Centre for Australian Military and Veterans' Health

Rwanda Deployment Health Study

Long-term health and Veterans' Affairs compensation of veterans of the 1994-1995 ADF deployment to Rwanda: exploratory analysis of retrospective Departmental data

The University of Queensland
AUSTRALIA

CAMVH
CENTRE FOR AUSTRALIAN MILITARY & VETERANS' HEALTH

Australian Government
Department of Veterans' Affairs

Suggested citation

Runge C, Kanesarajah J, Loos C, Waller M & Nasveld P 2014. *Rwanda Deployment Health Study Report.* The University of Queensland, Centre for Australian Military and Veterans' Health, Brisbane

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Acknowledgements

The Department of Veterans' Affairs (DVA) commissioned and funded the Rwanda Deployment Health Study. The DVA project team (2012-2013: Dr Eileen Wilson, Susan Nolan, Kerrie Martain, 2013-2014: Kyleigh Heggie, Marten Sneddon, Rose van Dijk, Tracey Chant, Tim Cummins) facilitated data requests and project management. Statisticians at DVA, led by Glen Yeomans, provided the DVA data for the study. Dr Richard Clark, a consultant epidemiologist to DVA, provided a comprehensive review of the report.

The Department of Defence Directorate of Workforce Information (Lyndall Waterford) provided demographic, service and deployment data for the cohort. Army, Navy and Air Force Health Records provided access to central medical records. Major Julie Simes-Phillips, Commander Alison Thomas and Commander Wendy Davey facilitated access to Defence-held data.

The Australian Institute of Health and Welfare (AIHW), the custodians of the National Death Index (NDI), provided the dates and causes of death. The National Coronial Information System allowed AIHW to provide CAMVH with the cause of a coronial death.

Samuel Duncan, Jane Holloway, Brenda Hughes, Alison Mackenzie, Patricia Newman, Daniel Pasternak, Graham Pasternak and Karen Riley extracted the data from the medical records. Alison Bath, Kate Bath, Nadine Mammone and Ildiko Putnoki provided administrative support.

Australian and New Zealand Standard Research Classifications

111706 Epidemiology 111705 Environmental and Occupational Health and Safety

Disclaimer

The conclusions and recommendations expressed in this report are those of the Centre for Australian Military and Veterans' Health and may not reflect those of DVA or the Australian Government.

Cover images: Australian Active Service Medal (L)[1]; United Nations Assistance Mission for Rwanda medal (R)[2]

Contents

Glossary

Accepted claimant	Military member or veteran with an accepted claim for compensation from the Department of Veterans' Affairs
Accepted PTSD claimant	Military member or veteran with an accepted claim for compensation for PTSD from the Department of Veterans' Affairs
ADF	Australian Defence Force
AIHW	Australian Institute of Health and Welfare
ASC I	Australian Services Contingent I (August 1994-February 1995)
ASC II	Australian Services Contingent II (February 1995-August 1995)
CAMVH	Centre for Australian Military and Veterans' Health
DVA	Department of Veterans' Affairs
DWI	(Department of Defence) Directorate of Workforce Information
GRIM	General Record of Incidence of Mortality
ICD-10	International Classification of Diseases – Version 10
MEC	Medical Employment Classification
NDI	National Death Index
Op TAMAR	Operation Troops and Medical Aid Rwanda
PTSD	Post-traumatic stress disorder
RAR	Royal Australian Regiment
SD	Standard deviation
SMR	Standardised Mortality Ratio
UNAMIR II	Second United Nations Assistance Mission for Rwanda

Summary

This report presents the findings of the Rwanda Deployment Health Study, a Department of Veterans' Affairs (DVA)-funded study conducted by the Centre for Australian Military and Veterans' Health (CAMVH).

The purpose of the study was to determine the health and compensation history of veterans of the Rwanda deployment (Operation TAMAR [Troops and Medical Aid Rwanda], hereafter Op TAMAR) and differences between subgroups of the cohort.

The aims of the study are to increase understanding of contemporary veterans' long-term health and compensation and provide insights into the use of existing data to research veterans' health.

The study collected, reconciled, developed and conducted exploratory analysis of data from Defence personnel and medical records, DVA compensation datasets and a National Death Index linkage.

CAMVH has produced an accurate nominal roll for the deployment, developed a framework for the extraction and analysis of medical records data and established a mortality study for the cohort.

Key finding:
Half of the Op TAMAR cohort does not currently hold Veterans' Affairs compensation. The compensation profile of the other half of the cohort is characterised by mental health claims that are attributed to the Op TAMAR deployment. Medical personnel have fewer compensation claims and fewer medical presentations than rifle company and support personnel. No large differences were observed between the two contingents that deployed and between personnel from formed units and individual augmentees.

Key facts:

- 680 Australian Defence Force (ADF) personnel deployed on Op TAMAR.
- Just under half of the Op TAMAR cohort (48.8 per cent) had an accepted compensation claim by September 2012.
- The majority of compensation claims for the cohort were made 11 to 15 years after Op TAMAR.
- Thirty-one per cent of the Op TAMAR cohort has a compensation claim or treatment for PTSD to date.
- The number of deaths observed for the Op TAMAR cohort by April 2013 was significantly less than would have been expected in the general population of the same age and sex distribution.

Outcomes for future research:

- The linkage of demographic, service and deployment data with compensation and medical records data will enable a range of research questions to be examined.
- An efficient and mutually-agreeable process between future researchers and the Department of Defence and DVA for access to medical records is required if this data source is to be efficiently utilised.

Repeating the analyses of the current study for the other key deployments of the Op TAMAR era, Somalia and Cambodia, would provide a picture of the health of veterans over 20 subsequent years. The health and compensation trajectories of these veterans may assist with predictions for the trajectories of veterans of more recent deployments.

Background

Operation TAMAR

Genesis and timeline

Operation TAMAR was the ADF contribution to the Second United Nations Assistance Mission for Rwanda (UNAMIR II).

The Australian Government agreed to a UN request for personnel to support the mission following the peak of the Rwandan genocide. On the 25th of July 1994 the Australian Government announced that a force would be deployed to provide medical support to the UNAMIR II personnel.[3] This force comprised staff for the UNAMIR II Headquarters and a Medical Support Force[4], subsequently collectively titled Australian Services Contingent I (ASC I). ASC I served from August 1994 to February 1995. A second contingent, ASC II, served from February to August 1995.[3]

Composition and role

The two similar sized contingents comprised regular and reserve Army personnel supported by a smaller number of Air Force and Navy personnel. The force was made up of medical personnel, a rifle company and support personnel, with medical specialists flown in on six-week rotations.[4-6] Personnel either deployed with their unit or were an individual augmentee (were the only one to deploy from their unit).[3]

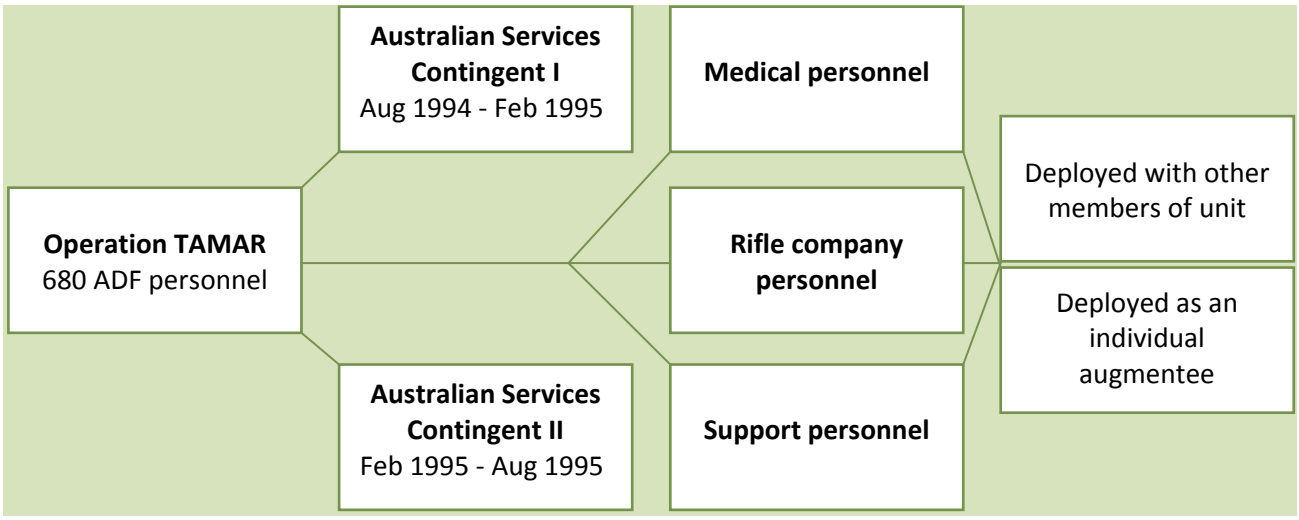

Figure A *Composition of Operation TAMAR*

The role of Op TAMAR was to provide medical support to UNAMIR II. This support extended to providing a hospital in Rwanda's capital, Kigali, providing aid posts throughout the country and preventive medicine, dental and aeromedical evacuation services.[4]

The Operation was also authorised to use spare capacity to provide medical care to the Rwandan people – this role dominated the operation as few UNAMIR II workers were ill or injured.[7] This care involved the treatment of casualties of mine explosions, vehicle accidents, gunshot wounds and infectious diseases not seen in developed nations.[8]

The UN mandate of non-intervention that adopts peacetime Rules of Engagement applied to Op TAMAR. This meant that personnel could only use their weapons if under direct hostile fire.[3]

Exposures

Both contingents were exposed to a high level of trauma. Murphy et al detailed the exposures.[9]

> Widespread inhumanity and suffering; stand-offs with local militia; mass graves and massacre sites; medical resuscitations; needle stick injuries; gruesome mine injuries; the suffering of children; patients dying in one's care; driving on uncleared roads (mine threat); deliberate vehicle collisions; driving through roadblocks; unburied bodies; seeing conditions in prisons.

There were also different challenges for each contingent. ASC I was characterised by frequent discovery of mass graves, massacre site discovery, exposed bodies and body parts, including within the area of the Kigali Hospital.[10] This exposure was repeated as the contingent members moved out across Rwanda to provide humanitarian support in villages and within the displaced persons camps.[11] The early phase was also characterised by an uncertainty in security and arrangements with the victorious Rwandan Patriotic Army and the post-genocide reappraisals.[11]

A refugee camp massacre (subsequently titled 'the Kibeho Massacre') occurred during the ASC II deployment. On the 19th of April 1995, 32 members of ASC II arrived at the Kibeho Displaced Persons Camp under orders to provide medical assistance to the refugees who were being forced to leave the camp by the Rwandan forces.[12] Over the following days, ASC II personnel witnessed the massacre of around 4,000 refugees by the Rwandan Patriotic Army and could not intervene due to the Rules of Engagement.[3] Later personnel who rotated through the camp continued to treat the remaining displaced persons and were exposed to squalid conditions.[3]

Op TAMAR veterans retrieve a casualty of the Kibeho massacre © Dept. of Defence

A study on the experiences of Op TAMAR personnel found that over 90 per cent reported seeing human degradation and misery on a large scale, 83 per cent believed that they were in danger of being killed and 94 per cent reported seeing dead bodies.[13]

The ADF deployed a three-member Psychology Support Team to the ASC II headquarters in Kigali following the massacre. The team conducted interventions with 156 personnel in the form of group and individual debriefings, counselling and psychological status assessments.[9]

A number of ASC II personnel who witnessed the Kibeho massacre have their stories published.[3, 12, 14, 15] Not being able to intervene greatly frustrated the personnel, however, many of the personnel and officials believe that had they not been in the camp the number massacred would have been higher.[12, 14]

Legacy

Due to the traumatic environment of the deployment, there is a perception in the military and general community of a high level of psychological morbidity in Op TAMAR veterans. The media has largely focussed on the ASC II experience with the Kibeho massacre.[16, 17]

A 2010 article in the Journal of Military and Veterans' Health stated that over 80 per cent of ASC II personnel are "on mental disability pensions, mainly for PTSD".[18] A source for the statement is not cited. This claim was disputed in a letter to the journal editor by COL (Ret.) Peter Warfe CSC, the ASC II Commander. COL Warfe obtained data from DVA that invalidated the unsupported claim – the data showed that "in the worst case 50 per cent of the 350 personnel who served in the second contingent could have accepted disability claims for PTSD."[19]

A number of veterans of Op TAMAR have reflected in published sources on the legacy of the deployment on their personal and professional lives. Psychological distress has clearly been a consequence for some personnel.[3, 15] Professionally, personnel have described the fulfilling nature of their work on Op TAMAR, despite the confronting conditions, and the learning opportunities it afforded them.[6, 8] A Flight Sergeant described in 2010:

> "Nothing will ever come close to what that place did professionally, in a good way, because we learnt a lot. But the inhumanity of what we saw that people can do to each other will also stay with us. We all came back very different people, and we still are."[8]

In 2006, the Department of Defence re-classified Op TAMAR to 'warlike service' from 'hazardous service'.[20] The designation of an operation is determined by an assessment of the level of hardship that ADF personnel experience. The re-classification allowed Op TAMAR veterans access to extended income support and health care entitlements from DVA.

The Australian Active Service Medal[1] was presented to personnel with 1 day of service on Op TAMAR following the 2006 re-classification of the operation.[21] A silver clasp bearing the inscription 'RWANDA', not shown in this image, adorns the centre of the ribbon.

The UNAMIR medal was presented to personnel with ninety days of service to the Mission.[2]

The Rwanda Deployment Health Study

DVA commissioned CAMVH to conduct the study. CAMVH developed two broad, exploratory, research questions in the research proposal and they were approved by DVA.

Research questions

1. What are the longitudinal health and compensation outcomes of the veterans of Operation TAMAR?

2. Are there differences in the longitudinal health and compensation outcomes between: the two contingents of Operation TAMAR; the three personnel groups who deployed; and those who were from a formed unit and those who were individual augmentees?

Rationale for the research questions

Question 1: The twentieth anniversary in 2014-15 of the ADF deployments to Rwanda affords an impetus to study the health of those who deployed. As the majority of the Op TAMAR cohort are now ex-serving (55 per cent or 70 per cent if inactive reserves are included), and as they are among the first of the post-Vietnam War veterans, an investigation of their long-term health and compensation history will be beneficial to understanding the health pathways of contemporary veterans.

A longitudinal self-report study of mental health in Op TAMAR veterans conducted up to six years post-deployment found increased traumatic symptoms over time.[13] The current study examines the prevalence of physical and mental conditions and their course over a longer time period using objective data.

Question 2: This study will identify any differences in health between subgroups of the cohort. There are differences in the experiences and exposures of the two contingents and the three personnel groups. There is evidence in the wider deployment literature of differences in health between personnel who deployed with a formed unit and those that did not.

Australian Services Contingent

There were tasks and events that occurred in one contingent that did not occur in the other. For example, ASC I set up the infrastructure required for the mission, particularly re-establishing the Kigali Central Hospital which bore physical evidence of the genocide.[7] The Kibeho massacre occurred during ASC II.

Personnel group

Both contingents comprised roughly equal proportions of medical, rifle company and support personnel. The longitudinal study found better self-reported mental health among medical personnel compared with rifle company personnel. The medical personnel reported lower levels of post-traumatic stress symptoms and alcohol misuse.[13] The current study will examine if this association holds true for compensation and medical records data and over a longer time period.

Unit status

Op TAMAR personnel were either from a formed unit or were an individual augmentee. The influence of unit cohesion (the bonding of unit members to sustain their commitment to the unit and the mission) on health has received considerable research attention.

Brailey and colleagues, for example, found that unit cohesion ameliorated PTSD symptoms in a United States Army cohort.[22] Sundin and colleagues found no difference between augmentees and personnel from a formed unit on symptoms of PTSD or common mental disorders, but found that augmentees were at a lower risk of alcohol misuse.[23]

Objective

To use existing data to describe and compare the types, frequencies and course of health conditions and compensation within the Op TAMAR veterans cohort

Aims

1. Increase understanding of contemporary veterans' long-term health and compensation
2. Provide insights into the use of existing data to research veterans' health

Method

Ethical approvals

Ethical approval was obtained for the study from the following ethics committees: Australian Defence Human Research Ethics Committee (reference: 653-12); Department of Veterans' Affairs Ethics Committee (E012/001); University of Queensland Behavioural and Social Sciences Ethical Review Committee (2012000405); Australian Institute of Health and Welfare Ethics Committee (EC2012/2/30).

Data collection

Figure B details the four categories of data used in the study along with the data elements obtained and where they were sourced. The personnel, compensation and health data were linked where appropriate.

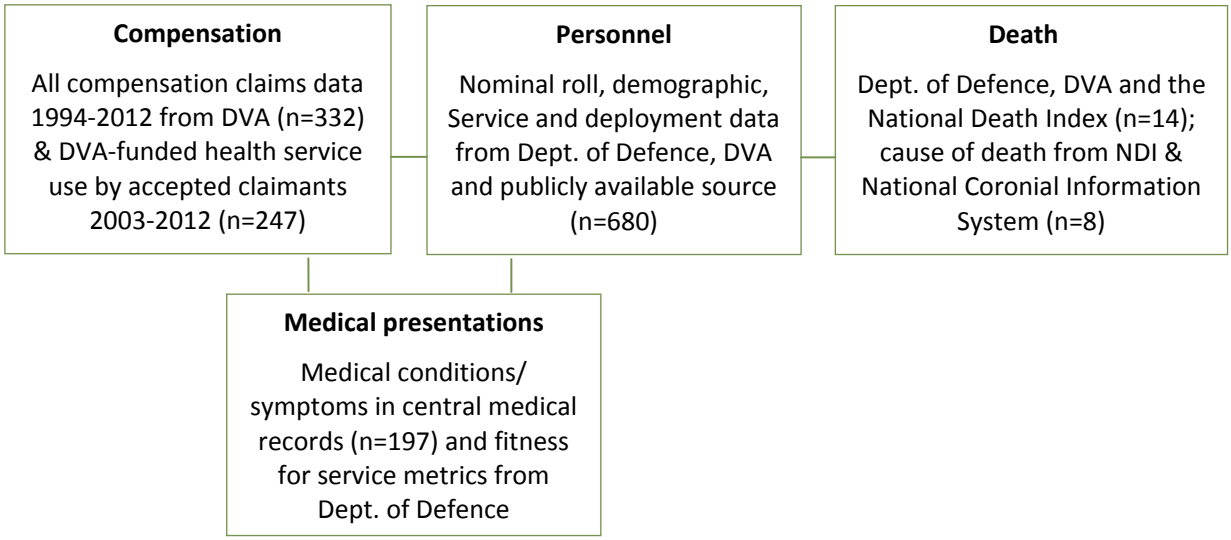

Figure B *Data categories, elements and sources for the Rwanda Deployment Health Study*

Nominal roll, demographic, service and deployment data

DVA provided CAMVH with a nominal roll of Op TAMAR veterans that contained 673 names, service information at the time of Op TAMAR, date of birth and date of death for veterans who were DVA clients.

