

M O N A S H U N I V E R S I T Y



ACCIDENT RESEARCH CENTRE

GENERAL PRACTICE
INJURY SURVEILLANCE IN THE
LATROBE VALLEY

by

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September, 1999

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**A collaborative study between
Monash University Accident Research Centre
Central West Gippsland Division of General Practice
Monash University Centre for Rural Health**

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Abstract:

The Extended Latrobe Valley Injury Surveillance (ELVIS) project aimed to collect detailed injury data for a defined geographic region from a high proportion of general practitioners for a full twelve months. Injury data was collected over a 12 month period from 7/11/94 to 6/11/95 by general practitioners participating in the Latrobe Valley research network of the Central West Gippsland Division of General Practice. Data was collected by the manual recording of injury presentations on a form, sections of which were completed by the patient and the general practitioner. Data completeness and quality were assessed. The practitioner participation rate was 96.5%, and the injury capture rate was 77%.

There were 5995 injuries recorded for the 12 month period. Injuries occurred most frequently in the 10-14 year age group, with a broad peak across the ages of 5-24 years. The male : female ratio for all injuries was 1.6 to 1. A third of the injuries occurred in the home and slightly more than one third (37%) occurred during leisure activities. The major injury cause was falls (24%). The most common injuries were sprains (21%), bruising (17%), and lacerations (19%). Follow up or referral was required after initial treatment in 36% of cases.

Comparisons were made with Victorian Injury Surveillance system emergency department injury surveillance data from the Latrobe Regional Hospital, and with a 1994 national general practice survey. An emergency department to general practice ratio of 1.2 : 1.0 was derived after adjusting for the respective capture rates. There were statistically significant differences for all the variables tested between general practice and emergency department presentations. The differences were larger than 5% for age group, location, nature of injury, body part injured, and treatment required. There were no statistically significant differences between the Latrobe Valley and the national general practice injury presentations. The differences were larger than 5% for six of the seven variables examined. There were statistically significant differences for location and external cause of injury between the full 12 months of Latrobe Valley general practice data and a combined 4 months of the same data selected to reflect the seasonal variation of injury patterns. None of these differences were greater than 4%.

The results of this study support the conclusion of others that the spectrum of injury seen in emergency departments can not necessarily be generalised to general practice. Firm conclusions regarding the representativeness of Latrobe Valley general practice injury presentations cannot be drawn from this study. Periodic surveillance may be suitable for the identification of overall patterns of injury, but may not be sensitive enough to detect emerging or new injury problems.

In addition to the direct results, this study has had a number of other significant outcomes including the production of a guide to computerised injury data collection in general practice, provision of local data for injury prevention purposes, and increased use of general practice data in injury research studies.

Key Words:

injury, injury surveillance, general practice, emergency department

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The project concept originated from the Victorian Injury Surveillance System, a project of Monash University Accident Research Centre. It was initially championed among the general practitioners by Professor Strasser, who was later joined by Drs Hall and Murphy. All three made a substantial contribution to the establishment of the project. In conjunction with Drs Birks, Sharma, and Beng Eu, a general practitioner research network collecting injury data was successfully formed.

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EXECUTIVE SUMMARY

Introduction

Injury represents a substantial social and economic cost to the community, as a leading cause of death, potential years of life lost and hospitalisation. Consequently, it has been identified as a priority for prevention in state and national health goals and targets. Ultimately the design of appropriate and effective injury prevention programs, relies upon good quality data covering the full range of injuries, particularly those requiring medical attention. Australia has developed good quality injury data systems for deaths, hospitalisations, and to a lesser degree, emergency department presentations. However, the extent and nature of the injury problem managed by general practitioners is only beginning to be understood.

The Extended Latrobe Valley Injury Surveillance (ELVIS) project reported here aimed to collect detailed injury data for a defined geographic region from a high proportion of the general practitioners for a full twelve months, thus further progressing the work of earlier studies. The Latrobe Valley was the selected site as a unique opportunity existed in this area to document the epidemiology of all medically treated injury in a defined geographic region, since comprehensive injury hospitalisation and emergency department injury presentation data were available for the same time period.

