18 months	282	(4.6)
	Mean	**(SD)**
Total duration of deployment in days	284.9	139.7

* Actual N from which each percentage or mean score is derived varies by up to 3% fewer participants depending on the number of respondents to each question.
† Age in years at first Korean War deployment is based on self-reported date of birth and Nominal Roll drawn deployment dates. Age categories were derived after rounding age in years to the nearest integer.
‡ Derived from Nominal Roll drawn date of first Korean War deployment, and self-reported year of first joining the Australian armed forces.

The Korean War veterans' participant questionnaire data in relation to Combat Exposure Scale (CES) responses, whether wounded in action and any associated category of evacuation, and any fever associated with the Korean War, are shown in Table 14, Table 15 and Table 16 respectively.

Table 14 shows that approximately one fifth (21%) of the Korean War veterans reported no combat exposure based on the scenarios described in the CES. These veterans reported, for example, no casualties in their unit, never having to fire rounds at the enemy, never seeing others injured by incoming rounds, and never being in danger of being injured or killed in the line of duty. More commonly veterans reported light combat exposure (31%), and large proportions also reported light-moderate (18%) and moderate (18%) combat exposure according to the CES scoring. A small proportion of the veterans (3%) reported heavy combat exposure.

Table 14. Combat Exposure Scale measures for Korean War service

Combat Exposure Scale	Korean War veterans	
	n	(%)
Did you ever go on combat patrols or have other very dangerous duty?	**N=5,797**	
No	2,159	(37.2)
1-3 times	568	(9.8)
4-12 times	930	(16.0)
13-50 times	1,292	(22.3)
More than 50 times	848	(14.6)
Were you ever under enemy fire?	**N=5,843**	
Never	2,577	(44.1)
For a period less than a month	1,032	(17.7)
For 1-3 months	638	(10.9)
For 4-6 months	587	(10.0)
For more than 6 months	1,009	(17.3)
Were you ever surrounded by the enemy?	**N=5,835**	
No	4,752	(81.4)
1-2 times	633	(10.8)
3-12 times	279	(4.8)
13-25 times	66	(1.1)
More than 25 times	105	(1.8)
What percentage of the men in your unit were killed, wounded or missing in action?	**N=5,658**	
No one	2,824	(49.9)
Between 1-25%	2,445	(43.2)
Between 26-50%	316	(5.6)
Between 51-75%	53	(0.9)
More than 75%	20	(0.4)

Table 14 continued over page

Table 14 continued

Combat Exposure Scale	Korean War veterans	
	n	(%)
How often did you fire rounds at the enemy?	**N=5,824**	
Never	3,040	(52.2)
1-2 times	381	(6.5)
3-12 times	746	(12.8)
13-50 times	693	(11.9)
More than 50 times	964	(16.6)
How often did you see someone get hit by incoming or outgoing rounds?	**N=5,853**	
Never	3,557	(60.8)
1-2 times	788	(13.5)
3-12 times	1,032	(17.6)
13-50 times	353	(6.0)
More than 50 times	123	(2.1)
How often were you in danger of being injured or killed in the line of duty?	**N=5,828**	
Never	2,486	(42.7)
1-2 times	1,316	(22.6)
3-12 times	1,164	(20.0)
13-50 times	494	(8.5)
More than 50 times	368	(6.3)
Combat Exposure Scale score	**N=5,269**	
None	1,118	(21.2)
Light	1,618	(30.7)
Light-moderate	920	(17.5)
Moderate	970	(18.4)
Moderate-heavy	494	(9.4)
Heavy	149	(2.8)

Additional analysis showed that combat exposure varied noticeably across Service branch (Figure 2), and across deployment era (Figure 4), but that there was little variability across subgroups of rank (Figure 3). Army veterans were much less likely to report light or no combat exposure, and much more likely to report moderate-heavy, or heavy, combat exposure, compared with veterans of the Navy and Air Force Services. In a similar pattern, veterans who first deployed to Korea during the active and static phases of the war were much less likely to report no combat or light combat, and much more likely to report moderate, moderate-heavy, or heavy combat exposure, compared with veterans who first deployed to Korea after the armistice. However across rank, veterans serving as officers or non-commissioned officers were only very slightly more likely than enlisted ranks to report no combat exposure, very slightly less likely to report moderate combat exposure, and equally likely to report heavy combat exposure.

Figure 2. Combat Exposure Scale score category across Service branch

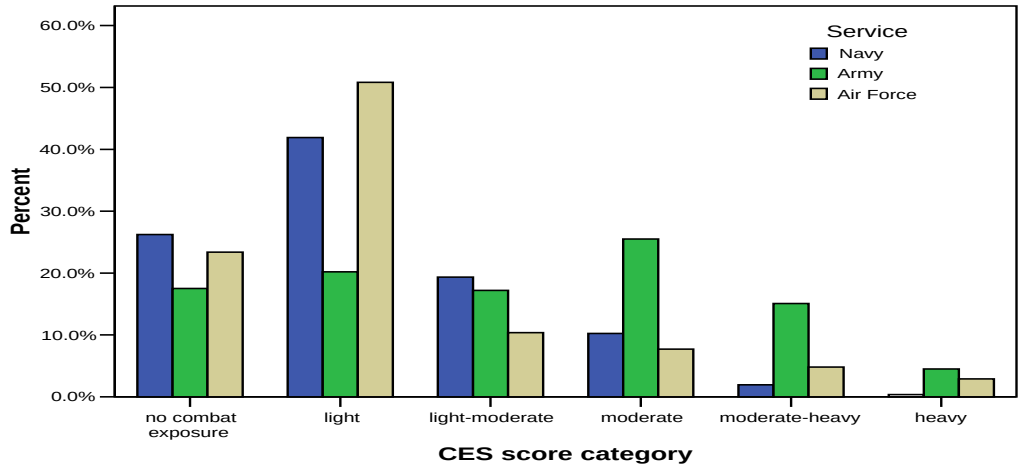


Figure 3. Combat Exposure Scale score category across rank during Korea

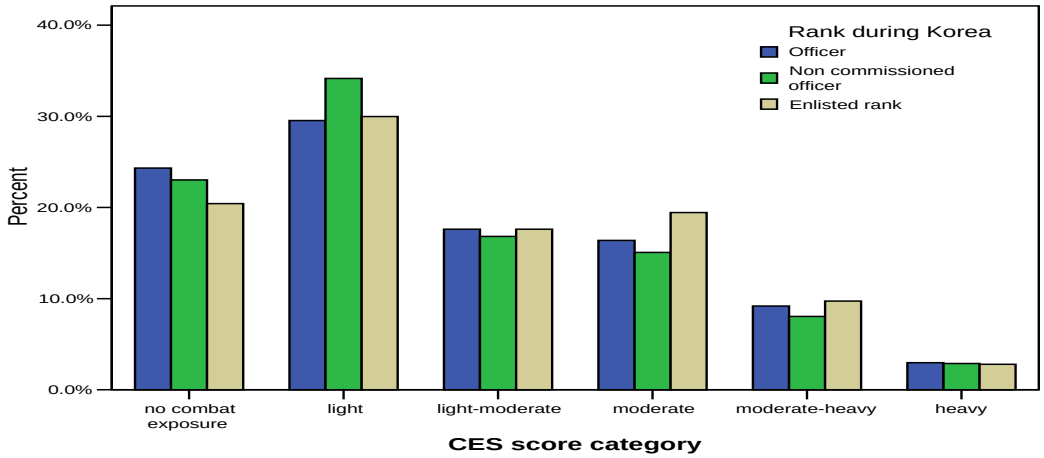


Figure 4. Combat Exposure Scale score category across deployment era

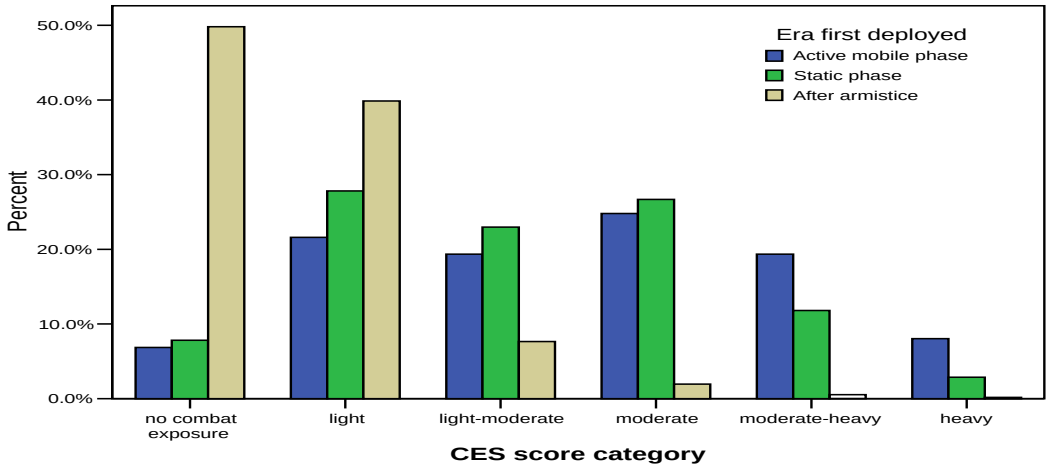


Table 15. Whether wounded in action during Korean War service, and any evacuation

	Korean War veterans N=6,045	
	n	**(%)**
Wounded in action		
No	5,174	(85.6)
Yes	871	(14.4)
If Yes, evacuated to a:		
1. Regimental Aid Post, first aid post, sick bay or field ambulance, and then returned to unit/ship/squadron	241	(4.0)
2. Local field hospital or hospital ship and then returned to unit/ship/squadron	193	(3.2)
3. Hospital in Japan and then returned to unit/ship/squadron	206	(3.4)
4. Hospital in Japan and then on to Australia for further medical attention	204	(3.4)

Veterans who reported being wounded in action during the Korean conflict, and the types (categories) of evacuation required for their worst injury, are shown in Table 15. 871 (14%) participating veterans reported being wounded in action. This group was equally divided in regard to the four types of evacuation reported for their injuries. Approximately one quarter sustained injuries that were treated at a local aid post such as a sick bay or field ambulance before return to duties, a quarter reported evacuation to a local field or ship hospital before return, a quarter reported more extreme evacuation to a hospital in Japan before return, and the final quarter reported evacuation to Japan and then on to Australia, without return to duties in Korea. It is assumed that each increase in category of evacuation, from item 1 through to item 4 above, is likely (though not always) to represent an increase in injury severity.

Additional analysis showed that a large majority (n=782, 90%) of the 871 veterans who reported being wounded in action, had served in the Army during the Korean War (not tabulated). DVA provided a list of all Army veterans officially listed as being Wounded In Action (WIA) during the Korean War. Official WIA qualifying criteria pertained to individuals directly injured by the actions of the enemy, at or within close proximity to the battle line. All other injuries were excluded from these criteria, including accidental injury, transport accidents, frost-bite, trench foot and infections or fevers requiring treatment (such as malaria, influenza and pneumonia). A total of 341 of the Army participants in the study were officially listed by DVA as WIA. Of these, 321 (95%) reported being wounded in action in the participant questionnaire. Compared with the pattern of treatment and evacuation shown in Table 15 for all participants who reported being wounded in action, Army veterans on the DVA official WIA list were less likely to report that their injuries were treated at a local aid post such as a sick bay or field ambulance (12%), or at local field or ship hospital (23%), and more likely to report more extreme evacuation to a hospital in Japan before return (32%), or evacuation to Japan and then on to Australia without return to duties in Korea (34%). Of all Army veteran participants who reported being wounded in action and evacuated to a hospital in Japan before return (n=184), or evacuated to Japan and then on to Australia (n=192), 45% (n=171) were not officially listed by DVA as WIA.

The study participants were not given the official DVA definition for Wounded In Action when completing the questionnaire, and it was not anticipated that their responses would

necessarily match with the official DVA WIA records. Instead, these data suggest that study participants may have included various injuries or illnesses, not necessarily just those which were a direct result of enemy action or within close proximity to the battle line, when reporting being wounded in action during the Korea War.

Table 16. Korean War service related fever

	Korean War veterans N=5,968	
	n	**(%)**
Reported fever in relation to Korean War		
None	4,909	(82.3)
Haemorrhagic fever	79	(1.3)
Malaria	794	(13.3)
Another type of fever	281	(4.7)

Table 16 shows the responses of 5,968 (97%) veterans who reported whether or not they had ever been told that they had haemorrhagic fever, malaria or another type of fever during, or as a result of, the Korean War conflict. Veterans could report more than one type of fever, and therefore some veterans are represented in more than one of the rows in Table 16. 82% of respondents reported no fever, 1% reported haemorrhagic fever, and 13% reported malaria. Other fevers, reported by 5% of respondents, included glandular fever, dengue fever, hepatitis, pneumonia, or a fever of unknown type. As there is a haemorrhagic form of dengue fever, it is possible that a small number of the dengue fevers reported were also haemorrhagic fevers.

6.3.2 Other military service

Table 17 shows other military career characteristics of the participating Korean War veterans, as reported in the participant questionnaire. One quarter of participating Korean War veterans served for a total period of six years with the Australian armed forces before leaving. Almost half of the group served for 10 years or more. Additional analysis showed that the group reported a median total of eight years service (range 1 to 50).

Approximately 12% reported an officer rank as the highest military rank of their Australian service career, 45% reported a non-commissioned officer rank and 42% reported an enlisted rank.

In addition to their Korean War deployment, 17% also reported involvement in World War II, 26% in British Commonwealth Occupying Force (BCOF) in Japan, 21% in the Malayan Emergency, 9% in the Borneo/Malaysian confrontation and 14% in the Vietnam War. As veterans could report more than one major military conflict in addition to the Korean War, individuals may be represented more than once in the associated percentages presented above and in Table 17. For 45% of veterans, the Korean War was the only major military conflict to which they deployed.

Table 17. Military career characteristics of participating Korean War veterans

	Korean War veterans N=6,122*	
	n	**(%)**
Total years served with Australian armed forces		
<= 5 years	1,039	(17.3)
6 years	1,606	(26.7)
7 to < 10 years	579	(9.6)
10 to < 20 years	1,323	(22.0)
20 to < 30 years	984	(16.4)
>= 30 years	476	(7.9)
Highest military rank in career		
Officer	724	(12.0)
Non-commissioned officer	2,766	(45.7)
Enlisted rank	2,556	(42.3)
Major military deployments in addition to the Korean conflict		
None	2,719	(45.4)
At least one	3,268	(54.6)
World War II	1,005	(16.7)
BCOF Japan	1,587	(26.4)
Malayan Emergency	1,246	(20.7)
Borneo/Malaysian confrontation	512	(8.5)
Vietnam	853	(14.2)
Other	186	(3.1)

* Actual N from which each percentage score is derived varies by up to 2% fewer participants depending on the number of respondents to each question.

6.4 Health behaviours: smoking and alcohol consumption

Smoking

Postal questionnaire responses were used to categorise Korean War veterans and comparison group participants according to whether they were current smokers, former smokers, or never or occasional smokers. For current smokers and former smokers additional calculations were carried out to estimate number of pack years of smoking.

The results, shown in Table 18, indicate that Korean War veterans (79%) were more likely than the comparison group (60%) to be current or former smokers. The very small accompanying P value indicates that difference in the overall pattern of smoking status between the two groups was statistically significant.

Amongst current or former smokers, Korean War veterans also averaged significantly higher pack-years of cigarette smoking, indicating that they have smoked in higher quantities or for longer durations than comparison group current or former smokers.

Table 18. Smoking status and median total pack years for current smokers and former smokers

Smoking status	Korean War veterans N=6,061		Comparison group N=1,489		
			weighted		
	n	(%)	n	(%)	P value
Current smoker	711	(11.7)	104	(7.0)	<0.001*
Former smoker	4,078	(67.3)	796	(53.4)	
Never/occasional	1,272	(21.0)	589	(39.6)	
Cigarette pack years amongst current or former smokers	**N=4,608 Median**	**Percentiles 10^{th}, 90^{th}**	**N=871 Median**	**Percentiles 10^{th}, 90^{th}**	**P value**
Cigarette pack years	41.01	9.0, 104.0	31.09	5.3, 89.0	<0.001†

* This P value refers to the effect of study group after adjustment for current age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

† This P value for the effect of study group was obtained from median regression using 1,000 bootstrap replications after adjustment for age (<=74 years; >=75 years), marital status (married or defacto; other), education (grade 10 or below; grade 11, 12 or certificate; diploma or university) and country of birth (Australia; other).

Alcohol consumption

Responses to the AUDIT-C questionnaire items, measuring frequency and quantity of current alcohol consumption, are shown in Table 19. Korean War veterans were slightly less likely to be non-drinkers, and slightly more likely to drink four or more times per week, than comparison group participants. Amongst drinkers, Korean War veterans (24%) were much more likely to drink five or more drinks on a standard day of drinking than the comparison group (11%), and veterans were much more likely to binge drink (drink six drinks or more in one sitting) and to do so more frequently than the comparison group. Small P values indicate that the overall pattern of drinking, represented by each AUDIT-C question, did differ statistically significantly between the Korean War veteran and comparison group participants.

Table 19. Frequency and quantity of alcohol consumption using the AUDIT-C

AUDIT-C	Korean War veterans		Comparison group		
			weighted		
	n	(%)	n	(%)	P value*
Frequency of taking a drink	**N=6,058**		**N=1,498**		
Never	946	(15.6)	276	(18.4)	
Once a month or less	795	(13.1)	187	(12.5)	
2 to 4 times per month	722	(11.9)	209	(13.9)	<0.001
2 to 3 times per week	984	(16.2)	246	(16.4)	
4 or more times per week	2,611	(43.1)	580	(38.7)	
Amongst drinkers: number of drinks on a standard day	**N=4,965**		**N=1,173**		
1 or 2	2,325	(46.8)	768	(65.5)	
3 or 4	1,404	(28.3)	275	(23.4)	
5 or 6	719	(14.5)	90	(7.7)	<0.001
7 to 9	332	(6.7)	30	(2.6)	
10 or more	185	(3.7)	9	(0.8)	
Amongst drinkers: frequency of 6 drinks or more on one occasion	**N=5,036**		**N=1,201**		
Never	2,275	(45.2)	754	(62.8)	
Less than once a month	1,114	(22.1)	218	(18.1)	
Monthly	476	(9.5)	80	(6.7)	<0.001
Weekly	562	(11.2)	94	(7.8)	
Daily or almost daily	609	(12.1)	55	(4.6)	

* Due to small cell sizes these P values were obtained after recoding number of drinks on a standard day to three categories (1 or 2; 3 or 4; 5 or more), and frequency of 6 drinks or more to 4 categories (never; less than once a month; monthly; weekly or more often), and after adjustment for age (<=74 years; >=75 years), marital status (married or defacto; other), education (grade 10 or below; grade 11, 12 or certificate; diploma or university) and country of birth (Australia; other).

The number of participants predicted to be current hazardous drinkers, using an AUDIT-C score of four or more, and also an AUDIT-C score of five or more, are shown in Table 20. At both thresholds, Korean War veterans were more than one and a half times more likely to be current hazardous drinkers than the comparison group.

Also shown in Table 20, and using the recommended cut-off score of two or more on the CAGE questionnaire, Korean War veterans were approximately three times more likely to meet criteria for a history of alcohol related problems indicative of dependence and/or abuse at some time in their lifetime.

Further, Korean War veterans were three times more likely to report ever considering themselves as heavy drinkers, and to report having had treatment for alcoholism.

Table 20. AUDIT-C current hazardous drinkers, CAGE history of alcohol problems, and self-reported heavy drinking and treatment for alcoholism

Alcohol	Korean War veterans N=6,122*		Comparison group N=1,510*					
			weighted		Age adj OR†	Multiv. adj OR‡	95% CI	P value
	n	(%)	n	(%)				
AUDIT-C hazardous drinkers								
cut-off score 4 or more	3,444	(58.6)	702	(48.7)	1.53	1.56	1.38 - 1.76	<0.001
cut-off score 5 or more	2,623	(44.6)	444	(30.8)	1.80	1.77	1.55 - 2.01	<0.001
CAGE history of alcohol problems								
cut-off score 2 or more	2,171	(36.1)	209	(14.2)	3.40	3.35	2.85 - 3.94	<0.001
Ever considered oneself a heavy drinker	2,265	(37.5)	223	(15.0)	3.40	3.23	2.76 - 3.79	<0.001
Ever treated for alcoholism or drinking problem	245	(4.1)	15	(1.0)	3.53	3.36	2.05 - 5.52	<0.001

* Actual value of N from which each percentage score is derived varies by up to 5% fewer participants depending on the number of respondents to each question.
† These odds ratios are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years).
‡ These odds ratios and associated 95% CIs and P values are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

6.5 Psychological disorders: Anxiety, Depression and Posttraumatic Stress Disorder

Hospital Anxiety and Depression (HAD) scale

6,016 (98.3%) Korean War veterans and 1,479 (98.2%) comparison group participants responded to all seven of the HAD anxiety subscale questions, and 5,836 (95.3%) Korean War veterans and 1,432 (95.1%) comparison group participants responded to all seven of the HAD depression subscale questions. Total scores are scaled in a negative direction such that higher scores represent poorer health (increased symptom severity). The mean total scores on each subscale for these participants, and the number of participants meeting HAD scale criteria for anxiety or depression (by reaching the cut-off score of 11 or more on either subscale), are shown in Table 21.

Table 21. HAD scale mean scores, and participants meeting HAD scale criteria for anxiety or depression

HAD scale	Korean War veterans N=6,122*		Comparison group N=1,510*					
	Mean	(SD)	weighted Mean	(SD)	Age adj mean diff†	Multiv. adj mean diff‡	95% CI	P value
Anxiety score	8.11	(4.89)	4.68	(3.54)	3.33	3.21	2.94-3.49	<0.001
Depression score	7.26	(4.39)	4.31	(3.24)	2.87	2.77	2.52-3.02	<0.001
Participants meeting HAD scale criteria for:	**n**	**(%)**	**weighted n**	**(%)**	**Age adj OR†**	**Multiv. adj OR**	**95% CI**	**P value**
Anxiety	1,882	(31.3)	100	(6.7)	5.87	5.74	4.65-7.09	<0.001
Depression	1,369	(23.5)	64	(4.5)	5.71	5.45	4.26-6.97	<0.001

* Actual N from which each mean and SD, or percentage, score is derived varies by up to 6% fewer participants depending on the number of respondents to each of the HAD scale's 14 questions.
† These OR and difference between mean values are both adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years).
‡ These OR and difference between mean values, and their associated 95% CIs and P values are adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

Korean War veterans recorded significantly higher mean scores, representing poorer health, on both the anxiety and depression subscales of the HAD scale. The difference between groups was very slightly more marked for anxiety than for depression. On both subscales, Korean War veterans were more than five times more likely than the comparison group to be experiencing depression or anxiety respectively, as defined by a total subscale score of 11 or more.

Posttraumatic Stress Disorder Checklist (PCL)

5,564 (91%) Korean War veterans and 1,390 (92%) comparison group participants answered each of the PCL's 17 symptom questions, and were given a total PCL score. Increasing PCL scores represent increasing number of symptoms (poorer health). Group mean and standard deviation (SD) PCL scores are shown in Table 20.

Korean War veterans recorded significantly higher mean PCL scores than the comparison group, representing markedly higher symptom reporting in the veteran group.

The number of participants predicted to meet criteria for a PTSD diagnosis, using a PCL score of 45 or more, or a more stringent PCL score of 50 or more, are also shown in Table 20. At both thresholds, Korean War veterans were close to six times more likely to meet criteria for a PTSD diagnosis than the comparison group participants.

Table 22. Total PCL scores, and number of participants meeting PCL criteria for PTSD with scores of 45 or greater, or 50 or greater

PCL	Korean War veterans N=5,564		Comparison group N=1,395					
			weighted		Age adj	Multiv. adj		
	Mean	(SD)	Mean	(SD)	mean diff†	mean diff‡	95% CI	P value
Total PCL score	36.37	17.45	24.80	(10.46)	11.22	10.77	9.79-11.76	<0.001
Participants meeting PCL criteria for PTSD	n	(%)	weighted n	(%)	Age adj OR†	Multiv. adj OR‡	95% CI	P value
cut-off >= 45	1,807	(32.5)	99	(7.1)	6.16	5.89	4.74-7.32	<0.001
cut-off >= 50	1,426	(25.6)	64	(4.6)	6.82	6.63	5.09-8.63	<0.001

† These OR and difference between mean values are both adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years).
‡ These OR and difference between mean values, and their associated 95% CIs and P values, are adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

PCL symptom scores were obtained for participants regardless of whether or not they nominated a stressful life event. Responses by participants who did nominate a stressful life event were categorised as either a Korean War event, other military event, other personal injury/illness/attack, witnessing of trauma to others, fire/flood or natural disaster, domestic event, other civilian event, or another/undetermined event. The category 'other military event' included experiences which were either clearly not Korean War events, or experiences which were possibly Korean War events but for which insufficient information was provided to be certain.

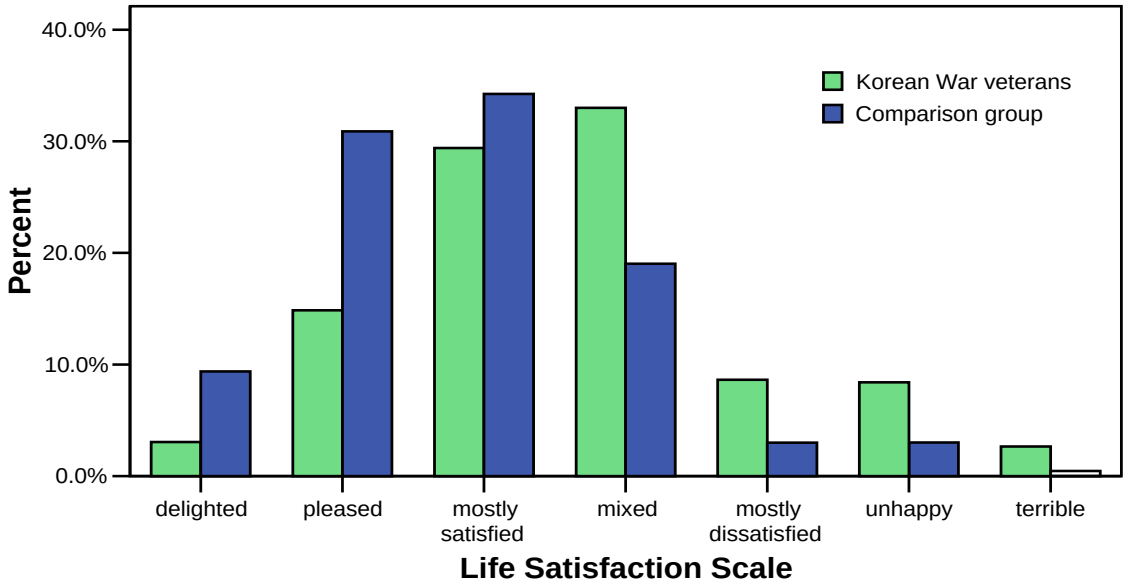
Domestic experiences were the most commonly reported stressful life event for both Korean War veterans (35%) and comparison group participants (52%). The second most nominated life event category for both groups was personal injury, illness or attack (assessed as not military related) with 18% of Korean War veterans and 21% of comparison group participants reporting an event of this nature. 18% of Korean War veterans nominated a Korean War event, and 13% nominated another military event. A further 11% of Korean War veterans and 12% of comparison group participants did not specify a stressful life event.

6.6 Life satisfaction and quality of life

Life Satisfaction scale

The Life Satisfaction scale was completed by 6,062 (99.0%) Korean War veterans and 1,506 (99.7%) comparison group participants, and their responses are shown in Figure 5. In relation to how they felt about their life as a whole, and taking in to account what had happened in the last year and what was expected to happen in the future, Korean War veterans were less likely than the comparison group to report feeling delighted, pleased or mostly satisfied, and more likely to report feeling mostly dissatisfied, unhappy or terrible.

Figure 5. Life Satisfaction scale responses



The results for the Life Satisfaction scale were expressed as Percent Life Satisfaction (PLS) scores with higher scores representing greater life satisfaction. PLS mean and SD scores are shown in Table 23 and in Figure 6. Korean War veterans recorded significantly poorer PLS scores than the comparison group, representing poorer life satisfaction.

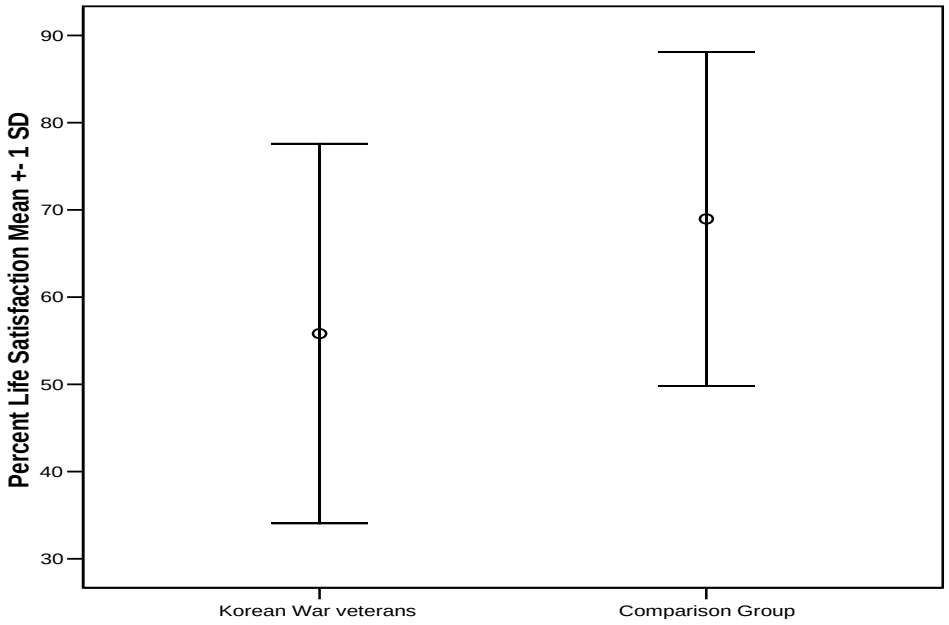
Table 23. Mean Percent Life Satisfaction score

Life Satisfaction Scale	Korean War veterans N=6,062		Comparison group N=1,506					
	Mean	(SD)	weighted Mean	(SD)	Age adj mean diff*	Multiv. adj mean diff†	95% CI	P value
Percent Life Satisfaction	55.81	(21.75)	68.96	(19.15)	-12.77	-12.03	-13.27, -10.79	<0.001

* This difference between means is adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years).
† This difference between means and associated 95% CI and P value is adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

The multivariate adjusted mean difference value of -12.03 represents an effect size of approximately 0.5 of the pooled group standard deviation. This is defined as a medium effect size by Cohen (1988)[160] and, combined with a 95% CI which clearly excludes zero (indicating no difference), and an accompanying very small P value, this difference in mean Percent Life Satisfaction scores would be considered to represent an important or meaningful difference between the two groups.

Figure 6. Percent Life Satisfaction Mean +- 1 SD error bars



World Health Organisation brief Quality of Life questionnaire (WHOQOL-Bref)
Korean War veteran and comparison group responses to the WHOQOL-Bref's two individual measures of self-rated quality of life, and satisfaction with health, are shown in Figure 7 and Figure 8.

Figure 7. WHOQOL-Bref question 1 "How would you rate your quality of life?"

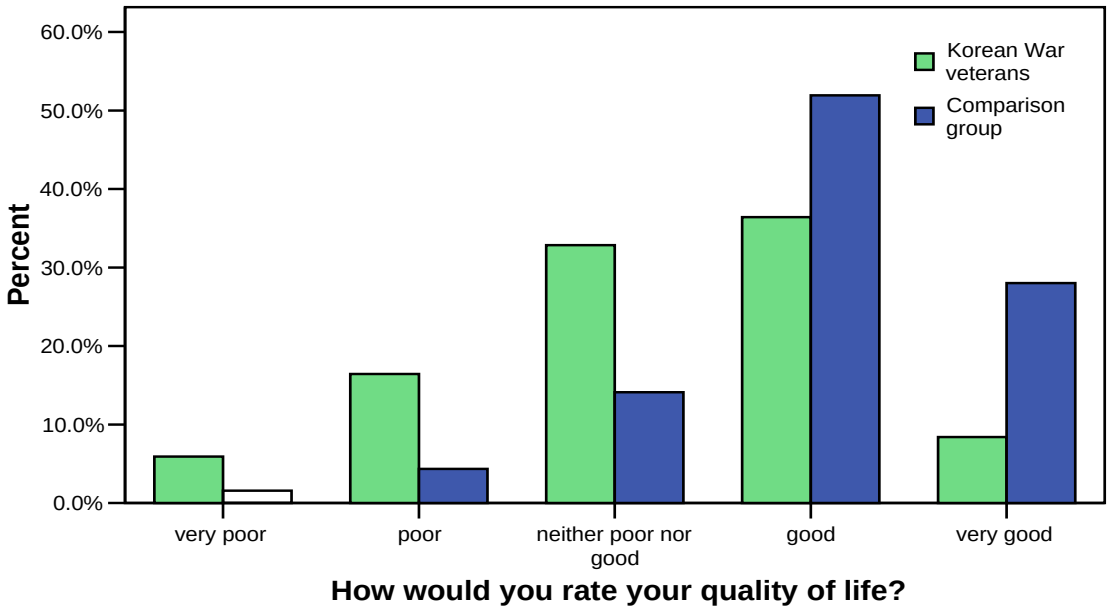
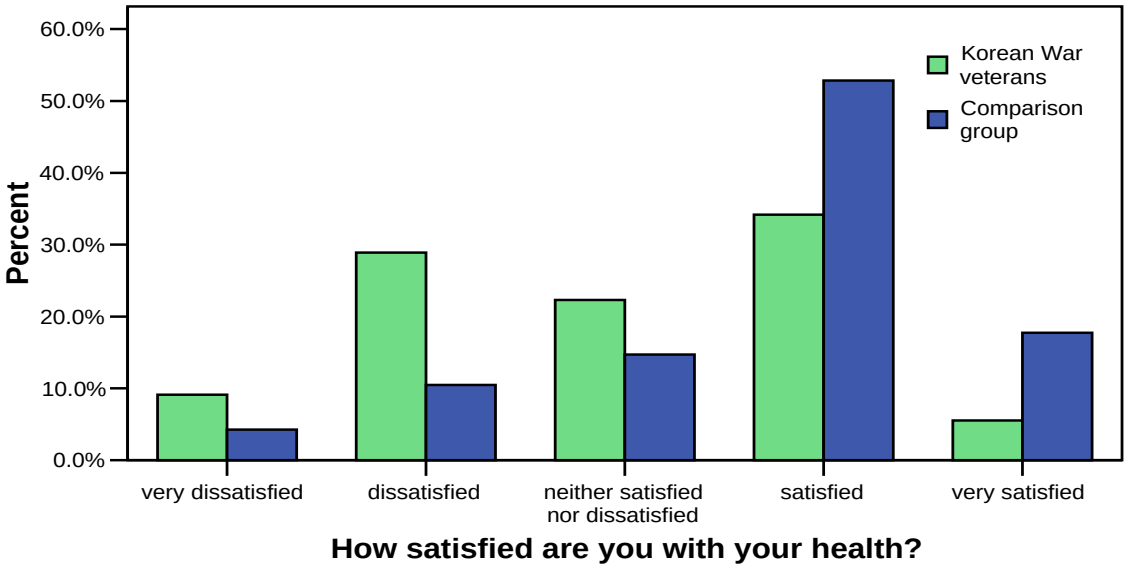


Figure 8. WHOQOL-Bref question 2 "How satisfied are you with your health?"