CAMVH obtained from the Department of Defence Directorate of Workforce Information (DWI) current names (to account for names changed through marriage or for other reasons), date of birth and death for the entire cohort, current service information and deployment history (where available).

Six personnel on the DVA nominal roll were not matched by the DWI (duplicate entries and civilian personnel) and were excluded (n=667).

In undertaking a review of Op TAMAR literature, CAMVH came across a publicly available nominal roll of Op TAMAR veterans.[3] This roll contained the surname, first initial and Op TAMAR rank, trade and contingent of the veterans. The roll was compared with the DVA roll and 15 names that appear on the publicly available roll are not on the DVA nominal roll. An additional request was made to DWI for details of these 15 personnel.

As deployment history pre-East Timor deployments is difficult to determine from the Defence human resources system (the DWI match showed that 17 of the 667 personnel had Op TAMAR recorded in the system), the additional personnel were identified through their name, year of birth, or current trade.

Of the 15 personnel, the identities of 13 were confirmed. One person could not be matched by the DWI. Additionally, the demographic and service characteristics of one person matched two potential people. The medical records for both of these people were accessed to find evidence of Op TAMAR deployment. It was evident from the records that neither person deployed on Op TAMAR. As there is a confirmed person with the same surname, first initial and contingent (but different Op TAMAR rank and trade) on the publicly available roll, CAMVH contends that this entry is likely a duplicate entry or mistake.

CAMVH contends that 680 personnel deployed on Op TAMAR.

Table A shows the data items that were obtained from the data sources used to construct the nominal roll. Figure C shows the process followed to produce the nominal roll for the study.

Table A *Data items relating to demographics, service and deployment characteristics by source*

Source	Demographics	Service	Deployment
Department of Veterans' Affairs	• *(Full name)* • Sex • Date of birth • Date of death	• Service at the time of Op TAMAR	• Unit/Ship at Op TAMAR *[Unit status]* • Mustering/Corp at Op TAMAR *[personnel group]*
Department of Defence Directorate of Workforce Information	• *(Full name)* • Sex • Date of birth • Date of death	• Service at Feb. 2013 • Service type Feb. 2013 (Regular/Reserve) • Employment status Feb. 2013 (Active/Discharged) • Hire date • Discharge date	• Deployment description (e.g. Op ASTUTE) *[deployment to East Timor, Afghanistan, Iraq]*
Public source [3]	• *(Surname and first initial)*	• Rank at Op TAMAR	• Trade at Op TAMAR *[personnel group]* • Australian Services Contingent *[I or II]*

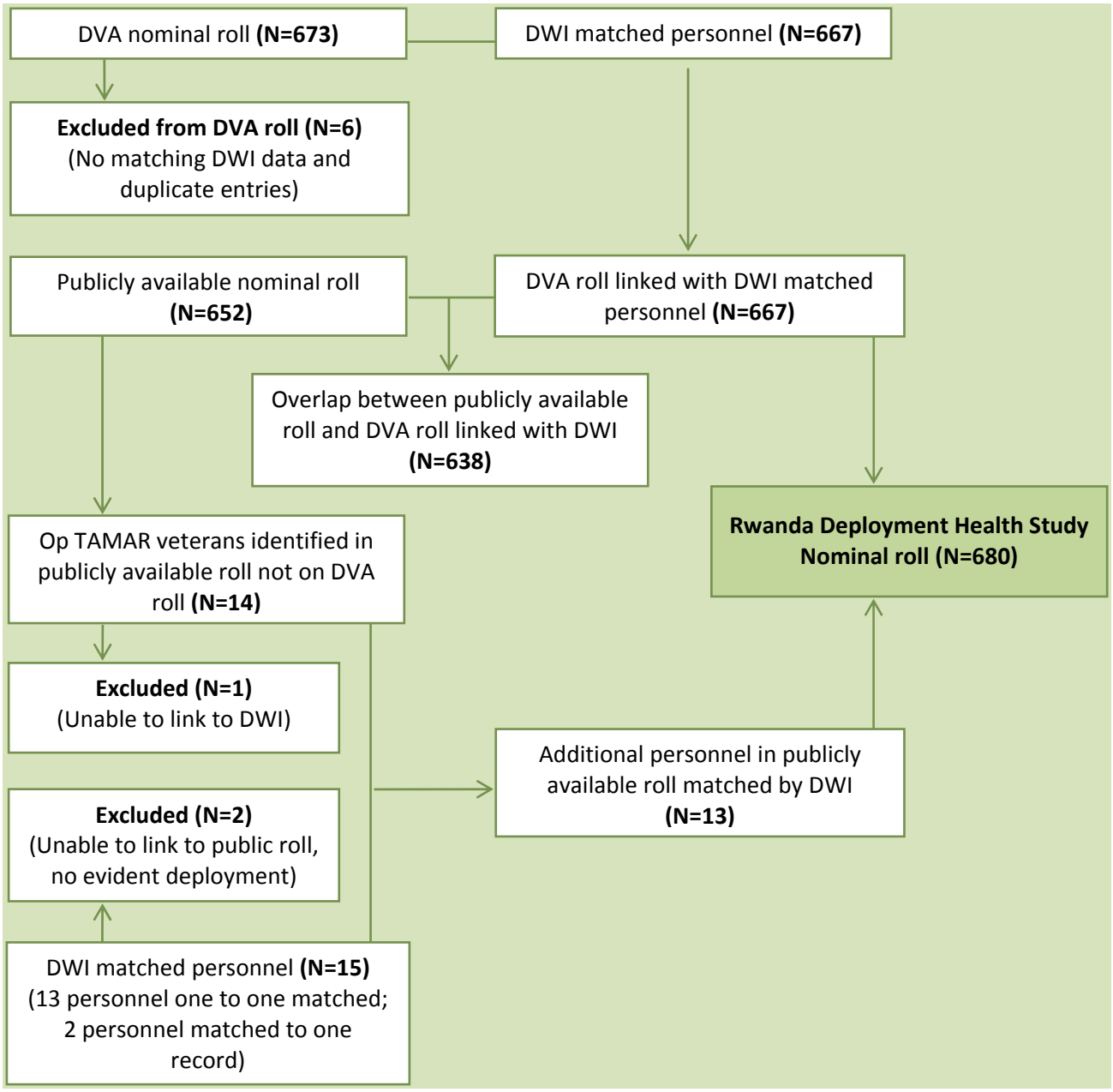

Figure C *Process of developing the nominal roll for the Rwanda Deployment Health Study*

DVA compensation claims and health service use data

DVA provided CAMVH with compensation data on Op TAMAR veterans with accepted and unaccepted claims. The study team classified the medical conditions listed in the disability field of the compensation dataset into 14 disease categories based on the broad categories in the International Classification of Diseases (ICD-10).[24] Thirteen claims did not have a disability description and were excluded from analysis.

Data on DVA-funded health service use by accepted claimants were also provided.

Table B shows the data items relating to compensation claims and DVA-funded health service use.

Table B *Data items relating to compensation claims and DVA-funded health service use*

Compensation (1979-September 2012)	Health service (2003-September 2012)
• Disability (e.g. tinnitus, post-traumatic stress disorder) • Decision (accepted, rejected, no incapacity found) • Claim type (disability pension/non-liability treatment) • Date of decision • Attributed to Op TAMAR (yes or no)	• Service item category (e.g. medical, allied health) • Service item (e.g. Consultation at consulting rooms, day program, biopsy) • Date of service • Cost of service item

Medical presentations and fitness to serve data

Defence-held personnel medical records and information from the DWI were the sources of health data. This study represents the first time that Defence medical records have been used to document all presentations for medical conditions/symptoms in ADF personnel over time and therefore provides insight into the use of records for research into military and veteran health.

CAMVH negotiated with Defence Health Records to obtain medical records for the Op TAMAR cohort for the purpose of data extraction. The study project manager obtained access to a Defence intranet platform that contains the physical and digital (where available) location of records. The majority of records for the Op TAMAR cohort are physical records and they reside in different Defence repositories based on the serving status of the veteran. CAMVH constructed a spreadsheet of Op TAMAR veterans by repository – the majority of ex-serving records are held at one repository, while serving records are at a number of repositories.

CAMVH aimed to obtain all medical records for the cohort; however, as Defence advised CAMVH that the physical records could not leave Commonwealth property and could only be photocopied, this was not feasible. Therefore, two Defence security-cleared CAMVH staff travelled to the Army record repositories to photocopy as many records as possible over five days. The staff spent three days at the repository where the ex-serving records are located and two days at a repository where some of the serving records are located. Records were chosen by sequentially working through the spreadsheet that was alphabetised by surname for the two locations. The staff photocopied 48 Army records and couriered them to CAMVH in secure courier boxes via a Defence-contracted courier.

The records for all 13 Op TAMAR Navy personnel were directly requested by the CAMVH Chief of Operations. The records were couriered to CAMVH where they were photocopied.

The digital records of 41 Air Force personnel were retrieved from the intranet platform and printed. The records for the five remaining Air Force personnel could not be accessed as they either had not been digitised or there was a problem with the digital file.

The digital records of 65 Army personnel were also retrieved from the intranet platform and printed. The digital records were printed for the extraction process as the size of the PDF files rendered it impractical to extract information without a hard copy.

Practical issues of using medical records: The medical records for the Op TAMAR cohort are large (up to 600 pages in some cases). Photocopying physical records requires the removal of many staples and older files contain some poorer-quality paper which cannot be placed in the manual feed tray of the photocopier. There are a significant number of duplicate and sometimes triplicate documents in all records. The legibility of handwritten documents is sometimes poor.

The 167 records obtained were extracted, with four records found to be incomplete. CAMVH statisticians conducted analysis on the demographic, Service, Op TAMAR deployment and compensation characteristics of the 163 complete records. While the sample was representative of the Op TAMAR cohort on many characteristics, there was a statistically significant underrepresentation of Army records for active regular personnel and personnel who do not have accepted compensation (as at September 2012).

The statisticians determined that a further 36 records would be required to achieve a representative sample. The study project manager travelled to the repositories and photocopied the 36 records. During extraction, one record was found to be incomplete. In total, CAMVH obtained 203 records, with 198 included in the sample for analysis.

A data extraction form and database were built in CAMVH's research data management platform, DatStat©, to collect and store the medical records data. The electronic data extraction form ensured that data were identified and entered systematically, with data input for most fields restricted to valid ranges of values. Data extraction was conducted by staff who were trained in the extraction protocol and took between two to eight hours per record.

Presentations (i.e. visits to the unit medical officer or an external physician or a hospital admission) were extracted for each medical condition/symptom identified in the record, from enlistment to discharge or most recent presentations. Conditions and symptoms were classified against collapsed ICD-10 chapters[24], i.e. A through to Y, under the categories of musculoskeletal, respiratory, gastrointestinal tract, dermatological, mental health, eyes, infection, cardiovascular system, hearing, central nervous system, endocrine system, cancer and other. The date of presentation and the type of form on which it appeared (e.g. Outpatient Clinical Record, Specialist Referral) were recorded.

The rationale for extracting these types of data is that they allow type and course of presentations for medical conditions to be determined. All recorded presentations were extracted from each medical record, including minor and acute conditions/symptoms for three reasons:

1) the total number of presentations contributes to the health profile of each veteran. Multiple presentations for relatively minor conditions may be indicative of an emerging or underlying health problem;

2) the description of conditions in the records was highly variable and the legibility sometimes poor; and

3) this method was systematic and reproducible by multiple extractors, as less discretion was required. Once all the data were collated they were reviewed, cleaned and checked.

The staff were also tasked with recording details on the causes of PTSD noted in the medical records. This was an exploratory process that yielded mixed results. The results are not reported as the process was not standardised and, as noted earlier, descriptions in the records are highly variable between records. Nevertheless, a process could be developed for use in future studies that intend to utilise medical records for the purpose of exploring the aetiology of PTSD in military personnel.

In this exploratory study, the staff who extracted the data from the medical records were not health information managers. However, all had data entry experience and several were familiar with medical records and medical terminology. Reliability of coding was not assessed using statistical tests, however, the staff were given sufficient training before and during the extraction process to minimise measurement bias. In addition, one in every ten records was cross-coded by the study project manager to assess the rigour and consistency of extraction.

Rigorous protocols were implemented to maintain the security and confidentiality of records. Data were entered under a unique Study ID. All identified documents were stored in CAMVH's Defence Restricted Network facility and were only accessed under the supervision of a security-cleared staff member.

Medical Employment Classification (MEC), a metric used to denote fitness to serve was obtained for the cohort from DWI at three time points – up to three years after Op TAMAR (between 1995-1998), at discharge for ex-serving personnel and the most recently available for currently serving personnel. MEC data were also collected from the medical records to supplement the DWI data.

The rationale for obtaining MEC was to examine the course of 'fitness to serve' and the number of personnel who were medically discharged.

There are four classification levels of MEC: MEC 1 denotes members who are fit for deployment without restriction; MEC 2 denotes members who have medical conditions that require access to medical support or employment restrictions; MEC 3 denotes members who are medically unfit for duties in their occupation that should be managed to recovery and; MEC 4 denotes members who are medically unfit for deployment in the long term.[25]

Table C shows the data items relating to medical presentations and fitness to serve.

Table C *Data items relating to medical presentations and fitness to serve*

Medical symptoms and conditions	• Musculoskeletal; respiratory; dermatological; gastrointestinal tract; infection; eyes; mental health; hearing; central nervous system; cardiovascular system; endocrine system; cancer; all other symptoms and conditions
Occurrence/type	• Date of presentation • Type of form (e.g. Outpatient Clinical Record)
Fitness to serve	Medical employment classification between 1995-1998; at discharge; most recent for currently serving personnel

Death data

CAMVH submitted the Op TAMAR nominal roll to the Australian Institute of Health and Welfare for linkage with the National Death Index (NDI). Date of death and cause of death were requested.

An application was made to the National Coronial Information System to request permission for the Australian Institute of Health and Welfare (AIHW) to provide CAMVH with the cause of deaths that went before a coroner.

AIHW provided CAMVH with matches on the NDI and CAMVH statisticians conducted a clerical review of the returned data to accept the linkage findings. Death data provided in the DVA nominal roll and by DWI were also included in the analysis. The DVA nominal roll was received in May 2012, the DWI data in February 2013 and the NDI linkage included deaths up until 30 April 2013.

Data analysis

Table D shows the dependent and independent variables examined in the study. To examine differences between the sub-groups of the cohort, rate ratios (RR) and its corresponding 95% confidence intervals were computed using a log-binomial regression model. The chi square test was also used to assess associations between two categorical variables of interest. Kaplan-Meier curves were used to estimate retention probabilities post Op TAMAR to discharge. The log rank test and the Wilcoxon test for equality of survivor functions were used to assess for differences in survivorship between the subgroups.

For the analysis, ASC I veterans were considered to have deployed from August 2, 1994 to February 15, 1995, with ASC II veterans considered to have deployed from February 16, 1995 to August 1, 1995. There are no firm deployment dates reported in the literature. Data were analysed using the statistical analysis programs SAS 9.3 and STATA 11. Statistical significance is defined at the five per cent level. Due to rounding, percentages presented may not add to 100.

Table D *Dependent and independent variables in the Rwanda Deployment Health Study*

Dependent variables	Independent variables
Compensation claims (1979-Sept. 2012) > Compensation claims > Accepted compensation and Op TAMAR attribution > Condition > Date of approved claim **DVA Health service use (2003-2013)** > Service item category > Cost of service item > Date of service **Medical presentations (1990-2011)** > ICD-10-classified medical conditions/symptoms > Number of presentations for medical conditions > Date of presentations **Fitness to serve** > Medical employment classification (One MEC 1995-1998; at discharge; most recently available for currently serving personnel) **Death (Return from Op TAMAR-30 April 2013)** > Date and cause	**Australian Services Contingent (ASC)** August 1994-February 1995 (ASC I); February-August 1995 (ASC II) **Personnel Group** Medical: Comprised medical, nursing and dental officers and assistants, operating theatre technicians, scientific officers, laboratory technicians, radiographers and physiotherapists. All Navy personnel and the majority of Air Force personnel were medical personnel. Rifle company: Comprised a majority of riflemen. Also assault pioneer platoon, platoon commanders/sergeants, and section commanders. Support: Comprised administration clerks, drivers, cooks, signallers, electricians, storemen, vehicle mechanics, intelligence officers, quartermasters, carpenters, translators, finance officers, and plumbers. **Unit status** Formed unit: > Riflemen came from the same unit – 2/4 RAR for ASC I and 2RAR for ASC II. > Medical and support personnel were from a number of units, with 1st Field Hospital and 3rd Brigade Administration Support Battalion responsible for 11 per cent and 10 per cent of personnel respectively. >Three per cent of medical and support personnel were from the Special Air Service Regiment. Individual augmentee: 27 per cent of support personnel and nine per cent of medical personnel were augmentees. Half of Navy personnel and 36 per cent of Air Force personnel were augmentees. **Current Service** Army, Navy, Air Force **Service type** Regular, Reserve **Serving status** Serving, Ex-serving **Subsequent deployment** East Timor, Afghanistan, Iraq **Demographics** Age; Sex

Findings

1. Demographic and career profile

Table 1 shows who the Op TAMAR veterans were at the time of Op TAMAR and who they were in 2013. The two contingents have a similar profile, whereas there is a significant difference in age by personnel group (p <0.001). Rifle company personnel are younger than medical and support veterans.

One third of the cohort was still actively serving in 2013, with rifle company personnel having the highest percentage of active regulars. Support personnel have the highest percentage of ex-serving members. Just under half of the cohort deployed to East Timor and just over one fifth to Afghanistan or Iraq.