The injury data was collected through a research network of general practitioners, established by the Central West Gippsland Division of General Practitioners. Here we report on the establishment of the injury surveillance system, data quality, and injury profile for the twelve month period, comparing this with the emergency department data for the area. Establishment and maintenance of the general practice research network will be reported elsewhere.

Methods

Injury data was collected over a 12 month period from 7/11/94 to 6/11/95 by general practitioners participating in the Latrobe Valley research network within the Central West Gippsland Division of General Practice.

Injury was defined as physical damage due to the transfer of energy (mechanical, thermal, chemical, electrical, radiation) or due to the absence of oxygen or heat. All new cases of acute injury (including poisoning) ie., the first presentation for medical treatment, were to be collected regardless of whether the event was accidental or intentional (or of unknown intent).

Refinement of a method suitable for application in general practice was achieved in consultation with the participating general practitioners and their practice staff. The method of data collection involved the manual recording of injury presentations to general practice on a form, sections of which were completed by the patient and general practitioner. Information collected included demographic data, activity and location at the time of injury, circumstances leading up to the injury, and diagnostic data. One line of text narrative about the injury event was also collected. Practice participation was supported by the project officer. Participating general practitioners were eligible for quality assurance points from the Royal Australasian College of General Practitioners. Participating general practitioners also received a small monetary payment for participation.

A computerised data entry system used for ELVIS was developed using Epi Info (Version 6.0), a public domain software package designed by the Centers for Disease Control (USA) to handle epidemiological data in questionnaire format. The coding system was based on the Injury Surveillance and Information System (ISIS), used for emergency department surveillance throughout Australia, and in addition, each case was assigned an external cause of injury code from the International Classification of Diseases Ninth Revision Clinical Modification

Results were compared with Victorian Injury Surveillance System (VISS) emergency department injury surveillance data from the only public hospital which serves the Latrobe Valley. Emergency department injury surveillance data was collected by VISS at the time of this study using similar methods. The results were also compared with a national pilot general practice injury survey conducted in October 1994 and using a similar methodology.

In order to test the hypothesis that periodic surveillance produces the same injury profile as continuous surveillance, a data subset was derived from the ELVIS database comprising of presentations during four one month periods selected to coincide with the peak of each season (January, April, July, October). The injury profile displayed by this data subset was then compared with that displayed by the full 12 months surveillance.

Assessment of data completeness and quality consisted of four main measures: proportion of injured patients captured (determined by regular audit), proportion of cases with a valid response for each variable, narrative quality scores, and completeness of the general practitioner coding. Narrative quality was assessed using a scoring system previously developed by Monash University Accident Research Centre.

Results

Nineteen out of 21 practices in the Latrobe Valley agreed to participate in the study resulting in a 90% practice participation rate. Fifty-six general practitioners agreed to participate resulting in a 96.5% practitioner participation rate. The injury capture rate was 77%,

There were 5995 injuries recorded in the database for the 12 month period. Children under 15 years made up almost a third of these injuries. Injuries occurred most frequently in the 10 to 14 year age group, with a broad peak across the ages of 5-24 years. More males than females presented with injuries in each age group until the age of 60 years and over. The male:female ratio for all injuries was 1.6 to 1, the highest ratio of 2.7 to 1 being in the 25 to 29 year age group.

A third of the injuries occurred in the home, especially garden or garage (16%) and in the living and sleeping areas (11%). Educational (13%) and transport settings (11%) were the next most common locations in which injuries occurred. Most injuries occurred while people were participating in a leisure/recreation activity (37%) and over half of these occurred during play, mainly among children under 10 years old. The major causes of injuries were falls (24%), mainly falls on the same level from slipping, tripping or stumbling; being hit, struck or crushed 15%, and cutting or piercing (13%).