Korean War veterans were less likely than the comparison group to rate their quality of life as good or very good, and more likely to rate their quality of life as very poor, poor or neither poor nor good. In a similar pattern, Korean War veterans were less likely to report being satisfied or very satisfied with their health, and more likely to report being very dissatisfied, dissatisfied or neither dissatisfied nor satisfied.

Mean scores for the WHOQOL-Bref's two individual questions on self-rated quality of life, and satisfaction with health, each with a possible range of 1 to 5, and for the instrument's four Domains, each with a possible range of 4 to 20, are shown in Table 24. All total mean scores are scaled in a positive direction such that higher scores denote higher quality of life.

Table 24. WHOQOL-Bref scores

WHOQOL-Bref	Korean War veterans N=6,122*		Comparison group N=1,510* weighted					
	Mean	(SD)	Mean	(SD)	Age adj mean diff†	Multiv. adj mean diff‡	95% CI	P value
Q1. Quality of life	3.25	(1.02)	4.01	(0.86)	-0.74	-0.70	-0.76, -0.65	<0.001
Q2. Satisfaction with health	2.98	(1.10)	3.69	(1.02)	-0.70	-0.68	-0.74, -0.62	<0.001
Domain 1 (Physical Health)	12.13	(3.48)	14.93	(3.10)	-2.76	-2.66	-2.86, -2.46	<0.001
Domain 2 (Psychological)	13.55	(2.93)	15.58	(2.26)	-1.99	-1.89	-2.05, -1.72	<0.001
Domain 3 (Social relationships)	13.08	(3.35)	15.02	(2.89)	-1.91	-1.81	-2.00, -1.62	<0.001
Domain 4 (Environment)	14.82	(2.51)	16.24	(2.15)	-1.40	-1.30	-1.44, -1.16	<0.001

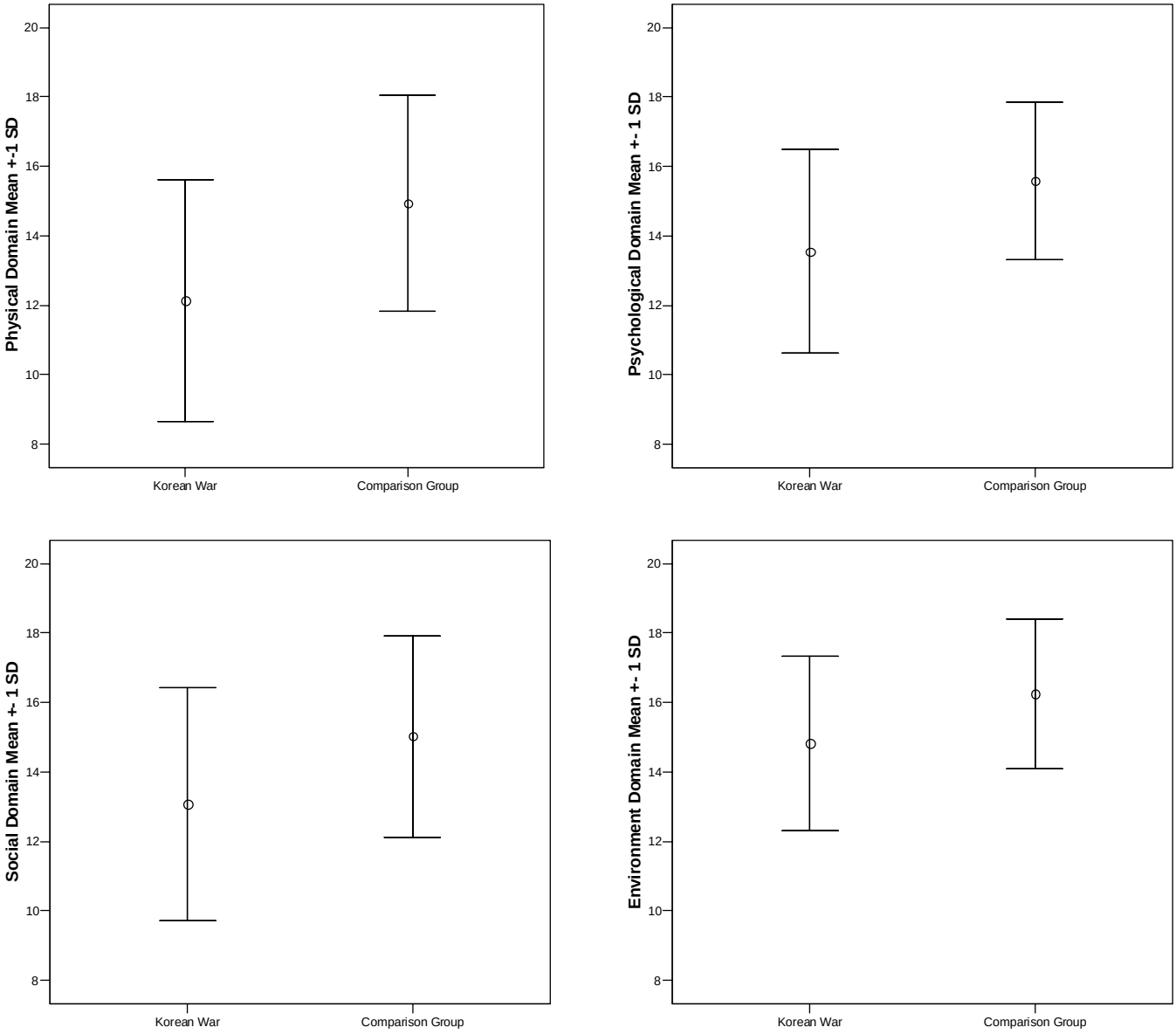
* Actual N from which each mean and SD score is derived varies by up to 2% fewer participants depending on the number of respondents to each of the WHOQOL-Bref's 26 questions.
† This difference between means is adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years).
‡ This difference between means and associated 95% CI and P value is adjusted for current age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

Korean War veterans receive poorer (lower) quality of life scores on all four Domains of the WHOQOL-Bref questionnaire, and also on the two individual measures of quality of life and satisfaction with health. The difference between groups on the Physical Health Domain was slightly larger than the differences between groups on the other WHOQOL-Bref Domains.

On each of the WHOQOL-Bref measures shown in Table 24 the multivariate adjusted mean difference values represent effect sizes of between 0.6 to 0.8 of the pooled group standard deviations. These are considered medium to large effect sizes[160] which suggest important or meaningful differences between the two groups on these quality of life measures.

Figure 9 further demonstrates the differences between the Korean War veteran and weighted comparison group results for each of the WHOQOL-Bref's four Domains.

Figure 9. WHOQOL-Bref Domain mean +-1 SD error bars



6.7 Hospitalisations and self-reported current medical conditions

Nights hospitalised in previous 12 months

5,986 (98%) Korean War veterans and 1,492 (99%) comparison group participants provided information about nights hospitalised in the previous 12 months.

Table 25. Nights hospitalised in previous 12 months

Nights hospitalised	Korean War veterans N=5,986		Comparison group N=1,496					
			weighted		Age adj	Multiv. adj		
	n	(%)	n	(%)	OR*	OR†	95% CI	P value
At least 1 night	2,111	(35.3)	383	(25.7)	1.60	1.58	1.38 – 1.80	<0.001
	Median	Percentiles 10th, 90th	Median	Percentiles 10th, 90th	Age adj median diff‡	Multiv. adj median diff§	95% CI	P value
Number of nights (amongst those hospitalised)	7.00	1.0, 30.0	5.00	1.0, 21.0	2	1	-0.19, 2.19	0.098

*This odds ratio was adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years).
†This odds ratio and associated 95% CI and P value was adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).
‡This difference between medians was obtained from median regression after adjustment for age (65-69; 70-74; 75-79; 80-84; 85+ years).
§This difference between medians and associated 95% CI and P value was obtained from median regression using 1000 bootstrap replications after adjustment for age (<=74 years; >=75 years), marital status (married or defacto; other), education (grade 10 or below; grade 11, 12 or certificate; diploma or university) and country of birth (Australia; other).

Table 25 shows that Korean War veterans (35%) were more likely than comparison group participants (26%) to report being hospitalised overnight at least once in the previous 12 months.

Of the 2,111 Korean War veterans and the 383 comparison group participants who reported hospitalisations, 66% of the Korean War veterans and 74% of the comparison group participants reported 1 to 10 nights hospitalisation, 34% and 36% of the groups respectively reported 11 to 30 nights hospitalisation, and 10% and 7% respectively reported more than 30 nights hospitalisation (not tabulated). The total number of nights reported ranged from one to 365 in both groups. Amongst those hospitalised, there was no difference between study groups in the median number of nights reported, after statistical adjustment for the regular covariates age, education, marital status and country of birth (Table 25).

Self-reported current medical conditions

Participant's self-reported doctor-diagnosed medical conditions, from a list of 15 conditions included in the participant questionnaires, are shown in Table 26. Unlike other health outcomes investigated in the questionnaire, a large number of participants did not fully complete the medical conditions questions; often not ticking either the Yes or No options to a possible condition. For example, 16% of Korean War veterans and 7% of comparison group participants did not answer whether they had asthma or not, and a similar percentage in each group did not indicate whether or not they had suffered stroke. The large percentage of missing responses for each medical condition rendered it difficult to reliably estimate the true group difference in the prevalences of each condition.

Because of the uncertainty in the data, the analysis was conducted using two approaches.

Firstly, the group differences were quantified with the 'not answered' participants excluded, and the results for these analyses are presented in the first row of Table 26 for each medical condition. Based on these analyses, Korean War veterans were between 1.5 and 3.5 times more likely to report having each of the listed medical conditions.

This first approach gives the same point estimates (age adj ORs and multiv. adj ORs) as those expected if the 'not answered' participants were, in actuality, distributed in to the Yes and No categories in similar proportions to those participants who did answer the questions. However, if the 'not answered' participants were added to the analysis in this way, the point estimates would stay the same but the 95% CI's would become more precise (narrow) and the P values would become smaller (more significant).

Secondly, the group differences were quantified with the 'not answered' participants included as non-cases for each medical condition (i.e. the correct answer assumed to be No), and the results for these analyses are presented in the second row of Table 26 for each medical condition. This approach slightly reduced the point estimates observed in the first analysis approach, but still showed that Korean War veterans were between 1.4 and 3.0 times more likely than the comparison group to report having each of the listed medical conditions.

This second approach was based on two theories as to why a large number of participants failed to answer the medical conditions questions fully. The first theory assumes that participants often looked through the list of medical conditions and simply ticked the Yes boxes to the conditions which applied to them, and ignored the conditions which did not apply to them; thus failing to tick the No boxes. The second theory makes the assumption that if a participant does not know whether he has, or does not have, a doctor-diagnosed medical condition, and subsequently does not answer the question on that basis, then it is in fact unlikely that he has that condition; and the subsequent correct answer is No.

Table 26. Self-reported current medical conditions

	Korean War veterans N=6,122		Comparison group N=1,510 weighted					
	n	(%)	n	(%)	Age adj OR*	Multiv. adj OR†	95% CI	P value
Asthma								
Yes	1,009	(16.5)	170	(11.2)	1.75	1.69	1.41-2.03	<0.001
No	4,149	(67.8)	1,232	(81.6)	1.53	1.49	1.24-1.78	<0.001
Not answered	964	(15.7)	109	(7.2)				
High blood pressure								
Yes	3,110	(50.8)	649	(43.0)	1.54	1.51	1.34-1.70	<0.001
No	2,465	(40.3)	794	(52.6)	1.36	1.34	1.19-1.50	<0.001
Not answered	547	(8.9)	67	(4.4)				
Stroke								
Yes	847	(13.8)	119	(7.9)	2.10	2.09	1.70-2.58	<0.001
No	4,265	(69.7)	1,283	(85.0)	1.82	1.82	1.49-2.24	<0.001
Not answered	1,010	(16.5)	107	(7.1)				
Heart attack or angina								
Yes	2,060	(33.6)	357	(23.7)	1.94	1.90	1.65-2.18	<0.001
No	3,283	(53.6)	1,066	(70.6)	1.68	1.66	1.44-1.90	<0.001
Not answered	779	(12.7)	86	(5.7)				
Rapid, irregular heart beat								
Yes	2,173	(35.5)	290	(19.2)	2.65	2.60	2.25-3.00	<0.001
No	3,159	(51.6)	1,134	(75.1)	2.27	2.23	1.93-2.57	<0.001
Not answered	790	(12.9)	86	(5.7)				
Liver disease								
Yes	312	(5.1)	30	(2.0)	3.12	3.06	2.04-4.59	<0.001
No	4,720	(77.1)	1,374	(91.0)	2.72	2.67	1.78-4.00	<0.001
Not answered	1,090	(17.8)	106	(7.0)				
Arthritis								
Yes	3,966	(64.8)	764	(50.7)	2.11	2.09	1.85-2.36	<0.001
No	1,679	(27.4)	691	(45.7)	1.78	1.76	1.56-1.98	<0.001
Not answered	477	(7.8)	56	(3.7)				
Kidney disease								
Yes	461	(7.5)	54	(3.6)	2.53	2.62	1.94-3.53	<0.001
No	4,599	(75.1)	1,352	(89.5)	2.20	2.28	1.69-3.08	<0.001
Not answered	1,062	(17.3)	104	(6.9)				

Table 26 continued over page

Table 26 continued

	Korean War veterans N=6,122		Comparison group N=1,510 weighted					
	n	(%)	n	(%)	Age adj OR*	Multiv. adj OR†	95% CI	P value
Diabetes								
Yes	1,134	(18.5)	224	(14.8)	1.57	1.54	1.30-1.82	<0.001
No	4,094	(66.9)	1,210	(80.1)	1.37	1.34	1.14-1.59	<0.001
Not answered	894	(14.6)	76	(5.0)				
Melanoma								
Yes	1,293	(21.1)	138	(9.2)	3.11	3.08	2.54-3.74	<0.001
No	3,879	(63.4)	1,267	(83.9)	2.68	2.67	2.20-3.23	<0.001
Not answered	950	(15.5)	105	(7.0)				
Other skin cancer								
Yes	2,702	(44.1)	523	(34.6)	1.78	1.80	1.58-2.04	<0.001
No	2,650	(43.3)	893	(63.1)	1.52	1.55	1.37-1.75	<0.001
Not answered	770	(12.6)	94	(6.2)				
Other cancer								
Yes	1,028	(16.8)	156	(10.4)	2.07	2.08	1.73-2.51	<0.001
No	4,035	(65.9)	1,244	(82.4)	1.77	1.79	1.48-2.15	<0.001
Not answered	1,059	(17.3)	110	(7.3)				
Stomach or duodenal ulcer								
Yes	1,578	(25.8)	192	(12.7)	2.73	2.65	2.24-3.31	<0.001
No	3,648	(59.6)	1,223	(81.0)	2.35	2.29	1.94-2.70	<0.001
Not answered	896	(14.6)	95	(6.3)				
Partial or complete blindness								
Yes	796	(13.0)	119	(7.9)	1.99	1.96	1.60-2.42	<0.001
No	4,295	(70.2)	1,295	(85.8)	1.72	1.70	1.38-2.09	<0.001
Not answered	1,031	(16.8)	96	(6.3)				
Partial or complete deafness								
Yes	4,145	(67.7)	626	(41.4)	3.50	3.51	3.10-3.98	<0.001
No	1,531	(25.0)	813	(53.8)	2.96	2.99	2.65-3.38	<0.001
Not answered	446	(7.3)	72	(4.8)				

* These OR and difference between mean values are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years).
† These OR and difference between mean values, and their associated 95% CIs and P values are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other).

7. PARTICIPANT RESULTS: KOREAN WAR VETERANS BY DEPLOYMENT CHARACTERISTICS

Additional analyses were conducted to detect any association between health outcomes in Korean War veterans, and characteristics of the Korean War deployment. For these analyses Korean War veterans were categorised into subgroups according to age at deployment, highest rank during the Korean War, Service branch, years of previous military service experience at deployment, total duration of deployment, whether or not wounded in action during Korea and type of any evacuation required, war phase (era) first deployed, Combat Exposure Scale (CES) score, and whether or not deployed to another major conflict. Health outcomes in Korean War veterans were compared across subgroups of each deployment characteristic, and the results are shown in the following tables.

The associations between health outcomes and age at deployment, rank, Service branch, previous military service experience, duration of deployment and deployment to another major conflict, were estimated after adjustment for current age, marital status, highest education and country of birth.

The associations between health outcomes and whether wounded in action, and CES score, were estimated after adjustment for the above-listed demographic variables and also for highest rank during the Korean War and for Service branch.

Differences in health outcomes across subgroups of deployment characteristics, which reach statistical significance after adjustment for the designated covariates, can be interpreted as representing an effect of that deployment characteristic which is independent of any confounding effects of the covariates.

A brief guide to interpreting the statistical analyses results presented in the tables is provided at section 4.12.5 of this report.

7.1 Deployment characteristics and PTSD, anxiety and depression outcomes

Posttraumatic Stress Disorder Checklist (PCL)

Korean War veterans predicted to meet criteria for a PTSD diagnosis, as defined by a high PCL cut-off score of 50 or more, are shown in Table 27 across subgroups of deployment characteristics.

There were statistically significant associations observed between PTSD and each of the deployment characteristics measured, except for deployment to a major conflict in addition to the Korean War.

The association between PTSD and increasing level of reported combat exposure was particularly strong, with veterans who reported heavy combat being almost 15 times more likely to meet criteria for PTSD than veterans who reported no combat. The dose response slope indicates that the expected increase in the odds of PTSD, per categorical increase in combat exposure level (eg from ‘moderate’ to ‘moderate-heavy’), is 65%.

The other most notable association was that with rank; with enlisted ranks being four times more likely, and non-commissioned officers being three times more likely, than officers to

meet criteria for PTSD. The dose response slope indicates a 54% increase in the odds of PTSD per categorical increase in rank (i.e. from 'enlisted rank' to 'non-commissioned officer' to 'officer').

Compared with Navy veterans, Army veterans were one and a half times more likely, and Air Force veterans were almost half as likely, to have PTSD.

Other associations were evident with decreasing deployment age, decreasing years of previous service experience, and increasing deployment duration. Each categorical decrease in deployment age was associated with an expected 23% increase in the odds of PTSD, each categorical decrease in years of previous service was associated with a 16% increase in the odds of PTSD, and each categorical increase in deployment duration was associated with an expected 27% increase in the odds of PTSD.

Further, the likelihood of PTSD was doubled in veterans who reported being wounded in action, regardless of evacuation type, compared with veterans who did not report being wounded, and almost halved in veterans who first deployed to Korea after the armistice, compared with veterans who first deployed during the earlier phases of the war.

Table 27. Korean War veterans meeting PCL criteria for PTSD at 50+ cut-off score, by deployment characteristics

	Korean War veterans meeting PCL criteria for PTSD (at 50+ cut-off)					
	n	**(%)**	**Odds ratio**	**Adj odds ratio***	**95% CI**	**P value**
Age at deployment						
<= 20	406	(31.9)	1.00	1.00	-	<0.001†
21-25	808	(26.1)	0.75	0.78	0.66-0.92	
26-30	168	(17.9)	0.47	0.56	0.42-0.75	
>= 31	28	(12.8)	0.31	0.51	0.27-0.98	
Categorical dose response‡	-	-	0.69	0.77	0.67-0.87	<0.001
Rank						
Officer	28	(6.7)	1.00	1.00	-	<0.001†
Non-commissioned officer	227	(21.5)	3.81	3.36	2.15-5.25	
Enlisted rank	1,168	(28.6)	5.56	4.19	2.71-6.48	
Categorical dose response‡	-	-	1.83	1.54	1.34-1.78	<0.001
Service branch						
Navy	470	(22.2)	1.00	1.00	-	<0.001†
Army	892	(29.8)	1.49	1.51	1.32-1.73	
Air Force	64	(14.3)	0.59	0.62	0.47-0.83	
Years of previous service in Australian armed forces.						
< 1 year	69	(27.1)	1.00	1.00	-	0.013†
1 to <4 years	916	(28.7)	1.08	1.03	0.77-1.39	
>= 4 years	406	(20.4)	0.69	0.80	0.58-1.10	
Categorical dose response‡	-	-	0.72	0.84	0.74-0.96	0.012

Table 27 continued over page

Table 27 continued

	Korean War veterans meeting PCL criteria for PTSD (at 50+ cut-off)					
	n	(%)	Odds ratio	Adj odds ratio*	95% CI	P value
Total duration of deployment						
< 6 months	281	(21.2)	1.00	1.00	-	<0.001†
6 to < 12 months	585	(24.2)	1.19	1.08	0.91-1.27	
>= 12 months	558	(30.9)	1.67	1.55	1.31-1.83	
Categorical dose response‡	-	-	1.31	1.27	1.16-1.38	<0.001
Era first deployed						
Mobile phase	236	(25.9)	1.00	1.00	-	<0.001†
Static phase	829	(28.3)	1.13	1.01	0.85-1.21	
After armistice	359	(20.9)	0.76	0.60	0.49-0.74	
Wounded in action						
No	1,081	(22.8)	1.00	1.00	-	<0.001†
Yes, evacuation type 1 or 2	174	(44.1)	2.66	2.35	1.88-2.93	
Yes, evacuation type 3 or 4	144	(39.7)	2.22	1.99	1.57-2.52	
Categorical dose response‡	-	-	1.66	1.54	1.38-1.72	<0.001
CES score						
No combat	114	(11.0)	1.00	1.00	-	<0.001†
Light	286	(18.8)	1.86	1.84	1.45-2.34	
Light-moderate	217	(25.5)	2.76	2.91	2.25-3.76	
Moderate	320	(35.8)	4.50	4.76	3.69-6.13	
Moderate-heavy	217	(46.5)	6.99	7.39	5.54-9.86	
Heavy	78	(60.9)	12.56	14.64	9.52-22.50	
Categorical dose response‡	-	-	1.61	1.65	1.56-1.75	<0.001
Any other major deployment						
No	669	(26.9)	1.00	1.00	-	
Yes	720	(24.3)	0.87	1.07	0.94-1.23	0.291

*These odds ratios and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted odds ratios within each exposure variable differ from unity.

‡ Dose-response per categorical change in this deployment characteristic.

Hospital Anxiety and Depression (HAD) rating scale

The number of veterans predicted to meet HAD scale criteria for anxiety or for depression, across subgroups of deployment characteristics, are shown in Table 28 and Table 29 respectively.

Within veterans, increasing odds of having anxiety or depression were associated with decreasing level of rank, being wounded in action during the Korean War, and increasing combat exposure. There was also an association between both psychological health outcomes and Service branch, with Army veterans demonstrating greatest odds of anxiety or depression, followed by Navy veterans, and Air Force veterans demonstrating the lowest odds.

The rank effect and combat exposure effect for both health outcomes were strong. Veterans who served with enlisted ranks were approximately three times more likely, and non-commissioned officers were approximately two times more likely, to meet HAD criteria for anxiety or depression, when compared with officers. There was an expected 56% increase in the odds of anxiety, and an expected 43% increase in the odds of depression, for every categorical decrease in rank. In regard to combat exposure, veterans reporting heavy combat were approximately six times more likely to have anxiety or depression than veterans reporting no combat. The expected increase in the odds of anxiety was 40%, and the corresponding increase for depression was 37%, for every categorical increase in combat exposure level.

Whilst the effect of being wounded in action during Korea, on both psychological health outcomes, was not as strong as the effect for rank or combat exposure, it was still notable, with veterans who reported being wounded in action, regardless of evacuation type, more than one and a half times more likely to have anxiety or depression than veterans who reported not being wounded.

There were weaker associations between increased anxiety, and depression, with increased deployment duration, and with deployment during the mobile and static phases of the war compared with deployment after the armistice.

Increased anxiety, but not depression, was also weakly associated with younger age at deployment, and with fewer years of prior service experience.

Neither anxiety, nor depression, was associated with deployment to a major conflict in addition to the Korean War.

Table 28. Korean War veterans meeting HAD scale criteria for anxiety, by deployment characteristics

	Korean War veterans meeting HAD scale criteria for anxiety					
	n	(%)	Odds ratio	Adj odds ratio*	95% CI	P value
Age at deployment						
<= 20	532	(39.3)	1.00	1.00	-	0.016†
21-25	1,046	(31.1)	0.70	0.78	0.67-0.91	
26-30	243	(23.8)	0.48	0.72	0.56-0.93	
>= 31	46	(18.9)	0.36	0.71	0.41-1.24	
Categorical dose response‡	-	-	0.70	0.84	0.74-0.95	0.004
Rank						
Officer	47	(10.7)	1.00	1.00	-	<0.001†
Non-commissioned officer	277	(24.7)	2.74	2.21	1.53-3.18	
Enlisted rank	1,556	(35.0)	4.48	3.09	2.17-4.40	
Categorical dose response‡	-	-	1.87	1.56	1.37-1.77	<0.001
Service branch						
Navy	663	(29.1)	1.00	1.00	-	<0.001†
Army	1,117	(34.2)	1.27	1.29	1.14-1.45	
Air Force	102	(21.8)	0.68	0.75	0.59-0.96	
Years of previous service in Australian armed forces						
< 1 year	97	(35.4)	1.00	1.00	-	0.027†
1 to <4 years	1,170	(34.2)	0.95	0.86	0.66-1.11	
>= 4 years	557	(25.7)	0.63	0.72	0.54-0.96	
Categorical dose response‡	-	-	0.72	0.85	0.75-0.96	0.007
Total duration of deployment						
< 6 months	405	(28.3)	1.00	1.00	-	0.005†
6 to < 12 months	801	(30.6)	1.12	1.00	0.87-1.16	
>= 12 months	671	(34.4)	1.32	1.22	1.05-1.42	
Categorical dose response‡	-	-	1.15	1.12	1.03-1.20	0.005
Era first deployed						
Mobile phase	300	(30.0)	1.00	1.00	-	<0.001†
Static phase	1,049	(33.1)	1.15	1.04	0.88-1.22	
After armistice	530	(28.9)	0.95	0.75	0.63-0.91	

Table 28 continued over page

Table 28 continued

	Korean War veterans meeting HAD scale criteria for anxiety					
	n	**(%)**	**Odds ratio**	**Adj odds ratio***	**95% CI**	**P value**
Wounded in action						
No	1,491	(29.3)	1.00	1.00	-	
Yes, evacuation type 1 or 2	180	(41.9)	1.74	1.62	1.31-2.00	<0.001†
Yes, evacuation type 3 or 4	174	(43.4)	1.85	1.75	1.40-2.18	
Categorical dose response‡	-	-	1.42	1.37	1.24-1.52	<0.001
CES score						
No combat	198	(17.9)	1.00	1.00	-	
Light	416	(26.1)	1.61	1.65	1.36-2.01	
Light-moderate	300	(33.1)	2.27	2.43	1.96-3.02	<0.001†
Moderate	364	(37.8)	2.78	2.96	2.38-3.67	
Moderate-heavy	222	(45.6)	3.83	4.12	3.19-5.32	
Heavy	78	(52.7)	5.10	5.73	3.92-8.37	
Categorical dose response‡	-	-	1.37	1.40	1.33-1.47	<0.001
Any other major deployment						
No	869	(32.4)	1.00	1.00	-	
Yes	961	(30.0)	0.89	1.12	0.99-1.27	0.062

*These odds ratios and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted odds ratios within each exposure variable differ from unity.

‡ Dose-response per categorical change in this deployment characteristic.

Table 29. Korean War veterans meeting HAD scale criteria for depression, by deployment characteristics

	Korean War veterans meeting HAD scale criteria for depression					
	n	**(%)**	**Odds ratio**	**Adj odds ratio***	**95% CI**	**P value**
Age at deployment						
<= 20	358	(27.3)	1.00	1.00	-	
21-25	755	(23.2)	0.80	0.85	0.71-1.01	
26-30	194	(19.5)	0.64	0.79	0.60-1.05	0.249†
>= 31	48	(20.4)	0.68	0.72	0.40-1.30	
Categorical dose response‡	-	-	0.83	0.88	0.77-1.00	0.058
Rank						
Officer	44	(10.0)	1.00	1.00	-	
Non-commissioned officer	225	(20.5)	2.31	2.13	1.45-3.13	<0.001†
Enlisted rank	1,100	(25.6)	3.08	2.69	1.84-3.92	
Categorical dose response‡	-	-	1.55	1.43	1.25-1.65	<0.001
Service branch						
Navy	457	(20.7)	1.00	1.00	-	
Army	832	(26.3)	1.37	1.38	1.21-1.58	<0.001†
Air Force	80	(17.2)	0.80	0.82	0.62-1.07	
Years of previous service in Australian armed forces						
< 1 year	67	(26.2)	1.00	1.00	-	
1 to <4 years	818	(24.6)	0.92	0.87	0.65-1.17	0.172†
>= 4 years	435	(20.6)	0.73	0.77	0.56-1.05	
Categorical dose response‡	-	-	0.82	0.88	0.76-1.01	0.061
Total duration of deployment						
< 6 months	303	(21.9)	1.00	1.00	-	
6 to < 12 months	569	(22.4)	1.03	0.95	0.81-1.12	0.010†
>= 12 months	491	(25.9)	1.25	1.18	0.996-1.40	
Categorical dose response‡	-	-	1.13	1.10	1.01-1.20	0.027
Era first deployed						
Mobile phase	224	(25.4)	1.00	1.00	-	
Static phase	758	(24.6)	0.96	0.92	0.77-1.10	<0.001†
After armistice	363	(20.3)	0.75	0.68	0.55-0.83	

Table 29 continued over page

Table 29 continued

	Korean War veterans meeting HAD scale criteria for depression					
	n	**(%)**	**Odds ratio**	**Adj odds ratio***	**95% CI**	**P value**
Wounded in action						
No	1,077	(21.8)	1.00	1.00	-	
Yes, evacuation type 1 or 2	135	(32.8)	1.75	1.57	1.25-1.97	<0.001†
Yes, evacuation type 3 or 4	130	(33.5)	1.81	1.63	1.29-2.07	
Categorical dose response‡	-	-	1.41	1.32	1.19-1.48	<0.001
CES score						
No combat	141	(13.1)	1.00	1.00	-	
Light	296	(18.9)	1.55	1.52	1.22-1.90	
Light-moderate	212	(24.0)	2.09	2.03	1.59-2.58	<0.001†
Moderate	251	(27.2)	2.47	2.43	1.91-3.10	
Moderate-heavy	167	(35.5)	3.64	3.55	2.69-4.68	
Heavy	69	(47.3)	5.93	5.96	4.04-8.80	
Categorical dose response‡	-	-	1.36	1.37	1.29-1.44	<0.001
Any other major deployment						
No	632	(24.3)	1.00	1.00	-	
Yes	692	(22.2)	0.89	0.995	0.87-1.14	0.941

*These odds ratios and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted odds ratios within each exposure variable differ from unity.

‡ Dose-response per categorical change in this deployment characteristic.

Table 30 continued

	Korean War veterans meeting AUDIT-C criteria for hazardous drinking (at 5+ cut-off)					
	n	**(%)**	**Odds ratio**	**Adj odds ratio***	**95% CI**	**P value**
Years of previous service in Australian armed forces						
< 1 year	123	(46.8)	1.00	1.00	-	0.776†
1 to <4 years	1,545	(46.1)	0.98	0.93	0.72-1.21	
>= 4 years	892	(41.9)	0.82	0.97	0.74-1.28	
Categorical dose response‡	-	-	0.87	1.01	0.90-1.14	0.837
Total duration of deployment						
< 6 months	592	(42.3)	1.00	1.00	-	0.596†
6 to < 12 months	1,161	(45.4)	1.14	1.06	0.93-1.22	
>= 12 months	865	(45.3)	1.13	1.07	0.93-1.24	
Categorical dose response‡	-	-	1.06	1.03	0.96-1.10	0.378
Era first deployed						
Mobile phase	429	(44.2)	1.00	1.00	-	0.055†
Static phase	1,407	(45.4)	1.05	0.96	0.83-1.12	
After armistice	784	(43.5)	0.97	0.84	0.71-0.99	
Wounded in action						
No	2,217	(44.5)	1.00	1.00	-	0.698†
Yes, evacuation type 1 or 2	197	(46.8)	1.10	1.09	0.88-1.34	
Yes, evacuation type 3 or 4	166	(43.1)	0.95	1.04	0.84-1.30	
Categorical dose response‡	-	-	0.997	1.03	0.93-1.14	0.522
CES score						
No combat	434	(40.0)	1.00	1.00	-	0.004†
Light	729	(46.7)	1.31	1.32	1.12-1.55	
Light-moderate	397	(44.7)	1.21	1.22	1.02-1.47	
Moderate	442	(46.9)	1.32	1.40	1.16-1.69	
Moderate-heavy	224	(47.6)	1.36	1.40	1.11-1.76	
Heavy	64	(45.4)	1.25	1.34	0.93-1.93	
Categorical dose response‡	-	-	1.05	1.07	1.03-1.12	0.002
Any other major deployment						
No	1,151	(44.1)	1.00	1.00	-	
Yes	1,416	(45.0)	1.04	1.22	1.09-1.37	0.001

*These odds ratios and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted odds ratios within each exposure variable differ from unity.

‡ Dose-response per categorical change in this deployment characteristic.

Table 31 shows the percentage of Korean War veterans meeting CAGE criteria for a history of alcohol related problems indicative of dependence and/or abuse at some point in the respondent's lifetime, across subgroups of deployment characteristics. Increasing risk of lifetime alcohol related problems in veterans was associated with several Korean War deployment characteristics.

There was a notable effect of combat exposure, with the odds of lifetime alcohol problems in veterans reporting heavy combat being almost double that of veterans reporting no combat, and a dose response slope indicating an expected 13% increase in the odds of lifetime alcohol problems per categorical increase in combat exposure.

Unlike the pattern shown for current hazardous drinking, increased prevalence of lifetime alcohol problems was associated with decreasing, and not increasing, level of rank; with the lowest ranked veterans most likely to meet CAGE criteria, and an expected 26% increase in the odds of lifetime alcohol problems per categorical decrease in rank level.

Lifetime alcohol problems were also associated with younger age at deployment, with the effect persisting after adjustment for current age, and an expected 16% increase in the odds of lifetime alcohol problems per categorical decrease in deployment age.

There was a notable association between lifetime alcohol problems and Service branch, with Army veterans most likely, and Air Force veterans least likely, to meet CAGE criteria.

There were also associations between lifetime alcohol problems and decreasing years of service experience prior to deployment, and increasing duration of Korean War deployment.

