The number, rate and site of reported injuries in the Australian Army, 1987–1991

Lieutenant Colonel Stephan J Rudzki, MB BS, GradDipSportsSc, MPH, FACSP

Synopsis

- Data from the Defence Occupational Health and Safety injury database for the period 1987–1991 were examined. The 1991 average reported rate of injury was 161 injuries per 1000 soldiers per year.
- Lower limb injury was the most common injury reported in the Australian Army, with a rate of 60.1 injuries per 1000 soldiers in 1991.
- Lower limb injuries accounted for 40% of all reported injury, but were responsible for 50% of bed days, 47% of sick leave and 51% of restricted duty. Their impact was disproportionate to their numbers. In 1992, 14% of the Army was not fully fit because of lower limb injury.

ADF Health 2000; 1: 54–57

IN THE PAST, DETERMINING the true number of injuries in the Army was difficult because of the nature of the reporting system. Injuries were seen at Regimental Aid Posts (RAPs), but reported by the injured individual to his/her orderly room via a Form PM 24 - *Report of Illness or Injury.* This was a voluntary act by the soldier and compliance was poor. Severe injuries or injuries with potential long-term consequences were likely to be reported, but less severe injuries were not.

This article presents injury rates from 1987 to 1991, a period when no routine injury statistics were collected, and therefore the true incidence of injury in the Army could not be determined. The ideal system of injury data collection would be an RAP-based reporting system, where all injuries initiate an injury report and the data are recorded when treatment is finished.

Methods

The only injury data available for analysis were collected in the Form PM 24 database maintained by the Directorate of Occupational Health and Safety (DOHS) in Canberra. Computer printouts of the contents were obtained for analysis. These data are almost certainly an underestimate of the true incidence, but they can be used as a guide to the minimum scale of the problem.

Due to the nature of the reports generated by the DOHS database, the initial injury data set was disparate and difficult to interpret. I manually tabulated sites of injury and reduced 16 categories to six for easier analysis. Sites of injury were divided into six broad categories: lower limb, upper limb, spine/pelvis, head/neck/eye, chest/abdomen and other.

The lower limb category is a combination of foot, toe, ankle, leg/knee and thigh injuries. Upper limb consists of finger, hand, arm/elbow and shoulder injuries. The spine/pelvis category is the combination of two similar categories on the Form PM 24 (back/spine and pelvis/back). The other categories are self-explanatory.

Form PM 24 data provided information about the number of hospital bed days, sick leave and restricted duty attributable to each injury. The data were also analysed by regional, occupational, functional Command and Corps grouping subsets.

Lieutenant Colonel Stephan J Rudzki joined the Army in 1981. He has served in 1 FD Hospital, CAMU, 3RAR, and 8/12 MDM Regiment and has seen overseas service in Indonesia, Western Sahara and Bougainville. He is currently an exchange officer serving with the US Army in San Antonio, Texas.

Results

Total injury data: Australian Army, 1987–1991

Box 1 shows reported injuries during the five-year period. The total number in 1991 was 4.1% greater than in 1987. Over the same period Army strength remained stable (31 057 to 31 002: data from Soldier Career Management Agency [SCMA] records, as at 1 July of each year).

Incidence of injury: Box 2 shows the annual incidence of reported injury for the years 1987 to 1991, expressed as a rate per 1000 soldiers. Reported rates of injury declined from

1 Number of reported injuries in the Australian Army, 1987 to 1991

Year	Injuries
1987	4806
1988	4526
1989	4176
1990	4363
1991	5005
Change from 1987 to 1991	+199 (4.1%)

1987 to 1990, but then rose sharply in 1991. The incidence rates in soldiers can be placed in perspective by comparison with rates of civilian injury. Box 3 shows the reported incidence of compensated occupational injury in the civilian workforce for the financial year 1986/87.

Site of injury: The lower limb was the most frequent site of injury during the period 1987–1991 (Box 4).

The number of lower limb injuries declined between 1987 and 1991, while upper limb and spine/pelvis injuries increased slightly. Head/neck and chest/abdominal injuries increased (Box 5).

Most of these increases occurred during 1991, having previously been in decline. The reason for these increases is not readily apparent, but the sites of injury suggest that motor vehicle accidents may have increased. Lower limb injuries were twice as frequent as those of the upper limb and spine/pelvis. There was an increase in head/neck and chest/abdomen injuries, with the proportion of chest/abdomen injuries in 1991 nearly double that in 1987.