The upper limbs were the most frequent body part injured (36%), mainly the hands (including fingers), wrists and forearms. Injuries to the lower limbs accounted for 30% of injuries, mainly to the foot, ankle and knee. The nature of injuries that were seen at the participating practices during the study were: sprain and strains (21%), mainly ankle, knee, lower back; bruising

(17%), mostly to the face, scalp and hand; and lacerations (19%), mainly hand, face and scalp. Almost two thirds of the patients seen in the general practices required minor treatment, ie. medical assessment only and/or treatment without follow-up (62%). In 36% of the cases, the patients required significant treatment, ie. treatment with follow-up or referral.

The reason most frequently recorded for choosing to present to general practice was that patients preferred to see a doctor who they know (33%), followed by the injury not being considered severe enough to visit the hospital emergency department (25%).

Data quality was good. There was a high rate of completion for each of the data variables ranging from 94.3% to 99.9%. Narrative scores compared favourably with those of the emergency department surveillance system (average score of 3.5 compared with 3.1). It was found that 4 forms, from a random sample of 100, had missing data from the section completed by the general practitioner.

An emergency department : general practice ratio of 1.2 : 1.0 was derived after adjusting the number of cases collected in both databases by the respective capture rates. There were statistically significant differences for all the variables tested between general practice and emergency department presentations. However, the number of cases was large providing the power to detect small differences with a high degree of confidence. The differences were larger than 5% for age group, location, nature of injury, body part injured, and treatment required. Specifically, general practice presentations had higher proportions of:

- injuries occurring in educational settings (13%, 6%)
- sprains (21%, 12%) and bruising (17%, 11%)
- lower limb injuries (30%, 23%)
- injuries requiring minor treatment (62%, 40%)

and lower proportions of:

- 15-29 year olds (28%, 34%)
- fractures (6%, 13%)
- head and facial injuries (21%, 29%)

There were statistically significant differences for location and external cause of injury between the full 12 months ELVIS data and the combined 4 months of ELVIS data selected to reflect the seasonal variation of injury patterns. Specifically, there was a higher proportion of injuries occurring in residential locations, and lower proportion occurring in educational settings for the periodic surveillance. There was also higher proportions of cutting/piercing injuries, and lower proportions of falls and over exertion injuries for the periodic surveillance. However, these differences were relatively small, mostly being 1 or 2%, with none being greater than 4%.

There were no statistically significant differences between the Latrobe Valley general practice injury presentations and the national general practice injury presentations, possibly due to the small number of cases available for analysis. The differences were larger than 5% for age group, sex, location, activity, external cause, body part injured, and treatment required.

Conclusions

This study has produced a comprehensive good quality general practice data collection which will be a rich source of information for injury research and prevention in the Latrobe Valley and beyond.

The prospective survey method developed for injury surveillance in hospital emergency departments proved adaptable for use in the general practice setting. The general practitioner participation rate was exceptional and is probably the best achieved in a relatively large research network in Australia. The capture rate, although less than the 85% aimed for, is quite acceptable. However, the limited information on the missing cases indicated that these were different in some respects, creating a potential source of bias in the data collection. Data quality proved to be good to excellent as evidenced by high completion rates for each variable and acceptable narrative scores.

Factors likely to have contributed to participation, data capture and data quality included consultation with the general practitioners and their reception staff during the development and implementation stages, development of acceptable data collection processes, personal recruitment to the research network, the availability of quality assurance points awarded for participation, the recognition of the value of staff and general practitioner time by payment. The impact of a full time project officer to provide technical assistance, support, audits, feedback, and ongoing encouragement should not be under-estimated.

Differences of age and injury severity observed between general practice and emergency department injury presentations in this study are similar to those of two other Australian comparative studies, with higher proportions of older patients, lower proportions of fractures, higher proportions of trunk injuries, and lower proportions of more severe injury presenting to general practice.

The finding of statistically significant differences, for all variables tested, between general practice and emergency department injury presentations should be treated cautiously due to the large numbers of cases involved. However, given that the differences were greater than 5% for age, location, nature of injury, body part injured and treatment required, the results of this study support the conclusion of others that the spectrum of injury seen in emergency departments can not necessarily be generalised to general practice.

The observed differences between general practice and emergency department presentations may be explained by two factors: the tendency for less severe injuries to present to general practice, and the operating hours of general practice.