Table 31. Korean War veterans meeting CAGE criteria for lifetime alcohol problems, by deployment characteristics

	Korean War veterans meeting CAGE criteria for lifetime alcohol problems					
	n	(%)	Odds ratio	Adj odds ratio*	95% CI	P value
Age at deployment						
<= 20	578	(42.6)	1.00	1.00	-	
21-25	1,242	(37.1)	0.79	0.88	0.76-1.03	
26-30	287	(28.0)	0.52	0.68	0.53-0.87	0.019†
>= 31	52	(21.8)	0.38	0.62	0.37-1.06	
Categorical dose response‡	-	-	0.73	0.84	0.75-0.94	0.003
Rank						
Officer	102	(23.3)	1.00	1.00	-	
Non-commissioned officer	349	(30.9)	1.47	1.37	1.02-1.82	<0.001†
Enlisted rank	1,719	(38.7)	2.08	1.67	1.26-2.21	
Categorical dose response‡	-	-	1.43	1.26	1.13-1.41	<0.001
Service branch						
Navy	764	(35.5)	1.00	1.00	-	
Army	1,270	(39.0)	1.27	1.26	1.13-1.42	<0.001†
Air Force	137	(29.1)	0.81	0.90	0.72-1.12	

Table 31 continued over page

Table 31 continued

	Korean War veterans meeting CAGE criteria for lifetime alcohol problems					
	n	(%)	Odds ratio	Adj odds ratio*	95% CI	P value
Years of previous service in Australian armed forces						
< 1 year	120	(44.6)	1.00	1.00	-	0.015†
1 to <4 years	1,319	(38.5)	0.78	0.74	0.57-0.95	
>= 4 years	676	(31.2)	0.56	0.67	0.51-0.88	
Categorical dose response‡	-	-	0.73	0.86	0.76-0.96	0.010
Total duration of deployment						
< 6 months	460	(32.1)	1.00	1.00	-	0.002†
6 to <12 months	936	(35.9)	1.19	1.10	0.96-1.27	
>= 12 months	773	(39.6)	1.39	1.29	1.11-1.49	
Categorical dose response‡	-	-	1.18	1.14	1.06-1.22	0.001
Era first deployed						
Mobile phase	332	(33.2)	1.00	1.00	-	0.075†
Static phase	1,179	(37.2)	1.20	1.09	0.93-1.27	
After armistice	660	(35.9)	1.13	0.94	0.79-1.12	
Wounded in action						
No	1,800	(35.3)	1.00	1.00	-	0.099†
Yes, evacuation type 1 or 2	180	(42.9)	1.37	1.24	1.00-1.53	
Yes, evacuation type 3 or 4	157	(39.4)	1.19	1.13	0.90-1.40	
Categorical dose response‡	-	-	1.14	1.09	0.99-1.21	0.095
CES score						
No combat	328	(29.7)	1.00	1.00	-	<0.001†
Light	566	(35.5)	1.30	1.33	1.13-1.58	
Light-moderate	337	(37.1)	1.39	1.41	1.17-1.71	
Moderate	363	(38.0)	1.45	1.39	1.15-1.69	
Moderate-heavy	219	(45.5)	1.98	1.87	1.48-2.37	
Heavy	66	(44.9)	1.93	1.87	1.30-2.69	
Categorical dose response‡	-	-	1.14	1.13	1.08-1.18	<0.001
Any other major deployment						
No	1,005	(37.7)	1.00	1.00	-	
Yes	1,112	(34.5)	0.87	1.04	0.93-1.17	0.523

*These odds ratios and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted odds ratios within each exposure variable differ from unity.

‡ Dose-response per categorical change in this deployment characteristic.

7.2 Deployment characteristics and alcohol related outcomes

Table 30 shows the percentage of Korean War veterans meeting AUDIT-C criteria for current hazardous alcohol consumption, using a cut-off score of five or more, across subgroups of deployment characteristics. Increasing prevalence of current hazardous drinking in Korean War veterans was associated with higher level of rank, and with increasing combat exposure. Statistically significant dose response slopes indicated an expected 22% decrease in the odds of current hazardous drinking per categorical decrease in rank, and an expected 7% increase in the odds of current hazardous drinking per categorical increase in combat exposure. There was also a very small association between current hazardous drinking and having deployed to another major conflict.

Whilst the results showed a strong pattern of increasing prevalence of current hazardous drinking with decreasing age at deployment, the differences across subgroups of deployment age did not reach statistical significance after adjustment for current age, marital status, education and country of birth. It was determined that the trend evident across subgroups of deployment age, was predominantly an effect of current age.

Table 30. Korean War veterans meeting AUDIT-C criteria for current hazardous drinking at 5+ cut-off score, by deployment characteristics

	Korean War veterans meeting AUDIT-C criteria for hazardous drinking (at 5+ cut-off)					
	n	(%)	Odds ratio	Adj odds ratio*	95% CI	P value
Age at deployment						
<= 20	661	(50.0)	1.00	1.00	-	0.198†
21-25	1,475	(44.9)	0.81	0.87	0.75-1.01	
26-30	399	(40.3)	0.67	0.86	0.68-1.09	
>= 31	68	(28.1)	0.39	0.67	0.41-1.09	
Categorical dose response‡	-	-	0.78	0.90	0.81-1.01	0.075
Rank						
Officer	221	(50.7)	1.00	1.00	-	<0.001†
Non-commissioned officer	453	(41.1)	0.68	0.51	0.40-0.67	
Enlisted rank	1,947	(44.9)	0.79	0.48	0.37-0.61	
Categorical dose response‡	-	-	0.97	0.78	0.70-0.86	<0.001
Service branch						
Navy	1,012	(45.4)	1.00	1.00	-	0.933†
Army	1,417	(44.4)	0.96	0.99	0.89-1.11	
Air Force	194	(42.4)	0.89	0.96	0.78-1.18	

Table 30 continued over page

7.3 Deployment characteristics and life satisfaction and quality of life

Percent Life Satisfaction Scale

Mean Percent Life Satisfaction (PLS) scores, for Korean War veterans across subgroups of deployment characteristics, are shown in Table 32. Higher mean PLS scores represent greater life satisfaction.

Table 32. Percent Life Satisfaction for Korean War veterans by deployment characteristics

		Percent Life Satisfaction					
		Mean	(SD)	Mean diff	Adj mean diff*	95% CI	P value
Age at deployment							
<= 20	(N=1,369)	53.01	(22.41)	0.00	0.00	-	0.031†
21-25	(N=3,375)	55.95	(21.41)	2.94	2.30	0.73-3.88	
26-30	(N=1,030)	58.41	(21.31)	5.41	2.94	0.46-5.42	
>= 31	(N=249)	60.04	(22.24)	7.03	4.10	-0.80, 8.99	
Categorical dose response‡		-	-	2.54	1.59	0.42-2.76	0.008
Rank							
Officer	(N=443)	67.31	(20.40)	0.00	0.00	-	<0.001†
Non-commissioned officer	(N=1,128)	58.54	(21.40)	-8.77	-7.80	-10.48, -5.12	
Enlisted rank	(N=4,486)	53.99	(21.56)	-13.32	-11.60	-14.21, -9.00	
Categorical dose response‡		-	-	-5.94	-5.00	-6.09, -3.90	<0.001
Service branch							
Navy	(N=2,297)	56.93	(21.67)	0.00	0.00	-	<0.001†
Army	(N=3,294)	54.34	(21.61)	-2.59	-2.67	-3.83, -1.50	
Air Force	(N=471)	60.69	(22.07)	3.76	3.24	1.09-5.39	
Years of previous service in Australian armed forces							
< 1 year	(N=269)	54.96	(22.36)	0.00	0.00	-	0.023†
1 to <4 years	(N=3,451)	54.70	(21.49)	-0.26	0.64	-2.05, 3.34	
>= 4 years	(N=2,188)	57.99	(21.77)	3.03	2.57	-0.29, 5.44	
Categorical dose response‡		-	-	2.60	1.60	0.41-2.79	0.009
Total duration of deployment							
< 6 months	(N=1,443)	56.66	(22.33)	0.00	0.00	-	<0.001†
6 to < 12 months	(N=2,639)	56.65	(21.35)	-0.01	0.77	-0.63, 2.18	
>= 12 months	(N=1,963)	54.07	(21.71)	-2.60	-1.91	-3.40, -0.42	
Categorical dose response‡		-	-	-1.39	-1.08	-1.82, -0.34	0.004

Table 32 continued over page

Table 32 continued

		Percent Life Satisfaction					
		Mean	(SD)	Mean diff	Adj mean diff*	95% CI	P value
Era first deployed							
Mobile phase	(N=1,005)	55.34	(22.52)	0.00	0.00	-	
Static phase	(N=3,197)	55.18	(21.86)	-0.16	0.52	-1.05, 2.09	<0.001†
After armistice	(N=1,853)	57.20	(21.07)	1.86	3.44	1.66-5.22	
Wounded in action							
No	(N=5,132)	56.76	(21.62)	0.00	0.00	-	
Yes, evacuation type 1 or 2	(N=429)	51.05	(21.36)	-5.71	-4.53	-6.68, -2.38	<0.001†
Yes, evacuation type 3 or 4	(N=403)	49.50	(21.38)	-7.25	-6.04	-8.27, -3.81	
Categorical dose response‡		-	-	-4.02	-3.29	-4.33, -2.26	<0.001
CES score category							
No combat	(N=1,111)	61.30	(19.46)	0.00	0.00	-	
Light	(N=1,610)	58.61	(21.45)	-2.68	-2.89	-4.50, -1.28	
Light-moderate	(N=913)	54.60	(21.73)	-6.70	-6.72	-8.57, -4.86	
Moderate	(N=963)	53.57	(21.61)	-7.73	-7.28	-9.16, -5.41	<0.001†
Moderate-heavy	(N=486)	50.89	(21.99)	-10.40	-9.89	-12.21, -7.56	
Heavy	(N=148)	46.17	(23.50)	-15.12	-14.64	-18.30, -10.98	
Categorical dose response‡		-	-	-2.72	-2.58	-3.03, -2.13	<0.001
Any other major deployment							
No	(N=2,700)	55.23	(21.61)	0.00	0.00	-	
Yes	(N=3,230)	56.56	(21.67)	1.33	-0.24	-1.43,0.95	0.691

*These mean differences and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).
† These P values assess whether any adjusted mean difference within each exposure variable differ from zero.
‡ Dose-response per categorical change in this deployment characteristic.

Decreased life satisfaction was most notably associated with increasing levels of combat exposure, and lower rank during the Korean War. Veterans reporting heavy combat exposure had mean PLS scores approximately 15% lower than veterans reporting no combat, representing a medium to large effect size of approximately 0.7 of a standard deviation (Cohen 1988[160] defined a large effect size as a mean difference of 0.8 of a standard deviation). Veterans who served under enlisted ranks had a mean PLS score approximately 12% lower than veterans who served as officers, representing a medium effect size (defined as a mean differences of 0.5 of a standard deviation).[160]

There was a statistically significant association between increased life satisfaction and Service branch (with Air Force veterans reporting highest life satisfaction and Army veterans reporting lowest life satisfaction), older age at deployment, and absence of any experience of being wounded in action during Korea, but the effect sizes were small (defined as a mean differences of 0.2 of a standard deviation).[160]

Whilst observed associations between increased life satisfaction and increasing duration of Korean War deployment, and deployment era after the armistice, reached statistical significance, the total differences in mean PLS scores across subgroups of these deployment characteristics were extremely small.

World Health Organisation Quality of Life (WHOQOL-Bref) questionnaire

Mean scores on each of the WHOQOL-Bref Domains, for Korean War veterans across subgroups of deployment characteristics, are shown in Table 33, Table 34, Table 35 and Table 36. Higher mean scores represent greater quality of life.

Table 33. WHOQOL-Bref Domain 1 (Physical Health) scores for Korean War veterans by deployment characteristics

		WHOQOL-Bref Domain 1 (Physical Health) score					
		Mean	(SD)	Mean diff	Adj mean diff*	95% CI	P value
Age at deployment							
<= 20	(N=1,362)	11.86	(3.55)	0.00	0.00	-	0.259[†]
21-25	(N=3,371)	12.18	(3.45)	0.32	0.23	-0.02, 0.49	
26-30	(N=1,028)	12.34	(3.52)	0.49	0.14	-0.26, 0.54	
>= 31	(N=245)	12.18	(3.38)	0.32	-0.08	-0.87, 0.71	
Categorical dose response[‡]		-	-	0.18	0.08	-0.11, 0.26	0.420
Rank							
Officer	(N=440)	13.75	(3.38)	0.00	0.00	-	<0.001[†]
Non-commissioned officer	(N=1,130)	12.37	(3.49)	-1.38	-1.01	-1.45, -0.58	
Enlisted rank	(N=4,470)	11.91	(3.45)	-1.84	-1.48	-1.90, -1.06	
Categorical dose response[‡]		-	-	-0.77	-0.63	-0.80, -0.45	<0.001
Service branch							
Navy	(N=2,282)	12.45	(3.45)	0.00	0.00	-	<0.001[†]
Army	(N=3,290)	11.76	(3.46)	-0.69	-0.72	-0.91, -0.54	
Air Force	(N=473)	13.14	(3.51)	0.70	0.64	0.29-0.98	
Years of previous service in Australian armed forces							
< 1 year	(N=270)	12.13	(3.55)	0.00	0.00	-	0.126[†]
1 to <4 years	(N=3,446)	12.02	(3.47)	-0.12	-0.02	-0.45, 0.41	
>= 4 years	(N=2,181)	12.36	(3.48)	-0.23	0.22	-0.24, 0.68	
Categorical dose response[‡]		-	-	0.26	0.17	-0.02, 0.37	0.075

Table 33 continued over page

Table 33 continued

		WHOQOL-Bref Domain 1 (Physical Health) score					
		Mean	**(SD)**	**Mean diff**	**Adj mean diff***	**95% CI**	**P value**
Total duration of deployment							
< 6 months	(N=1,442)	12.39	(3.48)	0.00	0.00	-	<0.001†
6 to < 12 months	(N=2,631)	12.28	(3.47)	-0.10	-0.03	-0.25, 0.20	
>= 12 months	(N=1,956)	11.73	(3.47)	-0.66	-0.59	-0.83, -0.35	
Categorical dose response‡		-	-	-0.34	-0.32	-0.43, -0.20	<0.001
Era first deployed							
Mobile phase	(N=999)	11.99	(3.60)	0.00	0.00	-	<0.001†
Static phase	(N=3,189)	12.04	(3.49)	0.05	0.07	-0.18, 0.33	
After armistice	(N=1,851)	12.36	(3.40)	0.38	0.47	0.19-0.76	
Wounded in action							
No	(N=5,114)	12.35	(3.46)	0.00	0.00	-	<0.001†
Yes, evacuation type 1 or 2	(N=431)	10.89	(3.34)	-1.47	-1.20	-1.55, -0.86	
Yes, evacuation type 3 or 4	(N=402)	10.75	(3.24)	-1.61	-1.29	-1.65, -0.94	
Categorical dose response‡		-	-	-0.93	-0.75	-0.91, -0.58	<0.001
CES score category							
No combat	(N=1,105)	13.30	(3.19)	0.00	0.00	-	
Light	(N=1,604)	12.61	(3.39)	-0.69	-0.74	-0.99, -0.48	<0.001†
Light-moderate	(N=913)	12.02	(3.38)	-1.28	-1.25	-1.55, -0.95	
Moderate	(N=965)	11.63	(3.52)	-1.67	-1.53	-1.84, -1.23	
Moderate-heavy	(N=488)	10.92	(3.50)	-2.39	-2.24	-2.62, -1.87	
Heavy	(N=147)	10.22	(3.61)	-3.08	-2.92	-3.51, -2.34	
Categorical dose response‡		-	-	-0.58	-0.54	-0.61, -0.46	<0.001
Any other major deployment							
No	(N=2,688)	12.15	(3.51)	0.00	0.00	-	
Yes	(N=3,230)	12.15	(3.45)	0.001	-0.19	-0.38, 0.001	<0.051

*These mean differences and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted mean difference within each exposure variable differ from zero.

‡ Dose-response per categorical change in this deployment characteristic.

Table 34. WHOQOL-Bref Domain 2 (Psychological) scores for Korean War veterans by deployment characteristics

		WHOQOL-Bref Domain 2 (Psychological) score					
		Mean	**(SD)**	**Mean diff**	**Adj mean diff***	**95% CI**	**P value**
Age at deployment							
<= 20	(N=1,359)	13.20	(3.02)	0.00	0.00	-	0.217†
21-25	(N=3,372)	13.56	(2.90)	0.36	0.22	0.01-0.43	
26-30	(N=1,033)	13.87	(2.87)	0.68	0.25	-0.08, 0.59	
>= 31	(N=244)	13.92	(2.85)	0.71	0.10	-0.56, 0.76	
Categorical dose response‡		-	-	0.29	0.12	-0.04, 0.28	0.129
Rank							
Officer	(N=440)	15.17	(2.49)	0.00	0.00	-	<0.001†
Non-commissioned officer	(N=1,127)	13.95	(2.84)	-1.22	-0.94	-1.30, -0.57	
Enlisted rank	(N=4,477)	13.28	(2.93)	-1.89	-1.50	-1.85, -1.15	
Categorical dose response‡		-	-	-0.85	-0.68	-0.82, -0.53	<0.001
Service branch							
Navy	(N=2,284)	13.74	(2.91)	0.00	0.00	-	<0.001†
Army	(N=3,292)	13.27	(2.93)	-0.47	-0.46	-0.62, -0.30	
Air Force	(N=473)	14.48	(2.78)	0.73	0.63	0.34-0.92	
Years of previous service in Australian armed forces							
< 1 year	(N=272)	13.34	(3.00)	0.00	0.00	-	0.001†
1 to <4 years	(N=3,443)	13.37	(2.90)	0.03	0.10	-0.26, 0.45	
>= 4 years	(N=2,183)	13.91	(2.90)	0.57	0.44	0.06-0.82	
Categorical dose response‡		-	-	0.44	0.28	0.12-0.44	0.001
Total duration of deployment							
< 6 months	(N=1,442)	13.78	(2.91)	0.00	0.00	-	<0.001†
6 to < 12 months	(N=2,626)	13.64	(2.94)	-0.14	-0.02	-0.21, 0.16	
>= 12 months	(N=1,965)	13.25	(2.91)	-0.53	-0.40	-0.60, -0.20	
Categorical dose response‡		-	-	-0.27	-0.22	-0.31, -0.12	<0.001
Era first deployed							
Mobile phase	(N=1,002)	13.52	(3.11)	0.00	0.00	-	<0.001†
Static phase	(N=3,186)	13.44	(2.94)	-0.08	0.02	-0.19, 0.23	
After armistice	(N=1,855)	13.75	(2.79)	0.23	0.42	0.18-0.66	

Table 34 continued over page

Table 34 continued

		WHOQOL-Bref Domain 2 (Psychological) score					
		Mean	**(SD)**	**Mean diff**	**Adj mean diff***	**95% CI**	**P value**
Wounded in action							
No	(N=5,117)	13.72	(2.89)	0.00	0.00	-	
Yes, evacuation type 1 or 2	(N=432)	12.65	(2.92)	-1.07	-0.86	-1.15, -0.58	<0.001†
Yes, evacuation type 3 or 4	(N=403)	12.51	(2.92)	-1.21	-1.01	-1.31, -0.71	
Categorical dose response‡		-	-	-0.69	-0.57	-0.71, -0.43	<0.001
CES score category							
No combat	(N=1,108)	14.44	(2.50)	0.00	0.00	-	
Light	(N=1,606)	13.98	(2.81)	-0.46	-0.48	-0.69, -0.26	
Light-moderate	(N=907)	13.47	(2.84)	-0.97	-0.94	-1.19, -0.69	<0.001†
Moderate	(N=966)	13.07	(2.97)	-1.37	-1.26	-1.51, -1.01	
Moderate-heavy	(N=488)	12.79	(3.05)	-1.65	-1.54	-1.85, -1.23	
Heavy	(N=148)	12.04	(3.49)	-2.41	-2.28	-2.77, -1.80	
Categorical dose response‡		-	-	-0.44	-0.41	-0.47, -0.35	<0.001
Any other major deployment							
No	(N=2,685)	13.45	(2.89)	0.00	0.00	-	
Yes	(N=3,234)	13.67	(2.92)	0.22	0.01	-0.15, 0.16	0.948

*These mean differences and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted mean difference within each exposure variable differ from zero.

‡ Dose-response per categorical change in this deployment characteristic.

Table 35. WHOQOL-Bref Domain 3 (Social Relationships) scores for Korean War veterans by deployment characteristics

		WHOQOL-Bref Domain 3 (Social Relationships) score					
		Mean	(SD)	Mean diff	Adj mean diff*	95% CI	P value
Age at deployment							
<= 20	(N=1,371)	12.66	(3.47)	0.00	0.00	-	0.347†
21-25	(N=3,380)	13.04	(3.34)	0.37	0.17	-0.07, 0.41	
26-30	(N=1,035)	13.56	(3.17)	0.90	0.34	-0.04, 0.72	
>= 31	(N=246)	14.04	(3.17)	1.37	0.43	-0.32, 1.18	
Categorical dose response‡		-	-	0.45	0.16	-0.01, 0.34	0.072
Rank							
Officer	(N=441)	14.76	(2.95)	0.00	0.00	-	<0.001†
Non-commissioned officer	(N=1,131)	13.57	(3.18)	-1.19	-1.06	-1.47, -0.65	
Enlisted rank	(N=4,496)	12.79	(3.37)	-1.96	-1.61	-2.01, -1.21	
Categorical dose response‡		-	-	-0.91	-0.70	-0.87, -0.53	<0.001
Service branch							
Navy	(N=2,294)	13.21	(3.31)	0.00	0.00	-	<0.001†
Army	(N=3,306)	12.88	(3.37)	-0.32	-0.30	-0.48, -0.12	
Air Force	(N=473)	13.84	(3.30)	0.63	0.49	0.16-0.82	
Years of previous service in Australian armed forces							
< 1 year	(N=273)	12.90	(3.44)	0.00	0.00	-	<0.045†
1 to <4 years	(N=3,457)	12.86	(3.37)	-0.04	0.004	-0.40, 0.41	
>= 4 years	(N=2,191)	13.51	(3.24)	0.62	0.28	-0.15, 0.72	
Categorical dose response‡		-	-	0.52	0.21	0.03-0.39	0.025
Total duration of deployment							
< 6 months	(N=1,447)	13.23	(3.35)	0.00	0.00	-	0.003†
6 to < 12 months	(N=2,641)	13.19	(3.32)	-0.04	0.09	-0.12, 0.31	
>= 12 months	(N=1,968)	12.83	(3.39)	-0.40	-0.24	-0.47, -0.02	
Categorical dose response‡		-	-	-0.21	-0.14	-0.25, -0.02	0.017
Era first deployed							
Mobile phase	(N=1,006)	13.21	(3.36)	0.00	0.00	-	
Static phase	(N=3,204)	12.99	(3.41)	-0.22	-0.03	-0.27, 0.21	0.010†
After armistice	(N=1,856)	13.18	(3.25)	-0.03	-0.28	0.01-0.55	

Table 35 continued over page

Table 35 continued

		WHOQOL-Bref Domain 3 (Social Relationships) score					
		Mean	**(SD)**	**Mean diff**	**Adj mean diff***	**95% CI**	**P value**
Wounded in action							
No	(N=5,136)	13.21	(3.33)	0.00	0.00	-	
Yes, evacuation type 1 or 2	(N=434)	12.41	(3.39)	-0.80	-0.62	-0.95, -0.29	<0.001†
Yes, evacuation type 3 or 4	(N=404)	12.33	(3.32)	-0.88	-0.81	-1.16, -0.47	
Categorical dose response‡		-	-	-0.51	-0.45	-0.60, -0.29	<0.001
CES score category							
No combat	(N=1,114)	13.88	(3.03)	0.00	0.00	-	
Light	(N=1,608)	13.34	(3.30)	-0.54	-0.54	-0.79, -0.30	<0.001†
Light-moderate	(N=913)	13.05	(3.29)	-0.83	-0.79	-1.08, -0.51	
Moderate	(N=964)	12.76	(3.43)	-1.12	-1.02	-1.31, -0.73	
Moderate-heavy	(N=491)	12.54	(3.44)	-1.34	-1.22	-1.57, -0.86	
Heavy	(N=148)	11.60	(3.70)	-2.28	-2.21	-2.77, -1.64	
Categorical dose response‡		-	-	-0.36	-0.33	-0.40, -0.26	<0.001
Any other major deployment							
No	(N=2,700)	13.02	(3.37)	0.00	0.00	-	
Yes	(N=3,246)	13.18	(3.32)	0.16	-0.14	-0.32, 0.04	0.133

*These mean differences and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).

† These P values assess whether any adjusted mean difference within each exposure variable differ from zero.

‡ Dose-response per categorical change in this deployment characteristic.

Table 36. WHOQOL-Bref Domain 4 (Environment) scores for Korean War veterans by deployment characteristics

		WHOQOL-Bref Domain 4 (Environment) score					
		Mean	**(SD)**	**Mean diff**	**Adj mean diff***	**95% CI**	**P value**
Age at deployment							
<= 20	(N=1,366)	14.51	(2.52)	0.00	0.00	-	0.106†
21-25	(N=3,389)	14.81	(2.50)	0.30	0.17	-0.01, 0.35	
26-30	(N=1,039)	15.21	(2.54)	0.71	0.34	0.06-0.63	
>= 31	(N=247)	15.20	(2.31)	0.70	0.20	-0.36, 0.77	
Categorical dose response‡		-	-	0.30	0.15	0.01-0.28	0.030
Rank							
Officer	(N=441)	16.59	(2.23)	0.00	0.00	-	<0.001†
Non-commissioned officer	(N=1,134)	15.22	(2.46)	-1.37	-1.04	-1.35, -0.74	
Enlisted rank	(N=4,503)	14.54	(2.47)	-2.04	-1.61	-1.90, -1.31	
Categorical dose response‡		-	-	-0.90	-0.70	-0.83, -0.58	<0.001
Service branch							
Navy	(N=2,293)	14.94	(2.46)	0.00	0.00	-	<0.001†
Army	(N=3,315)	14.60	(2.54)	-0.34	-0.32	-0.45, -0.19	
Air Force	(N=475)	15.74	(2.36)	0.80	0.68	0.43-0.92	
Years of previous service in Australian armed forces							
< 1 year	(N=273)	14.71	(2.76)	0.00	0.00	-	<0.001†
1 to <4 years	(N=3,461)	14.63	(2.46)	-0.09	-0.05	-0.35, -0.26	
>= 4 years	(N=2,194)	15.20	(2.49)	0.49	0.34	0.01-0.66	
Categorical dose response‡		-	-	0.45	0.27	0.14-0.41	<0.001
Total duration of deployment							
< 6 months	(N=1,448)	15.04	(2.50)	0.00	0.00	-	<0.001†
6 to < 12 months	(N=2,643)	14.89	(2.48)	-0.15	-0.03	-0.19, 0.13	
>= 12 months	(N=1,975)	14.56	(2.55)	-0.49	-0.35	-0.52, -0.18	
Categorical dose response‡		-	-	-0.25	-0.19	-0.27, -0.10	<0.001
Era first deployed							
Mobile phase	(N=1,008)	14.89	(2.58)	0.00	0.00	-	
Static phase	(N=3,209)	14.72	(2.57)	-0.17	-0.09	-0.27, 0.09	
After armistice	(N=1,859)	14.96	(2.38)	0.07	0.20	0.001-0.41	

Table 36 continued over page

Table 36 continued

		WHOQOL-Bref Domain 4 (Environment) score					
		Mean	(SD)	Mean diff	Adj mean diff*	95% CI	P value
Wounded in action							
No	(N=5,145)	14.96	(2.48)	0.00	0.00	-	
Yes, evacuation type 1 or 2	(N=433)	14.13	(2.66)	-0.83	-0.68	-0.92, -0.43	<0.001†
Yes, evacuation type 3 or 4	(N=406)	13.98	(2.47)	-0.97	-0.78	-1.04, -0.53	
Categorical dose response‡		-	-	-0.55	-0.44	-0.56, -0.33	<0.001
CES score category							
No combat	(N=1,115)	15.51	(2.29)	0.00	0.00	-	
Light	(N=1,608)	15.15	(2.36)	-0.36	-0.39	-0.57, -0.20	<0.001†
Light-moderate	(N=912)	14.80	(2.47)	-0.71	-0.66	-0.87, -0.45	
Moderate	(N=969)	14.51	(2.61)	-1.00	-0.88	-1.09, -0.67	
Moderate-heavy	(N=492)	14.32	(2.74)	-1.19	-1.06	-1.33, -0.80	
Heavy	(N=148)	13.59	(2.80)	-1.92	-1.80	-2.21, -1.38	
Categorical dose response‡		-	-	-0.33	-0.29	-0.34, -0.24	<0.001
Any other major deployment							
No	(N=2,703)	14.67	(2.47)	0.00	0.00	-	
Yes	(N=3,250)	14.97	(2.53)	0.30	0.10	-0.04, 0.23	0.169

*These mean differences and their associated 95% CIs and P values, for all dependent measures except wounded in action and CES score, are adjusted for age (65-69; 70-74; 75-79; 80-84; 85+ years), education (primary; any secondary up to grade 10; grades 11, 12 or certificate; diploma or university), marital status (married or defacto; widowered; divorced or separated; single, never married) and country of birth (Australia; other). Results for the dependent measures wounded in action and CES score include additional adjustment for rank in Korea (officer; non-commissioned officer; enlisted rank) and Service branch (Navy; Army; Air Force).
† These P values assess whether any adjusted mean difference within each exposure variable differ from zero.
‡ Dose-response per categorical change in this deployment characteristic.

Even though the observed associations between the four WHOQOL-Bref Domains and many of the deployment characteristics frequently met statistical significance, often the effect sizes were very small. Large effect sizes[160] were only observed when Korean War veterans were compared across increasing levels of combat exposure, and medium effect sizes[160] were observed when Korean War veterans were compared across increasing levels of rank during Korea. Increasing levels of reported combat exposure were consistently associated with decreasing (poorer) mean scores on each of the WHOQOL-Bref Domains of Physical Health, Psychological health, Social Relationships and Environment. The association was very slightly stronger for Physical Health than for health represented by the other Domains. The effect of rank, with enlisted ranks scoring on average 0.5 of a standard deviation lower than officers, was similar across each of the Domains.

Associations between WHOQOL-Bref Domain scores and other deployment characteristics rarely exceeded an adjusted mean difference of 0.2 of a standard deviation (defined as a small effect size)[160] and never reached 0.5 of a standard deviation (defined as a medium effect size).[160] There was no association between scores on any of the WHOQOL-Bref Domains and age at deployment or deployment to another major conflict.

Korea, July 1951. Members of 3RAR, travel in the back of a British three ton truck to the starting point of a patrol into the No Man's Land *of North Korea.* *(AWM image HOBJ2288)*

Korea, December 1950. In a winter landscape, a group of soldiers from 3RAR gather around a small fire while they eat a meal from their dixies. *(AWM image PO2201.045)*

8. SUMMARY AND DISCUSSION

The Australian Korean War veterans' Health Study was designed to complement the recently completed Australian Korean War veterans' Mortality,[19] and Cancer Incidence,[20] Studies. Together, these three studies constitute the first major study program of health in this Australian veteran population. The Health Study was a survey of the entire population of Australian Korean War veterans known to be alive and residing in Australia, and a comparison survey of a sample of similarly aged Australian men registered on the Australian Electoral Roll and reportedly residing in Australia at the time of the Korean War.

The Korean War veterans' Health Study aimed to compare the two groups on measures of self-rated quality of life and life satisfaction, indicators of depression, alcohol misuse and anxiety including posttraumatic stress disorder (PTSD), self-rated physical health, reported medical conditions and hospitalisations. The study also investigated whether specific service-related characteristics of the Korean War deployment were associated with current health.

Commissioned and funded by the Australian Government Department of Veterans' Affairs (DVA), and conducted by staff at Monash University's Department of Epidemiology and Preventive Medicine, the Australian Korean War veterans' Health Study commenced in early 2004 with recruitment closing in August of that year.

Recruitment, investigation of possible participation bias, and effects of proxy respondents

The study achieved an excellent participation rate within the Korean War veteran group, with more than 81% of 7,525 eligible Korean War veterans participating by returning their completed participant questionnaires. This high recruitment rate reflects the enthusiasm in the Korean War veteran community for this long-awaited health study, more than fifty years after the cease-fire.

The participation rate within the population sample was satisfactory, with 64% of 2,964 subjects returning completed questionnaires. 1,505 (80%) of the participating population sample subjects were subsequently assessed as being Australian born or having resided in Australia at the time of the Korean War, and therefore eligible for inclusion in the comparison group against which the results of the Korean War veterans were compared.

Participants in both study groups provided very complete data with very few responses missing from their questionnaires. Most of the questionnaire instruments could be fully scored for between 95% and 99% of all participants.

In both study groups the participation rates, and questionnaire data quality, represented substantial improvements over those achieved in the 2002 pilot study. These improvements can be partly attributed to modifications which were made to the main study design as a direct result of careful appraisal of the pilot study results.

Participation bias can occur if the health status of non-participants differs markedly, on average, to that of participants. This is less likely to have occurred in the Korean War veteran group where the participation rate was high, than in the population sample where the rate was lower. Several methods were used in the study to assess possible participation bias in both groups. Comparison of participants with non-participants on known demographic variables suggested that participants were very representative of the larger populations from which they were drawn, with participation rates varying little across known group characteristics including Service branch and rank during Korea, and current State or Territory of residence.

It was noted that non-participation was highest amongst the oldest subjects, and that refusers were more likely to report poorer general health and lower life satisfaction than participants. These differences are likely to have resulted in some over-estimation of the true health status of both study populations, compared with that which would have been observed if full participation had been achieved. However, the pattern of non-participation by older, and less well, subjects was observed in both study groups and, therefore, it was unlikely to notably effect the magnitude or direction of the differences in health outcomes between study groups which were observed in the study.

To maximise participation by the oldest and least well subjects, and by those unable to complete a written questionnaire for any other reason, subjects were invited to seek the assistance of a proxy, such as a relative, friend or carer, to complete the questionnaire. Previous studies comparing self-reported versus proxy ratings of health have demonstrated reasonable agreement between subjects and their proxies on reports of quality of life,[161] medical histories and medication use,[162, 163] and smoking status,[164] but also a tendency for proxies to over-estimate impairment and under-estimate quality of life,[165] and for agreement to decrease as level of impairment increases.[161] Assessment of proxy respondents in our study showed that only a small proportion of questionnaires were completed by proxy in both study groups, and that most proxies transcribed answers provided by the participants rather than estimating their own answers on behalf of the participants. In fact only 70 Korean War veteran questionnaires (1%) and 44 population sample questionnaires (2%) were completed by proxies who reported writing their own answers on behalf of the invited participants. With such small numbers of true proxy responses it was considered unlikely that misclassification of participant health, resulting from proxies erroneously estimating questionnaire responses, would notably impact upon the results of this study.

Overview of the participating Korean War veterans

At the time of completing their questionnaires, the 6,122 participating male Korean War veterans ranged in age from 66 to just under 100 years old. They had averaged just 23 years of age at the time of their deployment to Korea. Approximately 38% had served with the Royal Australian Navy (Navy), 55% with the Australian Army (Army) and 8% with the Royal Australian Air Force (Air Force). Most (78%) undertook one tour of duty during the Korean War, and the average duration of a tour was 218 days for the Navy, 245 days for the Army and 108 days for the Air Force. The majority of veterans (74%) served under an enlisted rank during the war, one third of the total group had less than two years of previous service experience in the Australian armed forces and, for 45%, the Korean War was their only career deployment to a major military conflict.

Whilst the 6,122 participating Korean War veterans represented approximately 81% of male veterans who were identified as alive and residing in Australia in 2004, they also comprised only 34% of all male Australian armed forces personnel who were deployed to the Korean War. The majority of Australia's Korean War veterans (approximately 57%) were deceased at the time of the Health Study.

The participating Korean War veterans differ from the original Korean War veteran group of almost 18,000 personnel, in regard to some known demographic and military characteristics.

Participating veterans were, on average, very slightly younger at the time of the Korean War deployment than the original group (median age 23 years versus 24 years respectively). More notably, the age range at the time of deployment differs between the two groups; the

participating study group ranged in age from 16 to 47 years at the time of deployment, whilst the original group ranged from 14 to 59 years.

The participating Korean War veterans were less likely than the original veteran group (17% versus 30%[19] respectively) to have deployed to World War II, and more likely (14% versus 9%[19] respectively) to have deployed to the Vietnam War.

Further, the participating study group comprised 55% Army veterans, whereas 61% of the original deployment were Army personnel.