When combined, lower limb, upper limb and back injuries were responsible for 74.2% of all injuries over the five-year period.

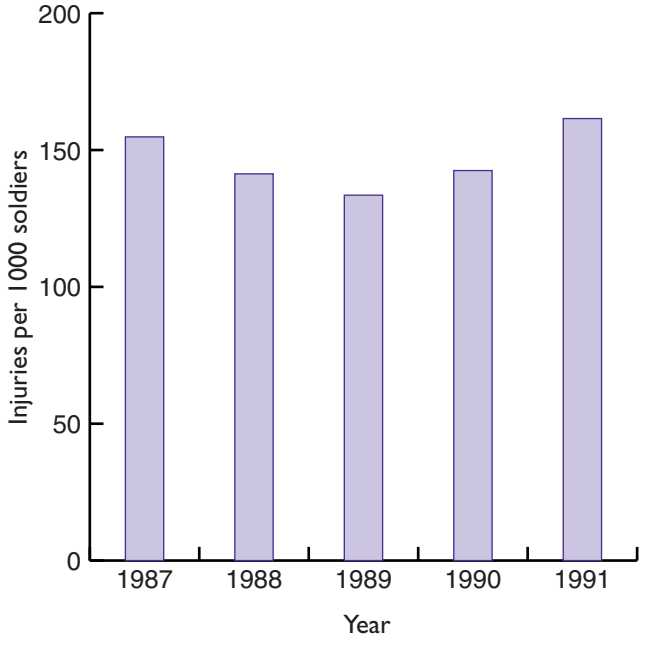
Leg/knee injuries: Given the high number of lower limb injuries, they warrant closer scrutiny. Leg/knee injuries made the largest single contribution to this category, accounting for over half of lower limb injuries and 21% of all injuries. Not only was the leg/knee the most common site of injury, but leg/knee injuries were associated with disproportionate morbidity, accounting for 31.7% of restricted duty, 33.6% of sick leave and 34.8% of bed days due to injury.

The term leg/knee is an unsatisfactory one, but it is the category listed on the Form PM 24. There is no way to distinguish between leg and knee injuries.

Injuries in Functional Commands

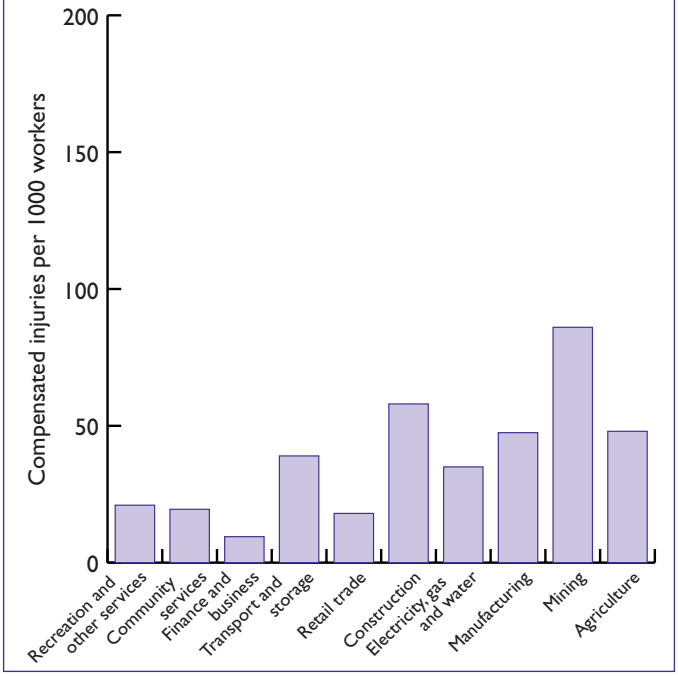
An examination of injury rates in the different Functional

2 Number of reported injuries per 1000 soldiers, Australian Army, 1987–1991



3 Number of compensated occupational injuries per 1000 workers in the Australian workforce, 1986/87

Data obtained from Worksafe Australia Annual Report 1990–1991.



Commands allows a better understanding of regional and occupational variation. Rates of injury allow for changes in Command numbers; Box 6 summarises the data.

Lower limb injury rates in the Functional Commands: Box 7 shows the lower limb injury rates for each of the Commands.