The results of this study suggest that the ratio of general practice to emergency department injury presentations may be closer to 1 than previously thought, and that this ratio is likely to be affected by local factors such as accessibility of hospital emergency department services.

Periodic surveillance may be suitable for the identification of overall patterns of injury, but may not be sensitive enough to detect emerging or new injury problems. Conclusions regarding the most appropriate months for periodic surveillance and the impact of starting and stopping data collection cannot be drawn from this study.

Firm conclusions regarding the representativeness of general practice injury presentations in the Latrobe Valley also cannot be made from this study.

In addition to a contribution towards establishing the epidemiology of minor injury, this study has had a number of other significant outcomes, including the production of a guide to computer assisted injury data collection in general practice, provision of local data for injury prevention purposes, availability of data for cost estimates of medically treated injury, and availability of general practice injury data for epidemiological injury research.

1. INTRODUCTION

1.1 BACKGROUND

Injury is the major cause of death in Australia from 1-44 years of age, accounting for up to 75% of deaths in some age groups (15-24 years) (Australian Bureau of Statistics, 1986; Australian Institute of Health, 1990). It is the leading single cause of potential years of life lost under 65 years of age, ahead of cancer and circulatory disease combined (Australian Institute of Health, 1990). Injury is also a significant cause of morbidity, as a leading cause of hospital admission and important reason for medical consultations (Harrison and Cripps, 1994). Consequently, since injury represents a substantial social and economic cost to the community, it has been identified as a priority for prevention in a series of national reports and programs, most recently in the National Health Goals and Targets (Better Health Commission, 1986, 1988; Department of Community Services and Health, 1988; Nutbeam et al., 1993).

Ultimately the design of appropriate and effective injury prevention programs, relies upon good quality data covering the full range of injuries, particularly those requiring medical attention. Australia has developed good quality injury data systems for deaths, hospitalisations, and to a lesser degree, emergency department presentations. However, the extent and nature of the injury problem managed by general practitioners is only beginning to be understood.

1.2 NATIONAL STUDIES OF INJURY IN GENERAL PRACTICE

National estimates indicate that there are 5 million general practice injury consultations each year, which is 1.5 times as many as there are emergency department injury presentations (McClure, 1995). A number of sporadic studies are beginning to elucidate the nature of injury presenting to general practitioners.

Estimates of the contribution of injury to general practice case-mix were provided by a series of national morbidity surveys, conducted in 1962-63, 1969-1974, and 1990-91 (Bridges-Webb, 1976; Bridges-Webb et al, 1992). Injuries were estimated to account for 12.9%, 4.9% and 2.8% respectively of all presentations to general practitioners. The most recent of these figures will undoubtedly be an underestimate as the classification system used did not discretely identify all injury presentations. The varying proportions estimated may be accounted for by differences between the three studies such as sampling variations or different male: female patient ratios. In addition, temporal variations such as changes in health care service utilisation patterns should be considered, particularly an increase in consultations per person per year associated with bulk-billing. In the 1990-91 study, injury ranked as the third most frequently managed problem and the second most frequently managed new problem, indicating that injury places significant demands on general practice.

This survey series represents a valuable description of the work of general practice, rather than the incidence or prevalence of disease and injury in the community (Bridges-Webb et al., 1992). Detailed studies of specific conditions can provide a foundation for practice management decisions, for improved case management, and for health promotion and disease prevention within the context of general practice. In addition, such studies could contribute to understanding the prevalence and incidence of certain conditions within the community. Until recently studies in Australian general practice have not yielded injury data of sufficient detail for the purposes of injury research and prevention.

Secondary analysis of the 1989-90 National Health Survey showed some differences between the profile of injury presenting to general practitioners and emergency departments. Injured patients presenting to general practitioners tended to be older and more often employed, and a lower proportion had sustained their injury in a sport or recreational setting. There were no statistically significant differences with regards to sex, country of birth or number of reduced activity days due to the injury (McClure, 1995). A substantial proportion (66%) of those seeking medical attention for an injury in the two weeks prior to the survey, were treated by a general practitioner, re-enforcing the need for basic injury surveillance in general practice.