Table 1 *Demographic, service and deployment characteristics of veterans by contingent/personnel group*

	Op TAMAR		ASC I		ASC II		ASC unknown		Medical		Rifle company		Support	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	680		326		328		26		226	[a]	205	[a]	246	[a]
Sex														
Male	614	90.3	299	91.7	290	88.4	25	96.2	179	79.2	205	100	227	92.3
Female	66	9.7	27	8.3	38	11.6	1	3.8	47	20.8	0	0.0	19	7.7
Op TAMAR														
Age (1995)														
Mean (SD)	30.4	(7.7)	30.0	(7.6)	30.4	(7.8)	34.0	(5.6)	34.2	(8.9)	26.0	(4.8)	30.4	(6.3)
19 and under	5	0.7	0	0.0	5	1.5	0	0.0	1	0.4	3	1.5	1	0.4
20-24	184	27.1	94	28.8	89	27.1	1	3.8	31	13.7	100	48.8	53	21.5
25-29	207	30.4	103	31.6	99	30.2	5	19.2	56	24.8	67	32.7	83	33.7
30-34	126	18.5	59	18.1	57	17.4	10	38.5	52	23.0	22	10.7	52	21.1
35-39	72	10.6	31	9.5	36	11.0	5	19.2	32	14.2	9	4.4	29	11.8
40 and over	86	12.6	39	12.0	42	12.8	5	19.2	54	23.9	4	2.0	28	11.4
Unit status														
Formed unit	540	79.4	275	84.4	265	80.8	0	0.0	166	73.5	196	95.6	178	72.4
Augmentee	91	13.4	37	11.3	53	16.2	1	3.8	42	18.6	2	1.0	47	19.1
Unknown	49	7.2	14	4.3	10	3.0	25	96.2	18	8.0	7	3.4	21	8.5
Subsequent deployments														
East Timor	315	46.3	153	46.9	152	46.3	10	38.5	98	43.4	126	61.5	91	37.0
Afghanistan/Iraq	147	21.6	74	22.7	69	21.0	4	15.4	37	16.4	60	29.3	50	20.3
February 2013														
Age														
Mean Age (SD)	48.0	(7.7)	47.7	(7.6)	48.0	(7.8)	51.6	(5.6)	51.9	(8.9))	43.6	(4.8)	48.0	(6.3)
Service														
Navy	13	1.9	7	2.1	6	1.8	0	0.0	13	5.8	0	0.0	0	0.0
Army	622	91.5	300	92.0	296	90.2	26	100	171	75.7	205	100	243	98.8
Air Force	45	6.6	19	5.8	26	7.9	0	0.0	42	18.6	0	0.0	3	1.2
Service status														
Active Regular	133	19.6	68	20.9	60	18.3	5	19.2	37	16.4	55	26.8	41	16.7
Active Reserve	70	10.3	23	7.1	44	13.4	3	11.5	34	15.0	12	5.85	23	9.3
Inactive Reserve	103	15.1	55	16.9	42	12.8	6	23.1	35	15.5	28	13.7	40	16.3
Ex-Serving	374	55.0	180	55.2	182	55.5	12	46.2	120	53.1	110	53.7	142	57.7
Deceased (April)	14	2.1	8	2.5	6	1.8	0	0.0	2	0.9	8	3.9	4	1.6

[a] Personnel group could not be determined for 3 personnel.

Figure 1 shows that a third of ex-serving veterans discharged in the first five years after Op TAMAR.

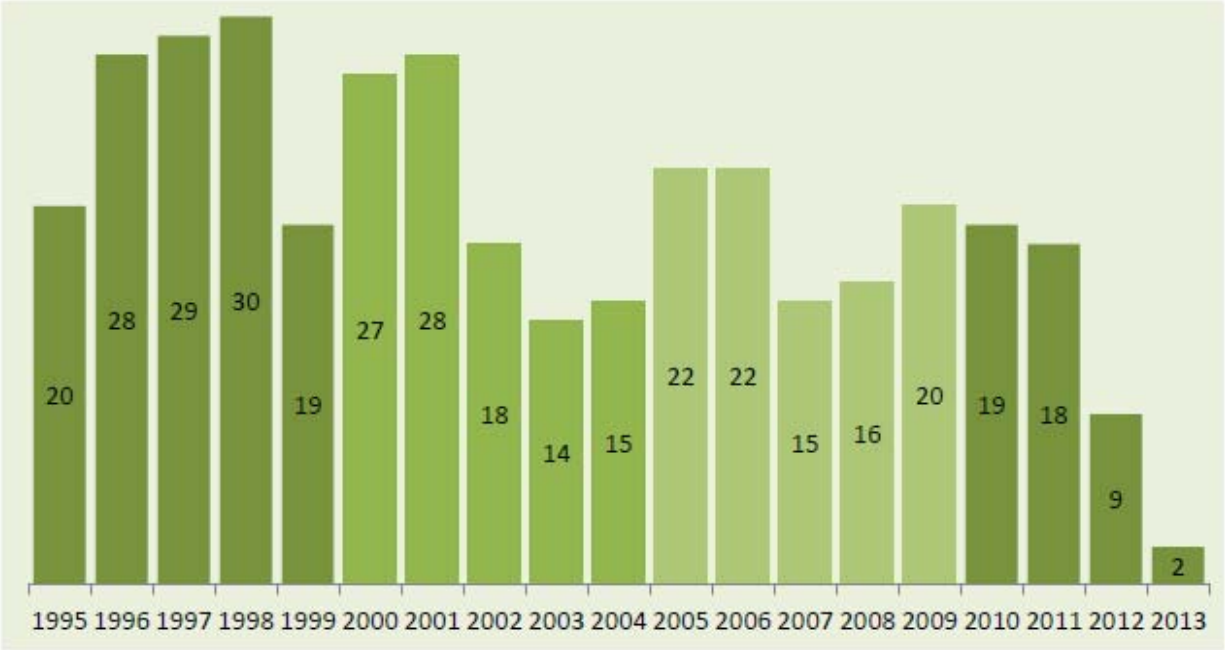

Figure 1 *Number of ex-serving Op TAMAR veterans by discharge year*

Figure 2 shows the Kaplan-Meier estimated retention probabilities post Op TAMAR to discharge for the entire cohort (top left), by contingent (top right), personnel group (bottom left), and unit status (bottom right). A total of 676 subjects were followed up with four excluded due to missing discharge dates. There is no evidence of any differential effect between the contingents, the personnel groups and by unit status.

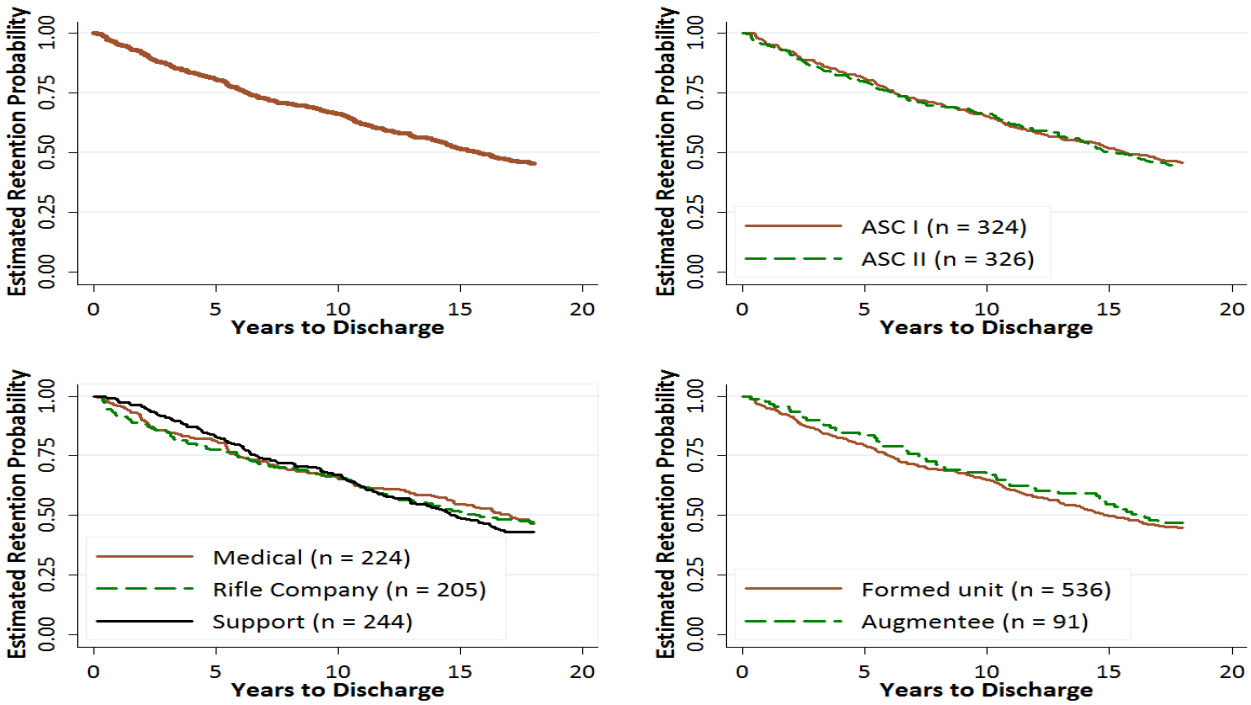

Figure 2 *Kaplan-Meier retention probabilities post Op TAMAR to discharge*

2. Compensation claims

Course of compensation

A total of 1509 claims made by 346 personnel were accepted between 1979 to September 2012. Seventy-one accepted claims made by 43 personnel occurred between 1979 and prior to Op TAMAR. In the current analysis, only claims made during and after Op TAMAR to September 2012 are included.

Table 2 shows the course of accepted compensation claims. An average of 4.3 accepted claims (SD=2.8) were made per claimant between 1994 and 2012, with total accepted claims made ranging from one to 18. The accepted claims per year rose steadily over time, peaking in the 2004-2006 period. Exactly half of all accepted claims were attributed to the Op TAMAR deployment.

Table 2 *Accepted claims and claimants by time period*

	1994[a]-1997	1998-2000	2001-2003	2004-2006	2007-2009	2010-	Total
Claims	155	206	250	338	280	209	**1438**
Claimants	66	88	80	96	83	63	**332**[b]
Average claims	2.3	2.3	3.1	3.5	3.4	3.3	**4.3**
Attributed to Op TAMAR							
Claims	60	105	108	174	154	118	**719**
Claimants	31	59	49	71	66	47	**260**[b]
Average claims	1.9	1.8	2.2	2.5	2.3	2.5	**2.8**(SD1.9)

[a] Based on estimated deployment dates for each contingent.

[b] The total number of claimants is a count of claimants who have at least one accepted claim between 1994 and 2012. Claimants may have multiple accepted claims over time.

There is a common perception that veterans submit the majority of their claims for compensation at the time of their discharge from the ADF. Figure 3 supports this perception. The number of accepted claims peaked within one year of discharge.

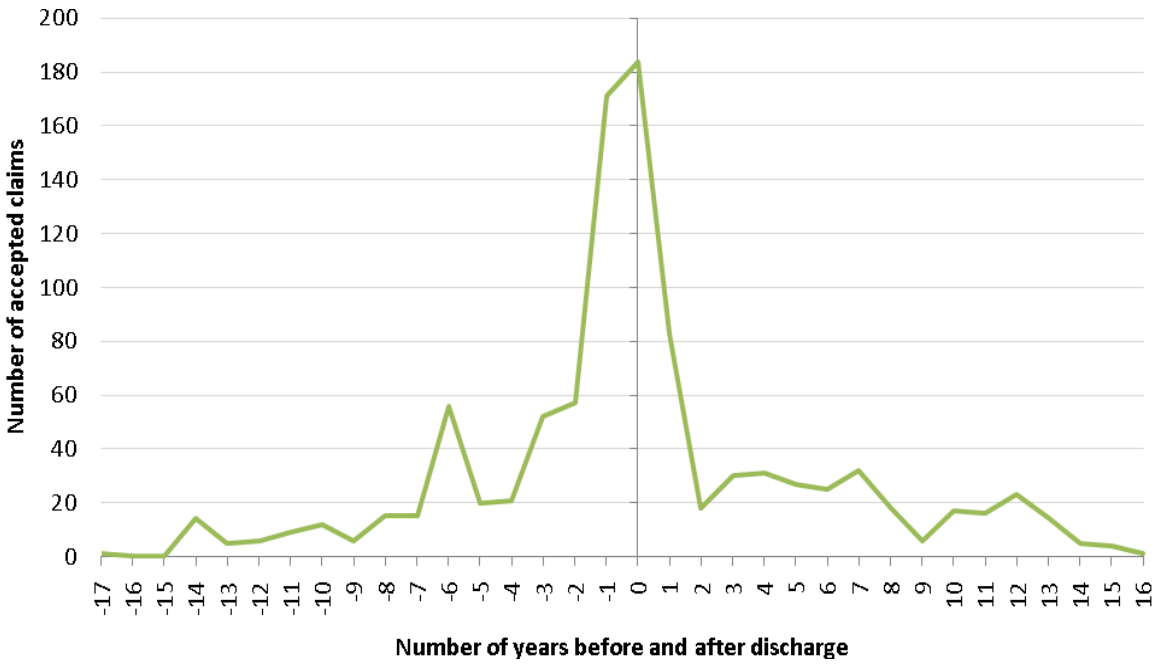

Figure 3 *Op TAMAR veterans accepted compensation by year of discharge & year compensation approved*

Additionally, a quarter of claims (24.7 per cent) were approved in either the year of, or the year before, the claimant discharged. Current serving members, however, hold almost a third (30.9 per cent) of the total accepted claims for the cohort.

Figure 4 shows the number of accepted claims by claim decision year. Three peaks are observed – in 1996, 2000 and 2005. A third of claims occurred between 2005 and 2008.

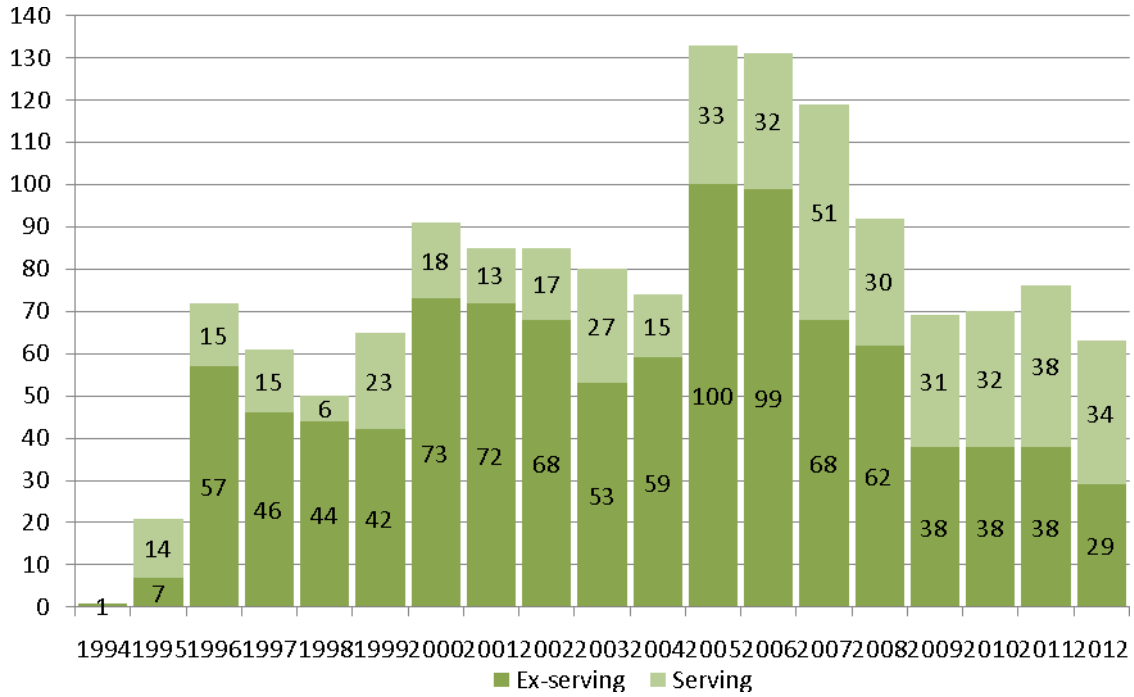

Figure 4 *Number of accepted claims by year claim approved and current serving status*

Figure 5 shows the percentage of accepted claims that occurred in five year periods after Op TAMAR. Over a third of claims occurred 11 to 15 years after the deployment.

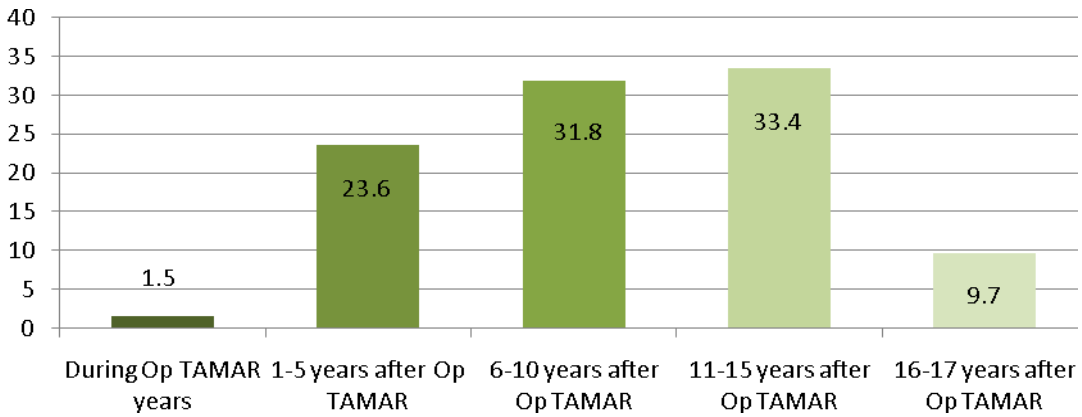

Figure 5 *Percentage of accepted claims by years after Op TAMAR*

Table 3 shows the demographic and deployment characteristics of Op TAMAR veterans by their compensation status and focusses on the number of claimants, rather than number of claims. This provides information on which Op TAMAR veterans have applied for compensation. Almost all veterans who made a claim had a claim accepted (94.3 per cent).