These differences between the two groups reflect the fact that veterans who were older at the time of the Korean War have been more likely to die than younger veterans, and that Korean War Army veterans have experienced a higher mortality rate than Navy and Air Force veterans.[19]

The participating, surviving Korean War veterans in this Health Study, therefore, are not entirely representative of the original Australian Korean War veteran population. Consequently, the health patterns and lifestyle behaviours observed in the participating veterans in the Health Study may not necessarily reflect those which may have been observed if the entire veteran group had been studied while alive.

The Health Study results, however, will be complemented and informed by the findings of the Australian Korean War veterans' Mortality[19] and Cancer Incidence[20] Studies and, together, the three studies will provide comprehensive information about the health of the entire veteran group.

Health outcomes in Korean War veterans and the comparison group

The results of the study showed that, approximately five decades after the Korean War, surviving veterans are experiencing markedly poorer psychological health, physical health, life satisfaction and quality of life, compared with a group of similarly aged Australian men who were residing in Australia at the time of the Korean War. The results also show that surviving Korean War veterans report a lifetime pattern of excess alcohol and tobacco consumption.

Psychological disorders; anxiety including PTSD, and depression

The two study groups differed markedly on measures of psychological morbidity, with Korean War veterans substantially more likely to report symptoms meeting criteria for anxiety, PTSD and depression.

Korean War veterans (26% or 33%, using two different cut-off scores for the Posttraumatic Stress Disorder Checklist (PCL)) were about six times more likely to meet criteria for PTSD than the comparison group. PTSD has been by far the most thoroughly investigated psychological health outcome in the international Korean War or WWII veteran health literature. Whilst reported prevalences of PTSD in studied veteran populations have been as low as 1% in veterans drawn from the US Normative Aging Study (NAS)[47, 53] and as high as 88% in Korean War POWs,[46] our findings are consistent with the majority of recent studies which report PTSD prevalences in the range of 24% to 32%.[40-43, 54, 166]

Importantly, few of these recent major studies have included comparison groups against which the results of the veterans could be directly compared. In our study, the 5% prevalence of comparison group subjects meeting PCL questionnaire criteria for PTSD was high compared with the 2.3% prevalence of PTSD previously reported in the Australian male

community by the Australian Bureau of Statistics (ABS) 1997;[56] the latter study used DSM-IV criteria. This suggests that the PCL questionnaire results may represent an over-estimation of the true level of PTSD in both study groups. Even so, the magnitude of the difference between the two study groups provides compelling evidence that Australian Korean War veterans are experiencing markedly higher levels of PTSD than that which would be expected in Australian men of similar age and ethnic background.

The adverse impact of PTSD upon the lives of affected individuals can be significant, with chronic PTSD characterised by interacting groups of unpleasant and distressing symptoms including intrusive, avoidant and hyperarousal phenomena. These may include, for example, distressing memories, dreams or nightmares of the event, restricted range of affect and emotional responses, and irritability and/or sudden outbursts of excessive anger.[167] It is not unusual for PTSD to be accompanied by other physical, psychological and social problems, including comorbid depression, alcohol abuse and/or panic disorder, marital and family dysfunction, and worsened experience of physical disability from other medical problems.[167] As the affected Korean War veterans age, symptoms in many cases are likely to worsen rather than improve.[42, 167, 168] For example, Port et al (2001)[42] reported a PTSD symptom pattern of immediate onset after war deployment and gradual decline, followed by increasing PTSD symptoms among older survivors. The authors suggested that retirement could be an important developmental milestone contributing to PTSD symptom increases.

Treatment of PTSD requires a broad approach utilising pharmacological, psychological and social interventions. It is important to address both psychiatric and physical co-morbidities. Importantly, elderly sufferers from long-standing chronic PTSD can achieve symptomatic and functional improvement with appropriate treatment.[167]

As PTSD is an anxiety disorder, it is consistent that the study results also show Korean War veterans (31%) to be six times more likely than the comparison group to meet Hospital Anxiety and Depression (HAD) scale criteria for anxiety. It is not clear from the current analyses, however, the extent to which anxiety disorders other than PTSD affect Korean War veteran and comparison group participants.

Also using HAD scale criteria, Korean War veterans (23%) were shown to be about five times more likely than the comparison group to be suffering from depression. Like the PCL questionnaire, the HAD scale results may represent a slight overestimation of the true prevalence of both anxiety and depressive disorders in both study groups, as the observed prevalences in the comparison group are higher than those found in the ABS 1997 Survey.[56] Nonetheless, the magnitude of the differences between the Korean War veterans and the comparison group are large. Without treatment, depression can be a serious illness typically characterised by loss of enjoyment for life, lack of energy and concentration, and sleep and appetite disturbances.[56] It is associated with poor life satisfaction,[115] risk of suicide[66] and medication non-compliance which can complicate comorbid medical conditions.[123]

Depression is often found to co-occur with PTSD, however there is an overlap in symptom criteria between PTSD and depressive disorders and the literature is unclear as to whether depression may be related to trauma as part of PTSD itself, or whether it represents autonomous symptoms occurring separately from PTSD.[39] The distinction has important implications for clinicians in regard to the most appropriate psychological health interventions. Southwick et al (1991)[169] for example, found that depression co-occurring with PTSD among war veterans was more resistant to conventional anti-depressants and biologically and psychologically different from depression in the absence of PTSD. Further, Brewin et al (1993)[170] (cited in Hyer et al. 1999)[39] recommended adding a trauma processing component to standard cognitive therapy for depression. Effective interventions may be informed by further analysis to assess patterns of interrelationship between depressive

and PTSD symptoms in Australia's Korean War veterans. Clinicians caring for individual veterans may need to consider integrated intervention approaches which reflect the complexity of veterans' prevailing symptoms.

Life satisfaction and quality of life

When asked how they felt about their life as a whole, taking into account what had happened in the last year and what was expected to happen in the future, Korean War veterans were less likely than the comparison group to report feeling delighted, pleased or mostly satisfied, and more likely to report feeling mostly dissatisfied, unhappy or terrible. Expressed as a Percent Life Satisfaction Score (PLS), Korean War veterans averaged 56%, well below (by approximately 0.5 of a standard deviation) the mean PLS score of 69% recorded by the comparison group. This finding is consistent with parallel findings of poorer physical and psychological health in these veterans, as these have both been shown to be closely associated with lower life satisfaction.[115] The comparison group mean score, in turn, was remarkably consistent with Cummins (1998) proposed universal norm of 70%,[118] and Dear, Henderson & Korten's (2002) report of a 70.4% mean PLS score in Australian adults.[115]

Using the broader World Health Organisation brief Quality of Life (WHOQOL-Bref) measure, Korean War veterans recorded poorer scores than the comparison group on several dimensions of overall quality of life. The WHOQOL Group defined quality of life as individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns; it is a subjective evaluation that is embedded in a cultural, social and environmental context.[113] Poorer scores for Korean War veterans comprised their assessments of poorer physical health (including ability to perform activities of daily living and mobility), psychological functioning (including self-esteem, concentration, negative mood, and body image), social relationships (including personal relationships and social support) and environment (including financial resources, transport, safety, and access to information). Consistent with the above findings, Korean War veterans were more likely than the comparison group to rate their quality of life as very poor, or poor, and to report dissatisfaction with their health.

Smoking patterns

Korean War veterans reported a lifetime pattern of tobacco smoking in excess of that reported by the comparison group. Korean War veterans were much more likely to be current smokers or former smokers, and more likely to have smoked in higher quantities, or for longer durations.

The increase in overall smoking exposure in Korean War veterans compared with the comparison group, particularly in former smoking history, may be in part associated with the fact that during the Korean War "cigarettes were freely available in large numbers" (p. 07).[20] Irrespective of the cause, the Korean War veterans' increased exposure to tobacco smoking over time has increased their risk of multiple diseases associated with smoking. Indeed tobacco smoking is the risk factor considered responsible for the greatest burden of disease in older Australians.[66]

The Australian Korean War veterans' Mortality Study (2003)[19] found that veterans had been dying at a higher rate than expected, based on rates in the Australian male population. This included elevated death rates from cancers, some of which are associated with smoking. It could be assumed, therefore, that some of Australia's deceased Korean War veterans may have smoked at even higher rates than the surviving Korean War veterans who participated in

the Health Study. If the total Korean War veteran population could have been included in the Study, it is possible that the observed increase in smoking exposure, relative to the comparison group, would have been greater in magnitude.

Our comparison group was restricted to participants who were residing in Australia at the time of the Korean War. Therefore the ethnic composition of the comparison group is slightly different to that of the average, current ageing Australian male population which includes men who have arrived from other countries more recently than the 1950s. As smoking patterns are known to vary significantly across different ethnic groups, it was particularly important to this measure that our comparison group was as similar as possible in terms of ethnic background to the Korean War veterans.

Compared with data from the Australian 1995 National Health Survey,[171] Korean War veterans (21%) were a little less likely to have never smoked than average Australian men aged 65 and above (27%), whilst the comparison group (40%) were much more likely to have never smoked. Also compared with the Australian 1995 Survey,[171] both Korean War veterans (12%) and the comparison group (7%) were less likely than Australian men aged 65 and above (15%) to be current smokers. The difference between our comparison group results and the National Health Survey results may reflect their different ethnic group composition, and this highlights the importance of using appropriately selected comparison groups in veteran studies in preference to comparisons with national normative data.

Alcohol consumption

Korean War veterans reported a pattern of lifetime and current alcohol consumption in excess of that reported by the comparison group.

Korean War veterans were slightly more likely to report being current alcohol drinkers, much more likely to report drinking in higher volumes and more likely to report binge drinking than the comparison group. Combined, these factors made the Korean War veterans more likely to be meet AUDIT-C questionnaire criteria for current “hazardous” drinking.

Korean War veterans were also more likely than the comparison group to meet CAGE questionnaire criteria for a history of alcohol related problems indicative of dependence and/or abuse at some point in their lifetime, to have considered themselves heavy drinkers, and to report having been treated for alcoholism or drinking problems.

In both study groups the percentages of subjects meeting CAGE questionnaire criteria for a history of lifetime alcohol problems (36% of Korean War veterans versus 14% of the comparison group) were higher than expected based on previous veteran literature. Other veteran studies using the CAGE questionnaire have reported lifetime alcohol problems in 9% to 19% of participating WWII or Korean War veterans from the US [43, 47, 49] and in 4% of non-veteran, mixed sex US controls.[49] However, using DSM-III criteria, other studies have reported lifetime alcohol abuse or dependence in between 25% and 34% of non-POW US WWII or Korean War veterans[46, 48] and in 24% of age-matched US non-veteran controls.[48]

The percentages of subjects meeting AUDIT-C questionnaire criteria for current hazardous drinking (45% of Korean War veterans and 31% of the comparison group) is also unexpectedly high in both study groups. The ABS (1997)[56] estimated current substance use disorders using DSM-IV criteria (including alcohol and drug use disorders) to occur in only 2.1% of Australian males aged 65 and over. Current risky alcohol consumption, as assessed in the Australian 2001 National Drug Strategy Household Survey,[62] was estimated to occur in only 7.7% of men aged 65-74 and in 3.3% of men aged 75 or over. Our finding of hazardous drinking in 31% of the comparison group appears to be an over-estimation of the likely, true

level of drinking in this group based on the above figures for the Australian aged male population. If so, a similar over-estimation is likely to be affecting the Korean War veteran results.

Whilst the measures of alcohol consumption used in this study may be overestimating the true levels of drinking or alcohol disorders in both study groups, the important observations are those reflecting the magnitude and direction of the differences between the Korean War veterans and the comparison group. Our measures consistently indicated that Korean War veterans have been at higher risk of lifetime alcohol problems, and of currently drinking in higher amounts, than the comparison group.

By maintaining a lifetime pattern of increased alcohol consumption, Korean War veterans have placed themselves at increased risk of multiple health outcomes associated with long-term excessive alcohol consumption, including liver disease, pancreatitis, diabetes and cancers, accidental injury and adverse interactions with medications.[66]

Current medical conditions and hospitalisations

Fifteen medical conditions included in the participant questionnaire were all reported one and a half to three times more frequently by Korean War veterans than the comparison group. These included asthma, high blood pressure, stroke (or after effects of stroke), heart attack or angina, rapid or irregular heart beat, liver disease, arthritis, kidney disease, diabetes, melanoma, other skin cancer, other cancer (not skin), stomach or duodenal ulcer, partial or complete blindness (not corrected by glasses) and partial or complete deafness.

The pattern of excess medical conditions in Korean War veterans is consistent with findings of the Australian Korean War veterans' Mortality and Cancer Incidence Studies which found excess cancers including melanoma,[20] and excess mortality associated with cancer, respiratory diseases, digestive diseases and with diseases of the circulatory system including ischaemic heart disease and stroke.[19] Excesses in several self-reported medical conditions are also consistent with veterans' increased exposure to tobacco and alcohol as described earlier.

Our findings rely on self-report of medical conditions without elucidation of symptom patterns or medications, without further evaluation in a clinical setting and without validation using medical records. Some previous studies have shown that self-report of medical conditions can be unreliable.[172, 173] Where we have been able to compare the observed comparison group prevalences with alternative sources of normative Australian data, we have found some striking similarities and some differences. The ABS (1999)[149] report complete or partial deafness in 42%, and arthritis in 53%, of men aged 75 years and over, these figures being very close to those found in our comparison group (41% and 51% respectively). In contrast the ABS (1999)[149] report prevalences of 9% for diabetes, 7% for asthma and 35% for hypertension in men aged 75 years and over, all lower than the prevalences observed in our comparison group (15%, 11% and 43% respectively).

There are several possible explanations for the observed differences in the prevalence of medical conditions between the ABS study populations and our study comparison group. The ABS typically surveys members of households, thereby excluding Australians who are hospitalised or in nursing homes or similar institutions. Our comparison group may have included hospitalised or institutionalised participants, and their inclusion may explain higher than 'normal' prevalences of some medical conditions. Some health differences between the ABS study populations and our study comparison group may also be related to the different ethnic composition of the comparison group compared with the normal Australian population. Alternatively, some differences may be related to over-reporting of medical conditions which can occur if participants mistakenly report medical conditions which they don't have. For

example, the Korean War veteran group reported an unexpectedly high 21% prevalence for melanoma, a figure well in excess of findings from the Australian Korean War veterans' Cancer Incidence Study[20] which found melanoma occurred in less than 2% of veterans. This over-reporting may be due to veterans confusing melanoma with basal or squamous cell skin carcinomas or benign skin lesions which may have been treated or removed by their doctors. Some over-reporting of this kind may be affecting the results for some medical conditions in both study groups.

The possibility of over-reporting of medical conditions means that we cannot be fully confident in the validity of all of the absolute prevalences observed in our two study groups. We prefer, therefore, to focus on the magnitude and direction of the differences observed between the Korean War veterans and comparison group in relation to self-reported medical conditions, and not the prevalences in each group. Importantly, the two previous studies of cancer incidence and causes of death in Korean War veterans give more reliable information for some medical conditions, because they match the groups against National cancer and death registries which contain very reliable information on these conditions.[19, 20]

Korean War veterans (35%) were more likely than the comparison group (26%) to report being hospitalised overnight at least once in the previous 12 months. Amongst those hospitalised, Korean War veterans reported slightly more nights of hospitalisation however this difference did not meet statistical significance after adjustment for covariates. The average number of nights hospitalised in both study groups was similar to the average length of hospital stay reported by the AIHW (2002) for Australian men aged 65 and above.[66] Self-reported hospitalisations in this study were not verified against hospital or claims data, and overnight hospitalisation or length of stay in hospital is not necessarily an indicator of the severity of illness.[66] Nevertheless, the increased rate of hospitalisation reported by veterans is consistent with the overall pattern of poorer physical and psychological health evident from other results in this study and those of the Mortality[19] and Cancer Incidence[20] Studies. Such increased hospitalisation rates can have important resource implications when planning health service utilisation for this veteran group.

Korean War deployment characteristics and their association with veterans' health

Several investigated characteristics of the Korean War deployment, in particular increasing combat exposure severity and low rank, were strongly associated with current ill-health, and poor life satisfaction and quality of life in Korean War veterans.

Combat exposure

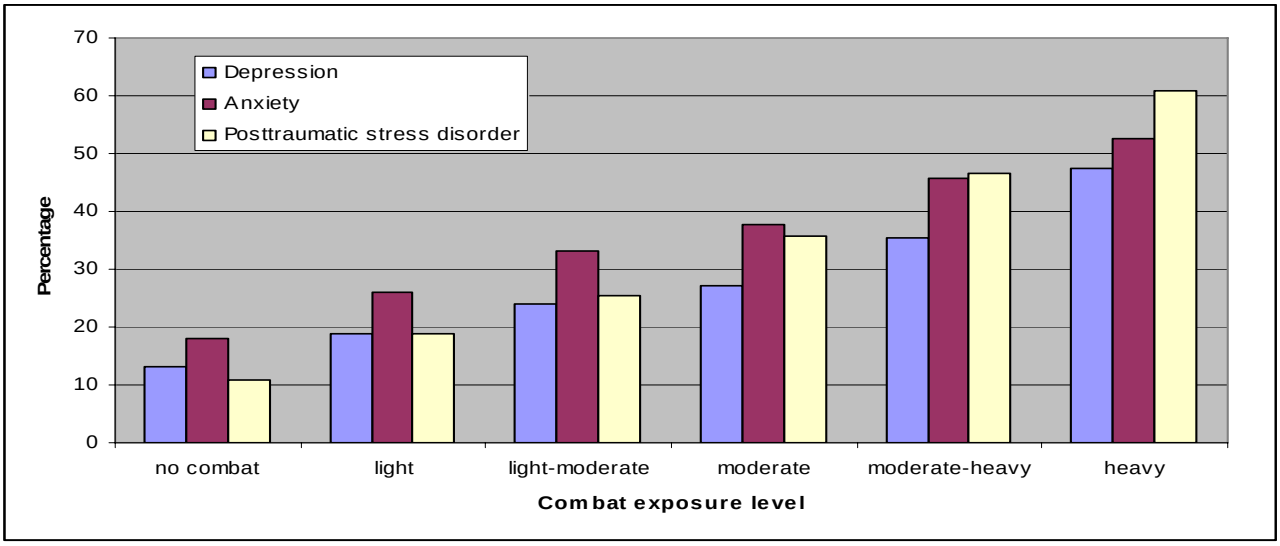
Increasing level of combat severity reported in relation to the Korean War was strongly associated with increased likelihood of current PTSD, anxiety, and depression, with current hazardous drinking and with history of alcohol related problems, with lower life satisfaction and with poorer quality of life.

Previous literature has frequently reported PTSD to be associated with increasing severity of combat or war-trauma exposure,[40, 41, 46, 53] and our study provides evidence of this association persisting very strongly some fifty years after the war. The conventional interpretation is that the stressful exposures are a central risk factor for the onset of symptoms.[174] However multiple additional factors are then thought to contribute to symptom persistence, or chronicity.[167]

The possibility of recall bias must be addressed in relation to our finding of an association between current ill-health and recall of increased combat severity in a war which occurred five decades earlier. It may be the case that memory of stressful experiences undergoes modification over time due to the presence of psychological or other adverse health symptoms. In a longitudinal study of UK Gulf War veterans, Wessely et al (2003)[175] found that recall of military hazards after conflict was not static and was associated with current self-rated perception of health. One possibility is that those individuals who have PTSD, for example, remember the events more accurately than those without the disorder.[176] Alternatively recall of threat or fear may become magnified with time in individuals who are symptomatic.[177] We were limited in our ability to assess the validity of our retrospectively collected combat exposure data, however we were able to gain some confidence in the data from our observations that some of the patterns of reported combat severity were in expected directions. For example, Army veterans and veterans who served during the mobile and/or static phases of the Korean War were much more likely to report moderate to heavy combat exposure than Navy or Air Force veterans or veterans who first deployed after the armistice, and Officers were slightly more likely than veterans of lower ranks to report no combat.

Figure A shows the pattern of association between combat exposure and PTSD, anxiety, and depression in Korean War veterans.

Figure A. Percentage of Korean War veterans with PTSD, anxiety, or depression across levels of combat exposure



Rank

Decreasing seniority in terms of rank at the time of the war, was also strongly associated with adverse health outcomes in Korean War veterans. Veterans who served with enlisted ranks were most likely, non-commissioned officers were less likely, and officers were least likely, to meet criteria for current PTSD, anxiety, depression, and history of alcohol related problems, and to report low life satisfaction and poor quality of life.

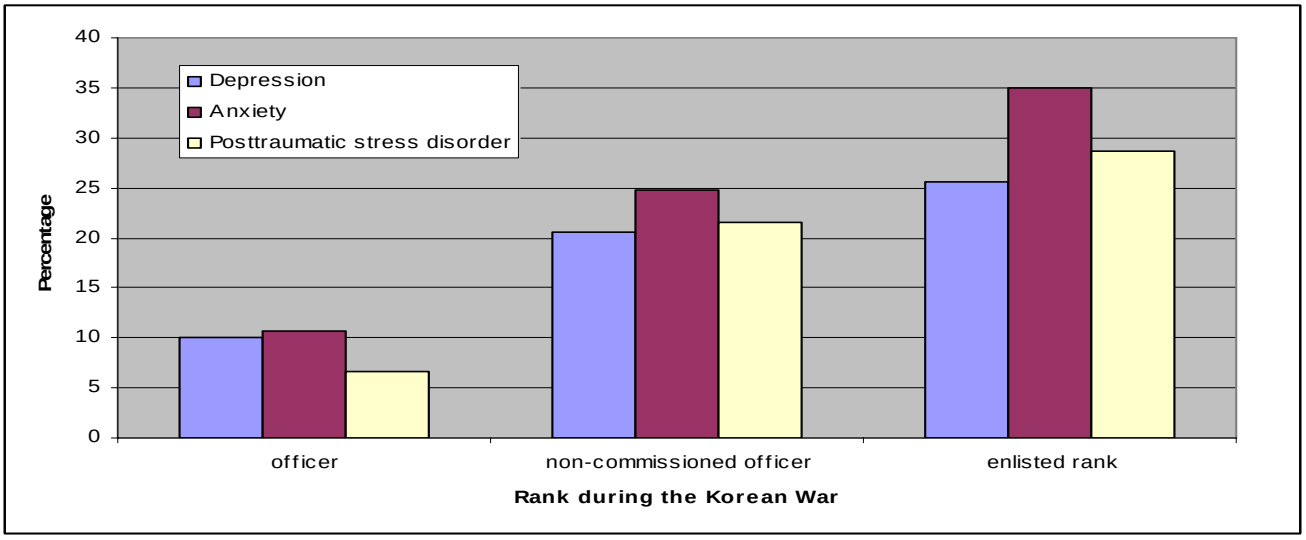
Consistent with our findings, lower rank has also previously been shown to be associated with increased psychological distress in British WWII and Korean War veterans,[40] and with both psychological and physical ill health in US Gulf War veterans[178] but the reason for these associations is unclear. In relation to the Korean War experience, our data showed that combat severity, using the Combat Exposure Scale (CES), did not differ markedly according to rank. Also, the association between rank and ill-health in Korean War veterans persisted after statistical adjustment for age. Therefore, some other characteristic of war deployment

related to low rank may be contributing to subsequent health. It is possible that there are rank-related differences in the experience of combat that the CES is not able to detect. For example, in our recent research with Australia's Navy Gulf War veterans using the Military Service Experience Questionnaire we found that lower ranked veterans reported more dangerous duties, experienced more helplessness associated with an inability to protect self or others from harm, and greater fear of attack, injury or death, than higher ranked veterans.[106] Lower rank may be associated with fewer years of armed forces experience prior to the Korean War deployment and this, in turn, was shown to be marginally associated with increased PTSD, anxiety, depression and history of alcohol related problems in our veteran participants. Other military service related factors such as access to strategic information, knowledge about the combat zone, type of military training, and personnel selection criteria such as demonstrated leadership, personality hardiness and coping skills may all vary on average across ranks and contribute to psychological vulnerability or resistance to negative war outcomes.

Some of the association between rank and ill-health may not be directly related to military service or Korean War deployment. Rank could be a proxy for socioeconomic status,[178] which is associated with both psychological and physical morbidity in civilian populations.[123, 179] Our statistical adjustment for education may not have fully controlled for other socioeconomic or related health risk factors which may be associated with rank, such as other formal qualifications, non-military income, employment level and associated job control, social support, unhealthy lifestyle behaviours or access to medical resources.

Figure B shows the pattern of association between rank and PTSD, anxiety, and depression in Korean War veterans.

Figure B. Percentage of Korean War veterans with PTSD, anxiety, or depression across levels of rank



Associations between other Korean War deployment characteristics and ill-health were more pronounced in relation to psychological health measures than they were in relation to life satisfaction and quality of life measures.

Service branch

Service branch was most notably associated with current PTSD, anxiety, depression and history of alcohol related problems, with Army veterans most likely, Navy veterans less likely and Air Force veterans least likely to meet criteria for these problems. Army veterans also

consistently reported the lowest life satisfaction and poorest quality of life, however the magnitude of these differences across Service branches was small.

Like rank, the observed association between psychological ill-health and Army Service in Korean War veterans may reflect a combination of military service-related differences between the Army, Navy and Air Forces Service, or non-military differences such as socioeconomic factors or health behaviours. The pattern of elevated ill-health amongst surviving Army veterans is consistent with the pattern of elevated mortality and cancer incidence in Army veterans, compared with Navy and Air Force veterans, which was demonstrated in the previous Australian Korean War veteran Mortality[19] and Cancer Incidence[20] Studies.

Being wounded in action

Report of being wounded in action was strongly associated with current PTSD, anxiety, and depression, and more weakly associated with alcohol related problems and poorer life satisfaction. The type of evacuation reported for the injury or illness, which may be indicative of severity, was not associated with these health outcomes.

Veterans were not given an official definition for "wounded in action" in the questionnaire, and it was apparent that reports of being wounded in action possibly included various injuries, some possibly accidental, or illness requiring treatment, and not just wounds which were a direct result of enemy action or within close proximity to the battle line. It was observed that Army veterans who were officially listed by DVA as having been Wounded In Action (WIA) during Korea, reliably reported being wounded in the participant questionnaire. However, these officially WIA Army veterans represented less than half of all Army participants who reported being wounded.

Our finding of an association between report of being wounded in action in Korea, and current psychological disorders in Australian Korean War veterans, is somewhat consistent with Hunt & Robbins (2001)[40] finding of an association between war-related disability or illness and psychological distress in British WWII and Korean War veterans. Just a few years after the 1991 Gulf War, and the 1992-97 Bosnia conflict, Unwin et al (1999)[95] reported an association between combat-related injury and posttraumatic stress reaction, a multi-symptom syndrome, and physical functioning in British veterans of these more recent conflicts. Our findings, more than fifty years after the Korean War cease-fire, suggest that the associations observed by Unwin et al (1999)[95] in younger veterans could persist for an extremely long period of time into the future.

Korean War deployment era

Veterans who deployed to the Korean War during the mobile or static phases of the war, were consistently more likely to meet criteria for PTSD, anxiety and depression, than veterans who first deployed after the armistice (cease-fire). There were no consistent differences in health outcomes between veterans who first deployed during the mobile phase of the war, compared with veterans who first deployed during the static phase of the war.

Duration of Korean War deployment

Increased duration of Korean War deployment was most strongly associated with increased PTSD. Veterans who deployed for more than 12 months were 1.5 times more likely to have

PTSD than veterans who deployed for less than 6 months. Increased duration of deployment was also moderately associated with anxiety, and history of alcohol related problems.

Similar findings, of associations between increased deployment duration and increased posttraumatic stress symptoms, have been observed in Vietnam War veterans from New Zealand,[180] and US soldiers deployed on a peacekeeping mission to Bosnia.[181]

Years of previous Australian armed forces service

Veterans who had fewer years of service experience prior to the Korean War were more likely to have PTSD, anxiety, and a history of alcohol problems than veterans who were more experienced. There was a 14%-16% increase in the prevalence of these disorders per categorical decrease in years of previous service experience from 4 or more years, to 1 to < 4 years, to < 1 year.

Age at time of deployment

Younger age at time of deployment (after statistical adjustment for current age), was associated with increased PTSD, anxiety and history of alcohol problems. Veterans who were aged 20 years or less at the time of deployment to the Korean War, for example, were approximately two times more likely to have PTSD, and 1.4 times more likely to have anxiety or a history of problem drinking, than veterans who were aged 31 years or older.

Deployment to major military conflicts in addition to Korea

Just over half of the participating Korean War veterans reported having been deployed to a major military conflict in addition to the Korean War. These Korean War veterans who had deployed to other major conflicts, however, did not report poorer health, poorer quality of life, or lower life satisfaction than other veterans who had not deployed to other conflicts.

Other Korean War deployment characteristics possibly associated with current health

There are a number of other Korean War deployment characteristics which may have impacted on the long term health of veterans, but which could not be directly investigated in this study.

The Korean War deployment experience included exposure to a number of environmental and chemical risk factors including extreme temperatures, rainfall and other climatic threats, multiple infectious disease sources, DDT and other insecticides, hydrocarbon combustion products, asbestos and petroleum fuel products. The participant questionnaire data showed that approximately 13% of surviving veterans reported having malaria as a result of their Korean deployment. A small number of participating veterans also reported haemorrhagic fever. However, there is little or no previously collected DVA, or Australian armed forces, data which can be used to systematically or accurately classify veterans in regard to their likelihood of exposure to other important environmental or chemical risk factors. As this Health Study was conducted so long after the Korean War, and as the questionnaire needed to be sufficiently short so as to be easily completed by the elderly study population, it did not attempt to retrospectively collect information on veterans' exposure to environmental or chemical risk factors during Korea. Therefore, we were not able to assess the extent to which these exposures have impacted upon current health.

Similarly, the questionnaire did not attempt to retrospectively collect veterans' experiences upon their return to Australia from Korea. The Korean War has been referred to as the 'forgotten' war with returning servicemen "greeted by a public that was apathetic to their deeds and sacrifices" (p.83).[22] Perceived rejection, and possible isolation from support services, including existing ex-service organisations, may have impacted upon veterans' social adjustment upon return to civilian life. In Vietnam War veteran literature it is suggested that social rejection after discharge from service has contributed to ill health in this more recent veteran group.[182] Other aspects of post-war experience, for example 'survivor guilt' over having survived while others died, have been associated with later stress disorders.[183] There was not scope in this study for a detailed investigation of the health effects of post-Korean War experiences such as these.

Further, because only a small number of Australians (29 servicemen) were taken prisoner of war during the Korean War, the long-term health effects of this traumatic war time experience could not be investigated in the participating veteran group.

Overview of association between health outcomes and deployment characteristics

There are strong observed associations between ill-health and combat severity, low rank, Army Service and being wounded in action, and weaker observed associations with deployment during the mobile or static phases of the war, increased duration of Korean War deployment, younger age at time of deployment, and decreased years of previous armed forces service. There are also possible associations (though we are unable to measure these) with war-related chemical and environmental risk factors. Combined, these suggest a very complex inter-relationship between war service and subsequent, long-term ill-health. The overall picture appears to be one of combat severity and duration, war-related injury, a malevolent and/or toxic environment, inexperience, lack of seniority, possibly youthfulness, and perhaps socioeconomic disadvantage all contributing to long-term morbidity. There are likely to be other military and non-military characteristics, such as personality or social support, which have also contributed to veterans' vulnerability to illness and the persistence of symptoms over time.

The Health Study findings in combination with those of the Australian Korean War veterans' Mortality and Cancer Incidence Studies

It is important, in considering the overall health impact of Korean War service on Australian veterans, that the results of the Mortality,[19] Cancer Incidence,[20] and Health Studies be considered in combination. Overall, Korean War veterans have experienced a 21% higher mortality rate than other Australian men,[19] and between 13% and 23% higher cancer incidence.[20] Amongst survivors, psychological disorders appear to be particularly excessive, medical conditions and hospitalizations are also elevated, and quality of life and life satisfaction is poorer than that experienced by other Australian men.

An important factor relevant to the observations in the Health Study, potentially resulting in an underestimation of the total level of morbidity attributable to war service, is the Mortality Study finding that the Australian Korean War veteran population has experienced a higher mortality rate than the equivalent Australian male population.[19] The Health Study was limited to veterans who were alive in 2004, the survivors from a group who have been dying at a greater rate than their age-matched community peers. The Health Study, therefore, has not been able to detect the excess morbidity and adverse health outcomes associated with the increased rate of death.

Of great value to the interpretation of both the Mortality[19] and Cancer Incidence[20] Study findings, is new information about veterans' cigarette and alcohol consumption which has been provided by the Health Study. Whilst smoking and alcohol data for deceased veterans is not available, the Health Study has shown that surviving veterans have been drinking and smoking at greater rates than a comparable sample of similarly aged Australian men.

The Cancer Incidence Study[20] found that Korean War veterans had elevated rates of several types of cancers for which smoking was a major-risk factor. Further analysis showed that the smoking prevalence rates in Korean War veterans would have to reach between 82% and 90% to explain observed cancer of the larynx ratios, 77% and 86% to explain cancer of the oesophagus ratios, and 59% and 64% to explain cancer of the lung ratios. In relation to head and neck cancers however, the analysis showed that even if 100% of veterans were smokers this would not explain the excess numbers. If we assume that deceased veterans have smoked in a similar pattern to surviving veterans or, more likely, at a higher rate, then our finding that 79% of surviving veterans report being former or current smokers may explain all of the excess lung cancers, many of the excess larynx and oesophagus cancers, and many but not all of the head and neck cancers previously observed in Korean War veterans.

In relation to alcohol, if a similar assumption is made that deceased veterans consumed alcohol in a similar, or more excessive, pattern to the survivors, then this may partly explain Mortality Study[19] findings of elevated mortality rates in Korean War veterans from specific causes of death including accidents and suicide, alcoholic liver disease and other digestive diseases.

The "healthy soldier" effect

There is a literature which would suggests that a "healthy worker" or "healthy soldier" effect, related to the exclusion of unfit persons from the armed forces, may partly conceal increased morbidity or mortality that should be attributed to war service.[184, 185] At the time of the Korean War, Australian armed forces volunteers were screened for their fitness to serve. Those who were accepted into the armed forces were those assessed as being in good health, with no chronic diseases or serious congenital anomalies, with no overt personality problems or behavioural disorders, no criminal record, and with IQ scores above 80.[19] Screened in such a way, and assuming no effect of war service or differences in post-war disease determinants, these Services personnel would be expected to have a lower risk of ill-health than the general male population.

In relation to our study of Australian Korean War veterans, the "healthy soldier" effect literature suggests that veterans would have been healthier than the comparison group at the time of deployment to the Korean War. Added to this observation is the reminder that the Health Study, limited to survivors, has been unable to detect excess morbidity and adverse health outcomes experienced by deceased veterans. In combination, these factors strongly suggest that the observed group differences in the direction of poorer health in veterans in the Health Study, actually represent an underestimation of the true magnitude of the differences which could be attributable to Korean War service.

Strengths and limitations of this study

The Health Study had various strengths which give confidence to the observed findings, but also some limitations which affect interpretation.

Unlike many recent studies which have used small or highly selected veteran groups, and which are, therefore, limited in their ability to extrapolate findings to the broader veteran community, a major methodological strength of our study has been the inclusion of the entire population of surviving Australian male Korean War veterans residing in Australia. The very low percentage of veterans recorded as not-contactable, and the excellent recruitment rate in this group, contribute to our confidence that the study results are very representative of the entire surviving population. Unlike most recent Korean War veteran health studies which have not included a civilian comparison group, another major strength of our study has been the inclusion of a large age-matched comparison group of Australian men who resided in Australia at the time of the war. This group provides an important bench-mark against which the health of the Korean War veterans can be usefully compared; providing important information about the extent of disease or ill-health in veterans which may be attributed to war service. Other methodological strengths contributing to confidence in our data include the use of well-validated instruments, where possible, for self-reported data, and DVA-held Nominal Roll data for some war-related service characteristics in preference to relying on veterans' recall.