Detailed information on injuries presenting to general practitioners was collected in a national general practice injury survey conducted in 1994. This study found that the home was the most common location for injury presenting to general practitioners and that falls were the most common cause. Children were most likely to present following an injury occurring during recreational activities, while adults were more likely to present following an injury occurring while working. Comparisons were made with emergency department presentation data and differences were observed in the location of injury, the activity at the time of injury, intent, nature of injury, the body part injured, and the disposal of the patient. (Ozanne-Smith and Williams, 1995).

However, there are a number of limitations to this national survey. The sample of participating practitioners was not randomly selected, and there were no opportunities to conduct audits to determine the injury capture rate. The emergency department data used for comparison was not derived from the same geographic regions, being derived from only one state, while the participating practices were drawn from all states. In addition, general practices from urban areas were under-represented (Ozanne-Smith and Williams, 1995). Differences in the proportions were not tested statistically.

1.3 REGIONAL STUDIES OF INJURY IN GENERAL PRACTICE

A study of the epidemiology of injury in the Australian Capital Territory was undertaken in 1992 (McClure and Ozanne-Smith, 1996). Data on patients seen in the two hospital emergency departments were extracted from medical records, while data on patients seen in general practice were collected prospectively on a separate form by a non-random sample of the 273 general practitioners serving the area. The participating general practitioners collected data for 2 week periods which cumulatively covered a continuous 12 month period.

The ratio of emergency department to general practice injury presentations in this region was 1.0. There were significant differences noted with regard to age of the injured patients and types of injuries treated in these two settings. Patients presenting to general practice were more likely to be older, suffered a higher proportion of trunk injuries and a lower proportion of fractures, and a lower proportion were admitted to hospital (McClure and Ozanne-Smith 1996). This study indicated that the pattern of injuries presenting to hospital emergency departments could not necessarily be generalised to general practice. Further, the finding that approximately half the injuries occurring in that community received initial care from general practitioners also indicated the potential importance of general practice in injury research and prevention.

The Extended Latrobe Valley Injury Surveillance (ELVIS) project reported here aimed to collect detailed injury data for a defined geographic region from a high proportion of the general practitioners for a full twelve months, thus further progressing the work of earlier

studies. The study design incorporated auditing procedures to allow determination of the injury capture rate. The Latrobe Valley was the selected site as a unique opportunity existed in this area to document the epidemiology of all medically treated injury in a defined geographic region, since comprehensive injury hospitalisation and emergency department injury presentation data were available for the same time period.

The injury data was collected through a research network of general practitioners, established by the Central West Gippsland Division of General Practitioners. Here we report on the establishment of the injury surveillance system, data quality, and injury profile for the twelve month period, comparing this with the emergency department data for the area. Establishment and maintenance of the general practice research network will be reported elsewhere.

2. METHOD

2.1 DATA COLLECTION

Injury data was collected by general practitioners participating in the Latrobe Valley research network within the Central West Gippsland Division of General Practice after Monash University and Latrobe Regional Hospital Ethics Committee approvals of the study.

The Latrobe Valley is located approximately 135 kilometres east of Melbourne and has a population of 80,000. The main industries are power generation including brown coal mining, paper manufacture, and services, with some agriculture. The majority of the population live in the urban centres, and are served by one major public hospital (Latrobe Regional Hospital) which has two campuses (Moe and Traralgon). The Gippsland Campus of Monash University is also situated in the Latrobe Valley, in Churchill.

Injury data was collected over a 12 month period from 7/11/94 to 6/11/95 by general practitioners in the towns of Morwell, Moe, Traralgon, Churchill and Trafalgar in the Latrobe Valley in Victoria. Injury was defined as physical damage due to (1) the transfer of energy ie., mechanical, thermal, chemical, or electrical energy, or radiation, or (2) the absence of oxygen or heat. All new cases of acute injury (including poisoning) ie., the first presentation for medical treatment, were to be collected regardless of whether the event was accidental or intentional (or of unknown intent).