Table 3 *Op TAMAR veterans' compensation profile by demographic, Service and deployment characteristics*

	Op TAMAR		Have not made a claim		Accepted claimant		Claimant with at least one claim attributed to Op TAMAR		
	n	% [a]	n	%	n	%	n	%	p [c]
Total	680	100	328	48.2	332	48.8	260	38.2	
Sex [b]									
Male	614	90.3	290	47.2	308	50.2	241	39.3	0.10
Female	66	9.71	38	42.4	24	36.4	19	28.8	
Age (1995) [a]									
19 and under	5	0.74	2	0.6	3	0.9	3	1.15	0.78 [d]
20-24	184	27.1	91	27.7	85	25.6	76	29.2	
25-29	207	30.4	107	32.6	94	28.3	78	30.0	
30-34	126	18.5	50	15.2	73	22.0	44	16.9	
35-39	72	10.6	36	11.0	36	10.8	26	10.0	
40 and over	86	12.6	42	12.8	41	12.3	33	12.7	
Contingent [b]									
ASC I	326	47.9	160	49.1	158	48.5	125	38.3	0.26
ASC II	328	48.2	153	46.6	163	49.7	129	39.3	
Unknown	26	3.82	15	57.7	11	42.3	6	23.1	
Personnel Group [b]									
Medical	226	33.2	131	58.0	87	38.5	68	30.1	0.01 [d]
Rifle Company	205	30.1	88	42.9	111	54.1	92	44.9	
Support	246	36.2	107	43.5	133	54.1	99	40.2	
Unknown	3	0.44	2	66.6	1	33.3	1	33.3	
Unit status [b]									
Formed unit	540	79.4	253	46.9	271	50.2	222	41.1	0.01
Augmentee	91	13.4	47	51.6	41	45.1	24	26.4	
Unknown	49	7.21	28	57.1	20	40.8	14	28.6	
Age [a]									
35-39	64	9.41	32	9.8	29	8.73	25	9.62	0.99
40-44	235	34.6	121	36.9	107	32.2	92	35.4	
45-49	152	22.4	69	21.0	77	23.2	58	22.3	
50-54	111	16.3	47	14.3	63	19	40	15.4	
55 and over	118	17.4	59	18.0	56	16.9	45	17.3	
Service [b]									
Navy	13	1.91	8	61.5	5	38.5	2	15.4	0.67 [d]
Army	622	91.5	297	47.7	307	49.4	242	38.9	
Air Force	45	6.62	23	51.1	20	44.4	16	35.6	
Service status [a]									
Active Regular	133	19.6	92	28.0	40	12	24	9.23	<0.001
Active Reserve	70	10.3	39	11.9	26	7.83	17	6.54	
Inactive Reserve	103	15.1	60	18.3	39	11.7	27	10.4	
Ex-serving	374	55	137	41.8	227	68.4	192	73.8	

[a] Column per cent.
[b] Row per cent.
[c] Chi square test of association.
[d] Excluding groups with small numbers.

Just under half of Op TAMAR veterans (48.8 per cent) had at least one accepted compensation claim by September 2012. Over a third (38.2 per cent) of Op TAMAR veterans had at least one accepted compensation claim attributed to Op TAMAR.

Medical personnel had a 29 per cent lower rate of accepted claims attributed to Op TAMAR compared to the rifle company and support personnel combined [RR (95% CI): 0.71 (0.57, 0.89)]. Those who deployed to Op TAMAR in formed units had a 56 per cent increased rate of accepted claims attributed to Op TAMAR, compared to augmentees [RR (95% CI): 1.56 (1.09, 2.23)].

In addition, those no longer serving in the military had 2.3 times the rate of accepted claims attributed to Op TAMAR, compared to those currently serving [RR (95% CI): 2.31(1.83, 2.91)]. However, there was no difference in the rate of accepted claims attributed to Op TAMAR of ASC 2 veterans compared with ASC 1 [RR (95% CI): 1.03 (0.85, 1.24)].

Figure 6 shows the percentage of the Op TAMAR cohort who are accepted claimants.

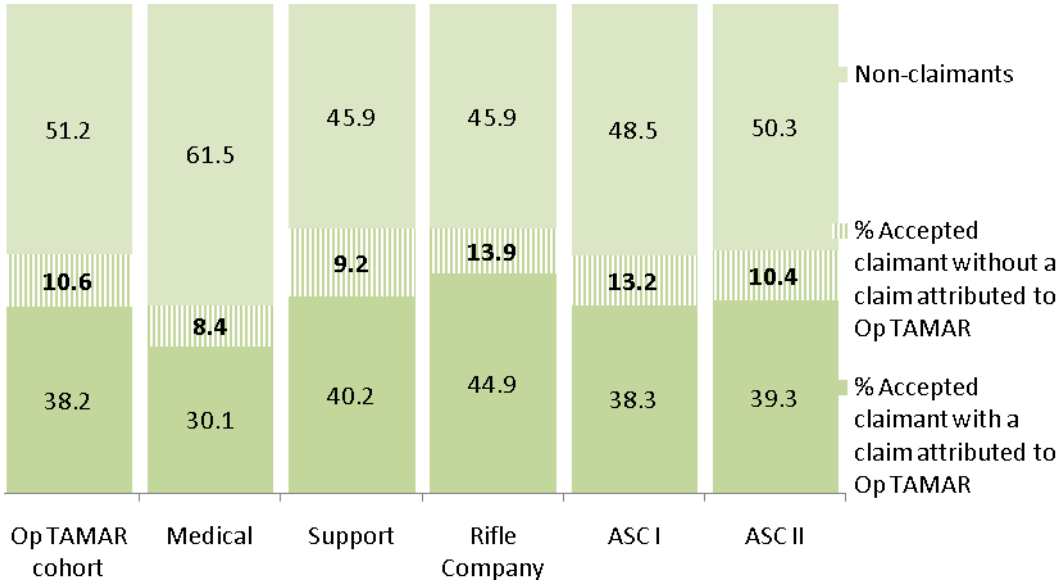

Figure 6 *Percentage of accepted claimants by Op TAMAR personnel group and contingent*

Type of compensation

Table 4 presents all the claims accepted and accepted and attributed to Op TAMAR by the cohort by disease category. It shows the number of claimants who made at least one claim for a condition in a disease category and it shows the total number of claims made in a disease category.

Musculoskeletal claims are the most prevalent claims making up 40.6 per cent of all accepted claims. Almost a third of the Op TAMAR cohort has at least one accepted musculoskeletal claim.

Mental health claims are the most prevalent claims attributed to Op TAMAR, making up 46.3 per cent of all accepted Op TAMAR-attributed claims. Approximately 30 per cent of the Op TAMAR cohort has at least one accepted Op TAMAR-attributed mental health claim.

Table 4 *Accepted claimants and claims and attribution to Op TAMAR by disease category*

	Accepted				Accepted and attributed to Op TAMAR			
Disease category	**Claimants**		**Claims**		**Claimants**		**Claims**	
	n	**%[b]**	**n**	**%[c]**	**n**	**%[b]**	**n**	**%[c]**
Mental Health [a]	222	32.6	483	33.6	203	29.9	333	46.3
Musculoskeletal	213	31.3	584	40.6	89	13.1	158	22.0
Hearing	126	18.5	180	12.5	77	11.3	112	15.6
Gastro Intestinal Tract	44	6.5	54	3.8	36	5.3	41	5.7
Dermatological	39	5.7	45	3.1	28	4.1	31	4.3
Cancer [a d]	29	4.3	44	3.1	18	2.6	18	2.5
Infection	14	2.1	14	1.0	3	0.4	3	0.4
Respiratory	9	1.3	9	0.6	3	0.4	3	0.4
Eyes	8	1.2	8	0.6	6	0.9	6	0.8
Cardiovascular System	7	1.0	7	0.5	7	1.0	7	1.0
Central Nervous System	3	0.4	3	0.2	3	0.4	3	0.4
Death	3	0.4	3	0.2	3	0.4	3	0.4
Dental	2	0.3	2	0.1	0	0.0	0	0.0
Genital and Urinary Tract	1	0.1	1	0.1	1	0.1	1	0.1
Other [e]	1	0.1	1	0.1	0	0.0	0	0.0
Total	**332[f]**	**48.8**	**1438**		**260[f]**	**38.2**	**719**	

[a] Includes non-liability claims. Non-liability claims represent health coverage by the DVA for treatment of cancer, PTSD, anxiety disorder and depressive disorder without the need to establish service causation. They are therefore not attributed to a deployment.[26]
[b] Per cent of Op TAMAR personnel (n=680)
[c] Per cent of all claims
[d] Includes malignant and non-melanotic malignant neoplasm of the skin.
[e] Exposure to chemicals/radiation, unspecified conditions, post-viral infection/chronic fatigue syndrome.
[f] Claimants are only counted once.

Figure 7 shows that the majority of the four of the top five most common claims by disease category were attributed to Op TAMAR. Over two thirds (68.9) of mental health claims by Op TAMAR accepted claimants are attributed to Op TAMAR. The majority of gastrointestinal tract, dermatological conditions and hearing claims are also attributed to Op TAMAR. The majority of musculoskeletal claims were not attributed to Op TAMAR.

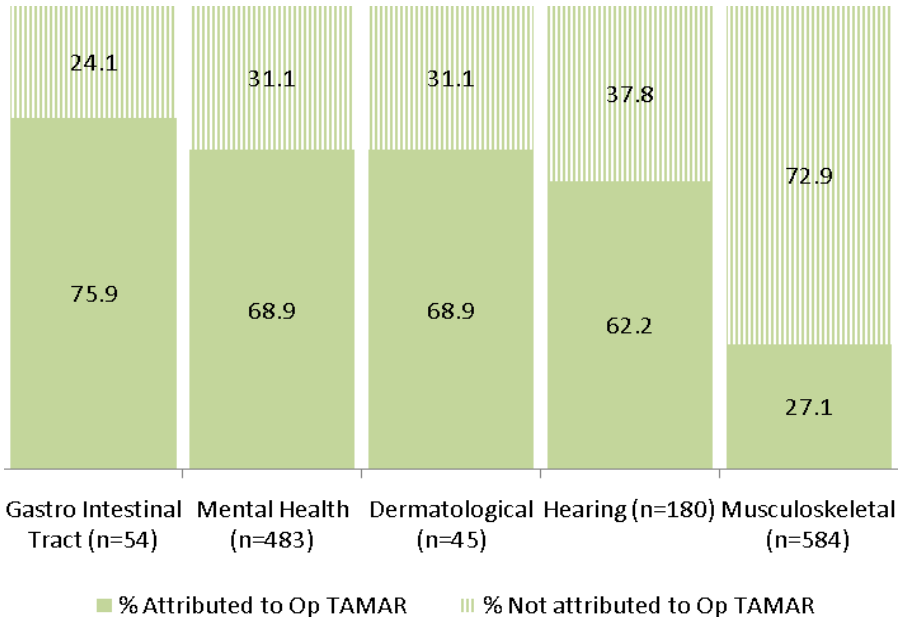

Figure 7 *Percentage of accepted claims by type and Op TAMAR attribution*

Table 5 shows the numbers of accepted claimants with accepted claims for specific conditions. Post-traumatic stress disorder (PTSD) is the most prevalent condition with 31 per cent of Op TAMAR veterans having a claim.

Table 5 Accepted claimants with claims for specific conditions

	Accepted claimants	
Condition	**n**	**%[a]**
Post-traumatic Stress Disorder	211	31.0
Sensori-Neural Hearing Loss	97	14.3
Tinnitus	79	11.6
Lumbar Spondylosis	77	11.3
Alcohol Dependence/Abuse	69	10.1
Osteoarthrosis	64	9.4
Depressive Disorders	58	8.5
Acute Sprain And Acute Strain	50	7.4
Fracture	37	5.4
Chondromalacia Patella	30	4.4
Rotator Cuff Syndrome	26	3.8
Gastro-Oesophageal Reflux	24	3.5
Irritable Bowel Syndrome	24	3.5
Intervertebral Disc Prolapse	23	3.4
Solar Keratosis	22	3.2
Internal Derangement Of The Knee	18	2.6
Non-melanotic malignant neoplasm of skin	17	2.5
Tinea Of The Skin	15	2.2
Cervical Spondylosis	14	2.1
Other conditions (each condition ≤13)	190	27.9
Unknown Conditions	60	8.8

[a] Per cent of all Op TAMAR veterans.

Table 6 shows the numbers of accepted claimants with Op TAMAR-attributed claims for specific conditions by total and by contingent. PTSD is the most prevalent condition with 27.8 per cent of Op TAMAR veterans having a PTSD claim attributed to Op TAMAR.

The two contingents have very similar proportions of accepted claimants with Op TAMAR-attributed claims by condition. ASC II personnel have a higher proportion of accepted claimants with Op TAMAR-attributed claims for PTSD and depressive disorders than ASC I personnel.

Table 6 Accepted claimants with Op TAMAR-attributed claims for specific conditions by total and by contingent

	Accepted claimants (n=260/680)[a]		ASC I accepted claimants (n=125/326)		ASC II accepted claimants (n=129/328)	
Condition	**n**	**%[b]**	**n**	**%[c]**	**n**	**%[c]**
Post-traumatic Stress Disorder	189	27.8	91	23.6	94	28.5
Alcohol Dependence/Abuse	62	9.1	35	9.1	25	7.6
Sensori-Neural Hearing Loss	60	8.8	31	8.0	28	8.5
Depressive Disorders	52	7.6	21	5.4	28	8.5
Tinnitus	50	7.4	26	6.7	24	7.3
Lumbar Spondylosis	30	4.4	19	4.9	11	3.3
Irritable Bowel Syndrome	20	2.9	10	2.6	10	3.0
Gastro-Oesophageal Reflux	19	2.8	10	2.6	9	2.7
Osteoarthrosis	19	2.8	11	2.8	8	2.4
Solar Keratosis	18	2.6	12	3.1	6	1.8
Acute Sprain, Acute Strain	14	2.1	6	1.6	7	2.1
Non-melanotic malignant neoplasm of skin	13	1.9	9	2.3	4	1.2
Erectile dysfunction	11	1.6	6	1.6	5	1.5
Tinea Of the Skin	8	1.2	8	2.1		0.0
Chondromalacia Patella	6	0.9	2	0.5	4	1.2
Injury	6	0.9	3	0.8	3	0.9
Intervertebral Disc Prolapse	6	0.9	5	1.3	1	0.3
Anxiety Disorder	5	0.7	2	0.5	3	0.9
Hypertension	5	0.7	2	0.5	2	0.6
Fracture	5	0.7	2	0.5	3	0.9
Other conditions (each condition ≤5)	75	11.0	41	10.6	31	9.4
Unknown conditions	20	2.9	11	2.8	8	2.4

[a] Includes unknown ASC (n=26).

[b] Per cent of total Op TAMAR veterans.

[c] Per cent of total contingent.

Table 7 shows that across almost all conditions, medical personnel had fewer claims than the rifle company and support personnel. Rifle company personnel have the highest proportion of mental health claims attributed to Op TAMAR. There was no evidence of a difference in the rate of accepted PTSD claims attributed to Op TAMAR, between medical personnel and rifle company personnel [RR (95% CI): 0.95 (0.80, 1.14)], or between support personnel and rifle company personnel [RR (95% CI): 0.89 (0.75, 1.06)].

There was a significant difference in the rate of accepted alcohol claims attributed to Op TAMAR, between medical personnel and rifle company personnel [RR (95% CI): 0.53 (0.29, 0.99)]. However, there were no significant differences between support and rifle company personnel [RR (95% CI): 0.76 (0.48, 1.22)].

Table 7 Accepted claimants with Op TAMAR-attributed claims for specific conditions by personnel group

	Medical (n=68/226)		Rifle Co. (n=92/205)		Support (n=99/246)		
	n	%[a]	n	%[a]	n	%[a]	p[b]
Post-traumatic Stress Disorder	50	22.1	71	34.6	68	27.6	0.02
Alcohol Dependence/Abuse	11	4.9	28	13.7	23	9.3	0.01
Sensori-Neural Hearing Loss	17	7.5	16	7.8	26	10.6	0.43
Depressive Disorders	11	4.9	20	9.8	21	8.5	0.13
Tinnitus	13	5.8	14	6.8	23	9.3	0.31
Lumbar Spondylosis	7	3.1	10	4.9	13	5.3	0.48
Irritable Bowel Syndrome	3	1.3	12	5.9	5	2.0	-
Gastro-Oesophageal Reflux	3	1.3	10	4.9	6	2.4	-
Osteoarthrosis	4	1.8	6	2.9	9	3.7	-
Solar Keratosis	2	0.9	5	2.4	11	4.5	-
Acute Sprain, Acute Strain	5	2.2	1	0.5	8	3.3	-
Non-melanotic malignant neoplasm of skin	2	0.9	3	1.5	8	3.3	-
Erectile dysfunction	2	0.9	4	2.0	5	2.0	-
Tinea Of the Skin	1	0.4	3	1.5	4	1.6	-
Chondromalacia Patella	2	0.9	1	0.5	3	1.2	-
Injury	1	0.4	2	1.0	3	1.2	-
Intervertebral Disc Prolapse	1	0.4	2	1.0	3	1.2	-
Anxiety Disorder	0	0.0	3	1.5	2	0.8	-
Hypertension	3	1.3	1	0.5	1	0.4	-
Fracture	3	1.3	0	0.0	2	0.8	-
Other conditions (≤5) [d]	30	13.3	21	10.2	23	9.3	0.37
Unknown conditions	6	2.7	6	2.9	8	3.3	0.93

[a] Per cent of total personnel group with condition.

[b] Chi square test of association, excludes groups with cell frequencies less than 5.

Table 8 assesses differences in claims within the personnel groups by contingent. For the medical and support personnel, ASC I veterans had a slightly higher number of accepted claimants and claims attributed to Op TAMAR than ASC II veterans. For the rifle company, ASC II veterans had a 34 per cent increase in the rate of claims attributed to Op TAMAR compared with ASC I veterans, however this did not reach statistical significance.

Table 8 *Compensation profile by personnel group by contingent*

	Op TAMAR (n=654*)		Have not made a claim		Accepted claim		Accepted claim Op TAMAR attributed			
	n	%	n	%	n	%	n	%	RR (95% CI)	p[a]
Medical										
ASC I	106	16.2	60	56.6	43	40.6	34	32.1	reference	0.69
ASC II	115	17.6	66	57.4	44	38.3	34	29.6	0.92 (0.62, 1.37)	
Rifle company										
ASC I	103	15.8	51	49.5	50	48.5	40	38.8	reference	0.06
ASC II	100	15.3	36	36.0	60	60.0	52	52.0	1.34 (0.98, 1.82)	
Support										
ASC I	117	17.9	49	41.9	65	55.6	51	43.6	reference	0.39
ASC II	113	17.3	51	45.1	59	52.2	43	38.1	0.87 (0.64, 1.19)	
Unknown	*26		15		11	-	6	-		

[a] Chi square test of association.

Health service use from compensation claims

Almost three quarters of the Op TAMAR accepted claimants (74.4 per cent; n=247) used DVA-funded health services between 2003 and 2013. The median cost per service user in this period was $9,848 and the average $26,853 (SD=$42,933). Table 9 shows the total and median costs per service type. Medical and pharmacy services were used by over 90 per cent and 80 per cent of service users respectively.

Figure 8 shows the cost over a 6 year period of these services.