Methodological limitations to the Health Study include the reliance on self-reported health measures, particularly in relation to self-reported medical conditions, and the necessity for retrospective assessment of lifestyle and some deployment-related factors. Whilst these aspects of the study design can leave the study results vulnerable to recall bias, we were able to demonstrate some areas of internal consistency when self-reported data was compared with alternative objective data.

As the study was conducted so long after the Korean War, it did not attempt to retrospectively collect information on veterans' exposure to environmental or chemical risk factors during Korea, which may have had important health implications. The scope of the study was further limited by the need for the questionnaire to be sufficiently short so as to be comfortably completed by elderly participants. Therefore, the study was not able to more broadly investigate additional military and non-military characteristics which may have contributed to veterans' vulnerability to illness and the persistence of symptoms over time, such as personality, coping skills and income.

These limitations demonstrate the disadvantages of retrospective cross-sectional health study designs, and highlight the advantages of utilising longitudinal health study designs, which commence shortly after war deployment and follow veterans forward in time.

Conclusion

The Australian Korean War veterans' Mortality,[19] Cancer Incidence,[20] and Health Studies combined present a compelling conclusion: that Korean War veterans have experienced post-war mortality and some cancers at excessive rates compared with similarly aged Australians, and that survivors continue to experience extremely poor psychological and physical health, a low level of life satisfaction and quality of life, and increased utilisation of health services. The Studies show that war service can have long-term, substantial effects on health which can persist fifty years after hostilities cease.

It is clear that some of the ill-health experienced by veterans is attributable to the severity of combat associated with Korean War service. Other military-related factors such as lack of seniority, inexperience, and war-related injury have also contributed to poor health. Non-military factors, such as socioeconomic disadvantage in the post-war period, have possibly also contributed to veterans' vulnerability to poor health and persistence of symptoms over

time. Finally, excessive tobacco smoking and alcohol consumption in the post-war period appear to be related to the Korean War deployment, and these lifestyle behaviours, in turn, have also had important adverse long term health effects.

Importantly, while past exposures and lifestyle factors cannot be changed, carefully planned health interventions may be effective in reducing ill-health experienced by Korean War veterans and in improving quality of life in their remaining years. In this regard, the results of this study should be useful in identifying the most appropriate health interventions, and levels of service provision, required by Australia's surviving Korean War veterans.

More than fifty years after the war, however, less than 45% of Australia's Korean War veterans remain alive. The deceased Korean War veterans cannot benefit from health interventions, or changes to health service provisions, which may arise from the findings of this study. Younger veterans of more recent conflicts, however, may benefit more from future studies if these can investigate deployment-related risk factors and health outcomes in closer proximity to the time of the deployment.

The results of the three Korean War veteran Studies could be viewed as providing a possible "snapshot" of the future health concerns faced by younger veterans of more recent conflicts. Indeed, the results of the Studies could be useful in identifying those veterans of more recent conflicts who may be at greatest risk of adverse health outcomes, and in developing appropriate strategies to prevent or reduce long-term ill-health in these veteran groups.

The Health Study, in combination with the Mortality[19] and Cancer Incidence[20] Studies, constitute a major study program of long term health in this Australian Korean War veteran population. This study program represents one of the most comprehensive investigations of health in an entire veteran group ever conducted internationally. The results will contribute substantially to the existing international body of knowledge on the long-term health effects of war deployment, and should assist in improving the health of future generations of military personnel, both in Australia and abroad.

The motto of the Signal Corps is Swift and Sure*, but it takes a lot of keeping up to when the snow falls so heavily that it breaks the communication cable. Members of 3RAR Signal Corps are ensuring that lines of communication are kept open at all times.*
(AWM image HOBJ1883)

Seoul, South Korea. 2nd September 1953. Old friends met when a group of RAAF pilots arrived at Camp Brittannia following their release from POW camps in North Korea. *(AWM image POJK0862)*

Pusan, Korea. 21st March 1953. Troops of 2RAR, disembarking from the ship New Australia to relieve 1RAR which is returning home after 12 months service in Korea. 1RAR would return in March 1954 for a second time. *(AWM image 157522)*

Kimpo, South Korea 1950-53. A group of No.77 Squadron RAAF ground staff stand around a snowman they have erected. *(AWM image JK0140)*

Japan, September 1953. A pilot flying a former Australian POW from Seoul, Korea to Iwakuni, Japan. *(AWM image JK0955)*

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APPENDIX A - PROJECT STAFF

Researchers - Monash University Department of Epidemiology & Preventive Medicine

Assoc Prof Malcolm Sim BMedSc MBBS MSc GDipOccHyg MSc PhD FAFOM FAFPHM FFOM
Occupational physician and principal investigator

Ms Jillian Ikin BA(Psych) GDipBHlthSci
Research fellow and study manager

Assoc Prof Andrew Forbes BSc(Hons) MSc PhD
Biostatistician

Mr Dean McKenzie BA(Hons)
Research fellow and biostatistician

Mr Anthony Del Monaco BSc(Hons) GDipComp
Programmer and data manager

Research assistants were Ms Elsa Barton, Ms Christina Dimitriadis, Ms Anna Davidson and Ms Kate Davidson.

Staff - Australian Government Department of Veterans' Affairs

Dr Keith Horsley MPubAdmin MBBS
Specialist Adviser Health Studies

Dr Eileen Wilson BA MSc PhD
Epidemiologist

Mr Denis Murphy BA GCertPSectMgt
Project Officer until January 2003

Ms Helen Westbury
Project Officer after January 2003

Ms Di Summerhayes
Contact and Recruitment Manager until January 2004

Contact and recruitment staff included Maureen Stewart, Marilyn Griffith and Ewan Stewart.

Consultants

Air Commodore (Dr) Warren Harrex MSc(OccMed) BmedSc(Hons) MBBS DObstRCOG DAvMed FAFPHM FAFOM
Consultant occupational physician,
Australian Government Department of Veterans' Affairs

Dr Philip AC Boorman BSc(Anat) MB BCh
Medical adviser
Australian Government Department of Veterans' Affairs

Dr P Jelfs BSc(Hons) PhD
Director of Epidemiology
South Australian Department of Health

Mr Robert van der Hoek BSc
Senior research analyst
Australian Institute of Health and Welfare

APPENDIX B - MEMBERSHIP OF THE SCIENTIFIC ADVISORY COMMITTEE

The Scientific Advisory Committee membership included:

Chair

Professor P Kincaid-Smith AC CBE BSc(Hons) MBChB DipClinPath FRCP FRACP MD FRCPA DSc HonDScMed HonLLD
Emeritus Professor, University of Melbourne, Melbourne, Vic.

Members

Emeritus Professor A S Henderson AO MD HonMD DSc FRACP FRCP FRANZCP FRCPsych.

Professor J McNeil MBBS MSc PhD FRACP FAFPHM
Head of Department, Department of Epidemiology and Preventive Medicine, Monash University, Vic.

Professor M Moore BSc(Hons) PhD DSc MACM
Director, Queensland Health Scientific Services, National Research Centre for Environmental Toxicology, Brisbane, Qld.

Professor J Zalcberg MBBS PhD FRACP
Director, Division of Haematology and Medical Oncology, Peter MacCallum Cancer Centre, Melbourne, Vic.

Colonel A M McDonald psc (Retd) GradDipAdmin AFAIM
(Consultative Committee Representative)
Korean Veterans Association of Australia Incorporated.

APPENDIX C - MEMBERSHIP OF THE CONSULTATIVE COMMITTEE

The Consultative Committee membership included:

Chair

Rear Admiral Simon Harrington AM Royal Australian Navy (Retd)
Repatriation Commissioner from 25 August 2003.

Major General Paul Stevens AO (Retd)
Repatriation Commissioner until 24 August 2003.

Members

Commander K M Barnett Royal Australian Navy (Retd)
Australian Veterans and Defence Services Council.

Rear Admiral I M Crawford AO AM(Mil)
Regular Defence Force Welfare Association.

Wing Commander R C Cresswell DFC (Retd)
Royal Australian Air Force Association.

Mr S Gellatly
Korea and South East Asia Forces Association of Australia.

Mr D Gibson PSM
Central Army Records Office, Department of Defence.

Mr M Rennie OAM (to July 2001)
Korea and South East Asia Forces Association of Australia.

Dr J Bradley (to November 2000)
Returned & Services League of Australia Limited.

Mr N Goldspink MBE (from December 2000)
Returned & Services League of Australia Limited.

Dr J Henderson PhD BEc FCPA (from March 2002)
Korea War Veterans Association, NSW Incorporated

Mr J Callaghan (from February 2000 to July 2001)
Korea War Veterans Association, NSW Incorporated.

Mr V Lowe (to February 2000 and from July 2001 to March 2002)
Korea War Veterans Association, NSW Incorporated.

Mr W Hindson MC MG
Australian Federation of Totally and Permanently Incapacitated Ex-Servicemen and Women.

Mr C Doust JP (from September 2000 to July 2001)
Australian Federation of Totally and Permanently Incapacitated Ex-Servicemen and Women.

Brigadier A Garland AM (Retd) (from October 1999 to September 2000)
Australian Federation of Totally and Permanently Incapacitated Ex-Servicemen and Women.

Mr W Weir OAM (to October 1999)
Australian Federation of Totally and Permanently Incapacitated Ex-Servicemen and Women

Major General J C Hughes AO DSO MC (Retd)
Royal Australian Regiment Association.

Mr G A Lang
Association of Queensland Korean Veterans Incorporated.

Mr J Manley OAM
Naval Association of Australia.

Colonel A M McDonald (Retd)
Korean Veterans Association of Australia Incorporated.

Mr G Keep (to July 1999)
Korean Veterans Tasmania.

Mr I Street (from August 1999 to December 2003)
Korean Veterans Tasmania.

Mr R Murphett (from January 2004 to February 2005)
Korean Veterans Tasmania.

Mr R Willmot (from March 2005)
Korean Veterans Tasmania.

Professor P Kincaid-Smith AC CBE
Chair, Scientific Advisory Committee.

Ms P Stevenson (from April 2003)
Branch Head, Defence Links, Department of Veterans' Affairs.

Mrs Heather Parry (from July 2002 to April 2003)
Branch Head, Defence Links, Department of Veterans' Affairs.

Mr A Edgar (from October 2001 to June 2002)
Branch Head, Defence Links, Department of Veterans’ Affairs.

Mr M Johnson (from August 2001 to October 2001)
Branch Head, Defence Links, Department of Veterans’ Affairs.

Mr N Bayles (from October 2000 to July 2001)
Branch Head, Defence Links, Department of Veterans’ Affairs

APPENDIX D - KOREAN WAR VETERANS' INVITATION LETTERS

MINISTER FOR VETERANS' AFFAIRS

STUDY ID: 10000

Dear Mr Veteran,

I am pleased to inform you of the launch of the Australian Government's study of the health of Australian veterans of the Korean War. The national study is being conducted by independent medical researchers at Monash University in conjunction with the Department of Veterans' Affairs. The results of this study will provide extensive and important information about the long-term consequences of involvement in war and the health profile of our Korean War veteran population.

You will receive your invitation to participate in the study within the next four to ten weeks. Participation involves completing a short questionnaire about your health and military service. If necessary, a relative, friend or carer can assist in completing the questionnaire on your behalf.

I would encourage you to read the invitation materials carefully when they arrive and to take a few moments to complete the questionnaire. Your participation in the study is voluntary and at no time will any information which you provide to Monash University and which identifies you be passed on to the Department of Veterans' Affairs. Participation in the study will have no effect on any pension, benefit or service to which you are entitled.

I trust that you will be able to assist in this important study for the benefit of our Korean War Veterans.

Yours sincerely

Danna Vale

DANNA VALE MP

Parliament House, Canberra ACT 2600 Telephone | 02 6277 7820 Facsimile | 02 6273 4140

MONASH
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ID NO.

Korean War Veterans' Health Study

10000

MR FIRST SECOND VETERAN

Monash University is pleased to invite you to participate in an important study of the health of Australia's Korean War Veterans. This study will contribute valuable knowledge to both civilian and Defence Force communities about the health impacts of war-related activities and experiences. This knowledge may assist you or other former Service personnel in gaining recognition for war-related ill-health. It may also assist the Australian Defence Force in developing the most appropriate supportive and protective measures against future health threats.

All Australian male veterans of the Korean War are invited and encouraged to participate. Participation simply involves completing the enclosed questionnaire and returning it to Monash University in the Reply-paid envelope provided. It is very important that as many veterans as possible participate, even if they are very old, very well or very unwell. *If necessary, a relative, friend or carer can assist in completing the questionnaire.* **Your answers will be confidential and no personal details, which identify you in any way, will be passed on to the Department of Veterans' Affairs or any other organisation.**

Please read the enclosed Explanatory Statement (on yellow paper) which is designed to provide you with all of the information you should require to make an informed decision about participating. If you do require further information, please phone the Monash study team on **1800 062 534**. This is a free call from anywhere in Australia.

If you DO wish to participate, please complete the enclosed questionnaire and return it, in the Reply-paid envelope provided, within three weeks of receiving this invitation.

If you DO NOT wish to participate, please sign the enclosed Voluntary Refusal Notification form (on green paper) and return it in the Reply-paid envelope or by fax.

In commemoration of the 50th anniversary of the signing of the Armistice ending the Korean War, the Royal Australian Mint has released a special 2003 coin honouring the bravery and sacrifice of the men and women who served. In appreciation of your involvement in this study the Minister for Veterans' Affairs, the Hon Danna Vale MP, will send one of these Mint issue coins to all respondents who return their completed questionnaire or signed Refuser Notification Form.

Thank you for considering this invitation. We look forward to including you in this important study.

Associate Professor Malcolm Sim

DEPARTMENT OF EPIDEMIOLOGY
& PREVENTIVE MEDICINE
Central & Eastern Clinical School
Alfred Hospital
Melbourne 3004
ABN: 12 377 614 012

MINISTER FOR VETERANS' AFFAIRS

ID NO: 10000

Dear Mr Veteran,

I am writing to invite you to participate in an important national health study of Australia's veterans of the Korean War. This study will compare the health of Korean War veterans with that of a group of Australians who did not serve in the Korean War. The results of this study will provide extensive and important information about the long-term consequences of involvement in war, the health profile of our veteran population and also that of older Australian men in general.

For the study to be successful we need to obtain responses from as many Korean War veterans as possible, regardless of whether you are in good or poor health.

The study is being conducted by independent medical researchers at Monash University. Completed questionnaires will be retained by the University, which will store them in accordance with the *Privacy Act 1988*. **No information from your questionnaire which identifies you will be available to the Department of Veterans' Affairs and your answers will not in any way affect your pension, benefits or any health services you are entitled to receive. If you wish, you may discontinue participation at any time.**

I am delighted to offer all those who complete and return the questionnaire or attached form a Royal Australian Mint Issued Korean War coin to keep. This 2003 coin commemorates 50 years since the signing of the Armistice to the Korean War and honours the bravery and sacrifice of all men and women who served.

Thank you for your consideration of this important study. I urge you to take part so that the information collected can be used to improve the health and well being of our Korean War Veterans.

Yours sincerely

Danna Vale

DANNA VALE MP

Parliament House, Canberra ACT 2600 Telephone | 02 6277 7820 Facsimile | 02 6273 4140

REPATRIATION COMMISSION

Dear Sir

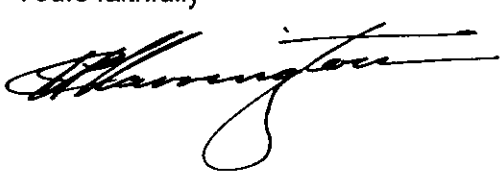
The Korean War Veterans' Study Consultative Committee (whose membership is shown below) oversees the studies of the health of Korean War veterans. We act as a bridge between the research teams responsible for running the studies and the broader veteran community. We strongly support this new health study and encourage you to take part.

The Committee has endeavoured to ensure that the study will provide important information about the health of the veteran community with the minimum of inconvenience to participants.

Your care in accurately answering the questionnaire and returning the completed forms will be invaluable to the success of the study.

I join my fellow Committee members and the Minister in strongly recommending your participation.

Yours faithfully



Simon Harrington
COMMISSIONER
Chairman, Korean War Veterans' Study Consultative Committee

Ex-Service Membership of the Committee

Association of Queensland Korean Veterans (Inc)
Australian Federation of TPI Ex-Servicemen and Women
Australian Veterans and Defence Services Council
Korea and South-East-Asia Forces Association of Australia
Korean Veterans' Association of Australia (Inc)
Korean Veterans of Tasmania
Korea War Veterans' Association NSW (Inc)
Naval Association of Australia
RAAF Association
RAR Association
Regular Defence Force Welfare Association
Returned and Services League of Australia Ltd

RADM C S H Harrington AM RAN (Retd)
PO Box 21 Woden ACT 2606
Phone: 02 6289 6733
Facsimile: 02 6289 6257
Email: simon.harrington@dva.gov.au

MONASH
UNIVERSITY

10000
MR FIRST SECOND VETERAN
PO BOX 858
WODEN ACT 2606

Korean War Veterans' Health Study

Dear Mr VETERAN,

You were recently sent a package inviting you to participate in the Korean War Veterans' Health Study. This package included a letter of invitation from the Minister for Veterans' Affairs, the Hon Danna Vale MP, and the study questionnaire. The Monash University study team has not yet heard from you and encourage you to again consider taking part. If you have recently forwarded your completed study questionnaire to us, or the Voluntary Refusal Notification Form, please disregard this reminder letter.

The study aims to provide valuable and much-awaited information about any long-term health effects of service in the Korean War. For the study to be successful in this aim, it is vital that as many veterans as possible participate. That includes those who are very old, those who are unwell as well as those who enjoy good health. Participation simply involves completing a written questionnaire about your health and some life experiences. *If necessary this questionnaire can be completed on your behalf by a relative, carer or friend.* Please note that participation is voluntary, that your responses will be retained confidentially by the University and that participation will not effect any pension, benefits or health services you are entitled to from DVA.

All veterans who send in their completed questionnaire or signed Refuser Notification Form will receive the **Royal Australian Mint Issued 2003 Korean War coin** commemorating 50 years since the signing of the Armistice and honouring the bravery and sacrifice of the men and women who served.

The study has the strong support of various Ex-Service Associations including Korean War veterans' Associations and the Returned and Services League of Australia (RSL). Representatives of these Associations sit on the Korean War Veterans' Study Consultative Committee. They have written to you in the previous invitation package and strongly recommend your participation.

We urge you to read the information which was sent to you in the invitation package. If you need any additional information, or if you need a new invitation package sent to you, please do not hesitate to contact the Monash study team on **1800 062 534**. This is a **free call** from anywhere in Australia.

We look forward to hearing from you soon.

Associate Professor Malcolm Sim
22/06/04

DEPARTMENT OF EPIDEMIOLOGY
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Melbourne 3004
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Korean War Veterans' Health Study
FINAL REMINDER

Dear Mr Veteran, STUDY ID: 10000

Recently you have been invited to participate in a national study of the health of Australia's veterans of the Korean War. We have not yet heard from you and send this final reminder to encourage you to consider taking part. If you have recently forwarded your completed study questionnaire to us, or the Voluntary Refusal Notification Form, please disregard this reminder letter.

This important study provides a rare opportunity to comprehensively document information about the health of Australia's surviving Korean War veterans. The study can only be successful if as many Korean War veterans as possible participate. Importantly that includes all of those who enjoy good health, as well as those who are unwell. Your participation, however, is completely voluntary.

Participation simply involves completing a written questionnaire about your health and some life experiences. *If you are unable to complete the questionnaire yourself, it can be completed on your behalf by a relative, carer or friend*. Please be assured that your questionnaire responses will be held confidentially by Monash University and that no information which identifies you in any way, will be passed on to the Department of Veterans' Affairs. Further, your answers will not in any way effect any DVA pension, benefit or health service to which you are entitled.

For your convenience, we have enclosed a new copy of the study questionnaire, Explanatory Statement, Voluntary Refuser Notification Form and Reply-paid envelope. If you need further information about the study, please do not hesitate to contact the Monash study team on **1800 062 534**. This is a **free call** from anywhere in Australia.

All veterans who send in their completed questionnaire or Refuser Notification Form will be sent a **Royal Australian Mint Issued 2003 Korean War coin** by the Minister for Veterans' Affairs, the Hon Danna Vale MP. This coin commemorates 50 years since the signing of the Armistice and honours the bravery and sacrifice of the men and women who served.

We look forward to hearing from you soon.

Associate Professor Malcolm Sim
23/06/2004

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APPENDIX E - KOREAN WAR VETERANS' HEALTH STUDY EXPLANATORY STATEMENT

Explanatory statement: **Korean War Veterans' Health Study**

Introduction

Medical researchers at Monash University are undertaking a health study of surviving, male veterans of the Australian military deployment to the Korean War. This includes Australian military personnel who served in Korea or it's adjacent waters during the Korean War conflict and after the cease fire, between 27 June 1950 and 19 April 1956. The Study is funded by the Australian Government Department of Veterans' Affairs (DVA). DVA have identified you as a Korean War Veteran and have provided your name and contact details.

The study aims to determine whether the general health of surviving, male Korean War veterans differs from that of a civilian comparison group of similarly aged Australian males. The study may be able to draw some conclusions about aspects of Korean War service which may have impacted on the current health of surviving veterans. The results of this study may assist you or other former Service personnel in gaining recognition for Service-related ill-health. It may also assist the Australian Defence Force in developing the most appropriate supportive and protective measures against future health threats.

Participation overview

If you are the veteran to whom the Study invitation package was addressed, then you are invited to participate in this Study. Participation in the study primarily involves completing a questionnaire about your health and quality of life today, including your medical conditions, general physical health, psychological wellbeing, alcohol and cigarette consumption and your reaction to stressful life events. There are also some very brief questions about your military service including your experiences during the Korean War. The questionnaire is expected to take up to one hour to complete and this can be undertaken in your own time at home. You may like to complete small parts at a time, taking more than one sitting to complete the whole questionnaire. The completed questionnaire can then be returned to the Monash University study team, in the Reply-paid envelope provided, at no cost to you.

It may be necessary for a relative, friend or carer to assist with the completion of the questionnaire. Wherever possible it should be your answer to each question that is recorded. If this is not possible, the relative, friend or carer should take great care to accurately estimate the correct answers on your behalf. This person may also sign the study Consent Form, near the start of the questionnaire, on your behalf if necessary.

The success of the study depends on as many veterans as possible participating, regardless of whether they are very well or very unwell. However, your participation in the study is completely voluntary. You are under no obligation to complete the questionnaire and return it to the study team. Your decision about participation will not in any way effect your pension, benefits or any health services you are entitled to from DVA. However, if you decide not to participate, we ask that you please sign the Voluntary Refusal Notification Form (on green paper), and return it in the Reply-paid envelope provided. If we do not hear from you, you will be sent two further reminder notices about participation in the Study.

In 2003 the Royal Australian Mint issued a new $1 coin commemorating the 50th anniversary of the signing of the Armistice to the Korean War. The Minister for Veterans' Affairs, the Hon Danna Vale MP, will send one of the Mint Issue commemorative coins to every veteran who returns his completed questionnaire or signed Refuser Notification Form to Monash University.

Risks and inconveniences

Sometimes answering questions about your health and life experiences can be stressful or upsetting. You may find this particularly so for questions about your Korean War experiences. You may prefer to answer the questionnaire with a supportive person present. Alternatively, if you feel distressed, it may be helpful for you to phone a fellow veteran or a member of your local Ex-Service Organisation for support. The questionnaire focuses largely on your current health issues, with only a few references to the past, and the questionnaire has been kept as brief as possible, only including questions which are absolutely necessary to the investigations of the study. Whilst it is important that you answer as many questions as possible, you may leave a question blank if you prefer not to answer it.

Confidentiality and privacy – What will happen to your information?

All of the information gained in the study will be held securely by Monash University for a minimum of 7 years. You may request access to your own information at any time. To ensure the confidentiality of the information, the data will have all identifying information, such as your name, removed and will be held in storage using code numbers. The information gathered for the study will be statistically analysed in grouped format, published in a report to the Government and in articles in medical journals. It will not be possible to identify any individual's results from these publications or reports.

DVA will store a set of the deidentified data indefinitely. The information will be protected according to the provisions of the *Privacy Act 1988*. Your information will NOT be accessed by DVA to assess compensation or pension claims. DVA can only use this information for the purpose of further medical research and only with the approval of an overseeing committee which includes representatives from veterans' groups.

Future investigations

We may need to contact you in the future. This may be to ask you about your health or to invite you to participate in more in-depth studies. If we do contact you, you will be under no obligation to participate in any proposed investigations.

Concerns or complaints
Should you have any concerns or complaints about the manner in which this project is conducted, please do not hesitate to contact the study team on **1800 062 534**.
The principal investigator for this study is:

Associate Professor Malcolm Sim
Monash University , Department of Epidemiology & Preventive Medicine
Level 3, 553 St Kilda Rd Melbourne VIC 3004
FREECALL: 1800 062 534 Fax: (03) 9903 0556

Alternatively you may wish to contact the Department of Veterans' Affairs, which has funded the study, on **1800 502 302.**

You can complain about the study if you don't like something about it. To complain about the study you can phone, or write to, the Monash University Standing Committee on Ethics in Research Involving Humans (SCERH) which has endorsed the study. Their contact details are as follows:

The Secretary
Monash University SCERH *(please quote project number 2003/332)*
PO Box 3A
Monash University VIC 3800
Telephone: (03) 9905 2052 Fax: (03) 9905 1420
Email: SCERH@adm.monash.edu.au

The Department of Veterans' Affairs Human Research Ethics Committee has also endorsed the study.

APPENDIX F - KOREAN WAR VETERANS' HEALTH STUDY PARTICIPANT QUESTIONNAIRE

MONASH
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DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

KOREAN WAR VETERANS' HEALTH STUDY

PARTICIPANT QUESTIONNAIRE

DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

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DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

THANK YOU

for participating in the Korean War Veterans' Health Study

Please read the following instructions regarding the completion of this questionnaire.

1. This questionnaire should be completed in relation to the veteran who has been named on the letter of invitation.

2. It is important that the Informed Consent Statement on page 1 be read and signed either by the veteran, or by the person completing the questionnaire on his behalf.

3. If it is necessary for a relative, friend or carer to complete the questionnaire on behalf of the veteran, then it is important that this be stated under the heading "Who is completing the questionnaire?" on page 2.

4. Unless directed otherwise, EVERY question should be completed if possible. Please choose the best available response to each question, even if there is not one that suits perfectly.

5. Please be sure to read each question, and its instructions, VERY CAREFULLY.

6. Please use a **BLUE OR BLACK PEN ONLY** to complete this questionnaire. If you make a mistake simply cross it out and clearly mark the correct answer.

7. When completing the questionnaire please place ticks ☑ in the tick-boxes provided. *correct*

   Please DO NOT place crosses ☒ in the boxes or circle the boxes ☐ *incorrect* *incorrect*

8. Alternatively, when required, please write clear numbers in the number-boxes provided.

   For example [1][5] years

9. Please ring the Monash University Study team if you are unsure about how to complete any section of this questionnaire. The Freecall number is **1800 062 534.** Please call any time during business hours, Eastern Standard Time, Monday to Friday. This call is free of charge from anywhere within Australia.

MONASH UNIVERSITY

DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

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UNIVERSITY

This page, holding your name and contact details, will be detached from the rest of the questionnaire

INFORMED CONSENT STATEMENT

Korean War Veterans' Health Study

Please read the following statement and place your signature in the space provided if you agree with the provisions of the study.

In signing this consent form I am declaring the following:

I agree to take part in the Korean War Veterans' Health Study

I have read and understood the Study Explanatory Statement.

I have had the opportunity to ask questions arising from the Explanatory Statement via the Monash University Freecall number 1800 062 534.

I understand that I may experience emotional distress associated with answering questions about my health and experiences.

I understand that I am participating in this study in a voluntary capacity and that at any time I can withdraw consent for my questionnaire responses to be used.

I am cooperating in this study on the provision that the information I provide in this questionnaire will be kept confidential and that any published reports of this study will preserve my anonymity.

Veteran's Name	
Veteran's Signature	**Date** / /
OR	
Signature of person completing the form on behalf of the veteran	**Date** / /

CONTACT DETAILS

The Department of Veterans' Affairs have retained your contact details confidentially. However, on occasion the Monash University researchers may need to contact some veterans who participate in the study. In case we need to contact you, could you please provide your address and a day-time telephone number here. Thank you.

Address:
Day time phone: ( )

WHO IS COMPLETING THE QUESTIONNAIRE?

Is the person who is completing this questionnaire the veteran who is named on the invitation letter, or is the questionnaire being completed by a relative, friend or carer on behalf of the veteran?

*Please tick **ONE.***

☐ Completed by veteran named on the invitation
GO STRAIGHT TO DEMOGRAPHICS QUESTIONS ON THE NEXT PAGE →

☐ Completed by relative, friend or carer on behalf of the veteran.

If completed by relative, friend or carer,

***are you transcribing answers provided by the veteran?**; for example, are you reading the questions to the veteran and recording his answers on to the questionnaire?*

***Or, are you writing your own answers on behalf of the veteran?**; for example, the veteran is too unwell to answer the questions and you are choosing the correct answers based on your own knowledge of the veteran's life and health?*

*Please tick **ONE.***

☐ Transcribing answers provided by the veteran

☐ Writing my own answers on behalf of the veteran

Please note that the remainder of the questionnaire refers to the veteran and not to the relative, carer or friend who might be completing the questions on the veteran's behalf.

DEMOGRAPHICS

We have some general questions to begin with.

1. **What is your date of birth?** ☐ / / Day / Month / Year

2. **Where were you born?**

☐ Australia ☐ New Zealand ☐ United Kingdom or Ireland ☐ Italy

☐ Greece ☐ Germany ☐ *Other* ______ *please specify*

3. **Do you regard yourself as being of Aboriginal or Torres Strait Islander origin?** ☐ NO ☐ YES

4. **What is your current marital status?** ***Choose one.***

☐ Married ☐ De facto ☐ Widower ☐ Divorced

☐ Separated ☐ Single, never married

5. **Which category best describes the HIGHEST educational qualification you have COMPLETED?** ***Choose one.***

☐ Primary school
☐ Secondary school up to grade 10 (including Services Education)
☐ Secondary school grades 11 or 12
☐ Certificate (trade, apprenticeship or technician)
☐ Diploma (associate or undergraduate)
☐ University degree

QUALITY OF LIFE and GENERAL HEALTH

6. **How would you rate your quality of life?** ***Choose one.***

☐ Very poor ☐ Poor ☐ Neither poor nor good ☐ Good ☐ Very good

7. **How satisfied are you with your health?** ***Choose one.***

☐ Very dissatisfied ☐ Dissatisfied ☐ Neither satisfied nor dissatisfied

☐ Satisfied ☐ Very satisfied

The following questions ask about **HOW MUCH** you have experienced certain things in the last **TWO WEEKS.**

	Not At All	A Little	A Moderate Amount	Very Much	An Extreme Amount
8. To what extent do you feel that physical pain prevents you from doing what you need to do?	☐	☐	☐	☐	☐
9. How much do you need any medical treatment to function in your daily life?	☐	☐	☐	☐	☐
10. How much do you enjoy life?	☐	☐	☐	☐	☐
11. To what extent do you feel your life to be meaningful?	☐	☐	☐	☐	☐

	Not At All	A Little	A Moderate Amount	Very Much	Extremely
12. How well are you able to concentrate?	☐	☐	☐	☐	☐
13. How safe do you feel in your daily life?	☐	☐	☐	☐	☐
14. How healthy is your physical environment?	☐	☐	☐	☐	☐

The following questions ask about **HOW COMPLETELY** you experienced or were able to do certain things in the last **TWO WEEKS.**

	Not At All	A Little	Moderately	Mostly	Completely
15. Do you have enough energy for everyday life?	☐	☐	☐	☐	☐
16. Are you able to accept your bodily appearance?	☐	☐	☐	☐	☐
17. Have you enough money to meet your needs?	☐	☐	☐	☐	☐
18. How available to you is the information that you need in your day-to-day life?	☐	☐	☐	☐	☐
19. To what extent do you have the opportunity for leisure activities?	☐	☐	☐	☐	☐

20. How well are you able to get around? ***Choose one.***

☐ Very poor ☐ Poor ☐ Neither poor nor good ☐ Good ☐ Very good

The following questions ask you to say how **GOOD or SATISFIED** you have felt about various aspects of your life over the last **TWO WEEKS.**

	Very Dissatisfied	Dissatisfied	Neither Satisfied Or Dissatisfied	Satisfied	Very Satisfied
21. How satisfied are you with your sleep?	☐	☐	☐	☐	☐
22. How satisfied are you with your ability to perform your daily living activities?	☐	☐	☐	☐	☐
23. How satisfied are you with your capacity for work?	☐	☐	☐	☐	☐
24. How satisfied are you with yourself?	☐	☐	☐	☐	☐
25. How satisfied are you with your personal relationships?	☐	☐	☐	☐	☐
26. How satisfied are you with your sex life?	☐	☐	☐	☐	☐
27. How satisfied are you with the support you get from your friends?	☐	☐	☐	☐	☐
28. How satisfied are you with the conditions of your living place?	☐	☐	☐	☐	☐
29. How satisfied are you with your access to health services?	☐	☐	☐	☐	☐
30. How satisfied are you with your transport?	☐	☐	☐	☐	☐

31. In the last TWO WEEKS how often have you had negative feelings such as blue mood, despair, anxiety, depression? ***Choose one.***

☐ Never ☐ Seldom ☐ Quite often ☐ Very often ☐ Always

32. How do you feel about your life as a whole, taking in to account what has happened in the last year and what you expect to happen in the future? Please choose <u>ONE</u> response.

- ☐ Delighted
- ☐ Pleased
- ☐ Mostly satisfied
- ☐ Mixed
- ☐ Mostly dissatisfied
- ☐ Unhappy
- ☐ Terrible

33. During the past TWELVE MONTHS have you been hospitalised *<u>overnight</u>* or longer because of any illness or injury? If YES, please estimate for *<u>how many nights</u>* you have been hospitalised in the past twelve months.

- ☐ **YES, for** ☐☐☐ ***nights***
- ☐ **NO**

Emotions play an important part in your health. These next questions are designed to help us to know how you feel. Read each item and tick the response which comes closest to how you have been feeling in the <u>PAST WEEK.</u>
Answer in relation to the PAST WEEK:

34. I feel tense or 'wound up'.	Most of the time A lot of the time Time to time, occasionally Not at all
35. I still enjoy the things I used to enjoy.	Definitely as much Not quite so much Only a little Hardly at all
36. I get a sort of frightened feeling as if something awful is about to happen.	Very definitely and quite badly Yes, but not too badly A little, but it doesn't worry me Not at all
37. I can laugh and see the funny side of things.	As much as I always could Not quite so much now Definitely not so much now Not at all

Answer in relation to the PAST WEEK:

38. Worrying thoughts go through my mind.	☐ A great deal of the time ☐ A lot of the time ☐ From time to time but not too often ☐ Only occasionally
39. I feel cheerful.	☐ Not at all ☐ Not often ☐ Sometimes ☐ Most of the time
40. I can sit at ease and feel relaxed.	☐ Definitely ☐ Usually ☐ Not often ☐ Not at all
41. I feel as if I am slowed down.	☐ Nearly all the time ☐ Very often ☐ Sometimes ☐ Not at all
42. I get a sort of frightened feeling like 'butterflies' in the stomach.	☐ Not at all ☐ Occasionally ☐ Quite often ☐ Very often

Answer in relation to the PAST WEEK:

43. I have lost interest in my appearance.	Defintely I don't take as much care as I should I may not take quite as much care I take just as much care as ever
44. I feel restless as if I have to be on the move.	Very much indeed Quite a lot Not very much Not at all
45. I look forward with enjoyment to things.	As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all
46. I get sudden feelings of panic.	Very often indeed Quite often Not very often Not at all

47. I can enjoy a good book or radio or TV program.	☐ Often ☐ Sometimes ☐ Not often ☐ Very Seldom

WELL DONE, YOU ARE HALF WAY THERE

Remember the Monash Study team is available on 1800 062 534 if you are unsure about how to complete any section of this questionnaire.