This definition includes diverse injuries and causes such as:

- burns, poisonings, lacerations, bruising, fractures, sprains/strains, foreign bodies
- collapses and fits if resulting in laceration, bruising etc
- motor vehicle related injury
- bites - insects, dogs, other animals
- cellulitis when secondary to an initial injury

The definition excludes:

- chronic injury and injuries of gradual onset (such as repetitive strain injury and occupational hearing loss)
- cases where there is no apparent relationship of the patient's symptoms to an injury event
- cases of adverse effects of prescribed medication
- presentations for review where a form has already been completed

Refinement of a method suitable for application in general practice was achieved in consultation with the participating general practitioners and their practice staff. The method of data collection involved the manual recording of injury presentations to general practice on a form, sections of which were completed by the patient and general practitioner. The form was a modified version of that developed by the Victorian Injury Surveillance System (VISS) for injury surveillance in hospital emergency departments, including the Latrobe Regional Hospital.

The process commenced with informed consent and data collection forms being handed to each injured patient at practice reception. Procedures for the identification of injured patients varied among the practices. A commonly used procedure involved posters or laminated cards at the desk asking patients with an injury to declare themselves to the receptionist, who would then hand them the forms. Alternatively, the role of initiating the injury data collection process was assumed by the registered nurse, where one was employed, or by the general practitioner. Prompts to remind the nurses and doctors included signs in the dressing/procedure room, signs on the back of the consultation room door or on the desk, and notes on the billing slips or other documentation which is routinely completed (See Appendix 1 for the data collection form and examples of other project materials).

After signing the consent if agreeable, the patient (or an accompanying person) then completed demographic information, details concerning the event leading to the injury, and reasons for choosing general practice. In circumstances where patients were unable to complete the form due to physical reasons or due to language difficulties, the receptionist or general practitioner completed as much detail as possible. After assessment of the patient and their injury, the general practitioner completed details concerning the nature and severity of the injury, the intent, and treatment given.

Practice participation was supported by the project officer who was involved in recruitment of the general practitioners to the study, ongoing liaison with all general practice staff, streamlining of processes where necessary, encouragement of participating staff, regular collection of completed forms, and conducting practice audits. Participating general practitioners were eligible for quality assurance points from the Royal Australasian College of General Practitioners. They also received a small monetary payment for participation.

2.2 DEVELOPMENT OF THE DATA ENTRY AND ANALYSIS SYSTEMS

The computerised data entry system used for ELVIS was developed using Epi Info (Version 6.0), a software package designed to handle epidemiological data in questionnaire format. It is public domain software, developed for public health use by the Centers for Disease Control and Prevention (Dean et al., 1994). It provides word processing, data entry and analysis functions. Data can be imported or exported in various formats, therefore making it compatible with other packages such as SPSS, SAS, dBase and Lotus 1-2-3.

The ELVIS injury recording system was established by reproducing the data collection form with entry fields on a screen. The entry fields comprised a combination of numeric and text fields reflecting the data collection form. This similarity facilitated data entry directly from the form, with coding being completed simultaneously. The database was automatically created within Epi Info from the on-screen questionnaire by using the entry fields as the variables.

A data validation system was developed to ensure that all necessary information was entered and codes (eg. body part) were valid. The program checked that all fields requiring a value were entered, and the date of birth was checked against the date of injury to ensure that the date of birth did not occur after the injury date. Only valid codes could be entered in appropriate fields and error messages would be displayed if invalid values were entered. A help function was provided for these fields to guide and assist the user on the values available.

An explanatory note at the bottom of the screen was included to guide the user to data entry requirements for each field. In addition, the text description of the code entered for the previous field would be displayed at the bottom of the screen.

Data security and confidentiality were ensured by password access into a designated computer, the absence of patient identifying information on the database, and storage of original data forms in a locked secured filing cabinet.

Backup procedures were performed regularly and a copy of the database stored on tape for security.