The AO/RMC/MD lower limb injury rate fell between 1987 and 1989 and then rose in 1990 and 1991. Lower limb injuries in Land Command remained stable between 1988 and 1990 and then rose in 1991. Logistics Command injuries fell between 1987 and 1989 and also rose in 1990 and 1991, a similar pattern to AO/RMC/MD. This pattern suggests that some change in training or procedures occurred in 1990.

Training Command appeared to have taken successful steps to reduce the number of lower limb injuries in its trainees, although it is not clear what contribution a reduced trainee intake has had on this reduction.

Both Logistics and Training Commands reduced their rates of lower limb injury between 1987 and 1991, while Land Command and AO/RMC/MD units increased their rates. The 1991 rates were similar in the three major Commands, while AO/RMC/MD units had a much lower rate of lower limb injury. This is probably a reflection of the less physically demanding requirements of those postings.

Corps injury rates

The Corps divide into the Service and Arms Corps. The Arms Corps have direct combat roles and have more physically intense training. The magnitude of and differences in injury rate are useful in assessing the relative risks of the different occupational groups within the Army. Box 8 shows the reported injury rates for different Corps for the period 1987–1992 (an extra year of data were available for this analysis).

Infantry had by far the highest rates of injury. This is not surprising given the physically demanding nature of Infantry work. What was surprising is the high rate of injury seen in the Medical Corps, which was the second highest in five of the six years reviewed. This may reflect an increased awareness of compensation entitlements and a greater willingness to report injury.

The rates fluctuated from year to year, in some cases markedly. The rate in RAAC fell from 158/1000 in 1987 to 129/1000 in 1989 and then rose to 198/100 in 1992.

Overall, the Arms Corps had the highest rates of injury, with the notable exception of RAE, which consistently had one of the lowest. The reason for this is not obvious, and is worthy of further investigation.

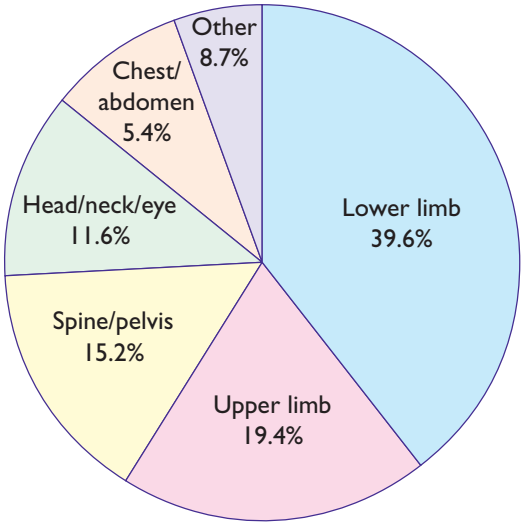
Discussion

Superficially, Army service appears to carry a risk of injury one and a half times greater than the most dangerous civilian occupation of mining, and over two and a half times the risk of work-

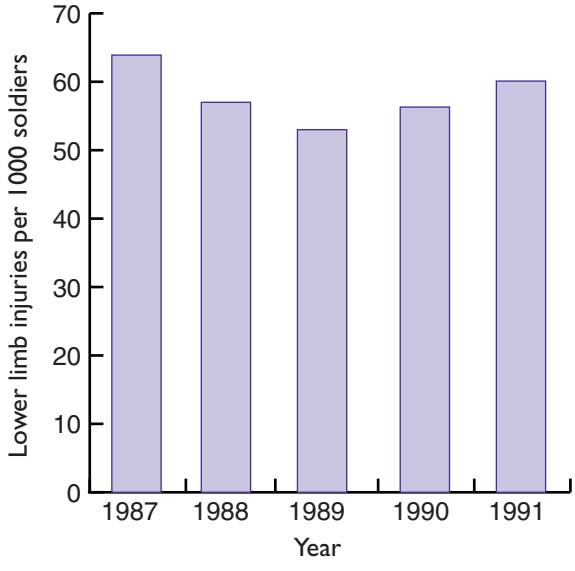
5 Changes in the frequency of different injury sites from 1987 to 1991

Site	Change from 1987 to 1991
Lower limb	–122 (–6.1%)
Upper limb	+ 29 (+3.2%)
Spine/pelvis	+6 (+0.7%)
Head/neck/eye	+163 (+30.1%)
Chest/abdomen	+211 (+102.4%)
Other	–104 (–24.3%)

Percentage of reported injuries, 1987-1991



4 Reported rate of lower limb injury, Australian Army, 1987–1991



ers in the construction industry. The civilian data, however, represent compensated injury, and, while similar to PM 24 reports, they are not directly comparable. The Worksafe data only recorded injuries in which there were five or more lost work days, while the PM24 database represented self-reported injury with no inclusion threshold.