Feel free to take a break and return to the questionnaire later.

SMOKING

48. Have you ever smoked as much as 1 cigarette daily, or 1 cigar per week or 1 ounce of tobacco per month, *for three months?*

☐ **NO** ***If NO go to next page*** →

☐ **YES**

a. If YES, at what age did you *first* smoke as much as 1 cigarette daily, or 1 cigar per week or 1 ounce of tobacco per month?

Age in years ☐☐

b. Taking in to consideration times that you may have quit smoking, please estimate *how many years in total* you would have smoked?

Number of years ☐☐

c. What is the *average* number of cigarettes per day, cigars per week, or ounces of tobacco per month that you have smoked during that time?

☐☐☐ cigarettes per ***day*** ☐☐☐ cigars per ***week*** ☐☐☐ ounces of tobacco per ***month***

d. Do you still/currently smoke as much as 1 cigarette per day or 1 cigar per week or 1 ounce of tobacco per month?

☐ **YES**

☐ **NO**

e. If NO, at what age did you last stop smoking as much as 1 cigarette per day or 1 cigar per week or 1 ounce of tobacco per month?

Age in years ☐☐

ALCOHOL

49. CURRENTLY, how often do you have a drink containing alcohol?

☐ ***NEVER*** ☐ Once a month or less ☐ 2 to 4 times a month

☐ 2 to 3 times a week ☐ 4 or more times a week

<u>If NEVER, go straight to question 52 down the page,</u>
otherwise read immediately below.

In answering the following questions, please remember that a 'standard' drink contains 10g of pure alcohol. Examples of a 'standard' drink include 1 glass of wine, sherry or port, 1 middy or pot of beer or 1 nip of spirits.

50. CURRENTLY, 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. CURRENTLY, 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. In the PAST, have you ever considered yourself a heavy drinker? ☐ NO ☐ YES

53. In the PAST, have you ever felt you should cut down on your drinking? ☐ NO ☐ YES

54. In the PAST, have people ever annoyed you by criticizing your drinking? ☐ NO ☐ YES

55. In the PAST, have you ever felt bad or guilty about drinking? ☐ NO ☐ YES

56. In the PAST, have you ever taken a drink first thing in the morning to steady your nerves or get rid of a hangover? ☐ NO ☐ YES

57. In the PAST, have you ever been treated for alcoholism or a drinking problem? ☐ NO ☐ YES

LIFE EVENTS

The following instructions are important for accurate completion of the next questions.

Below and on the next page is a list of problems and complaints that people sometimes have in response to stressful life experiences. We would like you to consider the event in ***your life*** that you found the ***most*** stressful or upsetting. Please nominate an event even if you don't think you have experienced anything particularly stressful or important.

Once you have nominated an event in the space provided below, please read the list of problems and complaints and indicate how much you have been bothered by each problem or complaint in the PAST MONTH in relation to your nominated stressful event. If you have not been bothered by a particular problem or complaint, simply tick the 'Not at all' option available to you.

58. The event in your life which you found the most stressful or upsetting was (please just nominate ONE event)

in what year? ☐☐☐☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
59. Had repeated, disturbing ***memories, thoughts or images*** of the stressful experience?	☐	☐	☐	☐	☐
60. Had repeated, disturbing ***dreams*** of the stressful experience?	☐	☐	☐	☐	☐
61. Been suddenly ***acting or feeling*** as if the stressful experience ***were happening again*** (as if you were reliving it)?	☐	☐	☐	☐	☐
62. Felt ***very upset*** when ***something reminded you*** of the stressful experience?	☐	☐	☐	☐	☐
63. Had ***physical reactions*** (eg heart pounding, trouble breathing, sweating) when ***something reminded you*** of the stressful experience?	☐	☐	☐	☐	☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
64. Been avoiding ***thinking about or talking about*** the stressful experience or avoiding ***having feelings*** related to it?	☐	☐	☐	☐	☐
65. Been avoiding ***activities or situations*** because ***they reminded*** you of the stressful experience?	☐	☐	☐	☐	☐
66. Had trouble ***remembering important parts*** of the stressful experience?	☐	☐	☐	☐	☐
67. ***Had loss of interest*** in activities that you used to enjoy?	☐	☐	☐	☐	☐
68. Been feeling ***distant or cut off*** from other people?	☐	☐	☐	☐	☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
69. Been feeling ***emotionally numb*** or unable to have loving feelings for those close to you?	☐	☐	☐	☐	☐
70. Been feeling as if your ***future*** somehow will be ***cut short?***	☐	☐	☐	☐	☐
71. Had trouble ***falling or staying asleep?***	☐	☐	☐	☐	☐
72. Been feeling ***irritable*** or having ***angry outbursts?***	☐	☐	☐	☐	☐
73. Had ***difficulty concentrating?***	☐	☐	☐	☐	☐
74. Been "***super alert***" or watchful or on guard?	☐	☐	☐	☐	☐
75. Felt ***jumpy*** or easily startled?	☐	☐	☐	☐	☐

MILITARY SERVICE EXPERIENCE

76. In what year did you <u>first</u> join the Australian Armed Forces?
Please include National Service but NOT the Citizen Military Forces or the Reserve Forces.

19 ☐☐

77. For how many years <u>in total</u> did you serve with the Australian Armed Forces?
Please include National Service but NOT the Citizen Military Forces or the Reserve Forces.

☐☐ **years**

78. What is the highest level of military rank which you achieved in all of your military career?

☐ Enlisted rank ☐ Non-commissioned Officer ☐ Commissioned Officer

79. In addition to your deployment to the Korean conflict, did you ever deploy to another <u>major military conflict or operation?</u>

☐ **NO** ☐ **YES If YES, which one/s?**

☐ World War II

☐ BCOF Japan

☐ Malayan Emergency

☐ Borneo/Malaysian Confrontation

☐ Vietnam

☐ Another major military conflict or operation

☐

Please specify

KOREAN WAR EXPERIENCE

The following questions refer to your experience during the Korean War.

80. During the Korean conflict, or <u>as a result</u> of the Korean conflict, were you ever told that you had haemorrhagic fever, malaria or another type of fever?

Please choose <u>all that apply</u>

- ☐ NO
- ☐ YES, haemorrhagic fever
- ☐ YES, malaria
- ☐ YES, another type of fever

☐

Please specify

81. During the Korean conflict, were you ever Wounded in Action?

☐ **NO** ☐ **YES**

If YES, which level of evacuation was required <u>for your worst injury?</u> Were you: Please choose ONE.

- ☐ Evacuated to a Regimental Aid Post, first aid post, sick bay or field ambulance, and then returned to your unit/ship.
- ☐ Evacuated to a local field hospital or hospital ship and then returned to your unit/ship/squadron.
- ☐ Evacuated to a hospital in Japan and then returned to your unit/ship/squadron.
- ☐ Evacuated to a hospital in Japan and then on to Australia for further medical attention.

82. During the Korean conflict did you ever go on combat patrols or have other very dangerous duty? (eg. drive in convoys or in a combat zone, patrol rivers, helicopter assaults, perimeter guard duty, etc.)

☐ NO ☐ 1-3 times ☐ 4-12 times ☐ 13-50 times

☐ more than 50 times

83. During the Korean conflict were you ever under enemy fire?

☐ Never ☐ for a period less than a month ☐ for 1-3 months

☐ for 4-6 months ☐ for more than 6 months

84. During the Korean conflict were you ever surrounded by the enemy?

☐ NO ☐ 1-2 times ☐ 3-12 times ☐ 13-25 times

☐ more than 25 times

85. During the Korean conflict what percentage of men in your unit were killed, wounded or missing in action?

☐ No one ☐ Between 1-25% ☐ Between 26-50%

☐ Between 51-75% ☐ More than 75%

86. During the Korean conflict how often did you fire rounds at the enemy?

☐ Never ☐ 1-2 times ☐ 3-12 times ☐ 13-50 times

☐ more than 50 times

87. During the Korean conflict how often did you see someone get hit by incoming or outgoing rounds? (at the moment it happened or very soon afterwards, enemy or Australian)

☐ Never ☐ 1-2 times ☐ 3-12 times ☐ 13-50 times

☐ more than 50 times

88. During the Korean conflict how often were you in danger of being injured or killed in the line of duty? (ie. pinned down, ambushed, near miss, an incident where you thought you were not going to make it, a really close call)

☐ Never ☐ 1-2 times ☐ 3-12 times ☐ 13-50 times

☐ more than 50 times

CURRENT MEDICAL CONDITIONS

89. ***Here is a list of medical conditions that usually last for some time. Do you currently have any of these medical conditions?***
Please only include a medical condition if it was diagnosed by a medical doctor.
Please tick YES if you have the condition and NO if you do not have the condition.

a. Asthma	NO ☐	YES
b. High blood pressure	NO ☐	YES
c. Stroke (or after effects of stroke)	NO ☐	YES
d. Heart attack or angina	NO ☐	YES
e. Rapid or irregular heartbeat	NO ☐	YES
f. Liver disease	NO ☐	YES
g. Arthritis	NO ☐	YES
h. Kidney disease	NO ☐	YES
i. Diabetes	NO ☐	YES
j. Melanoma	NO ☐	YES
k. Other skin cancer	NO ☐	YES
l. Other cancer (not skin)	NO ☐	YES
m. Stomach or duodenal ulcer	NO ☐	YES
n. Partial or complete blindness (not corrected by glasses)	NO ☐	YES
o. Partial or complete deafness	NO ☐	YES

Well done! This is the end of the questionnaire.

If you have any additional information you would like to provide about your health, please write details in the space provided here.

Please make sure that you have signed the Informed Consent Statement on page 1 and that every question has been answered where required.

If you are satisfied with the completed questionnaire, please place it in to the provided Reply paid envelope and return it to Monash University as soon as possible.

Many thanks for your participation

APPENDIX G - POPULATION SAMPLE'S INVITATION LETTERS

MONASH
UNIVERSITY

STUDY ID: 10000

Dear Mr Comparison,

We are writing to let you know that Monash University is soon to launch a national survey of men's health and ageing. You will receive an information package and a formal invitation to participate in the study within the next four to eight weeks.

The survey will provide valuable information about the health of different groups within Australia's elderly community, such as groups who are of different ages and from different backgrounds. It is important that the study involves men of all ages including those who are very unwell and those who enjoy good health. Your name and contact details, for the purpose of this important medical research, have been provided by the Australian Electoral Commission.*

Participation simply involves completing a short questionnaire about your health. *If necessary, a relative, friend or carer can assist in completing the questionnaire on your behalf.* Your answers will be completely confidential.

Please consider the invitation materials very carefully when they arrive. They will contain all of the information you should require to make an informed decision about participating. Please note that participation is completely voluntary.

Thank you for your consideration of this important study.

Yours sincerely,

Associate Professor Malcolm Sim

*The Australian Electoral Commission has provided name, address, gender, and age-range inforamtion fopr this medical research study in conformity with sections 91(4A)(e) and 91A(2A)(c) of the *Commonwealth Electoral Act 1918* and Regulation 10 of the Electoral and Referendum Regulations 1940.

DEPARTMENT OF EPIDEMIOLOGY
& PREVENTIVE MEDICINE
Central & Eastern Clinical School
Alfred Hospital
Melbourne 3004
ABN: 12 377 614 012

MONASH
UNIVERSITY

ID NO.
20000

Survey of Men's Health & Ageing

MR COMPARISON,

Monash University is pleased to invite you to participate in an important national survey assessing the health of Australian men who are over the age of 65 years. Your participation will contribute valuable information about the health of different groups in Australia's elderly community, including men of different ages and from different backgrounds. This survey is being conducted as part of the Korean War Veterans' Health Study. That study will also compare your health to that of Australian men who served in the Korean War to investigate the long-term effects of war deployment on our community.

You have been selected as one of 3,000 Australian men who are invited to participate in this health survey along with the surviving veterans of the Korean War. Your name and contact details have been sourced from the Australian Electoral Roll.

It is very important that as many invited persons as possible participate, even if they are very old, very well or very unwell. Participation simply involves completing the enclosed questionnaire and returning it to Monash University in the Reply-paid envelope provided. If necessary, a relative, friend or carer can assist in completing the questionnaire on your behalf. **Your answers will be confidential and no personal details, which identify you in any way, will be passed on to any Government department or any other organisation**.

Please read the enclosed Explanatory Statement (on yellow paper) which is designed to provide you with all of the information you should require to make an informed decision about participating. If you do require further information, please phone the Monash study team on **1800 062 534**.

If you DO wish to participate, please complete the enclosed questionnaire and return it, in the Reply-paid envelope provided, within three weeks of receiving this invitation.

If you DO NOT wish to participate, please sign the enclosed Voluntary Refusal Notification Form (on green paper) and return it in the Reply-paid envelope or by fax.

In 2003 the Royal Australian Mint released a new $1 coin commemorating the 50th anniversary of the signing of the Armistice to the Korean War and honouring the men and women who served. ***In recognition of your inclusion in this health study of elderly Australians, the Minister for Veterans' Affairs, the Hon Danna Vale MP, will send one of these Mint Issue coins to every study respondent who returns his completed questionnaire or signed Refuser Notification Form.***

Thank you for considering this invitation. We look forward to including you in this important study.

Associate Professor Malcolm Sim

DEPARTMENT OF EPIDEMIOLOGY
& PREVENTIVE MEDICINE
Central & Eastern Clinical School
Alfred Hospital
Melbourne 3004
ABN: 12 377 614 012

MINISTER FOR VETERANS' AFFAIRS

ID NO: 20000

Dear Mr Comparison,

I am writing to invite you to participate in an important survey of the health of Australian men aged 65 years and over.

The survey is being conducted as part of the Korean War Veterans' Health Study and will provide important information about the health of older men in our community.

For the survey to be successful we need responses from as many people invited to participate as possible, regardless of whether you are in good or poor health, a Korean War Veteran or not.

The study is being conducted by independent medical researchers at Monash University. Completed questionnaires will be retained by the University, which will store them in accordance with the *Privacy Act 1988*. **No information from your questionnaire which identifies you will be available to the Department of Veterans' Affairs and your answers will not in any way affect your pension, benefits or any health services you are entitled to receive. If you wish, you may discontinue participation at any time.**

I am delighted to offer all those who complete and return the questionnaire or attached form a Royal Australian Mint Issued Korean War coin to keep. This 2003 coin commemorates 50 years since the signing of the Korean War Armistice.

I would welcome your participation in this study and thank you for your time and effort in completing the questionnaire.

Yours sincerely

Danna Vale

DANNA VALE MP

Parliament House, Canberra ACT 2600 Telephone | 02 6277 7820 Facsimile | 02 6273 4140

MONASH
UNIVERSITY

20000
MR FIRST SECOND COMPARISON
PO BOX 858
WODEN ACT
2606

Survey of Men's Health & Ageing

Dear Mr COMPARISON,

You were recently sent a package informing you that you had been selected and invited to participate in an important national survey of men's health and ageing. This package included a letter of invitation from the Minister for Veterans' Affairs, the Hon Danna Vale MP, and the study questionnaire. The Monash University study team has not yet heard from you and encourage you to again consider taking part in this study. If you have recently forwarded your completed study questionnaire to us, or the Voluntary Refusal Notification Form, please disregard this reminder letter.

The survey aims to provide valuable information about the health of Australian men aged 65 and above and also to compare this with the health profile of those members of the community who are veterans of the Korean War. For the survey to be successful in these aims, it is vital that as many of the invited men as possible participate. That includes those who are very old, those who are unwell as well as those who enjoy good health. Participation simply involves completing a written questionnaire about your health and some life experiences. *If necessary this questionnaire can be completed on your behalf by a relative, carer or friend.*

We urge you to read the information which was sent to you in the invitation package. If you need any additional information, or if you need a new invitation package sent to you, please do not hesitate to contact the Monash study team on **1800 062 534**. This is a **free call** from anywhere in Australia.

In recognition of the inclusion of Australia's Korean War veterans in this study, all persons who send in their completed questionnaire or Refuser Notification Form will receive a **Royal Australian Mint Issued 2003 coin** commemorating 50 years since the signing of the Armistice to the Korean War and honouring the men and women who served.

We look forward to hearing from you soon.

Very best regards

Associate Professor Malcolm Sim
24/06/04

DEPARTMENT OF EPIDEMIOLOGY
& PREVENTIVE MEDICINE
Central & Eastern Clinical School
Alfred Hospital
Melbourne 3004
ABN: 12 377 614 012

MONASH
UNIVERSITY

Survey of Men's Health and Ageing
FINAL REMINDER

Dear Mr Comparison, STUDY ID: 20000

Recently you have been invited to participate in a national health survey of Australian men aged 65 and above. We have not yet heard from you and send this final reminder to encourage you to consider taking part. If you have recently forwarded your completed study questionnaire to us, or the Voluntary Refusal Notification Form, please disregard this reminder letter.

This important survey provides a valuable opportunity to record information about the health of the general Australian male population. The study can only be successful if as many invited men as possible participate. Importantly that includes all of those who are unwell, as well as those who enjoy good health.

Your participation simply involves completing a written questionnaire about your health and some life experiences and returning it to us in the Reply-paid envelope provided. *If you are unable to complete the questionnaire yourself, it can be completed on your behalf by a relative, carer or friend.*

For your convenience we have enclosed a new copy of the study questionnaire, Explanatory Statement, Voluntary Refuser Notification Form and Reply-paid envelope. If you need further information about the survey, please do not hesitate to contact the Monash study team on **1800 062 534**. This is a **free call** from anywhere in Australia.

Everyone who returns a completed questionnaire or signed Refuser Notification Form will receive a **Royal Australian Mint Issued 2003 coin**. This coin is offered by the Minister for Veterans' Affairs, the Hon Danna Vale MP, in appreciation of your involvement in the survey and in recognition of the survey's inclusion of Australia's Korean War veterans. The coin commemorates 50 years since the signing of the Armistice to the Korean War and has been released in honour of the men and women who served.

We look forward to hearing from you soon.

Very best regards

Associate Professor Malcolm Sim
24/06/04

DEPARTMENT OF EPIDEMIOLOGY
& PREVENTIVE MEDICINE
Central & Eastern Clinical School
Alfred Hospital
Melbourne 3004
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APPENDIX H - SURVEY OF MEN'S HEALTH AND AGEING EXPLANATORY STATEMENT

Explanatory statement: **Survey of Men's Health and Ageing**

Introduction

Medical researchers at Monash University are undertaking a health study of Australian males aged 65 and above. The survey aims to provide valuable information about the health of different groups in Australia's ageing male population, such as groups who are of different ages and from different backgrounds. The survey is being conducted as part of the Korean War Veterans' Health Study which also aims to provide information about the long-term effects of war-related activities and may assist the Defence Forces in developing appropriate supportive and protective measures against future health threats to their personnel. This research is funded by the Australian Government Department of Veterans' Affairs (DVA). You have been specifically identified as being eligible to participate in this survey and your contact details have been sourced from the Australian Electoral Commission (AEC). The AEC has provided name, address, gender and age range information for this medical research program in conformity with sections 91(4A)(e) and 91A(2A)(c) of the *Commonwealth Electoral ACT 1918* and Regulation 10 of the Electoral and Referendum Regulations.

Participation overview

Participation in the survey primarily involves completing a questionnaire about your health and quality of life today including your medical conditions, general physical health, psychological well being, alcohol and cigarette consumption and your reaction to stressful life events. There are also some very brief questions about your military service you may have undertaken, however, these may not be applicable to you. The questionnaire is expected to take up to 45 minutes to complete and this can be undertaken in your own time at home. You may like to complete small parts at a time, taking more than one sitting to complete the whole questionnaire. The completed questionnaire can then be returned to the Monash University study team, in the Reply-paid envelope provided, at no cost to you.

It may be necessary for a relative, friend or carer to assist with the completion of the questionnaire. Wherever possible it should be your answer to each question that is recorded. If this is not possible, the relative, friend or carer should take great care to estimate accurately the correct answers on your behalf. If necessary this person may also sign the study Consent Form, near the start of the questionnaire, on your behalf.

The success of the study depends on as many invited persons as possible participating, regardless of whether they are very old, very unwell or very well. However, your participation in the study is completely voluntary. You are under no obligation to complete the questionnaire and return it to the study team. Your decision about participation will have NO implications for your future access to Government sponsored medical care or benefits. However, if you decide not to participate, we ask that you please sign the Voluntary Refusal Notification Form (on green paper), and return it in the Reply-paid envelope provided. If we do not hear from you, you will be sent two further reminder notices about participation in the study.

In 2003 the Royal Australian Mint issued a new $1 coin in commemoration of it being 50 years since the signing of the Armistice to the Korean War. In recognition of your inclusion in this health study of elderly Australians, which also includes Korean War veterans, the Minister for Veterans' Affairs, the Hon Danna Vale MP, will send a Mint Issue commemorative coin to every respondent who returns his completed questionnaire or signed Refuser Notification Form to Monash University.

Risks and inconveniences

Sometimes answering questions about your health and life experiences can be stressful or upsetting. You may prefer to answer the questionnaire with a supportive person present. Alternatively, if you feel distressed, it may be helpful to you to phone a friend or a local supportive community group. The questionnaire focuses largely on your current health issues, with little reference to the past, and the questionnaire has been kept as brief as possible, only including questions which are absolutely necessary to the investigations of the study. Whilst it is important that you answer as many questions as possible, you may leave a question blank if you prefer not to answer it.

Confidentiality and privacy - What will happen to your information?

All of the information gained in the study will be held securely by Monash University for a minimum of 7 years. You may request access to your own information at any time. To ensure the confidentiality of the information, the data will have all identifying information removed, such as your name, and will be held in storage using code numbers. The information gathered for the study will be statistically analysed in grouped format, published in a report to the Government and in articles in medical journals. It will not be possible to identify any individual's results from these publications or reports.

DVA will store a set of the deidentified data indefinitely. The information will be protected according to the provisions of the *Privacy Act 1988*. Your information will NOT be accessed by DVA to assess compensation or pension claims. DVA can only use this information for the purpose of further medical research and only with the approval of an overseeing committee.

Future investigations

We may need to contact you in the future. This may be to ask you about your health or to invite you to participate in more in-depth studies. If we do contact you, you will be under no obligation to participate in any proposed investigations.

Concerns or complaints

Should you have any concerns or complaints about the manner in which this project is conducted, please do not hesitate to contact the study team on **1800 062 534**.
The principal investigator for this study is:

Associate Professor Malcolm Sim
Monash University , Department of Epidemiology & Preventive Medicine
Level 3, 553 St Kilda Rd Melbourne VIC 3004
Telephone: 1800 062 534 Fax: (03) 9903 0556

Alternatively you may wish to contact the Department of Veterans' Affairs, which has funded the study, on **1800 502 302**.

You can complain about the study if you don't like something about it. To complain about the study you can phone, or write to, the Monash University Standing Committee on Ethics in Research Involving Humans (SCERH) which has endorsed the study. Their contact details are as follows:

The Secretary
Monash University SCERH *(please quote project number 2003/332)*
PO Box 3A
Monash University VIC 3800
Telephone: (03) 9905 2052 Fax: (03) 9905 1420
Email: SCERH@adm.monash.edu.au

The Department of Veterans' Affairs Human Research Ethics Committee has also endorsed the study.

APPENDIX I - SURVEY OF MENS' HEALTH AND AGEING PARTICIPANT QUESTIONNAIRE

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DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

SURVEY OF

MEN'S HEALTH AND AGEING

PARTICIPANT QUESTIONNAIRE

DEPARTMENT OF EPIDEMIOLOGY & PREVENTIVE MEDICINE

THANK YOU

for participating in the Survey of Men's Health and Ageing

Please read the following instructions regarding the completion of this questionnaire.

1. This questionnaire should be completed in relation to the study participant who has been named on the letter of invitation.

2. It is important that the Informed Consent Statement on page 1 be read and signed either by the study participant, or by the relative, friend or carer completing the questionnaire on his behalf.

3. If it is necessary for a relative, friend or carer to complete the questionnaire on behalf of the study participant, then it is important that this be stated under the heading "Who is completing the questionnaire?" on page 2.

4. Unless directed otherwise, EVERY question should be completed if possible. Please choose the best available response to each question, even if there is not one that suits perfectly.

5. Please be sure to read each question, and its instructions, VERY CAREFULLY.

6. Please use a **BLUE OR BLACK PEN ONLY** to complete this questionnaire. If you make a mistake simply cross it out and clearly mark the correct answer.

7. When completing the questionnaire please place ticks ☑ in the tick-boxes provided. *correct*

   Please DO NOT place crosses ☒ in the boxes or circle the boxes ☐ *incorrect* *incorrect*

8. Alternatively, when required, please write clear numbers in the number-boxes provided.

   For example [1][5] years

9. Please ring the Monash University Study team if you are unsure about how to complete any section of this questionnaire. The Freecall number is **1800 062 534.** Please call any time during business hours, Eastern Standard Time, Monday to Friday. This call is free of charge from anywhere within Australia.

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This page, holding your name and contact details, will be detached from the rest of the questionnaire

INFORMED CONSENT STATEMENT

Survey of Men's Health and Ageing

Please read the following statement and place your signature in the space provided if you agree with the provisions of the study.

In signing this consent form I am declaring the following:

I agree to take part in the Survey of Men's Health and Ageing.

I have read and understood the Study Explanatory Statement.

I have had the opportunity to ask questions arising from the Explanatory Statement via the Monash University Freecall number 1800 062 534.

I understand that I may experience emotional distress associated with answering questions about my health and experiences.

I understand that I am participating in this study in a voluntary capacity and that at any time I can withdraw consent for my questionnaire responses to be used.

I am cooperating in this study on the provision that the information I provide in this questionnaire will be kept confidential and that any published reports of this study will preserve my anonymity.

Participant's Name	
Participant's Signature	**Date** / /
OR	
Signature of person completing the form on behalf of the participant	**Date** / /

CONTACT DETAILS

On occasion we may need to contact people who participate in the study. In case we need to contact you, could you please provide a day time telephone number here. Thank you.

Area code

WHO IS COMPLETING THE QUESTIONNAIRE?

Is the person who is completing this questionnaire the participant who is named on the invitation letter, or is the questionnaire being completed by a relative, friend or carer on behalf of the participant?

*Please tick **ONE.***

☐ Completed by participant named on the invitation
GO STRAIGHT TO DEMOGRAPHICS QUESTIONS ON THE NEXT PAGE →

☐ Completed by relative, friend or carer on behalf of the participant.

If completed by relative, friend or carer,

***are you transcribing answers provided by the participant?**; for example, are you reading the questions to the participant and recording his answers on to the questionnaire?*

***Or, are you writing your own answers on behalf of the participant?**; for example, the participant is too unwell to answer the questions and you are choosing the correct answers based on your own knowledge of the participant's life and health?*

*Please tick **ONE.***

☐ Transcribing answers provided by the participant

☐ Writing my own answers on behalf of the participant

Please note that the remainder of the questionnaire refers to the participant and not to the relative, carer or friend who might be completing the questions on the participant's behalf.

DEMOGRAPHICS

We have some general questions to begin with.

1. What is your date of birth? ☐ / /
Day / Month / Year

2. Where were you born?

☐ Australia ☐ New Zealand ☐ United Kingdom or Ireland ☐ Italy

☐ Greece ☐ Germany ☐ *Other* ☐ *please specify*

***If NOT Australian born** please answer questions 2a and 2b.*

2a. In what year did you FIRST settle in Australia? ☐ *year*

2b. Are you an Australian citizen? ☐ NO ☐ YES

If YES, in what year did you gain citizenship? ☐ *year*

3. Do you regard yourself as being of Aboriginal or Torres Strait Islander origin? ☐ NO ☐ YES

4. What is your current marital status? ***Choose one.***

☐ Married ☐ De facto ☐ Widower ☐ Divorced

☐ Separated ☐ Single, never married

5. Which category best describes the HIGHEST educational qualification you have COMPLETED? ***Choose one.***

☐ Primary school
☐ Secondary school up to grade 10 (including Services Education)
☐ Secondary school grades 11 or 12
☐ Certificate (trade, apprenticeship or technician)
☐ Diploma (associate or undergraduate)
☐ University degree

QUALITY OF LIFE and GENERAL HEALTH

6. How would you rate your quality of life? ***Choose one.***

☐ Very poor ☐ Poor ☐ Neither poor nor good ☐ Good ☐ Very good

7. How satisfied are you with your health? ***Choose one.***

☐ Very dissatisfied ☐ Dissatisfied ☐ Neither satisfied nor dissatisfied

☐ Satisfied ☐ Very satisfied

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The following questions ask about **HOW MUCH** you have experienced certain things in the last **TWO WEEKS.**

	Not At All	A Little	A Moderate Amount	Very Much	An Extreme Amount
8. To what extent do you feel that physical pain prevents you from doing what you need to do?	☐	☐	☐	☐	☐
9. How much do you need any medical treatment to function in your daily life?	☐	☐	☐	☐	☐
10. How much do you enjoy life?	☐	☐	☐	☐	☐
11. To what extent do you feel your life to be meaningful?	☐	☐	☐	☐	☐

	Not At All	A Little	A Moderate Amount	Very Much	Extremely
12. How well are you able to concentrate?	☐	☐	☐	☐	☐
13. How safe do you feel in your daily life?	☐	☐	☐	☐	☐
14. How healthy is your physical environment?	☐	☐	☐	☐	☐

The following questions ask about **HOW COMPLETELY** you experienced or were able to do certain things in the last **TWO WEEKS.**

	Not At All	A Little	A Moderate Amount	Mostly	Completely
15. Do you have enough energy for everyday life?	☐	☐	☐	☐	☐
16. Are you able to accept your bodily appearance?	☐	☐	☐	☐	☐
17. Have you enough money to meet your needs?	☐	☐	☐	☐	☐
18. How available to you is the information that you need in your day-to-day life?	☐	☐	☐	☐	☐
19. To what extent do you have the opportunity for leisure activities?	☐	☐	☐	☐	☐

20. How well are you able to get around? ***Choose one.***

☐ Very poor ☐ Poor ☐ Neither poor nor good ☐ Good ☐ Very good

The following questions ask you to say how **GOOD or SATISFIED** you have felt about various aspects of your life over the last **TWO WEEKS.**

	Very Dissatisfied	Dissatisfied	Neither Satisfied Or Dissatisfied	Satisfied	Very Satisfied
21. How satisfied are you with your sleep?	☐	☐	☐	☐	☐
22. How satisfied are you with your ability to perform your daily living activities?	☐	☐	☐	☐	☐
23. How satisfied are you with your capacity for work?	☐	☐	☐	☐	☐
24. How satisfied are you with yourself?	☐	☐	☐	☐	☐
25. How satisfied are you with your personal relationships?	☐	☐	☐	☐	☐
26. How satisfied are you with your sex life?	☐	☐	☐	☐	☐
27. How satisfied are you with the support you get from your friends?	☐	☐	☐	☐	☐
28. How satisfied are you with the conditions of your living place?	☐	☐	☐	☐	☐
29. How satisfied are you with your access to health services?	☐	☐	☐	☐	☐
30. How satisfied are you with your transport?	☐	☐	☐	☐	☐

31. In the last TWO WEEKS how often have you had negative feelings such as blue mood, despair, anxiety, depression? ***Choose one.***

☐ Never ☐ Seldom ☐ Quite often ☐ Very often ☐ Always

32. How do you feel about your life as a whole, taking in to account what has happened in the last year and what you expect to happen in the future? Please choose <u>ONE</u> response.

- ☐ Delighted
- ☐ Pleased
- ☐ Mostly satisfied
- ☐ Mixed
- ☐ Mostly dissatisfied
- ☐ Unhappy
- ☐ Terrible

33. During the past TWELVE MONTHS have you been hospitalised *<u>overnight</u>* or longer because of any illness or injury? If YES, please estimate for *<u>how many nights</u>* you have been hospitalised in the past twelve months.

- ☐ **YES, for** ☐☐☐ ***nights***
- ☐ **NO**

Emotions play an important part in your health. These next questions are designed to help us to know how you feel. Read each item and tick the response which comes closest to how you have been feeling in the <u>PAST WEEK.</u>
Answer in relation to the PAST WEEK:

34. I feel tense or 'wound up'.	Most of the time A lot of the time Time to time, occasionally Not at all
35. I still enjoy the things I used to enjoy.	Definitely as much Not quite so much Only a little Hardly at all
36. I get a sort of frightened feeling as if something awful is about to happen.	Very definitely and quite badly Yes, but not too badly A little, but it doesn't worry me Not at all
37. I can laugh and see the funny side of things.	As much as I always could Not quite so much now Definitely not so much now Not at all

Answer in relation to the PAST WEEK:

38. Worrying thoughts go through my mind.	☐ A great deal of the time ☐ A lot of the time ☐ From time to time but not too often ☐ Only occasionally
39. I feel cheerful.	☐ Not at all ☐ Not often ☐ Sometimes ☐ Most of the time
40. I can sit at ease and feel relaxed.	☐ Definitely ☐ Usually ☐ Not often ☐ Not at all
41. I feel as if I am slowed down.	☐ Nearly all the time ☐ Very often ☐ Sometimes ☐ Not at all
42. I get a sort of frightened feeling like 'butterflies' in the stomach.	☐ Not at all ☐ Occasionally ☐ Quite often ☐ Very often

Answer in relation to the PAST WEEK:

43. I have lost interest in my appearance.	Defintely I don't take as much care as I should I may not take quite as much care I take just as much care as ever
44. I feel restless as if I have to be on the move.	Very much indeed Quite a lot Not very much Not at all
45. I look forward with enjoyment to things.	As much as I ever did Rather less than I used to Definitely less than I used to Hardly at all
46. I get sudden feelings of panic.	Very often indeed Quite often Not very often Not at all

47. I can enjoy a good book or radio or TV program.	☐ Often ☐ Sometimes ☐ Not often ☐ Very Seldom

WELL DONE, YOU ARE HALF WAY THERE

Remember the Monash Study team is available on 1800 062 534 if you are unsure about how to complete any section of this questionnaire.

Feel free to take a break and return to the questionnaire later.

SMOKING

48. Have you ever smoked as much as 1 cigarette daily, or 1 cigar per week or 1 ounce of tobacco per month, *for three months?*

☐ **NO** ***If NO go to next page*** →

☐ **YES**

a. If YES, at what age did you *first* smoke as much as 1 cigarette daily, or 1 cigar per week or 1 ounce of tobacco per month?

Age in years ☐☐

b. Taking in to consideration times that you may have quit smoking, please estimate *how many years in total* you would have smoked?

Number of years ☐☐

c. What is the *average* number of cigarettes per day, cigars per week, or ounces of tobacco per month that you have smoked during that time?

☐☐☐ cigarettes per ***day*** ☐☐☐ cigars per ***week*** ☐☐☐ ounces of tobacco per ***month***

d. Do you still/currently smoke as much as 1 cigarette per day or 1 cigar per week or 1 ounce of tobacco per month?