Table 9 *Health service use of Op TAMAR accepted claimants by Service use type*

Service Type	No. service users	Total cost$	Median cost per service user [Min, Max]$
All	247	6,632,717	9,848 [3, 375,717]
Medical	229	1,745,298	4,402 [30, 56,003]
Pharmacy	208	957,584	1,849 [3, 62,861]
Allied Health	172	1,063,563	2,840 [126, 40,157]
Private Hospitals Unique Items	117	2,220,204	4,777 [104, 314,971]
Veterans Home Care	16	36,411	636 [100, 13,199]
Rehabilitation Appliance Program	31	40,627	916 [36, 4,193]
Public Hospital Episode	32	378,120	2,719 [1,018, 90,461]
Community Nursing	4	5,448	1,025 [403, 2,995]
Other [a]	6	334	34 [9, 152]
Unknown	5	185,127	21,283 [2,177, 110, 131]

[a] Kilometre allowance for service providers.

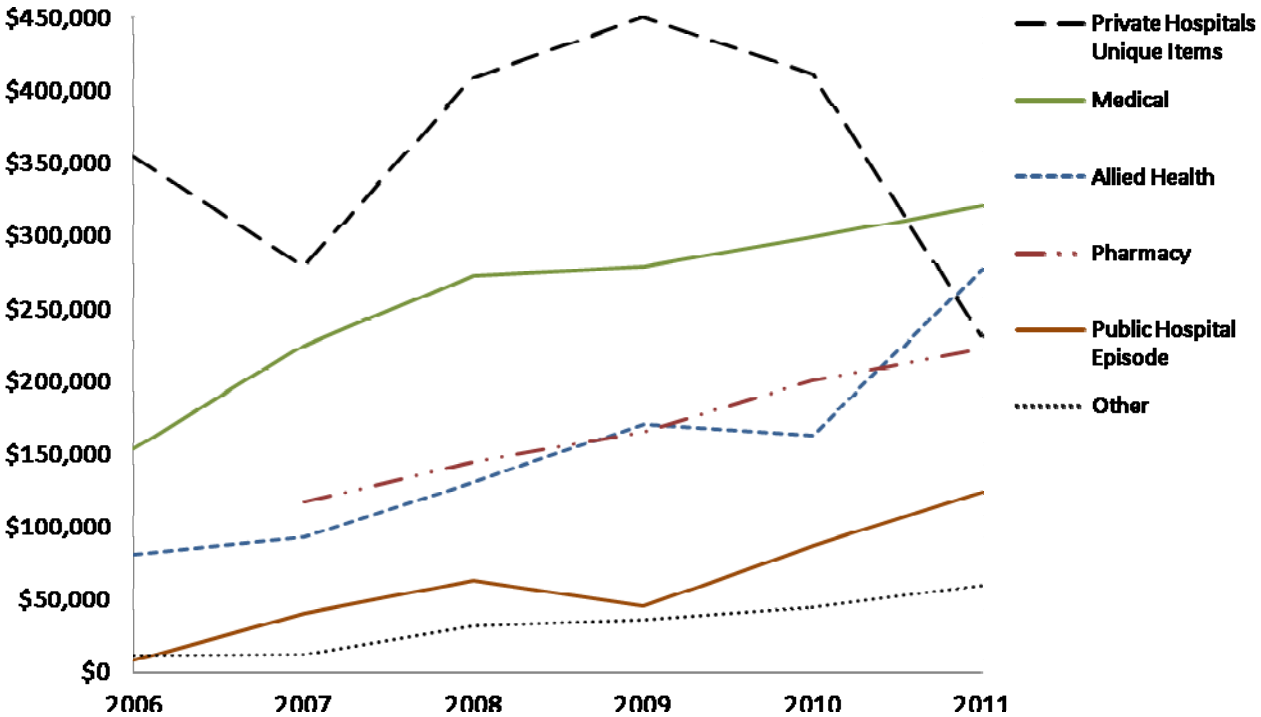

Figure 8 *Total cost to DVA of health services for 247 Op TAMAR veterans 2006-2011*

3. Medical presentations

Profile of medical record sample

The representativeness of the veterans whose records were obtained is shown in Table 10. All records for Navy Op TAMAR veterans were collected and the majority of Air Force records were obtained. The Army personnel whose records were obtained had similar demographic, service and deployment characteristics to those whose records could not be obtained. This indicates that the records acquired are representative of the Op TAMAR Army cohort as a whole, and biases based on these characteristics are minimized.

Table 10 *Characteristics of personnel whose records were obtained (n=198) and were not obtained (n=482)*

	Army					Air Force				Navy	
	Record obtained		Record not obtained			Record obtained		Record not obtained		Record obtained	
	n	%	n	%	P [a]	n	%	n	%	n	%
Total	147	23.6	475	76.4		38	84.4	7	15.6	13	100
Sex											
Male	136	92.5	444	93.5	0.69	19	50.0	6	85.7	9	69.2
Female	11	7.5	31	6.5		19	50.0	1	14.3	4	30.8
Contingent											
ASC I	73	49.7	227	47.8	1.00	18	47.4	1	14.3	7	53.8
ASC II	72	49.0	224	47.2		20	52.6	6	85.7	6	46.2
Unknown	2	1.4	24	5.1		0		0		0	
Personnel Group											
Medical	36	24.5	135	28.4	0.62	35	92.1	7	100	13	100
Rifle Company	51	34.7	154	32.4		0		0		0	
Support	60	40.8	183	38.5		3	7.9	0		0	
Unknown	0	0.0	3	0.6		0		0			
Unit status											
Formed unit	125	85.0	382	80.4	0.41	24	63.2	3	42.9	6	46.2
Augmentee	12	8.2	56	11.8		13	34.2	3	42.9	7	53.8
Unknown	10	6.8	37	7.8		1	2.6	1	14.3	0	
Age (Feb 2013)											
35-39	16	10.9	48	10.1	0.49	0		0		0	
40-44	56	38.1	164	34.5		9	23.7	1	14.3	5	38.5
45-49	31	21.1	109	22.9		10	26.3	0		2	15.4
50-54	17	11.6	81	17.1		10	26.3	0		3	23.1
55 and over	27	18.4	73	15.4		9	23.7	6	85.7	3	23.1
Service Status											
Active Regular	27	18.4	91	19.2	0.61	11	28.9	2	28.6	2	15.4
Active Reserve	13	8.8	53	11.2		1	2.6	2	28.6	1	7.7
Inactive Reserve	27	18.4	68	14.3		6	15.8	1	14.3	1	7.7
Ex-serving	80	54.4	263	55.4		20	52.6	2	28.6	9	69.2
Accepted claimants [b]											
Total	77	52.4	244	51.4	0.83	18	47.4	2	28.6	5	38.5
Attributed to Op TAMAR [c]	64	83.1	178	73.0		15	83.3	1	50.0	2	40.0
Accepted PTSD claim [c]	50	64.9	137	56.1		10	55.6	1	50.0	4	80.0
PTSD treatment only [c]	3	3.9	6	2.5		0		0		0	

[a] Chi square test of association, excludes groups with cell frequencies less than 5 (thus why no test for Air Force).

[b] Includes all accepted claims 1979-Sept. 2012.

[c] Number of accepted compensation in each column is used as the denominator in per cent calculation.

Course of medical presentations

Data on 15,737 presentations between 1990 and 2011 were analysed since by 1990 about 70 per cent of the subset for whom medical records were obtained had enlisted. One veteran of the subset did not have a presentation recorded within this time period and was therefore excluded from the analysis, thus n=197.

The average number of presentations per person in the medical records was determined. The denominator for each year was limited to veterans serving in that year (including part of the year). Table 11 shows the number of veterans serving in each year and part year.

Table 11 *Number of veterans whose medical records were obtained by number serving by year*

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
136.9	163.3	175.9	188.0	195.5	197.2	191.3	181.6	173.1	166.6	161.0
2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
150.9	146.5	142.1	138.1	133.0	124.6	119.4	116.3	112.5	107.4	102.8

Figure 9 shows that there was a small but relatively consistent difference between Op TAMAR veterans who became accepted claimants and those who have not, before, during and after Op TAMAR – accepted claimants had, on average, one to two additional presentations per service year. The spike in the accepted claimant presentations in 1998-1999 is driven by a large number of presentations from a few accepted claimants.

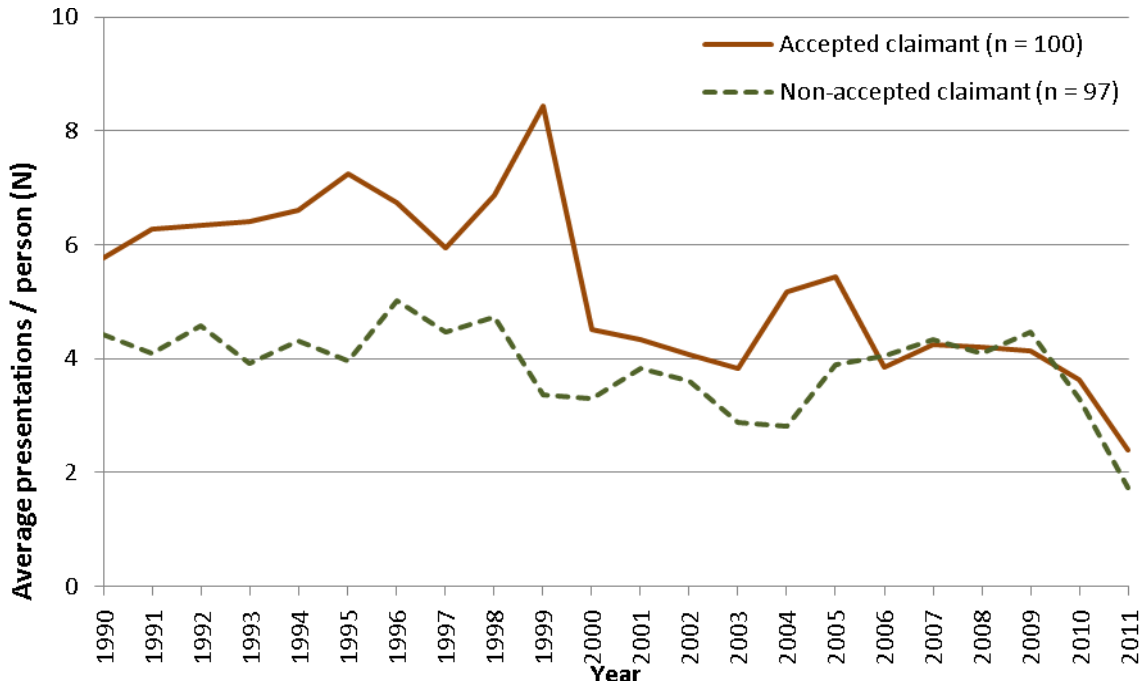

Figure 9 *Average presentations per veteran per year of service by claimant status*

Figure 10 shows no difference in presentation trends between veterans of ASC I and ASC II.

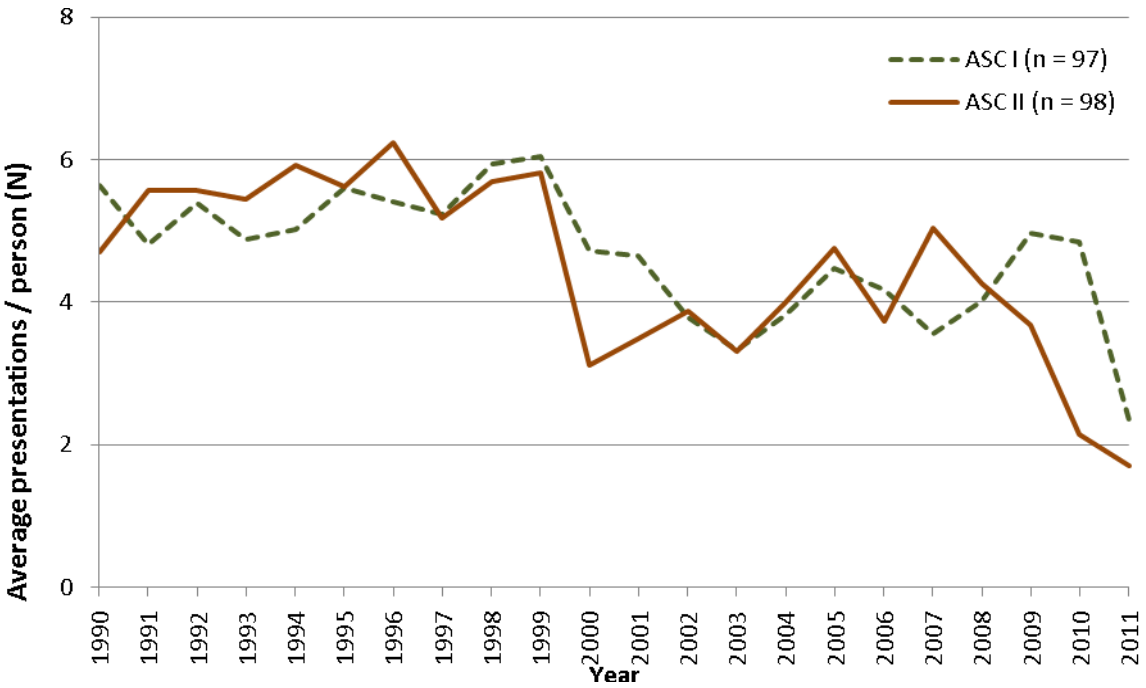

Figure 10 *Average presentations per veteran per year of service by contingent*

Figure 11 shows that the medical personnel had the lowest number of presentations over time and the rifle company personnel had the highest number of presentations.

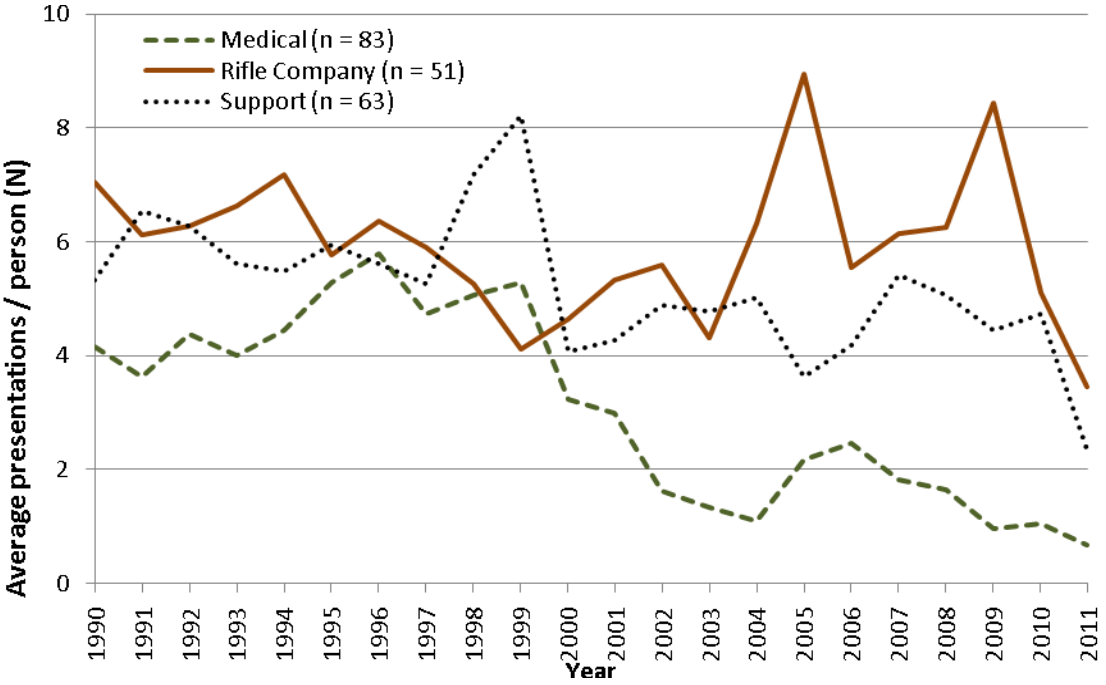

Figure 11 *Average presentations per veteran per year of service by personnel group*

Figure 12 shows a slight difference between personnel from a formed unit and augmentees, however, this should be interpreted with caution due to the small sample. The spike in the augmentees' presentations in 2006-2007 is driven by a large number of presentations from one person for a musculoskeletal condition.

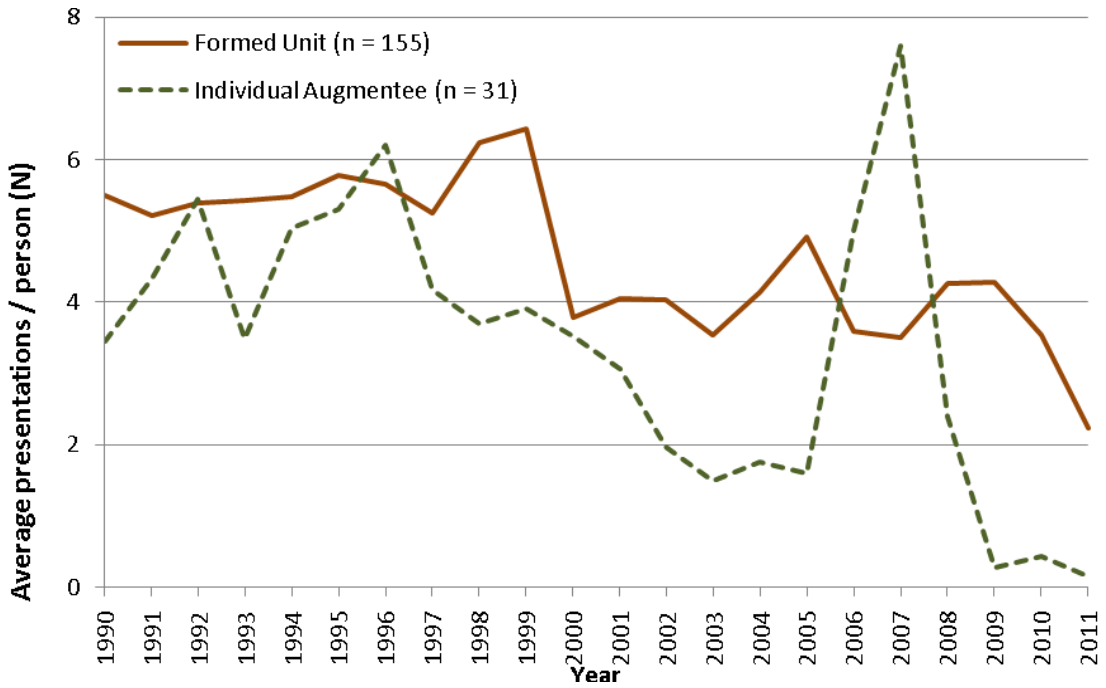

Figure 12 *Average presentations per veteran per year of service by unit status*

Figure 13 shows the proportion of musculoskeletal conditions declining over time, with the proportion of mental health conditions declining after three peaks in 1999, 2005 and 2009.