The lower limb accounted for 40% of all reported injuries, with the upper limb (19%) and spine/pelvis (15%) the next most frequent sites of injury.

Lower limb injuries were responsible for 50% of bed days, 47% of sick leave and 51% of restricted duty. Their impact was disproportionate to their numbers. In 1992, 14% of the Army was not fully fit because of lower limb injury. Leg/knee injuries, in particular, caused disproportionate morbidity, making them the single most important cause of morbidity in the Army, or the single most important cause of reduced personnel operational readiness.

The rate of injury varied between Functional Commands. Logistics Command and Training Command lowered their reported rates of injury between 1987 and 1991, while Land Command saw a steady increase of 16.2% from 1987 to 1991. Lower limb injuries in Land Command rose by 7.8% during the same period.

The analysis of injury rates by Corps excluded those in non-Corps employment (eg, staff appointments on headquarters). RAINF reported the highest injury rates with 262 injuries per 1000 soldiers in 1991, much higher than the Army rate of 161 per 1000. This highlights the physical risks associated with infantry training and employment.

High rates of injury are of concern because they impact on combat and operational readiness. As the ADF shrinks it cannot afford to have its scarce personnel resources debilitated for lengthy periods by injury. ❑

6 Injury rate per 1000 soldiers in each of the Australian Army Functional Commands, 1987–1991

	1987	1988	1989	1990	1991	Change from 1987 to 1991
AO/RMC/MD	78.9	68.6	62.3	82.8	105.8	+26.9 (34.1%)
Land command	166.8	165.0	164.5	174.5	193.9	+27.1 (16.2%)
Logistics Command	231.0	197.2	177.2	165.9	175.4	-55.8 (-24.2%)
Training Command	208.7	172.5	148.4	140.0	154.1	-54.6 (-26.2%)

AO/RMC/MD = Army Office, Royal Military College and the Military Districts — grouped together as a Command category in DOHS print-outs. ADFA cadets are also included in this category. Military Districts were abolished in 1993, and Logistics Command became Support Command in 1997.

7 Lower limb injury rate per 1000 soldiers in each of the Australian Army Functional Commands, 1987–1991

	1987	1988	1989	1990	1991	Change from 1987 to 1991
AO/RMC/MD	30.4	20.8	21.1	32.4	35.8	+5.4 (17.8%)
Land command	65.4	66.1	66.3	68.8	70.5	+5.1 (7.8%)
Logistics Command	88.3	75.1	62.6	62.7	62.7	-25.6 (-29.0%)
Training Command	100.4	81.5	64.9	63.1	66.9	-33.5 (-33.4%)

8 Injury rate per 1000 soldiers in each of the Australian Army Corps, 1987–1992

	1987	1988	1989	1990	1991	1992
RAINF	231.5	238.8	238.0	239.1	262.0	262.0
RASIGS	123.3	110.4	93.6	98.1	124.6	113.4
RAA	135.4	138.4	119.3	111.1	139.7	142.3
RAAC	158.3	143.2	129.3	155.3	198.5	198.3
RAAMC	172.3	147.7	147.5	163.1	157.3	199.1
RAAOC	129.9	134.9	131.2	137.8	157.2	149.0
RACT	149.6	123.0	142.6	135.3	141.5	155.5
RAE	114.0	96.8	101.7	113.5	111.8	110.1
RAEME	150.8	138.1	131.2	136.0	164.3	144.2

RA INF = Royal Australian Infantry; RA SIGS = Royal Australian Signals Corps; RA A = Royal Australian Artillery; RA AC = Royal Australian Armoured Corps; RA AMC = Royal Australian Army Medical Corps; RA AOC = Royal Australian Army Ordnance Corps; RA CT = Royal Australian Corps of Transport; RA E = Royal Australian Engineers; RA EME = Royal Australian Electrical and Mechanical Engineers.