☐ **YES**

☐ **NO**

e. If NO, at what age did you last stop smoking as much as 1 cigarette per day or 1 cigar per week or 1 ounce of tobacco per month?

Age in years ☐☐

ALCOHOL

49. CURRENTLY, how often do you have a drink containing alcohol?

☐ ***NEVER*** ☐ Once a month or less ☐ 2 to 4 times a month

☐ 2 to 3 times a week ☐ 4 or more times a week

If NEVER, go straight to question 52 down the page, otherwise read immediately below.

In answering the following questions, please remember that a 'standard' drink contains 10g of pure alcohol. Examples of a 'standard' drink include 1 glass of wine, sherry or port, 1 middy or pot of beer or 1 nip of spirits.

50. CURRENTLY, 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. CURRENTLY, 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. In the PAST, have you ever considered yourself a heavy drinker? ☐ NO ☐ YES

53. In the PAST, have you ever felt you should cut down on your drinking? ☐ NO ☐ YES

54. In the PAST, have people ever annoyed you by criticizing your drinking? ☐ NO ☐ YES

55. In the PAST, have you ever felt bad or guilty about drinking? ☐ NO ☐ YES

56. In the PAST, have you ever taken a drink first thing in the morning to steady your nerves or get rid of a hangover? ☐ NO ☐ YES

57. In the PAST, have you ever been treated for alcoholism or a drinking problem? ☐ NO ☐ YES

LIFE EVENTS

The following instructions are important for accurate completion of the next questions.

Below and on the next page is a list of problems and complaints that people sometimes have in response to stressful life experiences. We would like you to consider the event in ***your life*** that you found the ***most*** stressful or upsetting. Please nominate an event even if you don't think you have experienced anything particularly stressful or important.

Once you have nominated an event in the space provided below, please read the list of problems and complaints and indicate how much you have been bothered by each problem or complaint in the PAST MONTH in relation to your nominated stressful event. If you have not been bothered by a particular problem or complaint, simply tick the 'Not at all' option available to you.

58. The event in your life which you found the most stressful or upsetting was (please just nominate ONE event)

in what year? ☐☐☐☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
59. Had repeated, disturbing ***memories, thoughts or images*** of the stressful experience?	☐	☐	☐	☐	☐
60. Had repeated, disturbing ***dreams*** of the stressful experience?	☐	☐	☐	☐	☐
61. Been suddenly ***acting or feeling*** as if the stressful experience ***were happening again*** (as if you were reliving it)?	☐	☐	☐	☐	☐
62. Felt ***very upset*** when ***something reminded you*** of the stressful experience?	☐	☐	☐	☐	☐
63. Had ***physical reactions*** (eg heart pounding, trouble breathing, sweating) when ***something reminded you*** of the stressful experience?	☐	☐	☐	☐	☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
64. Been avoiding ***thinking about or talking about*** the stressful experience or avoiding ***having feelings*** related to it?	☐	☐	☐	☐	☐
65. Been avoiding ***activities or situations*** because ***they reminded*** you of the stressful experience?	☐	☐	☐	☐	☐
66. Had trouble ***remembering important parts*** of the stressful experience?	☐	☐	☐	☐	☐
67. ***Had loss of interest*** in activities that you used to enjoy?	☐	☐	☐	☐	☐
68. Been feeling ***distant or cut off*** from other people?	☐	☐	☐	☐	☐

In the PAST MONTH, and as a result of your nominated event, have you:

	Not At All	A Little Bit	Moderately	Quite A Bit	Extremely
69. Been feeling ***emotionally numb*** or unable to have loving feelings for those close to you?	☐	☐	☐	☐	☐
70. Been feeling as if your ***future*** somehow will be ***cut short?***	☐	☐	☐	☐	☐
71. Had trouble ***falling or staying asleep?***	☐	☐	☐	☐	☐
72. Been feeling ***irritable*** or having ***angry outbursts?***	☐	☐	☐	☐	☐
73. Had ***difficulty concentrating?***	☐	☐	☐	☐	☐
74. Been "***super alert***" or watchful or on guard?	☐	☐	☐	☐	☐
75. Felt ***jumpy*** or easily startled?	☐	☐	☐	☐	☐

MILITARY SERVICE EXPERIENCE

76. Have you ever served as a member of the Australian Armed Forces or enlisted in the Armed Forces of another country (including National Service but NOT including the Citizen Military Forces or the Reserve Forces)?

☐ **NO** *If NO, please go straight to the "CURRENT MEDICAL CONDITIONS" questions on page 13.*

If YES, please answer the questions in the boxes below where applicable.

☐ **YES, I served as a member of the Australian Armed Forces.**

In what year did you *first* join? **1 9** ☐☐

For how many years *in total* did you serve with the Australian Armed Forces?
Please include National Service but do NOT include years of service in the Citizen Military Forces or the Reserve Forces. ☐☐ **years**

☐ **YES, I enlisted as a member of the Armed Forces of another country.**

Which country? ☐

For how many years *in total* did you serve with the Armed Forces of that country? ☐☐ **years**

77. What is the highest level of military rank which you achieved in all of your military career?

☐ Enlisted rank ☐ Non-commissioned Officer ☐ Commissioned Officer

78. Did you ever deploy to a *major military conflict or operation?*

☐ **NO** ☐ **YES** **If YES, which one/s?**

☐ World War II
☐ Korean War
☐ BCOF Japan
☐ Malayan Emergency
☐ Borneo/Malaysian Confrontation
☐ Vietnam
☐ Another major military conflict or operation

☐

Please specify

CURRENT MEDICAL CONDITIONS

79. ***Here is a list of medical conditions that usually last for some time. Do you <u>currently</u> have any of these medical conditions?***

Please only include a medical condition <u>if it was diagnosed by a medical doctor.</u> Please tick YES if you have the condition and NO if you do <u>not</u> have the condition.

a. Asthma	NO ☐	YES
b. High blood pressure	NO ☐	YES
c. Stroke (or after effects of stroke)	NO ☐	YES
d. Heart attack or angina	NO ☐	YES
e. Rapid or irregular heartbeat	NO ☐	YES
f. Liver disease	NO ☐	YES
g. Arthritis	NO ☐	YES
h. Kidney disease	NO ☐	YES
i. Diabetes	NO ☐	YES
j. Melanoma	NO ☐	YES
k. Other skin cancer	NO ☐	YES
l. Other cancer (not skin)	NO ☐	YES
m. Stomach or duodenal ulcer	NO ☐	YES
n. Partial or complete blindness (not corrected by glasses)	NO ☐	YES
o. Partial or complete deafness	NO ☐	YES

Well done! This is the end of the questionnaire.

If you have any additional information you would like to provide about your health, please write details in the space provided here.

Please make sure that you have signed the Informed Consent Statement on page 1 and that every question has been answered where required.

If you are satisfied with the completed questionnaire, please place it in to the provided Reply paid envelope and return it to Monash University as soon as possible.

Many thanks for your participation

APPENDIX J - REFUSER NOTIFICATION FORM

Voluntary Refusal Notification Form

If you have decided NOT to participate in the Health Study you can inform Monash University by signing and returning this form in the Reply-paid envelope provided, or by faxing it to 03 99030556.

MR FIRST SECOND COMPARISON ID.NO. 20000

I have chosen not to participate in the Health Study.

Signed _ on this day _ _ _/ _ _ _/2004

You do not need to do anything further than sign this form and return it to Monash University. Alternatively, if you are willing to provide us with some more information, please consider answering the questions below. Your answers could provide us with valuable information about the quality of life and health of people who are not participating in the study, and their reasons for not participating.

You may leave these questions blank if you prefer not to answer them.
You will be entitled to the $1 commemorative coin whether or not you answer them.

1. **How do you rate your life as a whole, taking in to account what has happened in the last year and what you expect to happen in the future? Please tick one:**

   ☒ Delighted
   ☒ Pleased
   ☒ Mostly satisfied
   ☒ Mixed
   ☒ Mostly dissatisfied
   ☒ Unhappy
   ☒ Terrible

2. **How satisfied are you with your health? Please tick one:**

   ☒ Very dissatisfied
   ☒ Dissatisfied
   ☒ Neither satisfied nor dissatisfied
   ☒ Satisfied
   ☒ Very Satisfied

3. **Why have you chosen NOT to participate in the Study? Please tick all that apply.**

   ☒ You are too busy
   ☒ You are not well enough
   ☒ You don't think the study applies to you
   ☒ The questionnaire is too long
   ☒ You are not interested in participating in a health study
   ☒ Another reason _____
   Please specify reason

APPENDIX K - OTHER MAJOR MILITARY CONFLICTS OR OPERATIONS

A brief description is provided below for each of the major military conflicts or operations listed at question 79 in the KWVHS participant questionnaire, and question 78 in the SMHA participant questionnaire (excluding a description of the Korean War).

Second World War 1939 - 1945

Almost a million Australians, both men and women, served in the Second World War (WWII). Australian servicemen fought in campaigns against Germany and Italy in Europe, the Mediterranean and North Africa, and against Japan in south-east Asia and the Pacific. Over 30,000 Australian servicemen were taken prisoner in WWII, and 39,000 gave their lives. Two thirds of those taken prisoner were captured by the Japanese during their advance through south-east Asia within the first few weeks of 1942. While those who became prisoners of the Germans had a strong chance of returning home at the end of the war, 36% of prisoners of the Japanese died in captivity.

British Commonwealth Occupation Force, Japan 1946 - 1952

Participation in the British Commonwealth Occupation Force (BCOF) marked the first time that Australians were involved in the military occupation of a sovereign nation that it had defeated in war. BCOF participation in the allied force occupying Japan was announced on 31 January 1946, though planning and negotiations had been in progress since the end of the war. The main body of Australian troops arrived in Japan on 21 February 1946. Up to 45,000 Australians served in BCOF, including an infantry contingent of 4,700, base units consisting of 5,300, an Air Force wing of 2,200 and 130 from the Australian General Hospital. The Australian Navy also had a presence in the region as part of the British Pacific Fleet. For two thirds of the period of occupation Commonwealth forces were represented solely by Australians, and throughout BCOF's existence it was always commanded by an Australian officer.

Malayan Emergency 1950 - 1960

The Malayan Emergency was declared on 18 June 1948 after three estate managers were murdered in Perak, northern Malaya, by guerrillas of the Malayan Communist Party (MCP). In addition to air and infantry forces, Australia also provided artillery and engineering support, and an air-field construction squadron built the main runway for the air force base at Butterworth. Lasting 13 years, the Malayan Emergency was the longest continuous military commitment in Australia's history. Thirty-nine Australian servicemen were killed in Malaya, although only 15 of these deaths occurred as a result of operations, and 27 were wounded, most of whom were in the Army.

Borneo/Malayan Confrontation - Confrontation in Indonesia 1963 - 1966

Between 1962 and 1966 Indonesia and Malaysia fought a small, undeclared war which came to involve troops from Australia and Britain. The term "Confrontation" was coined by Indonesia's Foreign Minister, Dr Subandrio, in January 1963, and it has come to refer to Indonesia's efforts at that time to destabilise the new Malaysian federation, with a view to breaking it up. The actual war began when Indonesia launched a series of cross-border raids into Malaysian territory in early 1963.

The Australian units, which fought during Confrontation, did so as part of a larger British and Commonwealth force under overall British command. Australia's commitment to operations against Indonesia in Borneo and West Malaysia fell within the context of its membership in the Far East Strategic Reserve.

Continuing negotiations between Indonesia and Malaysia ended the conflict, and the two sides signed a peace treaty in Bangkok in August 1966. Twenty-three Australians were killed during Confrontation, seven of them on operations, and eight were wounded. Because of the sensitivity of the cross-border operations, which remained secret at the time, Confrontation received very little coverage in the Australian press.

Altogether, in the period 1964-1966, two infantry battalions, two squadrons of the Special Air Service Regiment, troops of the Royal Australian Signals, an artillery detachment and five squadrons of the Royal Australian Engineers were involved in Borneo. Ships of the Royal Australian Navy served in the surrounding waters and several Royal Australian Air Force squadrons were also involved during Confrontation.

Vietnam War 1962 - 1973

Australia's (then) Minister for External Affairs announced the decision to send military instructors to Vietnam on 23 May 1962. The first Australian troops committed to Vietnam arrived in Saigon on 3 August 1962. This group of 30 advisers was collectively known as the Australian Army Training Team Vietnam. As the conflict escalated, so too did the pressure for an increased Australian commitment. This commitment grew to involve the Australian Army, Navy and Air Force as well as civilian support such as medical/surgical aid teams, war correspondents and officially sponsored entertainers. By the time of the final withdrawal of the Australian Embassy Guard on 1 July 1973, approximately 60,000 Australian men and over 500 Australian women had served in the Vietnam War. Of these, more than 500 were killed or listed as missing presumed dead, and 3,131 were wounded. The Vietnam War therefore, represents Australia's largest military commitment in terms of personnel deployed since the Second World War.

APPENDIX L - ETHICS COMMITTEE APPROVAL LETTERS

MONASH University

8 March 2004

A/Prof. Malcolm Sim
Epidemiology & Preventive Medicine
Alfred Hospital

Ms Jillian Ikin
C/o Chief Investigator

2003/332 - Korean War Veteran's Health Study and Survey of Mens' Health and Ageing

Thank you for submitting your Request for Amendment form with respect to the above named project.

This is to advise that the requested amendments dated 2 March 2004 have been approved and the project can proceed according to your approval given on 9 June 2003.

Thank you for keeping the Committee informed.

Dr Andrea Lines
Human Ethics Officer (on behalf of SCERH)

Standing Committee on Ethics in Research Involving Humans
Research Grants and Ethics Branch
Monash University, Melbourne, VIC 3800, Australia
Building 3D, Clayton Campus, Wellington Road, Clayton
Telephone +61 3 9905 2052 Facsimile +61 3 9905 1420
Email scerh@adm.monash.edu.au
www.monash.edu.au/resgrant/human-ethics

MONASH University

16 December 2003

A/Prof. Malcolm Sim
Epidemiology & Preventive Medicine
Monash Medical School
Alfred Hospital Campus

Ms Jillian Ikin
C/o Chief Investigator

2003/332 - Korean War Veteran's Health Study and Survey of Mens' Health and Ageing

Thank you for submitting your Request for Amendment form with respect to the above named project.

This is to advise that the requested amendments dated 10 December 2003 have been approved and the project can proceed according to your approval given on 9 June 2003.

Thank you for keeping the Committee informed.

Dr Andrea Lines
Human Ethics Officer (on behalf of SCERH)

Standing Committee on Ethics in Research Involving Humans
Research Grants and Ethics Branch
Monash University, Melbourne, VIC 3800, Australia
Building 3D, Clayton Campus, Wellington Road, Clayton
Telephone +61 3 9905 2052 Facsimile +61 3 9905 1420
Email scerh@adm.monash.edu.au
www.monash.edu.au/resgrant/human-ethics/

9 June 2003

MONASH UNIVERSITY

Assoc. Prof Malcolm Sim
Epidemiology and Preventative Medicine
Alfred Hospital Campus

Ms Jillian Ikin
Epidemiology and Preventative Medicine
Alfred Hospital Campus

2003/332 - Korean war Veterans Health Study and Survey of Men's Health and Ageing

Thank you for the information provided in relation to the above project. The items requiring attention have been resolved to the satisfaction of the Committee. Accordingly this research is approved to proceed.

Terms of approval
The project is approved as submitted for a three year period from the date of this letter and this approval is only valid whilst you hold a position at Monash University. You should notify the Committee immediately of any serious or unexpected adverse effects on participants or unforeseen events that might affect continued ethical acceptability of the project. Any changes to the research protocol require the submission and approval of an amendment. Substantial variations may require a new application. Please quote the project number above in any further correspondence and include it in the complaints clause which must be included in the explanatory statement and may be expressed more formally if appropriate:

You can complain about the study if you don't like something about it. To complain about the study, you need to phone +61 3 9905 2052. You can then ask to speak to the secretary of the Human Ethics Committee and tell him or her that the number of the project is _____. You could also write to the secretary. That person's address is:

The Secretary
The Standing Committee on Ethics in Research Involving Humans
Building 3d, Monash University, Victoria 3800
Telephone + 61 3 9905 2052 Fax + 61 3 9905 1420
Email: SCERH@adm.monash.edu.au

Progress reports
Continued approval of this project is dependent on the submission of annual progress reports and a termination report. Please ensure that the Committee is provided with an annual report by 20 December each year. A final report should be provided at the conclusion of the project. The Committee should be notified if the project is discontinued before the expected date of completion. The report form is available at http://www.monash.edu.au/resgrant/human-ethics/forms-reports/index.html.

Retention and storage of data
The Chief Investigators of approved projects are responsible for the storage and retention of original data pertaining to a project for a minimum period of five years. You are requested to comply with this requirement.

Andrea Lines.

Dr Andrea Lines
Human Ethics Officer
Standing Committee on Ethics in Research Involving Humans

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COMMONWEALTH DEPARTMENT OF
VETERANS' AFFAIRS

NATIONAL OFFICE

Associate Professor Malcolm Sim
Department of Epidemiology and Preventive Medicine
Alfred Hospital
Commercial Road
PRAHRAN VIC 3181

Reference: 033579
Contact: Vicki Whitehorn
Telephone: (02) 6289 6179
Facsimile: (02) 6289 4776
E-mail: vicki.whitehorn@dva.gov.au

cc: Mr Dennis Murphy
DVA National Office

Korean War Veterans' Health Study– pilot study participants' explanatory letters

Dear Professor Sim

Thank you for submitting the above changes in protocol for consideration by the DVA Human Research Ethics Committee. The Committee considered them at its meeting on 11 December 2003.

The Committee had no ethical or privacy concerns with the changes and endorsed the new protocols.

I would like to remind you that, as part of their monitoring role, the Committee must be:

- advised, in writing and before implementation, should protocols change in the future.
- provided with progress reports and/or final reports.

The Committee looks forward to receiving your progress/final report in due course.

If you would like to discuss this matter further, please contact me in the first instance on (02) 6289 6179 or via the Committee's e-mail address (ethics.committee@dva.gov.au).

Yours sincerely

V Whitehorn

Vicki Whitehorn
Ethics Committee Coordinator

18 December 2003

COMMONWEALTH DEPARTMENT OF
VETERANS' AFFAIRS

NATIONAL OFFICE

Associate Professor Malcolm Sim
Department of Epidemiology and Preventive Medicine
Alfred Hospital
Commercial Road
PRAHRAN VIC 3181

Reference: 031893
Contact: Vicki Whitehorn
Telephone: (02) 6289 6179
Facsimile: (02) 6289 4776
E-mail: vicki.whitehorn@dva.gov.au

cc: Ms Peta Stevenson and Mr Dennis Murphy
DVA National Office

Korean War Veterans' Health Study (including the Survey of Mens' Health and Ageing) – revised invitation and participation protocols

Dear Professor Sim

Thank you for addressing the concerns of the DVA Human Research Ethics Committee, as outlined in the notification letter dated 20 June 2003.

The Committee considered the revised protocols out-of session. The Committee has no ethical or privacy concerns with the proposal, as amended, and has endorsed it.

I would like to remind you that, as part of their monitoring role, the Committee must be:

- advised, in writing and before implementation, should protocols change in the future.
- provided with progress reports and/or final reports.

The Committee looks forward to receiving your progress/final report in due course.

If you would like to discuss this matter further, please contact me in the first instance on (02) 6289 6179 or via the Committee's e-mail address (ethics.committee@dva.gov.au).

Yours sincerely

Vicki Whitehorn
Ethics Committee Co-ordinator

2 July 2003

COMMONWEALTH DEPARTMENT OF
VETERANS' AFFAIRS

NATIONAL OFFICE

Associate Professor Malcolm Sim
Department of Epidemiology and Preventive Medicine
Alfred Hospital
Commercial Road
PRAHRAN VIC 3181

Reference: 033579
Contact: Vicki Whitehorn
Telephone: (02) 6289 6179
Facsimile: (02) 6289 4776
E-mail: vicki.whitehorn@dva.gov.au

cc: Ms Peta Stevenson and Mr Dennis Murphy
DVA National Office

Korean War Veterans' Health Study (including the Survey of Mens' Health and Ageing)

Dear Professor Sim

Thank you for submitting the above proposal for consideration by the DVA Human Research Ethics Committee. The Committee considered the proposal at its meeting on 13 June 2003.

The Committee recognises that this is an important area of research and endorsed the proposal, subject to satisfactory clarification regarding the following concerns:

- While the Minister's invitation letter does include information about participation not affecting DVA entitlements, it does not advise veterans that participation is voluntary and that they can withdraw and it should. Furthermore, the Minister's initial letter should incorporate all of this information and the information should also be repeated or reinforced in other communication with veterans (e.g. participant information, reminder letters).
- The Committee prefers that this information be presented in 14 point bold font and has a standard paragraph, which can be adapted if needed, specifically:

  Your answers will be completely confidential and any personal details, which may identify you in any way, <u>will not</u> be passed to the Department of Veterans' Affairs. Your answers will not in any way affect your pension, benefits or any health services you are entitled to from DVA. If you wish, you may discontinue your participation in this study any time.

- Participants should be encouraged to contact the researchers if they have any problems with the study.

Please note that the Committee should be advised immediately in writing if the protocol changes from that approved, before the study progresses under the amended protocol. In

addition, researchers must provide the Committee with progress reports or a final report for shorter-term projects. These requirements are part of the Committee's monitoring role.

The Committee looks forward to receiving your progress/final report in due course.

If you would like to discuss this matter further, please contact me in the first instance on (02) 6289 6179 or via the Committee's e-mail address (ethics.committee@dva.gov.au).

Thank you for your cooperation in this matter.

Yours sincerely

Vicki Whitehorn
Ethics Committee Coordinator

20 June 2003

APPENDIX M - AUSTRALIAN KOREAN WAR VETERANS' PILOT HEALTH STUDY

MONASH
UNIVERSITY

Korean War veterans' Pilot Health Study

December 2002

Assoc Prof Malcolm Sim
Ms Jill Ikin

Monash University Department of Epidemiology and Preventive Medicine

1. PILOT HEALTH STUDY DESIGN

This study is a pilot of a cross-sectional survey of the entire cohort of surviving male Korean War veterans who are residing in Australia, and a comparison sample of similarly aged Australian men who are registered on the Australian Electoral Roll.

1.1 Study aims and objectives

The pilot study aims to evaluate the efficacy of a main, cross-sectional survey which in turn is designed to address the following research questions.

1. Do surviving male Korean War veterans differ significantly, in their general physical health and functioning, from a comparison population of similarly aged Australian men.
2. Do surviving male Korean War veterans differ significantly, in their general psychological health, from a comparison population of similarly aged Australian men. Specific comparisons include indicators of depression, alcohol misuse and anxiety including posttraumatic stress disorder.
3. Amongst surviving male Korean War veterans, do factors including age at deployment, rank at deployment and severity of combat experience predict differences in general physical health and functioning and general psychological health.

Specifically, the pilot study aims to evaluate the following aspects of the main, cross-sectional survey design:

1. *The ability of the main, cross-sectional study to answer the posed research questions*. A primary aim of the pilot study is to ensure that a main study, if conducted, will be methodologically sound enough to answer the research questions which it is designed to address.
2. *The suitability of the Electoral Roll as a source from which to draw a comparison group for the Korean War veterans:* This includes an assessment of the ease of extracting from the Roll, and contacting, a suitable age-matched comparison group for the Korean War veterans. Also of interest is the ease with which the study team can identify, for the purpose of exclusion, comparison group respondents who do not meet eligibility criteria for participation in the study. The proportion of Korean War veterans represented on the Electoral Roll is also a measure of the suitability of a comparison group drawn from this source.
3. *Currency and completeness of address information* provided both via the Korean War Veteran Mortality and Cancer Incidence Studies databases and via the Electoral Roll. A main study would be largely dependent on these data sources for contact information for study subjects.
4. *Participation rates and reasons for refusal*. Numbers of completed study questionnaires from the Korean War veterans' and comparison group will be tracked and used to predict participation rates in the main study. Nominated reasons for refusing participation will be assessed to identify aspects of the main study materials or design which inhibit participation.
5. *Feedback from invitation recipients and study participants*. The tone and content of telephone calls from invitation recipients and study participants will be evaluated to identify any aspects of the study materials which are misunderstood by recipients or

aspects of the study design which seem to be facilitating or, conversely, inhibiting participation in the study.

6. *Quality of returned questionnaire data* will be assessed to identify any problem areas in the questionnaire which need revision, reformatting or replacement.
7. *Missing important health concerns*. Responses to the open question provided at the end of the questionnaire ("Do you have any important health concerns which are not covered in this questionnaire?") will be evaluated for the purpose of identifying important medical conditions or health issues worth consideration for inclusion in the main study postal questionnaire.
8. *Ease of completion of the questionnaire*. Responses to open questions about the complexity, readability and emotional reaction to questionnaire items, will be evaluated for the purpose of identifying any additional problems areas in the questionnaire content.

1.2 Study populations

1.2.1 Definition of Korean War veteran study group

Korean War veterans are defined as all members of the Royal Australian Army, Royal Australian Navy or the Royal Australian Air Force who landed in Korea or who entered the waters surrounding the coast of Korea within a distance of 185 km seaward, including those who were seconded to the Army of the Republic of South Korea, the United States Air Force or Navy, the British Army, Navy or Air Force and any other allied service; all members of philanthropic organisations; all members of the Australian Forces Overseas Fund and all official entertainers and war correspondents who saw service in Korea between 27 June 1950 and 19 April 1956. These total 17,872 persons listed on the Department of Veterans' Affairs Nominal Roll for that conflict, including 5,769 Navy, 10,848 Army and 1,226 Air Force personnel, 19 members of philanthropic organisations and 10 civilians. The Nominal Roll comprises 18,814 men (99.7%) and 58 women (0.3%).

To have been eligible for service with the Australian armed forces in the 1950's, men had to be:

- Aged 18 years or older.
- An Australian citizen or British subject.

Korean War veterans to be included in this study are those who are:

- Male.
- Known or assumed to be alive.
- Residing permanently in Australia.

Live status will be determined from the records of the Korean War Veterans' Mortality Study database. At August 2002, 8,846 (49.7%) of all male Korean War veterans were recorded as alive on this database, 7297 (41.0%) were recorded as deceased and live status was unknown for the remaining 1671 male veterans (9.4%).

The average age of the surviving Korean War veterans is estimated to be 74, with youngest aged 65 and oldest aged approximately 95.

1.2.2 Definition of the comparison group

The comparison group subjects are defined as Australian males who were registered on the Australian Electoral Roll in July 2002, aged between 65 and 95 years and assessed as eligible to have served with the Australian armed forces during the period 1950 – 1955. The comparison group may include Australian males who did serve with the Australian armed froces at any time, including the period 1950 – 1955.

With some exclusions, the current Australian Electoral Roll should include all persons[i] who:

- Are alive.
- Are 18 years of age or older.
- Are an Australian citizen (or a British subject who was on a Commonwealth of Australia Electoral Roll on 25 January 1984).
- Have lived at their current residence for at least one month.

The Australian Electoral Roll excludes:

- People, who by reason of being of unsound mind, are incapable of understanding the nature and significance of enrolment and voting.
- Prisoners serving a sentence of five years or more.
- People who have been convicted of treason and not pardoned.
- Australian citizens living permanently overseas who do not have a fixed intention of returning to Australia.
- Any persons who renounce their Australian citizenship.

The study team is able to access a complete list of all enrolled males, aged 65 and above, from the current Electoral Roll. This list includes address upon enrolment[ii] but not phone numbers, country of birth or year of naturalisation. Korean War veterans will be removed from the list of possible comparison group subjects drawn from the Electoral Roll.

For the purpose of this study, eligibility to have served with the Australian armed forces during the period 1950 – 1955 will be determined from responses to the postal questionnaire and defined as:

- Aged at least 18 years old by the year 1955;
- AND
    - Australian born; or
    - British born (or a British subject) and first settled in Australia by 1955; or
    - Not Australian born or a British subject, but holding Australian citizenship in 1955.

It is anticipated that more than 20% of males aged 65 and older, who are registered on the Australian Electoral Roll in July 2002, will not meet these eligibility criteria for service with the Australian armed forces during the period 1950 – 1955. This is based on estimates that only 68% of males on the Electoral Roll, aged 65 years and above, will be Australian born and that an additional 11% will have been born in the United Kingdom or Ireland.[1] An unknown percentage of those born in the United Kingdom or Ireland will not have been residing permanently in Australia during the period of the Korean War. Whilst some people born in countries other than Australia, United Kingdom or Ireland may have been residing in

[i] The Australian Electoral Commission estimate that 95% of the eligible population are enrolled (AEC, Annual Report 2000-2001)

[ii] Address upon enrolment is not included for 'silent' voters.

Australia by the early 1950's, presumably only a small proportion of these were Australian citizens by that time, with citizenship only offered to this group for the first time in 1949.

Subjects who do not meet the defined eligibility to have served with the Australian armed forces, during the period 1950 – 1955, will need to be identified by their responses to the postal questionnaire questions relating to country of birth, year of first settlement in Australia and year of naturalisation (if an Australian citizen by naturalisation). These questions will be included only in the comparison group version of the postal questionnaire.

1.2.3 Sample size

The pilot study included 125 Korean War veterans. These were randomly drawn from the cohort of male Korean War veterans believed to be alive, as recorded in the database of the Korean War Veterans' Mortality Study in August 2002.

The comparison group sample totalled 125 subjects drawn from the entire list of men, aged between 65 and 95 years, who were registered on the Australian Electoral Roll in July 2002. Half of the comparison group subjects were randomly selected from those Electoral Roll subjects aged 74 years or above (the median age for surviving Korean War veterans) and half were randomly selected from those Electoral Roll subjects aged less than 74 years.

1.3 Contact strategy and recruitment procedures

1.3.1 DVA-based Contact and Recruitment Team

To ensure maintenance of the privacy and security of the contact details for Korean War veterans, a small DVA-based Contact and Recruitment Team (CRT) was established with exclusive access to the contact details contained within the DVA-held Nominal Roll for the Korean War. In general the role of the CRT was to:

- Obtain and maintain current contact details for the Korean War veteran group and the comparison group.
- Make initial mail contact with eligible subjects.
- Identify incorrect addresses amongst the data set, including the logging of study invitations which are returned to DVA marked "addressee unknown" or similar.
- Follow-up subjects, who do not respond to the initial mail contact, by sending reminder mailout packages.
- Respond appropriately to the queries and concerns of eligible subjects who may phone DVA requesting further information in order to make an informed decision about participating in the study.

1.3.2 Contact strategy

All eligible subjects were invited to participate via mailed invitation.

The initial invitation package contained:

- A letter of invitation to participate in the study from the Monash University study team.
- A personally addressed letter of endorsement from the Minister for Veterans' Affairs.

- A personally addressed letter of endorsement from the chair of the Consultative Committee.
- A study Explanatory Statement.
- The study Consent Form.
- A study Refuser Notification form.
- The study survey/questionnaire.
- A Reply-paid envelope.

Different versions of the Monash University invitation letter, the study Explanatory Statement, Consent Form and the study questionnaire were tailored for the Korean War veteran group and for the comparison group separately.

A first reminder letter was sent to those subjects who did not respond to the initial invitation package within three weeks of its dispatch, by either returning their completed survey or returning a Refuser Notification, or for whom the invitation package was not returned to sender from an incorrect address. This was a single page letter from the Monash University study team.

Further, a second reminder package was sent to those subjects who did not respond to the first reminder letter within three weeks of its dispatch, or for whom previous invitations had not been returned to sender from an incorrect address. This package contained:

- A single page letter from the Monash University study team.
- The study Refuser Notification form.
- The study survey/questionnaire.
- A Reply-paid envelope.

The initial set of address and phone contact details for Korean War veteran group subjects, used by the Contact and Recruitment Team, were those recorded as 'last known' on the Korean War Veterans Mortality and Cancer Incidence Studies databases. In February 2002 it was predicted that approximately 90% of the Korean War veterans, known to be alive, were current clients of the DVA. For these it was assumed that listed addresses would be very accurate. In the pilot study, no search procedures to identify alternative and current contact details were conducted for cases where addresses proved to be incomplete, incorrect or out of date.

1.3.3 Recruitment outcomes

Upon cessation of the contact and recruitment effort subjects were classified as belonging to one of the following recruitment outcomes:

Participant: these persons completed, or part completed and returned their study consent form and questionnaire.

Refuser: These persons refused participation in the study by either returning their Refuser Notification form or notifying the recruitment team by phone, email or post.

Reported overseas: During the contact and recruitment period these persons were determined to be overseas for a prolonged time and therefore ineligible for participation.

Reported deceased: During the contact and recruitment period these persons were reported to be deceased.

Ineligible: During the contact and recruitment period it was determined that these persons did not meet the eligibility criteria for participation as either a Korean War veteran group or comparison group subject.

Address missing or incorrect: This category was for subjects for whom address information was missing or determined to be incorrect; for example, this may have been evident due to a return of an invitation package marked "addressee unknown".

No reply: This default category was for all persons who did not respond to the mailed invitation packages and who could not otherwise be placed into one of the categories described above.

A subject tracking procedure and database, written by the Monash University study team, was used to manage and monitor the progress of the contact strategy and recruitment procedures.

1.4 Survey Instruments

1.4.1 Instrument selection

Selection of the appropriate survey instruments was based on the following considerations.

- Instruments were required which addressed the main study hypotheses; namely instruments which provided indications of physical and psychological functioning, and instruments which covered suitable demographic and exposure issues.
- Evidence of instrument validity when used with elderly and Australian populations.
- The availability of Australian normative comparison data or use of the instruments in previous studies of Korean War or other elderly veterans.
- Appropriateness of questions for an elderly, primarily retired population (for example. questions about functionality which relate to the work-place were considered inappropriate).
- Appropriateness of instrument length for completion by an elderly population, with preference given to instruments which were brief.
- As the survey was to be sent via the post, preference was given to instruments which were designed to be self-administered.

1.4.2 Overview of the study questionnaire

The survey instrument was a questionnaire sent by post and designed to be self-administered. It was anticipated that participants would complete the questionnaires in their own time at home, with access to a study free-call number if assistance was required.

This questionnaire included the following sections:

Instructions for completion of the questionnaire

Instructions, for the completion of the questionnaire, included guidelines about the study including invited subjects only, advice about proxy completion, use of 'ticks' and not 'crosses' in response boxes and the importance of reading the questions carefully and choosing from the response options available.

Proxy administration
This section was designed to determine whether the questionnaire was being self-administered or completed by proxy. If proxy administered, additional questions sourced the identity of the proxy, his/her relationship to the intended subject and reasons for proxy administration. Questions also determined whether the proxy was simply transcribing answers on behalf of the subject (for example, the participant has poor vision and was able to provide his own answers to the questions but not able to write them on to the form) or if the proxy was providing his/her own answers to the questions because the participant was not able to comprehend them, or alternatively not able to convey his own responses.

Informed Consent
The Informed Consent Statement, for the study, was placed inside the questionnaire to ensure it's completion and return with the questionnaire data.

Demographic and socioeconomic information
Demographic and socioeconomic information collected included:

- Date of birth.
- Country of birth.
- Whether currently enrolled to vote (Korean War veteran group only).
- If not Australian born, year of first settlement in Australia and year of naturalisation (comparison group only).
- Indigenous status.
- Current marital status.
- Type of disability pension if received.
- Highest educational qualification.

Demographic and socioeconomic variables were selected for several purposes. The demographic characteristics of date of birth, country of birth and indigenous status are included in the National Minimum Data Set, a core set of data elements agreed by the National Health Information Management Group for mandatory collection and reporting at a national level.[2]

Questions referring to date of birth, country of birth, and year of naturalisation were further designed to be to determine true eligibility of comparison group subjects for inclusion in the final data analysis.