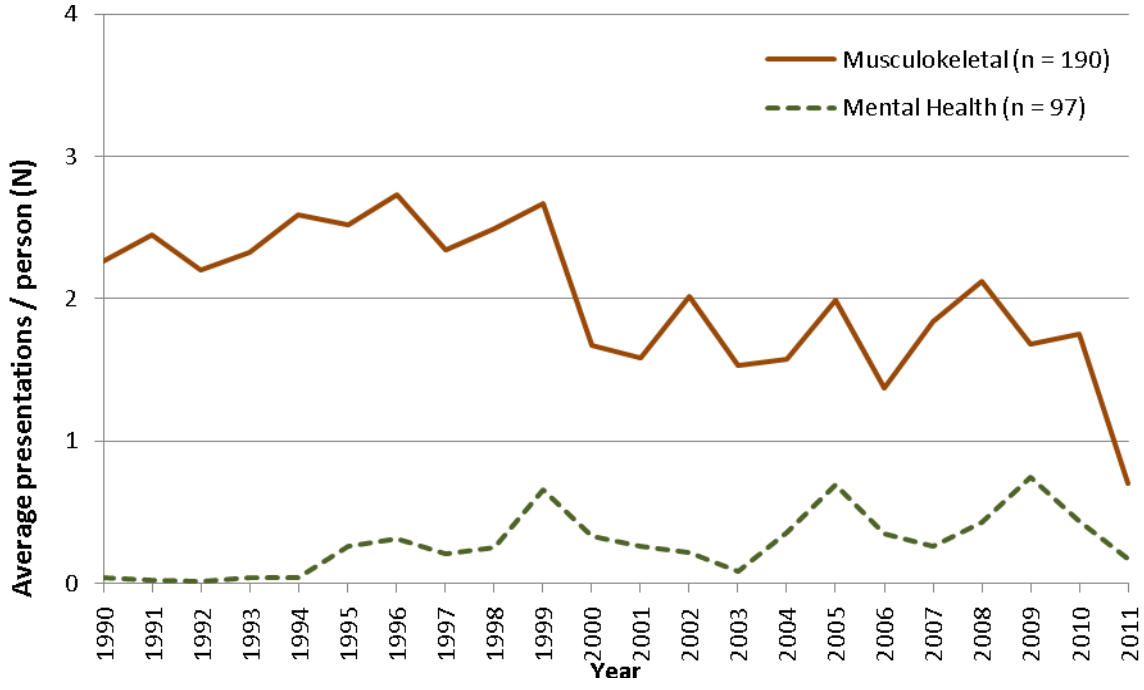

Figure 13 *Average presentations per veteran per year of service for mental health/musculoskeletal conditions/symptoms*

Type of medical presentations

Table 12 shows presentations by disease category by the number of veterans who presented and the total and median number of presentations. Musculoskeletal conditions make up just under half of all presentations (44.2 per cent) and nearly all veterans had at least once musculoskeletal presentation (96.4 per cent). Over 70 per cent of the 197 veterans presented with conditions from the first five disease categories in the table.

Table 12 *Presentations reported in the medical records of 197 Op TAMAR veterans by number of veterans who presented and total and median number of presentations*

Disease category	Number of veterans who presented		Total number of presentations		Median & [max] number of presentations
	n	%[a]	n	%[b]	
Musculoskeletal	190	96.4	6950	44.2	24 [195]
Respiratory	179	90.8	2005	12.7	8 [62]
Dermatological	160	81.2	1189	7.6	6 [60]
Other [c]	160	81.2	1221	7.8	5 [46]
Gastrointestinal Tract	150	76.1	1301	8.3	5 [81]
Infection	128	64.9	667	4.2	3 [30]
Eyes	101	51.2	300	1.9	2 [13]
Mental Health	97	49.2	880	5.6	5 [60]
Hearing	87	44.1	317	2.0	2 [33]
Central Nervous System	56	28.4	239	1.5	2 [39]
Cardiovascular System	49	24.8	325	2.1	2 [65]
Endocrine System	44	22.3	196	1.2	2 [30]
Cancer [d]	23	11.6	126	0.8	6 [16]
Unknown conditions	14	7.1	21	0.1	1 [6]
Total	**197**		**15737**		**60 [362]**

[a] Per cent of all veterans with an obtained medical record.

[b] Per cent of all presentations.

[c] Includes blood/immune diseases, benign neoplasms, non-specific symptoms and surgery presentations.

[d] Includes malignant and non-melanotic malignant neoplasm of the skin. One presentation for prostate cancer and six presentations for melanoma.

Table 13 shows that a higher proportion of accepted claimants had a presentation in each disease category than those without accepted claims. No large differences were observed between the contingents, however, more ASC II personnel presented for cancer, endocrine system and dermatological conditions compared with ASC I personnel.

Across all disease categories, fewer medical personnel presented for conditions compared with the other two groups. More rifle company personnel presented for respiratory, mental health, cardiovascular system conditions and cancer than the other two groups. More support personnel presented for infection, hearing, central nervous system and endocrine system conditions than the other two groups.

Table 13 *Per cent of accepted claimants and non-claimants contingent and personnel groups with presentations by disease category reported in the medical records of 197 Op TAMAR veterans*

Disease category	Accepted claimants (n=100)	Non-claimants (n=97)	ASC I (n=97)	ASC II (n=98)	Medical (n=83)	Rifle company (n=51)	Support (n=63)
Musculoskeletal	97.0	95.9	95.9	96.9	91.6	100.0	100.0
Respiratory	97.0	84.5	91.8	89.8	85.5	96.1	93.7
Gastrointestinal Tract	88.0	74.2	79.4	83.7	75.9	84.3	85.7
Other [a]	83.0	79.4	83.5	79.6	75.9	88.2	82.5
Dermatological	82.0	70.1	73.2	79.6	72.3	78.4	79.4
Mental health	72.0	57.7	63.9	67.3	57.8	72.5	68.3
Eyes	68.0	29.9	46.4	52.0	47.0	52.9	49.2
Infection	58.0	44.3	53.6	50.0	45.8	43.1	65.1
Cardiovascular Systems	48.0	40.2	42.3	45.9	38.6	51.0	46.0
Hearing	34.0	22.7	28.9	28.6	21.7	27.5	38.1
Central Nervous System	31.0	18.6	26.8	23.5	22.9	21.6	30.2
Endocrine System	27.0	17.5	17.5	27.6	16.9	19.6	31.7
Cancer [b]	15.0	8.2	7.2	16.3	6.0	21.6	11.1

[a] Includes blood/immune diseases, benign neoplasms, non-specific symptoms and surgery presentations.
[b] Includes malignant and non-melanotic malignant neoplasm of the skin.

Table 14 shows the pattern of presentations in medical records and accepted claims. The table demonstrates the types of disease categories that are most likely to be associated with claims. All claimants who had mental health presentations recorded in their medical record had an accepted claim for mental health. The majority of claimants with musculoskeletal and hearing presentations have accepted claims for conditions in these categories.

Table 14 *Accepted claimants with medical records (n=100) by number of claimants with presentations against the disease categories and number of claimants with accepted claims against the disease categories*

Disease category	No. of accepted claimants with presentations	Accepted claimants
Musculoskeletal	97	69
Respiratory	97	2
Dermatological	88	17
Other [a b]	83	1
Gastrointestinal Tract	82	11
Infection	72	3
Mental Health	68	69
Eyes	58	2
Hearing	48	40
Central nervous system	34	1
Cardiovascular systems	31	3
Endocrine	27	-
Cancer [c]	15	11

[a] Includes blood/immune diseases, benign neoplasms, non-specific symptoms and surgery presentations.
[b] Exposure to chemicals/radiation, unspecified conditions, post-viral infection/chronic fatigue syndrome.

[c] Includes malignant and non-melanotic malignant neoplasm of the skin.

4. Fitness to serve

The following tables show MEC up to three years after Op TAMAR, at discharge and the most recently available for currently serving personnel. Table 15 shows that across each of the points, most personnel were classified as MEC 1 or 2, meaning that they were medically fit to deploy. Over a third of ex-serving personnel discharged as MEC 4, meaning that they were medically unfit to deploy in the long term.

Tables 16-18 show that accepted claimants at each time point were more likely to have a lower MEC than non-claimants. Table 17 shows that more rifle company personnel discharged at MEC 4 compared with the other two groups which is further evidence that the rifle company have the poorest health outcomes among the Op TAMAR cohort. The rifle company MEC also influences the lower MEC at discharge for formed unit personnel compared to augmentees.

Table 15 *MEC for the Op TAMAR cohort after Op TAMAR, at discharge and most recently available*

	After Op TAMAR MEC (1995-1998) (n=567)		Discharge MEC (n=312)		Most recently available MEC for currently serving (n=305)	
	n	%	n	%	n	%
MEC 1	496	87.5	139	44.6	174	57.1
MEC 2	39	6.9	52	16.7	109	35.7
MEC 3	14	2.5	12	3.9	15	4.9
MEC 4	16	2.8	106	34.0	7	2.3
Other [a]	2	0.4	3	1.0	0	0

[a] Unknown MEC codes.

Table 16 *MEC in 1995-1998 by service, deployment and claimant status (n=567)*

	MEC 1		MEC 2		MEC 3		MEC 4		Other		Total
	n	%	n	%	n	%	n	%	n	%	
Total	496		39		14		16		2		567
Service											
Navy	3	33.3	2	22.2	0	0.0	4	44.4	0	0.0	9
Army	485	88.3	36	6.6	14	2.6	12	2.2	2	0.4	549
Air Force	8	88.9	1	11.1	0	0.0	0	0.0	0	0.0	9
Service type											
Active Regular	112	92.6	7	5.8	1	0.8	1	0.8	0	0.0	121
Active Reserve	62	92.5	4	6.0	1	1.5	0	0.0	0	0.0	67
Inactive Reserve	82	89.1	7	7.6	3	3.3	0	0.0	0	0.0	92
Ex-serving	240	83.6	21	7.3	9	3.1	15	5.2	2	0.7	287
Contingent											
ASC I	237	87.1	17	6.3	7	2.6	10	3.7	1	0.4	272
ASC II	237	87.8	19	7.0	7	2.6	6	2.2	1	0.4	270
Unknown	22	88.0	3	12.0	0	0.0	0	0.0	0	0.0	25
Personnel group											
Medical	143	83.6	17	9.9	3	1.8	6	3.5	2	1.2	171
Rifle Company	155	90.6	4	2.3	4	2.3	8	4.7	0	0.0	171
Support	196	88.3	17	7.7	7	3.2	2	0.9	0	0.0	222
Unknown	2	66.7	1	33.3	0	0.0	0	0.0	0	0.0	3
Unit status											
Formed unit	398	88.2	24	5.3	14	3.1	13	2.9	2	0.4	451
Augmentee	58	81.7	10	14.1	0	0.0	3	4.2	0	0.0	71
Unknown	40	88.9	5	11.1	0	0.0	0	0.0	0	0.0	45
Claimant status											

Accepted claimants	239	83.0	27	9.4	10	3.5	11	3.8	1	0.3	288
Non-claimants	257	92.1	12	4.3	4	1.4	5	1.8	1	0.4	279

Table 17 *Discharge MEC by Service, deployment and claimant status (n=312)*

	MEC 1		MEC 2		MEC 3		MEC 4		Other		Total
	n	%	n	%	n	%	n	%	n	%	
Total	139		52		12		106		3		312
Service											
Navy	2	25.0	1	12.5	1	12.5	4	50.0	0	0.0	8
Army	117	41.5	51	18.1	10	3.5	101	35.8	3	1.1	282
Air Force	20	90.9	0	0.0	1	4.5	1	4.5	0	0.0	22
Contingent											
ASC I	63	42.9	20	13.6	5	3.4	58	39.5	1	0.7	147
ASC II	69	44.8	29	18.8	7	4.5	47	30.5	2	1.3	154
Unknown	7	63.6	3	27.3	0	0.0	1	9.1	0	0.0	11
Personnel group											
Medical	53	52.0	14	13.7	4	3.9	28	27.5	3	2.9	102
Rifle Company	21	25.3	14	16.9	3	3.6	45	54.2	0	0.0	83
Support	63	50.4	24	19.2	5	4.0	33	26.4	0	0.0	125
Unknown	2	100.0	0	0.0	0	0.0	0	0.0	0	0.0	2
Unit status											
Formed unit	101	41.2	41	16.7	9	3.7	92	37.6	2	0.8	245
Augmentee	28	62.2	7	15.6	2	4.4	7	15.6	1	2.2	45
Unknown	10	45.5	4	18.2	1	4.5	7	31.8	0	0.0	22
Claimant status											
Accepted claimants	55	27.5	35	17.5	8	4.0	100	50.0	2	1.0	200
Non-claimants	84	75.0	17	15.2	4	3.6	6	5.4	1	0.9	112

Table 18 *Most recently available MEC for personnel currently serving (2013) by service, deployment and claimant status (n=305)*

	MEC 1		MEC 2		MEC 3		MEC 4		Total
	n	%	n	%	n	%	n	%	
Total	174	57.0	109	35.7	15	5.0	7	2.3	305
Service									
Navy	3	75.0	1	25.0	0	0	0	0	4
Army	156	56.1	103	37.1	13	4.7	6	2.2	278
Air Force	15	65.2	5	21.7	2	8.7	1	4.3	23
Service type									
Active Regular	69	51.9	51	38.3	8	6.0	5	3.8	133
Active Reserve	39	55.7	26	37.1	4	5.7	1	1.4	70
Inactive Reserve	66	64.7	32	31.4	3	2.9	1	1.0	102
Contingent									
ASC I	90	61.6	50	34.2	4	2.7	2	1.4	146
ASC II	79	54.5	51	35.2	10	6.9	5	3.4	145
Unknown	5	35.7	8	57.1	1	7.1	0	0	14
Personnel group									
Medical	67	63.8	33	31.4	3	2.9	2	1.9	105
Rifle Company	57	60.0	31	32.6	4	4.2	3	3.2	95
Support	49	47.1	45	43.3	8	7.7	2	1.9	104
Unknown	1	100.0	0	0	0	0	0	0	1
Unit status									
Formed unit	141	59.0	85	35.6	8	3.3	5	2.1	239
Augmentee	22	52.4	13	31.0	6	14.3	1	2.4	42
Unknown	11	45.8	11	45.8	1	4.2	1	4.2	24
Claimant status									
Accepted claimants	42	37.2	56	49.6	12	10.6	3	2.7	113
Non-claimants	132	68.8	53	27.6	3	1.6	4	2.1	192

5. Post-traumatic stress disorder

PTSD represents the largest singular compensated condition in the Op TAMAR cohort. This section examines the demographics, other compensation, medical presentations and fitness to serve of PTSD claimants.

Demographic and career profile

Table 19 shows the characteristics of accepted claimants with and without an accepted PTSD claim. Accepted PTSD claimants are slightly younger on average compared with non-claimants (Average age (SD): 46.9(6.9) versus 50.1(6.9)). The majority of accepted PTSD claimants are ex-serving and discharged earlier than non-PTSD claimants.

Table 19 *Demographic and service characteristics of accepted PTSD claimants and non-claimants*

	Accepted claimants (n=211)		Non-PTSD claimants (n=121)		
	n	**%**	**n**	**%**	**P** [a]
Age (2013)					
35-39	24	11.4	5	4.1	0.001
40-44	80	37.9	27	22.3	
45-49	45	21.3	32	26.5	
50-54	33	15.6	30	24.8	
55+	29	13.7	27	22.3	
Service status					
Currently Serving	39	18.5	66	54.6	<0.001
Ex-serving	172	81.5	55	45.5	
Discharge period [b]					
1995-1996	18	10.5	4	18.2	0.39
1997-1999	41	24.0	10	19.6	
2000-2005	63	37.8	18	33.3	
2006-2013	49	28.7	22	40.7	

[a] Chi square test of association.
[b] No information on discharge date is available for one PTSD claimant and one non-PTSD claimant.

Compensation claims

Course of compensation

Figure 14 shows the accepted PTSD claims before, during and after discharge year. Up to four years before discharge, very few PTSD claims were made. The number of claims sharply increased one year before discharge and peaked at discharge year and sharply declined one year post discharge.

Currently serving members hold just under a fifth (17.5 per cent) of accepted PTSD claims.

The longest time period between discharge and a PTSD claim is 15 years (discharge 1996, claim 2011). Of people who discharged before the year their PTSD claim was approved, the average period between discharge and claim was 5.45 years (SD 4.02).

Figure 15 shows that two peaks in PTSD claims occurred in 2000 and 2006 (five and 11 years after Op TAMAR).

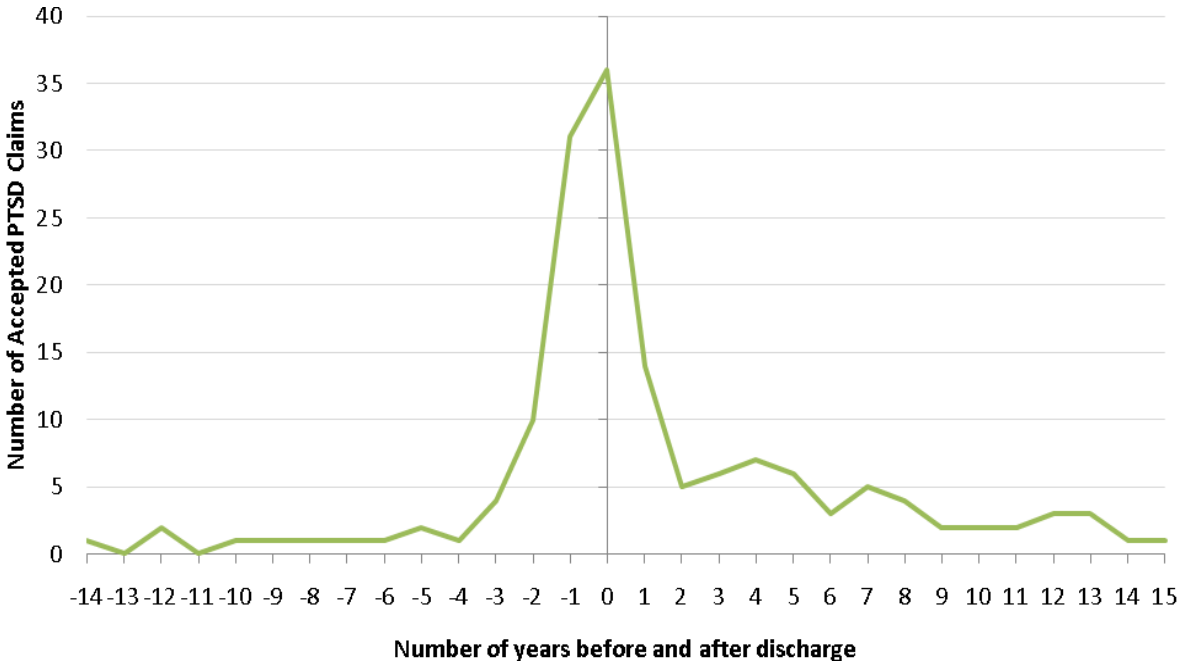

Figure 14 *Accepted claims for PTSD attributed to Op TAMAR by year of discharge and year claim approved*

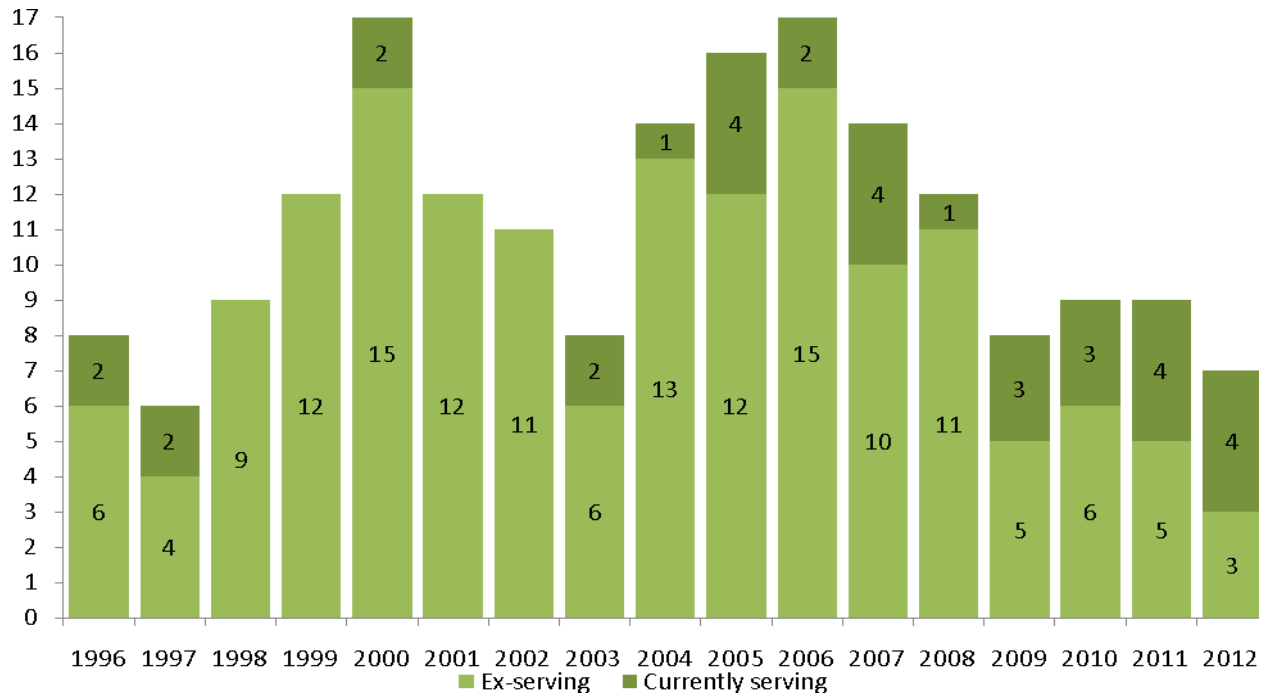

Figure 15 *Number of Op TAMAR veterans with accepted PTSD compensation attributed to Op TAMAR by year claim approved*

Figure 16 shows the percentage of PTSD claims attributed to Op TAMAR that occurred in five year periods after Op TAMAR. Almost three quarters of PTSD claims (72.5 per cent) occurred at least six years after Op TAMAR.

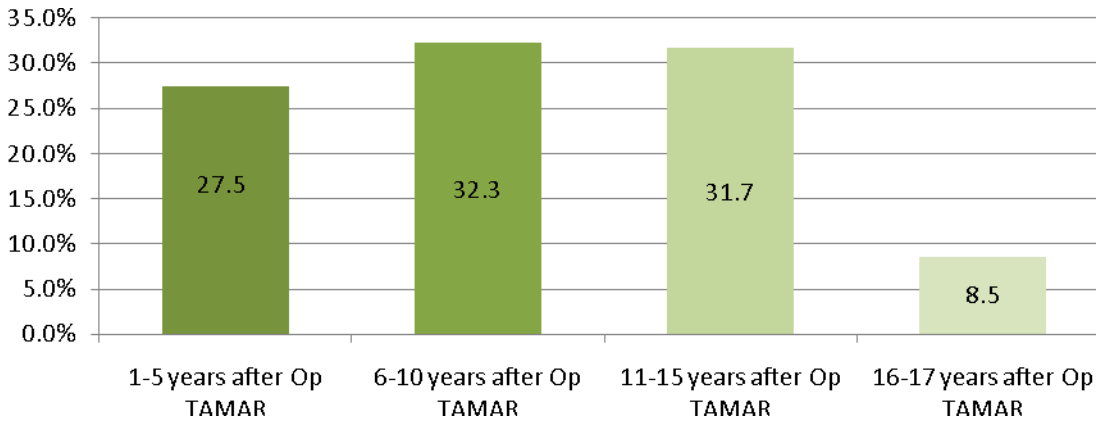

Figure 16 *Percentage of accepted PTSD claims attributed to Op TAMAR by years after Op TAMAR*

Type of compensation

Table 20 shows that a higher proportion of accepted PTSD claimants claimed for non-PTSD mental health conditions, gastrointestinal tract, dermatological, respiratory and cardiovascular system conditions than non-PTSD claimants. In contrast, a higher proportion of non-PTSD claimants have claims for musculoskeletal, infection, eye conditions and cancer.

PTSD claimants were five times more likely to make a non-PTSD mental health claim, compared to non-PTSD claimants and 12 times more likely to make a claim relating to gastrointestinal tract conditions.

Table 20 *Percentage of accepted claimants by PTSD claim status with claims in all disease categories*

Disease category	Accepted claimants with accepted PTSD claim (n=211)	Accepted claimants with no accepted PTSD claim (n=121)	RR (95% CI) [a]	P [b]
Mental Health	100.0	9.1	-	-
Mental health excluding PTSD	51.2	9.1	5.63 (3.16, 10.04)	*<0.001*
Musculoskeletal	49.8	89.3	0.56 (0.48, 0.64)	<0.001
Hearing	38.4	37.2	1.03 (0.77, 1.38)	0.83
Gastrointestinal Tract	19.9	1.7	12.04 (2.97, 48.87)	<0.001
Dermatological	12.3	10.7	1.15 (0.61, 2.15)	0.67
Cancer [c]	6.2	13.2	0.47 (0.23, 0.94)	0.03
Respiratory	3.8	0.8	4.59 (0.58, 36.24)	0.15
Infection	3.3	5.8	0.57 (0.21, 1.60)	0.29
Cardiovascular System	2.8	0.8	3.44 (0.42, 28.24)	0.25
Eyes	1.9	3.3	0.57 (0.15, 2.25)	0.43
Central Nervous System	0.5	1.7	0.29 (0.03, 3.13)	0.31
Genitourinary Tract	0.0	0.8	-	-
Other [d]	0.5	0.0	-	-

[a] Unadjusted results presented due to small cell sizes

[b] Chi square test of association.

[c] Includes malignant and non-melanotic malignant neoplasm of the skin.

[d] Exposure to chemicals/radiation, unspecified conditions, post-viral infection/chronic fatigue syndrome.

Medical presentations

The medical records sample contained records for 67 Op TAMAR veterans who had an accepted claim for PTSD. The representativeness of the accepted PTSD claimants whose records were obtained is shown in Table 21. Fewer records of rifle company personnel who are accepted PTSD claimants were obtained than for the other personnel groups.

Table 21 *Demographic, Op TAMAR deployment and Service characteristics of accepted PTSD claimants whose records were obtained and those who were not obtained*

	Record obtained		Record not obtained		
	n	%	n	%	P [a]
Total	67		145		
Sex					
Male	60	89.6	140	96.6	0.04
Female	7	10.4	5	3.4	
Contingent					
ASC I	34	50.7	69	47.6	0.73
ASC II	33	49.3	73	50.3	
Unknown	0	0.0	3	2.1	
Personnel Group					
Medical	24	35.8	32	22.1	0.03
Rifle Company	17	25.4	62	42.8	
Support	26	38.8	51	35.2	
Unit status					
Formed unit	55	82.1	127	87.6	0.11
Augmentee	10	14.9	11	7.6	
Unknown	2	3.0	7	4.8	
Age (Feb 2013)					
35-39	4	6.0	20	13.8	0.12
40-44	24	35.8	56	38.6	
45-49	12	17.9	33	22.8	
50-54	12	17.9	21	14.5	
55 and over	15	22.4	15	10.3	
Service					
Navy	4	6.0	0	0.0	-
Army	53	79.1	144	99.3	
Air Force	10	14.9	1	0.7	
Service Status					
Active Regular	7	10.4	8	5.5	0.18
Active Reserve	2	3.0	7	4.8	
Inactive Reserve	7	10.4	8	5.5	
Ex-serving	51	76.1	122	84.1	

[a] Chi square test of association, excludes groups with cell frequencies less than 5.

Course of medical presentations

Figure 17 shows that Op TAMAR veterans who became accepted PTSD claimants had more presentations later on in service than those who are accepted claimants but non-PTSD claimants.

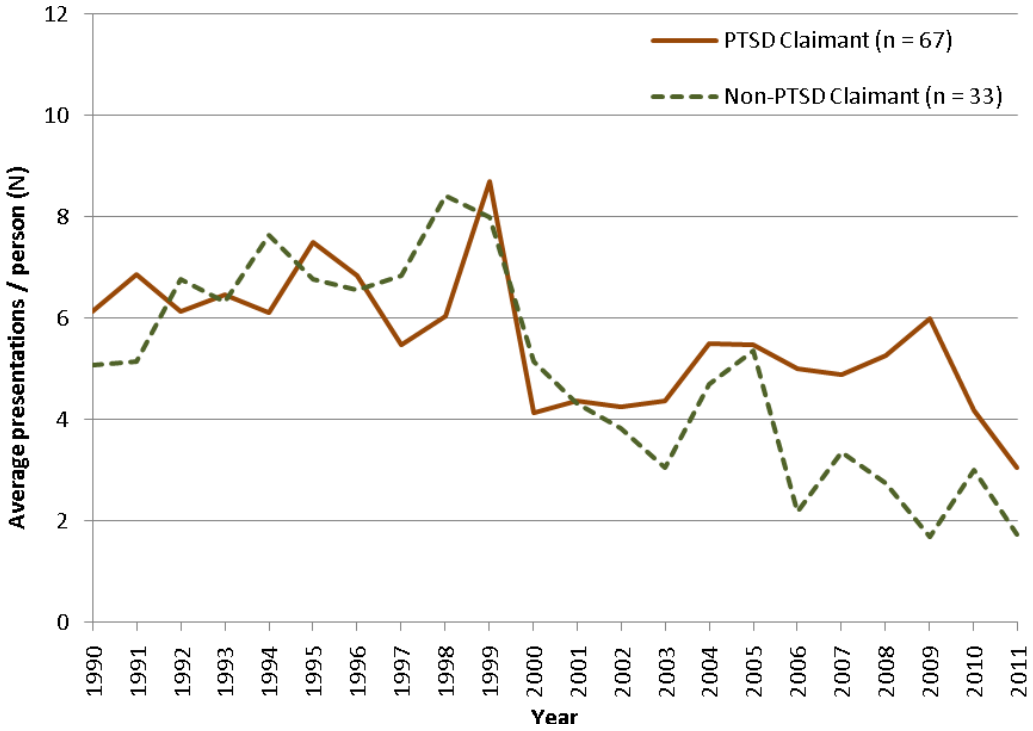

Figure 17 *Average presentations per veteran per year of service by a sample of accepted PTSD claimants (n=67) and non-claimants (n=33)*

Figure 18 shows the number of PTSD presentations by year of a veteran's first presentation of PTSD symptoms in the medical record relative to the year their PTSD claim was approved.

Thirty-five veterans with an accepted PTSD claim were found to have presentations for PTSD symptoms in their medical record. The majority of veterans (65 per cent) had their PTSD claim approved in the year of their first presentations for PTSD symptoms in their medical record, or the year after. Of the 32 personnel who did not have presentations for PTSD symptoms in their record, 21 were ex-serving, six were inactive reserves, two were active reservists and three were active regulars as at February 2013.

In addition to the sample of 67 veterans with an accepted PTSD claim, there were 11 veterans who had presentation data for PTSD in their record but who did not have an accepted PTSD claim. Of these 11, seven were medical personnel, two were rifle company personnel and two were support personnel. Six are ex-serving, two were active reservists, two were inactive reservists and one was an active regular at February 2013. Four are accepted claimants, with two having a rejected PTSD claim.

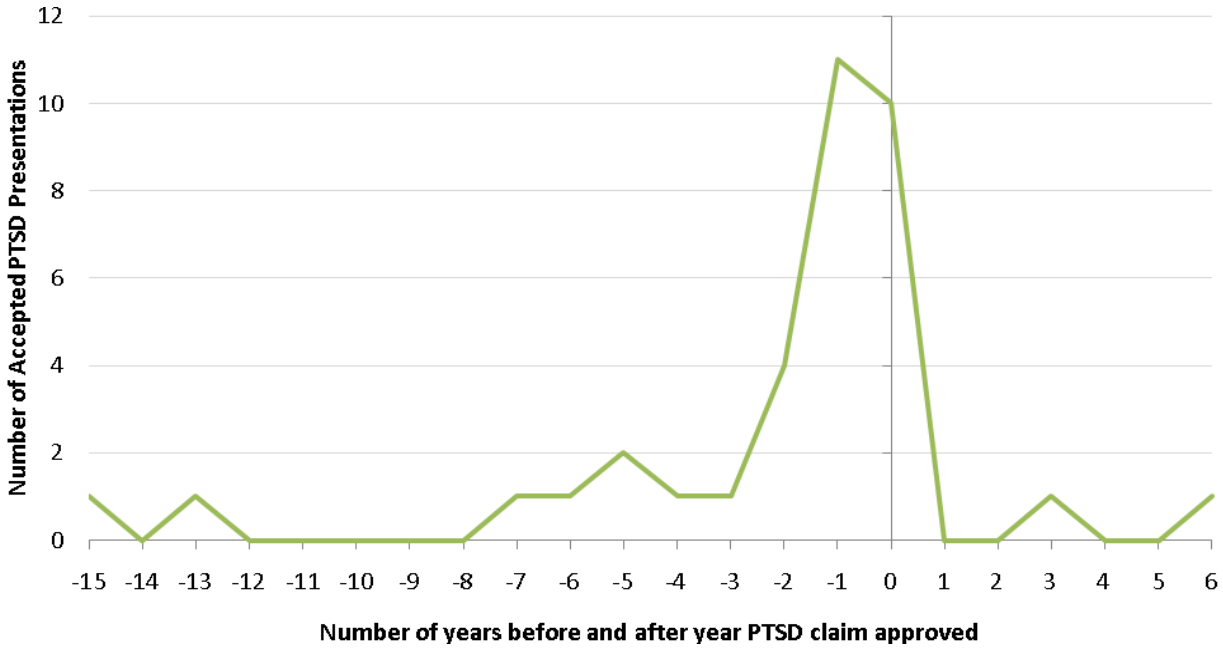

Figure 18 *First presentation for PTSD symptoms in the medical records of 67 Op TAMAR personnel with accepted PTSD compensation by year PTSD claim approved*

Type of medical presentations

Table 22 looks at presentations in the medical records and accepted claimants with and without an accepted PTSD claim.

The table shows that a higher proportion of accepted claimants with a PTSD claim had presentations for respiratory, central nervous system, mental health (significant difference) and hearing conditions in their medical records than accepted claimants without a PTSD claim. In contrast, more accepted claimants without a PTSD claim presented for other conditions, eye-related conditions, infection conditions, cardiovascular system conditions and cancer than accepted claimants with a PTSD claim.

Table 22 *Percentage of presentations made by Op TAMAR veterans who became accepted claimants with and without an accepted PTSD claim*

Disease category	Accepted claimants with accepted PTSD claim (n=67)	Accepted claimants with no PTSD claim (n=33)	RR (95% CI) [a]	P [b]
Respiratory	98.5	93.9	1.05 (0.96, 1.15)	0.21
Musculoskeletal	97.0	97.0	1.00 (0.93, 1.08)	0.99
Dermatological	88.1	87.9	1.00 (0.86, 1.17)	0.98
Gastrointestinal Tract	86.6	72.7	1.19 (0.95, 1.50)	0.09
Other [c]	80.6	87.9	0.92 (0.77, 1.09)	0.36
Mental health	76.1	51.5	1.48 (1.03, 2.11)	0.01
Mental health excluding PTSD	49.3	45.5	1.08 (0.69, 1.69)	0.72
Infection	68.7	78.8	0.87 (0.69, 1.11)	0.29
Eyes	53.7	66.7	0.81 (0.58, 1.12)	0.22
Hearing	49.3	45.5	1.08 (0.69, 1.69)	0.72
Central Nervous System	37.3	27.3	1.37 (0.72, 2.59)	0.32
Cardiovascular System	28.4	36.4	0.78 (0.43, 1.41)	0.42
Endocrine System	28.4	24.2	1.17 (0.57, 2.39)	0.66
Cancer [d]	13.4	18.2	0.74 (0.29, 1.90)	0.53

[a] Unadjusted rate ratios

[b] Chi square test of association.

[c] Includes blood/immune diseases, benign neoplasms, non-specific symptoms and surgery presentations.

[d] Includes malignant and non-melanotic malignant neoplasm of the skin.

Fitness to serve

Table 23 shows that a higher proportion of Op TAMAR veterans who became accepted PTSD claimants have a lower MEC (MEC 3 or 4) than non-PTSD claimants at first assessment after Op TAMAR. This is also the case at discharge and at the most recently available assessment for currently serving personnel, with the difference particularly pronounced at discharge. Almost two-thirds of accepted claimants with PTSD discharged at MEC 4, while just over a fifth discharged at MEC 1.