The question in relation to whether Korean War veterans are currently enrolled to vote or not, was designed to be used in the pilot study to assess the proportion of Korean War veterans currently on the Australian Electoral Roll.

Marital status and educational qualifications were included because they are important predictors of health status.

Receipt of a disability pension was designed to be used as an objective indicator of health differences between the two groups. Type of pension received may be a marker of severity of health problems.

The Short Form 12® Health Survey
The Short Form 12 Health Survey (SF-12)[3] is a generic measure of health status. This questionnaire produces a "physical component summary" (PCS) score as an indicator of physical health and a "Mental Component Summary" (MCS) score as an indicator of mental

health. The instrument comprises 12 questions on a single page and is designed to be completed by most participants within two minutes.

The questions cover eight concepts commonly represented in health surveys; namely Physical Functioning, Role limitations due to physical problems, Bodily Pain, General Health, Energy/Fatigue, Social Functioning, Role limitations due to emotional problems, Mental Health and Change in Health.

The SF-12 has become one of the most widely used instruments for purposes of monitoring health of populations. More than one million SF-12 surveys were administered within a year of its release in 1996. Due to it's fairly recent release there has only been limited use of this instrument in the literature exploring the health of very elderly veterans (eg. Korean War or World War II Veterans). However the SF-12 items are directly derived from the more widely used SF-36,[4] and observed SF-12 PCS and MCS scores can be compared with those achieved in studies employing the SF-36. These two instruments show a very high level of agreement.

The original SF-36 has been demonstrated to be highly reliable. Ware et al (1993), combining the results from 14 studies, demonstrated median alpha reliability exceeding 0.8 for all eight subscales.[5] Exemplary validity of the 36-item instrument has been demonstrated in numerous studies indicating that the instrument accurately discriminates between groups of different ages, with or without minor or severe medical conditions, and with or without mental conditions. The shorter SF-12 loses about 10% in empirical validity, compared with the SF-36, however in group comparisons reported to date the SF-12 and SF-36 have reached the same statistical conclusions about group differences. For large study groups the SF-12 is believed to represent an excellent trade-off between reduced questionnaire length and reduced precision.[3]

The Australian Bureau of Statistics (ABS) 1997 National Survey of Mental Health and Wellbeing of adults incorporated the SF-12 and therefore Australian normative data is available for approximately 927 males aged 65 years and older.[6] A mental health study of the South Australian population found that approximately 10% of participants aged 75+ (number of subjects and sex breakdown not given) scored above cut-off on the SF-12.[7]

Life Satisfaction Scale

Also called the Delighted Terrible Scale, this scale is used to assess satisfaction with life in general.[8] It is most commonly used in population settings and was included in the ABS 1997 Survey.[6, 9] Test-retest reliability has been reported to be approximately 0.70, with 92 percent of respondents providing an answer on retest that was identical or immediately adjacent to their previous answer.[8] Internal consistency reliabilities have been reported at 0.74 and 0.87 on a sample of chronic mental patients.[10] A median validity coefficient of 0.82 has also been reported.[11]

Modified Lambeth Disability Screening Questionnaire (Version 3)

The Lambeth Disability Screening Questionnaire (LDSQ)[12] was designed to screen for physical disability in adults living in the community. Questions concern mobility and self care, and are phrased in terms of difficulty in performing various activities. Three versions of the questionnaire have been developed, each shorter than the previous version. The third version, in its complete form, is 22 items long and designed to be interviewer administered.[13] No reliability information is available. Validity estimates have been made by using the LDSQ Version 3 scores to predict the physical and psychosocial subscale scores of the Functional Limitations Profile (FLP); for a description of the FLP see McDowell and

Newell (1996).[14] For the physical subscale, the actual FLP scores correlated 0.79 with those predicted by the LDSQ Version 3; for the psychosocial scales the correlation was 0.50.

Our study only used the first 12 items of the LDSQ Version 3. These items focused on difficulties with body movement, ambulation and mobility and self-care. Excluded items were those focusing on sensory problems and social activity. These exclusions were primarily made to limit the total length of the study questionnaire. Social activity questions were also excluded on the basis that the SF-12 already included a Social Functioning measure.

Hospital Anxiety and Depression (HAD) scale

The Hospital Anxiety and Depression (HAD) scale is a brief 14 item self-rating measure of anxiety and depression.[15] It was designed for use with general populations rather than psychiatric patients, it has been widely used in Australia and its psychometric properties are considered quite good in terms of factor structure, intercorrelation, homogeneity and internal consistency.[16]

Posttraumatic Stress Disorder Checklist (PCL)

The PCL[17] is an easily administered self-report rating scale for assessing the 17 DSM-IV symptoms of post traumatic stress disorder (PTSD). It has excellent test-retest reliability over a 2-3 day period. Internal consistency is very high for each of the three groups of items corresponding to the DSM-IV symptom clusters as well as for the full 17-item scale. The PCL correlates strongly with other measures of PTSD, such as the Mississippi Scale and the Impact of Event Scale, and also correlates moderately with level of combat exposure.

Since it was not developed until 1993, not many studies of older veterans have used the PCL. However some data are available on Australian Vietnam veterans, Australian Gulf War veterans, US peacekeeping missions, several US Gulf War veteran studies, as well as many civilian studies.

Three versions of the PCL are available, although the differences are very minor. The PCL-M is a military version and questions refer to *"a stressful military experience"*. Our study uses the PCL-S, which is a non-military version that can be referenced to any specific traumatic event; questions refer to *"the stressful experience"*. The third version, the PCL-C is a general civilian version that is not linked to a specific event; the questions refer to *"a stressful experience from the past"*. The scoring is the same for all three versions.

A total score is computed by adding the 17 items, so that possible scores range from 17 to 85. Used as a continuous measure, the PCL has good diagnostic utility. In Vietnam combat veterans a cut-off of 50 on the PCL was a good predictor of a PTSD diagnosis. Principal components analysis revealed one large factor, consisting primarily of re-experiencing and hyperarousal items, and one much smaller factor, consisting primarily of emotional numbing items.

Tobacco consumption

Tobacco smoking, reported as being "responsible for the greatest burden on the health of Australians", has been associated with diseases including cardiovascular diseases, cancers, emphysema, stroke and thrombosis.[18]

In our study the consumption of cigarettes, cigars and tobacco will be assessed to determine:

- Smoking status: Ever smoker vs former smoker vs never smoker.
- Total number of years smoked.
- Approximate average amount of cigarettes, cigars or tobacco smoked per year of smoking.
- Cumulative amount of smoking in 'pack-years'.

There will be limitations to interpretation of this data. A longer questionnaire would be required, with multiple smoking start dates and quit dates, if the investigators were to very accurately calculate 'pack years' of cigarette consumption. Additionally, some under reporting of smoking consumption is expected.[19]

Alcohol Use

Alcohol use questions have been drawn from both the Alcohol Use Disorders Identification Test (AUDIT), from the Australian Diabetes, Obesity and Lifestyle Study and from the CAGE questionnaire.

The AUDIT scale was developed by the World Health Organisation as a screening instrument for current hazardous and harmful alcohol consumption.[20] The questions from this scale, which quantify current levels of alcohol consumption, have been used in our study questionnaire.

An additional question, drawn from the Australian Diabetes, Obesity and Lifestyle Study has been selected for it's evaluation of whether the respondent considers that he has ever been a 'heavy' drinker.

Finally the five-item CAGE questionnaire[21, 22] has been added to evaluate the existence of alcohol related problems indicative of dependence and/or abuse, across the respondent's lifetime.

Brief military history

Korean War veterans only

General information, sought in relation to military service, includes:

- The year of first full-time service
- Total duration, in years, of full-time service, not including service in Citizen Military or Reservist Forces
- Any Service as members of overseas forces, including years of duration
- Highest rank achieved
- Any deployments to major conflicts, other than Korea

Other information sought, specific to the Korean War deployment, includes:

- Whether Wounded in Action, and level of evacuation required
- Whether the subject was ever told he had haemorrhagic fever, malaria or other fever, during the Korean conflict or as a result of the Korean conflict.

Comparison group only

General information, sought in relation to military service, includes:

- Whether ever served as a member of Australian armed forces or the armed forces of another country, not including service in Citizen Military or Reservist Forces
- If served with Australian armed forces; year of first service and total duration of service
- If served as member of overseas armed forces; total duration of service
- Highest rank achieved
- Any deployments to major conflicts

Current medical conditions
Subjects are asked to report whether they currently have one or more of the following chronic medical conditions: asthma, high blood pressure, stroke, heart disease, liver disease, arthritis, kidney disease, diabetes, cancer (not skin), stomach or duodenal ulcer and thyroid disease.

Hospitalisations
Respondents are asked to estimate the number of nights of hospitalisation in the previous year.

Other health concerns
Respondents are asked an open question about any other important health concerns they wish to tell the investigators about.

Feedback about the questionnaire
A series of brief, open questions invite the respondents to provide comments and feedback about the questionnaire design and content. These include questions pertaining to whether the questionnaire was easy to read or straightforward to complete, whether there were any areas of the questionnaire which were upsetting or distressing to answer and whether the questionnaire content sufficiently covered important aspects of the respondents' health.

Time to completion
Respondents were asked to estimate the total time taken, in minutes, to complete the questionnaire.

Nominated Medical Practitioner
Respondents are invited to provide the name and current contact details of a personal medical practitioner. These contact details may be used in the main, cross-sectional survey for the purpose of validating self-reported medical conditions

Name and Personal Contact Details
Respondents are asked to provide their full name, address and phone number. These will be used to verify the identity of study respondents and to facilitate follow-up contact of respondents if necessary.

Korean War Exposure Assessment (Korean War veterans only)
Various aspects of Korean War service will be assessed for their possible impact on current health in Korean War veterans.

Aspects of service experience, which will be assessed, include:

- Service type, with comparisons made between those who served with the Australian Army versus the Royal Australian Navy versus the Royal Australian Air Force.
- Rank at deployment, with comparisons made between those who served as enlisted personnel versus non-commissioned officers versus commissioned officers.
- Duration of deployment, with comparisons made between those who served on long deployments versus those who served on short deployments. (Consideration may need to be given, if possible, to those who may have had short deployments due to injury).

Information in relation to the above categories of service experience will be drawn directly from the Korean War Nominal Roll.

In addition to the categories described above, it may be possible to rate participating Korean War veterans in relation to the levels of combat severity experienced and malevolence of environment. It has commonly been found that combat severity is highly predictive of PTSD in veteran populations. Through construction of an Expert Panel comprising Korean War veterans and military historians, it could be possible to estimate the levels of combat severity,

experienced by Korean War veterans, based on Nominal Roll held information about Unit, Ship and Squadron and dates of deployment.

The feasibility and accuracy of this exercise is yet to be determined.

1.5 Pilot study Ethics Committees' Approvals

Approval for piloting this study was sought and received from:

- The Monash University Standing Committee on Ethics in Research Involving Humans. Approval received on 18 April 2002.
- The Department of Veterans' Affairs Human Research Ethics Committee. Approval received on 20 August 2002.

2. RESULTS

2.1 Contact and recruitment

Mailouts to invited study subjects commenced on 30 August 2002, with first reminder letters despatched on 20 September 2002 and second reminder packages despatched on 11 October 2002. The recruitment outcomes for the entire study sample are shown in Table 2.1 for responses received by 1 November 2002, three weeks after the final mailout. Participation rates were based on 120 Korean War veterans and 122 comparison group subjects who remained after the removal of subjects reported to be ineligible for participation, overseas or deceased. Of the original 125 subjects in each group, four (3%) Korean War veterans but no comparison group subjects were reported as deceased during the contact and recruitment period, one (1%) Korean War veteran was found to be ineligible for participation as he did not serve in Korea[iii], two (2%) comparison group subjects were classified as ineligible for participation as they were female and one additional comparison group subject was reported to be overseas for an extended period.

Table 2.1 Recruitment outcomes for total study sample.

Recruitment outcomes				
	Korean War veterans N=125		**Comparison group N=125**	
	n	**(%)**	**n**	**(%)**
Not eligible	1	(0.8)	2	(1.6)
Reported deceased	4	(3.2)	0	(0)
Reported overseas	0	(0)	1	(0.8)
Recruitable subjects	**N=120**		**N=122**	
Participants (quest. received)	84	(70.0)	60	(49.2)
Refused participation	15	(12.5)	36	(29.5)
Refuser Notification rcvd	13	(10.8)	33	(27.0)
Other refusal	2	(1.7)	3	(2.5)
Address missing/incorrect	9	(7.5)	0	(0)
No reply	12	(10.0)	26	(21.3)

The Korean War veterans' group achieved a participation rate of 70%. Several addresses for this group proved to be missing or inaccurate (7.5%) and these subjects did not receive their invitations to participate. The participation rate amongst remaining subjects, who are presumed to have received their invitation packages, was 76% (84/111). Participation in the study was actively refused by 12.5% of recruitable Korean War veterans, or 13.5% (15/111) of those presumed to have received their invitation packages. Ten percent of recruitable Korean War veterans had not replied to the study invitation upon closure of the contact and recruitment period.

[iii] The invited subject was the brother to the true Korean War veteran. In a main study, the true Korean War veteran would be identified if possible and the invitation to participate redirected.

The comparison group achieved a recruitment rate of 49%. All recruitable subjects were presumed to have received their invitation packages as no incorrect addresses were identified. Participation in the study was actively refused by almost 30% of comparison group subjects. Approximately 21% of recruitable comparison group subjects did not respond to the study invitation.

2.2 Reasons given for declining to participate

Most refusers (13/15 Korean War veterans and 33/36 comparison group subjects) utilised the Refuser Notification form provided with the study invitation package. Of these, ten (77%) Korean War veterans and 25 (76%) comparison group subjects provided additional information about their reasons for declining participation in the study, using the options provided for them on the Refuser Notification form. The results of this assessment are presented in Table 2.2. Subjects could nominate more than one reason for declining to participate and therefore individual subjects may appear in Table 2.2 more than once.

Reasons nominated by Korean War veterans were quite evenly spread across the options offered on the Refuser Notification form and included not being well enough, not thinking the study applied to them, not being interested in participating and the questionnaire being too long. Where 'other reasons' were nominated, these included illness (2 subjects), religious grounds (1 subjects), recent completion of a health survey (1 subject) and the suggestion that the study was "50 years too late" (1 subject).

Comparison group refusers were most likely to nominate the item which indicated that they felt that the study did not apply to them, or that they were not interested in participating in a health study. Where 'other reasons' were nominated, these included statements that the subjects were not Korean War veterans (5 subjects), subjects were too old (2 subjects), illness (2 subjects) and the fact that the subjects spoke no English (2 subjects).

Table 2.2 Nominated reasons for declining to participate

Reasons for declining to participate				
	Korean War veterans N=10		Comparison group N=25	
	n	(%)	n	(%)
Too busy	0	(0)	1	(4)
Not well enough	2	(20)	5	(20)
Study not applicable	2	(20)	11	(44)
Questionnaire too long	2	(20)	3	(12)
Not interested	3	(30)	9	(36)
Other reasons	5	(50)	11	(44)

Three comparison group subjects phoned the Monash University 1800- freecall number to explain that they were not veterans of the Korean War and believed, therefore, that they had received the study invitation in error. It was explained to these subjects that they were indeed correctly invited to participate, however it is unknown whether they subsequently participated or not.

2.3 Postal questionnaire data

Postal questionnaires were returned by 144 subjects including 84 Korean War veterans and 60 comparison group subjects.

2.3.1 Time taken to complete the questionnaire

Postal questionnaire respondents were invited to estimate the total amount of time, in minutes, they took to complete the questionnaire. A total of 137 subjects answered this question and the median time reported was 30 minutes (range 6–240). Korean War veterans who answered this question (n=78) reported a median of 45 minutes (range 10-240) and the comparison group (n=59) reported a median of 30 minutes (range 6-90).

2.3.2 Representation of Korean War veterans on the Australian Electoral Roll

Two Korean War veterans (2.3%), of the 84 who completed the postal questionnaire, indicated that they were not currently enrolled to vote on the Australian Electoral Roll. The reasons for their exclusion from the Roll were not asked. One additional Korean War veteran reported that he did not know whether he was currently enrolled to vote or not.

2.3.3 Identification of ineligible comparison group subjects

The comparison group's responses to questions about country of birth, year of first settlement in Australia and year of naturalisation (if applicable) were used to determine whether the comparison group participants met eligibility for participation in the study according to the criteria that they should appear to have been eligible to have served with the Australian armed forces during the period 1950 – 1955. These criteria are defined in section 1.2.2 and, using these, 11 (18%) of the 60 comparison group subjects who completed the postal questionnaire were assessed as being ineligible for participation in the study.

The two comparison group subjects who refused participation in the study and reported that they spoke no English, are also likely to have been ineligible for participation based on these criteria.

2.3.4 Level of proxy completion of questionnaires

Questionnaires were reported to be completed by proxies on behalf of three Korean War veterans (3.6%) and two comparison group subjects (3.3%). As detailed below, in section 2.3.5, the question about proxy completion of questionnaires was frequently not answered by respondents.

2.3.5 Quality and completeness of questionnaire responses

The returned questionnaires were assessed for the quality and completeness of responses. The numbers of subjects for whom data were missing, or assessed to be incorrect or incomplete, are shown in Table 2.3, for the various sections of the questionnaire.

Overall the quality of the responses in the returned questionnaires was very good. There were very few sections of the questionnaire where responses were incomplete or missing for more than a few respondents. In particular, responses to questions in relation to personal details, tobacco consumption, alcohol use and military service were rarely incomplete or missing. Health measures including the Life Satisfaction scale, functional disability scale, HAD scale and hospitalisations were also rarely incomplete or missing.

The SF-12 could not be scored for approximately 13% of Korean War veterans and 7% of the comparison group. Whilst most of these subjects only missed one or two questions in the 12 item scale, responses to all 12 items are required for this instrument to be scored.

The stem question to the PCL-S was either not answered, or incorrectly answered, by 35% of the Korean War veterans and 22% of the comparison group. The failure to correctly answer this stem question renders the responses to the remainder of the PCL-S questions not usable. The question was more likely to be missed completely (70% of incorrect responses) rather than answered incorrectly (30% of incorrect responses).

The medical conditions questions were incompletely answered by 50% of Korean War veterans and 35% of the comparison group. Typically, these respondents appeared top have ticked "Yes" to medical conditions which applied to them, but left the remaining medical conditions blank. Whilst it appears likely that the "No" option should have been ticked for these remaining medical conditions, the study team could not be sure whether the true response to each not-ticked medical condition was "No" or missing.

The majority of respondents (58% of the Korean War veterans and 60% of the comparison group) failed to answer the question about proxy completion of the questionnaire. It appeared in most cases that the invited study subject, and not a proxy, completed the questionnaire, however this could not be determined with any certainty.

Fourteen percent of Korean War veterans and five percent of the comparison group were assessed to have incorrectly answered the military service question which read "Did you ever serve as a member of the Armed Forces of another country". These respondents included Korea, Japan, Papua New Guinea, Malaya and Vietnam as countries for whom they served. It is considered highly unlikely that these subjects served as members of the Armed Forces of these countries, and instead that these represent countries to which they deployed, or were seconded, as members of the Australian armed forces.

There was no evidence that the quality of the data deteriorated towards the end of the questionnaire, and this suggests that the length of questionnaire was not too long or adversely affecting the quality of responses.

Table 2.3 Missing, incorrect or incomplete questionnaire responses

Missing or incomplete questionnaire responses					
	Korean War veterans N=84		Comparison group N=60		
Item	**n**	**(%)**	**n**	**(%)**	**Comments**
Consent Form	4	(4.8)	2	(3.3)	
Name and contact details	2	(2.3)	2	(3.3)	Not given
Proxy question	49	(58.3)	36	(60.0)	Failed to indicate whether questionnaire was completed by invited participant or by proxy
Personal details					
Date of birth	0	(0)	0	(0)	
Country of birth	0	(0)	0	(0)	
Marital status	0	(0)	1	(1.7)	
Pension	4	(4.8)	5	(8.3)	
Education	1	(1.2)	1	(1.7)	
SF-12 Health Survey	11	(13.1)	4	(6.7)	
Life Satisfaction scale	0	(0)	1	(1.7)	
Functional disability	1	(1.2)	3	(5.0)	
HAD scale	1	(1.2)	3	(5.0)	
PCL-S	29	(34.5)	13	(21.7)	Stem question not answered at all (29/42) or answered incorrectly (13/42)
Tobacco consumption					
Ever smoked daily	0	(0)	1	(1.7)	
Age started smoking	1	(1.2)	1	(1.7)	
Total years	2	(2.3)	2	(3.3)	
Average cigarettes per day	1	(1.2)	1	(1.7)	
Currently smoke	2	(2.3)	1	(1.7)	
Age last stopped	1	(1.2)	1	(1.7)	
Alcohol consumption					
How often	0	(0)	1	(1.7)	
How many	1	(1.2)	0	(0)	
Six or more	1	(1.2)	0	(0)	Plus 1 KWV and 1 CG subject answered this question unnecessarily
CAGE questionnaire	1	(1.2)	2	(3.3)	

Table 2.3 continued over page

Table 2.3 continued

Missing or incomplete questionnaire responses

Item	Korean War veterans N=84 n	(%)	Comparison group N=60 n	(%)	Comments
Korean War veterans' military service					
Year first joined	1	(1.2)	NA	NA	Response not consistent with additional information provided
Years in ADF in total	0	(0)	NA	NA	
Member of armed forces of another country	12	(14.3)	NA	NA	All 12 subjects listed Korea, some also listed Japan, PNG, Malaya and Vietnam.
Highest rank	1	(1.2)	NA	NA	
Other conflicts	1	(1.2)	NA	NA	Listed "other" as PNG and Japan
Level of evacuation if injured	3	(3.6)	NA	NA	Gave two responses when one was requested
Fever	3	(3.6)	NA	NA	1 not answered, 1 put 'malaria' as 'other' and 1 listed 'pneumonia' as 'other'.
Comparison group's military service					
Ever served in the military	NA	NA	2	(3.3)	
Ever serve with the ADF	NA	NA	0	(0)	
Ever serve as member of armed forces of another country	NA	NA	3	(5)	All served in WWII and listed New Guinea
Highest rank	NA	NA	0	(0)	
Other conflicts	NA	NA	2	(3.3)	1 answered 'No" to military service but "yes" to Korea, Malaya and "various operations", 1 answered unnecessarily
Medical conditions	42	(50)	21	(35)	Invariably only ticking "Yes" where applicable but not ticking "No" for other conditions
Hospitalisations	0	(0)	1	(1.7)	

2.3.6 Other health concerns

Participants were invited to list any other important health concerns which they wished to tell us about. Forty Korean War veterans (48%) and 25 comparison group subjects (42%) listed additional health concerns. These covered a broad range of symptoms and medical conditions across a variety of body systems. In the Korean War veteran group, only a few types of health problems were reported by more than two or three respondents and these included heart bypass surgery and other vascular diseases (n=8), sight and hearing problems (n=6) and

posttraumatic stress disorder or other anxiety disorders (n=5). In the comparison group, hearing problems, skin cancers and joint problems were each reported by a few respondents.

2.3.7 Questionnaire feedback

More than 80% of Korean War veteran, and 75% of comparison group, participants answered positively to all questions about whether the questionnaire was easy to read, sufficiently spread out with large enough text and straightforward to complete with no sections unclear or too complex. Similarly the majority of respondents positively endorsed the content of the questionnaire as sufficiently covering important aspects of their health and were unlikely to report that any sections of the questionnaire were upsetting or distressing to complete.

Where respondents did provide feedback about shortcomings of the questionnaire (n=12, 15% Korean War veterans and n=14, 22% comparison group) there was no consistent theme to these. There were some comments in relation to the PCL questions being either stressful to answer or, conversely, difficult to answer because there had not been a stressful life event. Two subjects recommended larger tick boxes and wider page borders. A few subjects suggested that the health coverage in the questionnaire was not broad enough and their recommendations were various, including coverage of accidents, war-related trauma, past health concerns in addition to those which are current and age-related health problems.

2.3.8 Nominated Medical Practitioner

Sixty five (77%) Korean War veterans and 36 (60%) comparison group subjects provided the name and contact details for a medical practitioner.

2.4 Other feedback from invited subjects and participants

There were only a few telephone calls from study subjects to the Study 1800-freecall number and these were either by the comparison group subjects who rang to explain that they were not veterans of the Korean War (see section 2.2) or calls in relation to minor queries about correct completion of the questionnaire. There were no calls about other aspects of the study materials or study design.

3. DISCUSSION AND RECOMMENDATIONS

This pilot study provided some clear information about the expected effectiveness and success of a larger, cross-sectional postal survey of Korean War veterans and a comparison group drawn from the Australian Electoral Roll. The study was well received by the Korean War veterans with an acceptable participation rate and positive feedback about the content of the questionnaire. Whilst participation in the comparison group was low, there were some clear reasons for non-participation provided by this group which can be addressed to significantly improve recruitment in a future study. The overall quality of the questionnaire data was very good and there were only a few questionnaire items which need modification to improve future data collection.

A participation rate of 70% amongst Korean War veterans is a promising result. This recruitment rate would in fact be considered quite suitable for most major epidemiological studies and it is particularly good considering the age of the Korean War veteran population, the postal nature of the study invitation and little previous promotion of the study to the Korean War veteran community.

It should be noted that more than seven percent of the Korean War veterans were found to have incorrect or missing addresses, and, if these addresses can be correctly identified in a future study, this should effectively increase the Korean War veteran participation rate by approximately five percent. This highlights the necessity for a main study to include a comprehensive address-search strategy aimed at identifying accurate, current address information for as many Korean War veterans as possible.

Less than half of the invited comparison group subjects participated in the pilot study. This recruitment rate would be considered inadequate for a main, cross sectional study with little confidence given to any research findings therein. However, we believe that some revisions to the study materials would substantially improve this recruitment rate in a future study. A considerable proportion of the comparison group refusers appeared to have misinterpreted the study invitation materials by assuming that they were required to be Korean War veterans to participate. We believe that an important revision to the comparison group invitation package, reducing the focus on "Korean War veterans" and increasing the focus on the inclusion of Australian men in the community, would substantially increase the future recruitment success in the comparison group. This could include changing the title of the study (currently "Korean War Veterans' Health Study") on the invitation materials and questionnaires which go to the comparison group. For example, an alternative study title could be "Health in older Australians". The study Explanatory Statement for the comparison group could emphasise that the study has two aims; to document the health of older Australians and to use these data for comparison with the Korean War veteran population. It would remain important, however, that the study materials sent to Korean War veterans retain the current study title. It should be noted that alterations to the study materials, such as those described here, would be subject to appropriate Ethics Committees approval.

Less common reasons for non-participation, given by both Korean War veterans and comparison group subjects, included ill-health and being too old, and few proxy respondents completed the questionnaires on behalf of invited participants, such as these, who were unable to do so. Non-participation amongst the very unwell and very old is likely to result in an over estimation of the overall health status of both study populations in a main, cross-sectional study. Revisions to the study invitation materials should be considered which highlight the importance of participation by subjects who are very old or unwell and to

emphasise the provision that a proxy (such as a caregiver or family member) may complete the questionnaire on behalf of subjects if they are unable or unwilling to complete it themselves for any reason.

Along with the recommendations outlined above, some additional enhancements to the quality of the overall presentation and packaging of the study invitation materials, and some appropriate media promotion of the study to the Korean War veteran community, we believe that a future cross-sectional study could successfully achieve participation rates of at least 75% in the Korean War veterans' group and at least 65% in the comparison group.

The overall quality of the returned questionnaire material was excellent, with most sections regularly completed in full. This included high quality data in potentially difficult or controversial sections such as questions about cigarette consumption and alcohol use. The questionnaires were, on average, completed within 45 minutes and respondents did not seem to have trouble with an instrument of this length.

Only a few sections of the questionnaire need reconsideration and revision. The PCL was poorly completed by many respondents and it is important that the main study questionnaire contain an effective measure of posttraumatic stress disorder. In many cases of non-response to the PCL, it appears that respondents simply missed the stem question altogether. The stem question for the PCL is located at the bottom of a page in the questionnaire, after lengthy instructional text. We believe that repositioning the PCL stem question, to the start of a new page, will substantially improve the response rate to this question. However, some respondents who did answer the PCL stem question, answered this question poorly despite the instructions provided. Some further revision to the instructions for this question may be beneficial. Alternatively it may be necessary to consider some alternative instruments which measure PTSD, to replace the PCL in this questionnaire.

Other required revisions to the questionnaire include alterations to the wording of questions, or to their instructions, to encourage full completion of the consent form, medical conditions questions, the SF-12 and question about proxy completion of the questionnaire. The question about service as members of the armed forces of another country needs revision to ensure that participants do not continue to report countries to which they deployed but for whom they did not serve.

There were few consistent themes in regard to 'other important health concerns' which were reported, by respondents, to be missing from the content of the current questionnaire. Some reported areas of health, including heart and vascular diseases, joint problems and posttraumatic stress disorder, are already covered, in varying degree, in the existing questions. Some participants nominated sight and hearing problems, which are common in aging populations, and these may be worth consideration for inclusion in a main study.

Korean War veterans averaged 15 minutes longer, than the comparison group, to complete their questionnaires. The causes and consequences, of this difference between the two groups, are unknown. The veteran group may be taking longer to complete the questionnaire due to poorer health. Alternatively, the veterans may be more motivated, than the comparison group, to take extra care with their responses to each question. It is difficult to know whether such a difference, between the two groups, would result in a systematic bias in the study results. The potential for such a bias may be reduced, however, if the comparison group's invitation materials are revised to reduce emphasis on Korean War veterans and increase emphasis on the general Australian male population, and if this group are subsequently more motivated to take extra care with their responses.

The Australian Electoral Roll excludes certain members of the Australian community including the very unwell who may be of unsound mind and incapable of understanding the nature and significance of enrolment and voting. Therefore, any health study utilising a registered Electoral Roll sample will underestimate the prevalence of this level of disability in the community. Such persons, however, may be included amongst the Korean War veteran population, and therefore their exclusion from the comparison group could artificially increase differences in ill-health observed between the two study populations. This pilot study found that all but two Korean War veteran participants (2%) reported being included on the Australian Electoral Roll. These participants completed the questionnaire in full and, therefore, were unlikely to be excluded from the Electoral Roll for health reasons similar to those given above. It remains uncertain, however, whether any of the Korean War veteran non-responders, or refusers who cited ill-health, would be excluded from the Electoral Roll. Therefore, despite the seemingly high representation of Korean War veteran participants on the Electoral Roll, the true effects of the exclusion of very unwell people from the comparison group, which is drawn from the Roll, are difficult to estimate.

The Electoral Roll, otherwise, proved to be an effective source for recruiting a suitable comparison group to the Korean War veterans. Use of the Electoral Roll allowed the study to identify a group of Australian men of similar age to the Korean War veteran group, and provided very reliable address information. As expected, however, approximately 18% of the comparison group participants were found to be ineligible for participation according to the study criteria, as they had not been Australian citizens at the time of the Korean War, nor British subjects residing in Australia at that time. These ineligible subjects were effectively identified with the use of a small set of questions included in the questionnaire. It could be presumed, therefore, that approximately 18% of the comparison group refusers and non-responders could also be classified as ineligible for participation, however, the true proportion in these sub-groups is unknown. The Electoral Roll sample also included two female subjects (1.6%) who were identified and subsequently classified as ineligible for participation. Therefore, whilst the Electoral Roll proved to be a very useful source for identifying, and contacting, a suitable comparison group for a Korean War veterans' health study, the sample size for a main, cross-sectional study comparison group would need to be over-estimated to allow for a predicted 18-20% ineligibility rate in the Electoral Roll population.

We believe that a cross-sectional, postal survey of the entire cohort of surviving Australian male Korean War veterans, and a smaller sample of Australian men of similar age drawn from the general community, could provide valuable information about the recent burden of illness in this veteran population. Such a study could effectively compare the current level of physical and psychological morbidity in the Korean War veteran population, with that of the average Australian elderly male, and potentially draw some conclusions about the health effects of some war-related exposures. Such a study could also contribute valuable information about the aging Australian male population in general. It should be noted that, as a stand alone study of health in Korean War veterans, a morbidity study of this kind would be limited to 'healthy survivors' of the Korean War. By definition this study excludes close to nine percent of Korean War veterans for whom live status is unknown, and the study, also, can make no assessment of the past health status of veterans who are deceased and who, perhaps, were most affected by the Korean War. However, this proposed morbidity study is designed to compliment the Korean War veterans Mortality and Cancer Incidence Studies. Together, these studies can provide comprehensive death, cancer and morbidity information on approximately 90% of Australia's Korean War veterans. Such research would contribute

substantial information about the long-term effects of war exposure in Australian veterans to a scientific literature which is severely lacking in this area of health in the aging.

In summary, and in relation to the aims of this pilot study, we can make the following conclusions:

1. With some straight forward modifications to the study protocol, invitation materials and questionnaire content, we believe that a main, cross-sectional study would be methodologically sound enough to effectively address research questions in relation to the current physical and psychological health of Korean War veterans.

2. The Australian Electoral Roll is a very suitable source from which to draw an appropriate comparison group for a Korean War veterans' health study. A male, age-matched comparison group was easily extracted, Korean War veterans were well represented on the Roll and ineligible comparison group participants were easily identified upon participation.

3. There were some inaccuracies in the address information held in the Korean War Veteran Mortality and Cancer Incidence Studies databases. Address information provided by the Electoral Roll for comparison group subjects, however, proved to be very accurate.

4. Participation rates in the pilot study were 70% for the Korean War veterans and 49% for the comparison group. Non-participation was highest in the comparison group where some subjects mistakenly believed that they were supposed to be Korean War veterans in order to participate. Other reasons for non-participation in both groups included ill-health and old age, with few questionnaires being completed by proxy on behalf of these subjects. With some modifications to the study protocol, we believe that non-participation by these groups can be minimised, and a main, cross-sectional study could successfully achieve participation rates of 75% in the Korean War veterans' group and 65% in the comparison group.

5. A few telephone calls from comparison group subjects highlighted the fact that some members of this group misinterpreted the study materials to mean that only Korean War veterans could participate. There was little other telephone feedback to suggest that other aspects of the study materials or design were misinterpreted or responsible for inhibiting participation in the study.

6. The quality and completeness of questionnaire data was very good in most sections and can be easily improved in specific areas where data quality was poor.

7. There were few consistent themes in regard to 'other important health concerns' which were reported to be missing from the content of the current questionnaire. Some participants reported sight and hearing problems, which are common to aging populations, and these could be considered for inclusion in a main study.

8. The format, level of complexity and coverage of the questionnaires proved to be very acceptable to most respondents, and there were few problems reported.

To ensure the success of a main study, our recommendations include:

1. Instituting a comprehensive address search strategy to identify current address details for Korean War veterans.
2. Modifying the comparison group invitation package materials to reduce the focus on Korean War veterans and increase the focus on the non-veteran Australian population.

3. Revising all invitation materials to encourage participation by the very old and very unwell and to encourage participation by proxy.
4. Revising or replacing specified sections of the questionnaire, including the PCL, SF-12, medical conditions and proxy questions, to maximise returned data quality.
5. Improving the overall presentation and packaging of invitation materials.
6. Ensuring appropriate Ethics Committee review of all modifications to the study protocol.
7. Ensuring comprehensive media promotion of the study to the Korean War veteran community and to the general community.
8. Over-sampling any selected comparison group to allow for 18-20% ineligibility amongst Electoral Roll subjects.

A final point worth consideration is that the average age of the Korean War veterans is 74 years. Therefore, it is important that if a main study is to be undertaken, this should commence as soon as is feasible.

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