Table 23 *Accepted claimants with and without an accepted PTSD claim tabulated by MEC at three time points*

	MEC 1		MEC 2		MEC 3		MEC 4		Unknown		
	n	%	n	%	n	%	n	%	n	%	Total
MEC after Op TAMAR (1995-1998)											
PTSD claimants	135	82.3	11	6.7	9	5.5	9	5.5	0	0.0	164
Non-PTSD claimants	104	83.9	16	12.9	1	0.8	2	1.6	1	0.8	124
MEC at discharge											
PTSD claimants	32	22.2	17	11.8	6	4.2	89	61.8	0	0.0	144
Non-PTSD claimants	23	41.1	18	32.1	2	3.6	11	19.6	2	3.6	56
Most recently available MEC for currently serving personnel											
PTSD claimants	10	29.4	19	55.9	4	11.8	1	2.9	-	-	34
Non-PTSD claimants	32	40.5	37	46.8	8	10.1	2	2.5	-	-	79

6. Deaths

Death and cause of death

Death was assessed from the date of return from Op TAMAR until 30 April 2013 which was the cut-off date for the National Death Index (NDI) at the time of the linkage. The average length of follow-up was 17.8 years. Fourteen deaths (two per cent of the cohort) were recorded across three data sources. These data sources and the discrepancies between them are shown in Figure 19.

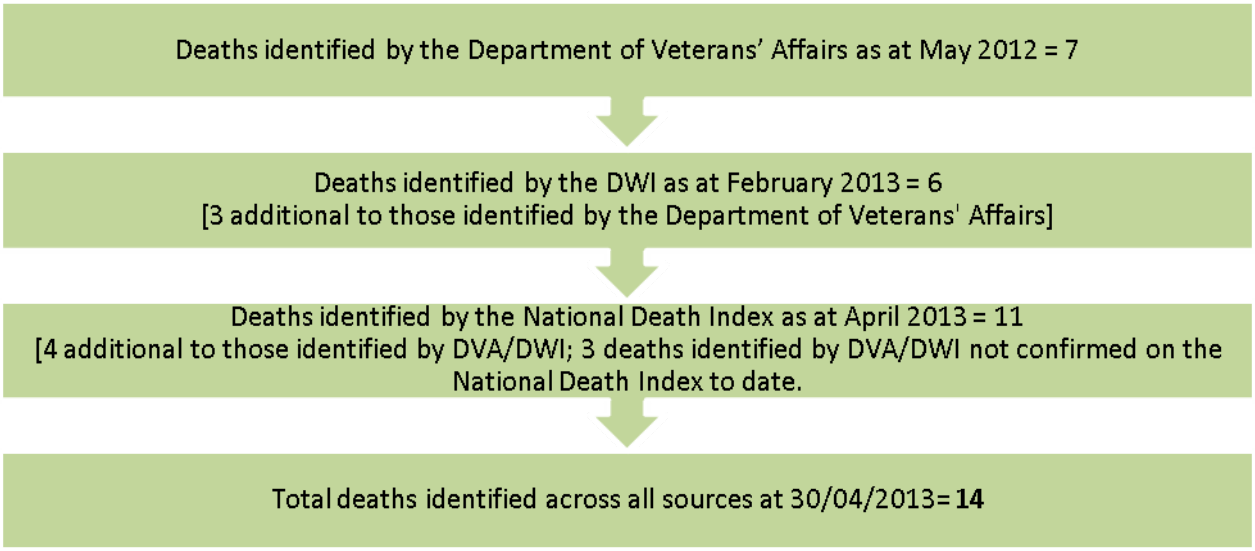

Figure 19 *Sources of death data for the Op TAMAR cohort*

At the time of the linkage, cause of death information was available for eight of the eleven decedents identified by the NDI. Two deaths were recent and therefore cause of death was not available to the NDI at the time of the linkage.

The causes of death recorded were deaths from external causes, cancers and diseases of the circulatory system. Detailed tables of cause have not been presented because of the small number of cases involved. All 14 deaths were used to compare the mortality of the Op TAMAR cohort with the general population.

Comparison with death rates in the general population

Comparison of the Op TAMAR cohort with the general population involved comparing the observed number of deaths with the number of deaths expected if rates of mortality were the same in the Op TAMAR cohort as in the general population.

The expected number of deaths is based on the number of people in each age/sex group and national mortality rates for people in that stratum. These population rates were obtained from AIHW General Record of Incidence of Mortality (GRIM).[27] The expected number of events in the population was calculated by multiplying the number of person years in each five-year age and sex group for each calendar year by the rate of mortality for that age/sex group and year.

The Standardised Mortality Ratio (SMR) was used to compare rates in the Op TAMAR cohort to Australian norms. These were defined as: SMR = 100 × (Observed number of deaths / Expected number of deaths)

A standardised ratio equal to 100 indicates no difference between the observed and expected number of events. A standardised ratio above 100 means that the observed number of events was higher than expected and a standardised ratio below 100 indicates that the number of events was lower than expected. An overall ratio (across all sex and age groups) was calculated using the direct method of standardisation.[28]

The 95 per cent confidence interval gives a range of values around the estimated SMR. If the confidence interval does not include 100, the number of events was significantly different from that in the Australian population. A statistically significant result is expected to be produced by chance about five per cent of the time.

Death rates in the Australian population were not available for the years 2008-2010. Therefore, to calculate the expected number of deaths for these years, the Australian population mortality statistics for 2007 were used.

Table 24 shows that the number of deaths observed for the Op TAMAR cohort (14 deaths) was significantly less than would have been expected in the general population of the same age and sex distribution (54 deaths).

Table 24 *All-cause mortality for the Op TAMAR cohort compared with mortality in the Australian population*

	Observed deaths	Expected deaths	SMR 95% CI	p [a]
All-cause mortality	14	54.3	25.8 (15.3, 43.5)	<0.001

[a] Chi square test of association.

7. Visualisation of a fictionalised Op TAMAR veteran career, health and compensation pathway

To demonstrate the richness of the existing data sources that can be drawn together to look at long-term health of veterans, a fictionalised pathway of an Op TAMAR veteran is provided in Figure 20. The fictionalised veteran represents majority groupings of the Op TAMAR cohort – an ex-serving regular Army veteran; a rifleman; and an accepted claimant with an Op TAMAR-attributed PTSD claim that first presented around 10 years after the deployment. The specific details are an amalgamation of several veterans.

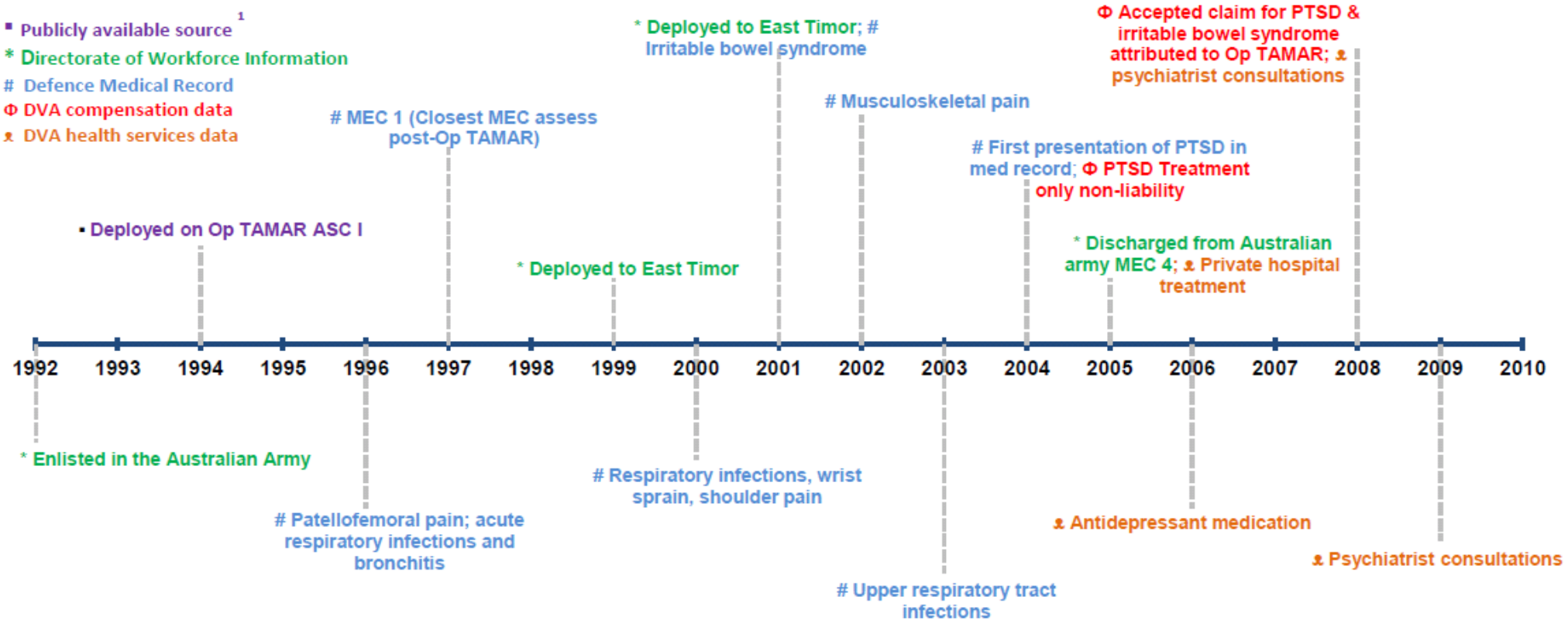

Figure 20 *Fictionalised career, health and compensation pathway of an Op TAMAR veteran*

Discussion

Summary of findings

Career and demographic profile

- Thirty per cent of Op TAMAR veterans were still serving in the military in 2013, while 70 per cent were ex-serving or inactive reservists.
- Rifle company veterans of Op TAMAR are younger than the medical and support veterans.
- There is no evidence of difference in discharge rates between the contingents, personnel groups and between personnel from formed units and individual augmentees.

Compensation claims

- By September 2012 just under half of the Op TAMAR cohort (48.8 per cent) had at least one accepted compensation claim, with 38.2 per cent having an accepted claim that was attributed to Op TAMAR. If PTSD claims are removed, 10.4 per cent of the cohort had an accepted claim attributed to Op TAMAR.
- The bulk of compensation claims occurred 11 to 15 years after the end of Op TAMAR. Up until 2013 the number of accepted claims peaked in 2005-2007, with over a quarter of all claims (26.6 per cent) in these three years.
- Across almost all conditions, medical personnel had fewer accepted claims and fewer Op TAMAR-attributed claims than the rifle company and support personnel. There was no difference between ASC I and ASC II for Op TAMAR-attributed claims. Individual augmentees had fewer Op TAMAR-attributed claims than personnel from formed units – this outcome likely reflects the fact that rifle company personnel had a greater proportion of personnel from formed units than the other two personnel groups.
- Mental health and musculoskeletal conditions were the most common reason for claims with almost a third of the cohort (32.6 per cent and 31.3 per cent) having an accepted claim.

Medical presentations and assessments

- Over time, accepted claimants (Op TAMAR veterans with accepted compensation claims) and rifle company personnel had more presentations in their medical records than non-claimants and the other personnel groups. No large difference in presentations was observed between the contingents or between personnel from formed units and individual augmentees.
- Musculoskeletal conditions were the most common presentation in the veterans' medical records.
- Accepted claimants had a lower MEC after Op TAMAR and at discharge than non-claimants and rifle company personnel had a lower MEC than the other two groups at discharge.

Post-traumatic stress disorder

- Almost one third (31.0 per cent) of the Op TAMAR cohort has an accepted claim or treatment for PTSD. Nearly all accepted PTSD claims are attributed to Op TAMAR.
- By time, 40.2% per cent of PTSD claims occurred 11 years after Op TAMAR. Two peaks of claims have occurred to date – in 2000 and 2006.
- Almost two thirds of Op TAMAR veterans with a PTSD claim discharged at MEC 4.

Deaths

- Fourteen Op TAMAR veterans (two per cent) had died as at 30 April 2013. The number of deaths observed for the Op TAMAR cohort was significantly less than would have been expected in the general population of the same age and sex distribution (54 deaths).

Responses to Aims

Increase understanding of veterans', particularly peacekeepers', long-term health and compensation.

Prevalence of PTSD

The perception of a high level of psychological morbidity in Op TAMAR personnel is supported by the study. Almost one third (31.0 per cent) of the Op TAMAR cohort has an accepted claim for PTSD. The highest prevalence estimates of PTSD obtained from validated scales in self-report studies for other similar deployments (i.e. UN peacekeeping deployments with traumatic exposures), such as Somalia and former Yugoslavia, were 8 per cent (Dutch peacekeepers, former Yugoslavia, average six years after deployment)[29], 10.9 per cent (United States peacekeepers, Somalia, 18 months after deployment)[30], and 16 per cent (United Kingdom peacekeepers, former Yugoslavia, three years after deployment).[31]

The prevalence of PTSD in the Op TAMAR cohort is evidence of associations found in the literature between exposure to traumatic events during deployment and adverse mental health outcomes. Bramsen and colleagues[32], for example, found that greater exposure to traumatic events during deployment to Former Yugoslavia was associated with greater severity of self-reported PTSD symptoms. Hodson's study of Op TAMAR personnel showed an increase of self-reported PTSD caseness over time, associated with high traumatic exposure. [13]

Delayed-onset PTSD is suggestive in the Op TAMAR cohort, with 40.2 per cent of claims occurring more than 11 years after the deployment. Andrews and colleagues[33] compared immediate-onset and delayed-onset PTSD by interviewing 142 United Kingdom veterans receiving a pension for PTSD or physical disability. Veterans with delayed-onset PTSD experienced a gradual accumulation of symptoms and were more likely to report major depressive disorder and alcohol abuse prior to PTSD onset. They were also more likely than veterans with no PTSD to report a severe life stressor in the year before PTSD onset.

It is important to note that time of compensation for PTSD does not reflect time of clinical onset. However, this study found that a large number of accepted PTSD claimants had their claim approved not long after they first presented with symptoms in their medical record.

Furthermore, PTSD compensation only represents people who have sought compensation through DVA. There could be Op TAMAR veterans who have sought treatment for PTSD externally to DVA and veterans who have not sought treatment at all. There could therefore be a higher percentage of the cohort with psychological distress than was found in this study.

Difference in outcomes between personnel groups

The previous finding that medical personnel self-reported lower levels of post-traumatic stress holds true for the objective data in the current study.[13] Across almost all conditions, particularly mental health conditions, medical personnel have fewer Op TAMAR-attributed claims than the rifle company and support personnel. Medical personnel also had fewer presentations across all disease categories in their medical records than the other two groups.

The medical personnel were substantially older than the other two groups at the time of Op TAMAR – 38.1 per cent were aged over 35 compared to 23.2 per cent and 6.4 per cent of support and rifle personnel respectively. Their age, experiences of medical trauma and psychological training may be protective against adverse mental health. Additionally, there may be characteristics of the medical personnel in this cohort that may not be found in another medical personnel group. Proportionately fewer presentations in their medical records may also be influenced by a propensity either to self-treat or be treated informally by colleagues.

Differences in health between occupational groups in the military have been reported in the literature. For example, Sundin and colleagues[34] investigated self-reported mental health in three occupational groups of deployed UK military personnel – Royal Marine commandos, paratroopers and other Army infantry – and found that the infantry had poorer health comparatively. Sundin et al contended that the high level of preparedness of the commandos and paratroopers may have lessened the psychological impact of deployment.

The Op TAMAR cohort has substantially fewer deaths than in the general population of the same age and sex. This difference probably reflects the 'healthy soldier effect' – an observation that military populations have lower mortality than the general population because of the health screening they undertake, their requirement to maintain fitness and their better access to medical care.[35]

The general decline in the average number of presentations in the medical records after OP TAMAR may also reflect the 'healthy soldier effect', whereby a high proportion of members who discharged were medically unfit, while healthier members were more likely to remain in service.

Provide insights into the use of existing data to research veterans' health.

- The capacity to link demographic, service and deployment characteristics data with compensation and medical records data allows for differences among subgroups of personnel to be determined. It also allows for career and health pathways to be constructed. These linkages and the dataset CAMVH has produced provide the opportunity to explore a range of research questions.

- The data used in the study is objective – the compensation data is from claims determined by DVA assessors, the medical records presentation data was recorded by health professionals and the fitness to serve metric is determined by military assessors. 'Survey burden' for ADF personnel is a concern with a large number of self-report health studies of ADF personnel occurring in the last decade. Utilising existing data avoids this burden and the biases of self-report (e.g. recall and social desirability bias).

- Just over half (51.2 per cent) of Op TAMAR veterans are not accepted claimants. Obtaining medical records data and fitness to serve data allows for long-term health of veterans, particularly those who are not currently accepted claimants, to be assessed. Defence medical records are the largest collection of data for the most people of any source. Their size and the range of information contained within them, however, requires a careful consideration of what is useful and consistent data. Development of clear extraction protocols is therefore essential and has been clarified to a large degree in this study.

- The medical records only include presentations recorded within the Defence system (or presentations to external clinicians where referrals were made by Defence Medical Officers). It has been observed anecdotally that serving members may seek care from external health providers in some cases. In addition, the descriptions of medical conditions (or symptoms where no diagnosis was made) extracted from the records were highly variable, i.e. some medical officers were more descriptive than others.

- The retrieval and copying of physical medical records and the downloading and printing of digital records is a costly and time consuming process. An efficient and mutually-agreeable process between future researchers and the Department of Defence and DVA is required if this data source is to be efficiently utilised.

Conclusions

The purpose of the study was to determine the health and compensation history of veterans of the Rwanda deployment and differences between subgroups of the cohort.

The health of the Op TAMAR cohort is characterised by a high rate of PTSD that is expressed in two compensation peaks five and 11 years after the deployment. Despite this, half of the cohort does not have compensation for any condition. Medical personnel have fewer compensation claims and medical presentations than rifle company and support personnel. No large differences were observed between the two contingents and between personnel from formed units and individual augmentees.

The finding that medical personnel appear to have better health than the rifle company and support personnel particularly warrants further analysis. Identification of health-promoting characteristics among medical personnel may aid the design of interventions to improve the health of all personnel.

The aims of the study are to increase understanding of contemporary veterans' long-term health and compensation and provide insights into the use of existing data to research veterans' health. The Op TAMAR cohort provided such an opportunity and may provide the foundation of a framework to better predict the trajectories of veterans of contemporary deployments.

Comparing the Op TAMAR deployment with other similar deployments from the same era, i.e. Somalia and Cambodia, will improve DVA's ability to predict the extent to which exposures particular to a specific deployment influence health.

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