The coding system was based on the Injury Surveillance and Information System (ISIS), used for emergency department surveillance throughout Australia (National Injury Surveillance and Prevention Project, 1988). All ISIS coding was performed by the same data processor, experienced in the use of ISIS. In addition, each case was assigned a code by a trained nurse researcher for external cause of injury (E code) from the International Classification of Diseases Ninth Revision Clinical Modification (Commission of Professional and Hospital Activities, 1986).

2.3 DATA ANALYSIS

The data analysis functions of Epi Info were used to generate frequencies and cross tabulations. The results were compared with injury surveillance data collected by the Latrobe Regional Hospital Emergency Department through VISS. The data collection process, form and coding system used for ELVIS were based on those used at the Latrobe Regional Hospital by VISS. Thus, these two injury databases, one for emergency department presentations (including admissions) and one for general practice presentations, collect comparable data. Capture rates for this VISS collection in 1993/94 were 90% at the Traralgon campus and 85% at the Moe campus. For admitted cases, the capture rate was 100% at both campuses.

The results were also compared with those obtained in a national pilot general practice injury survey conducted in October 1994 and using a similar methodology (Ozanne-Smith and Williams, 1995). The national survey was based on a pilot study undertaken by 17 general practitioners in the former Shire of Bulla in 1992. The national survey was conducted during a two week period in October, thus data for a comparable time period were extracted from the ELVIS database for this comparison.

The seasonal variations in injury occurrence must be taken into account by injury surveillance systems. Generally, this is accomplished by continuous surveillance extending for at least 12 months. In order to test the hypothesis that periodic surveillance produces the same injury profile as continuous surveillance, a data subset was derived from the ELVIS database comprised of presentations during four one month periods selected to coincide with the peak of each season (January, April, July, October). The injury profile displayed by this data subset was then compared with that displayed by the full 12 months surveillance.

The comparisons of ELVIS and VISS 12 month profiles, ELVIS and the National survey 2 week profiles, and ELVIS 12 month and 4 month profiles were tested for statistical significance using the chi square statistic to test homogeneity for each category in each data set. The probability of a type 1 error was set at two levels, $\alpha=0.05$ and $\alpha=0.01$.

2.4 DATA QUALITY CONTROL

Assessment of data completeness and quality consisted of four main measures: proportion of injured patients captured, proportion of cases with a valid response for each variable, narrative quality scores, and completeness of the general practitioner coding.

The proportion of injury patients captured was determined by a regular audit performed for each practice participating in the study. Audits consisted of manual checking of practice records to determine the number of injured patients presenting on a particular day. This was then compared with the number of injured patients for whom a form was completed.

The proportion of cases with valid responses was determined by a frequency analysis for each variable.

A previously developed narrative scoring system was used to assess the amount of information provided on the circumstances of the injury events. A simple index was developed to quantify the presence or absence of desired information, and the level of detail provided (Table 1). The index was applied to the narratives on a random sample of 100 forms.

Table 1 Injury surveillance narrative scoring system

Narrative characteristic	Score		
	absent	present, complete	present, not complete
Activity (specific)	0	1	0.5
Location	0	1	0.5
What went wrong	0	1	0.5
What actually produced the bodily harm	0	1	0.5
Product involvement described including brand or model name or other agent (person, animal)	0	1	0.5
Bonus information eg., protective gear, body part injured	0	1	0.5

The completeness of details concerning the nature of injury provided by the general practitioner was also assessed in a random sample of 100 forms. In addition, the forms were checked for inconsistencies in coding.

3. RESULTS

3.1 PRACTICE PARTICIPATION

Participation in the study was high. Nineteen out of 21 practices in the Latrobe Valley agreed to participate in the study resulting in a 90% practice participation rate. Fifty-six general practitioners agreed to participate resulting in a 96.5% practitioner participation rate. Registrars in training attached to participating practices also contributed to the data collection.

3.2 GENERAL PRACTICE INJURY PROFILE IN THE LATROBE VALLEY

3.2.1 Geographic distribution

The geographic distribution of general practice injury presentations is shown in Table 2.

Table 2 Distribution of general practice injury presentations by town, Latrobe Valley, Victoria, 1994/95

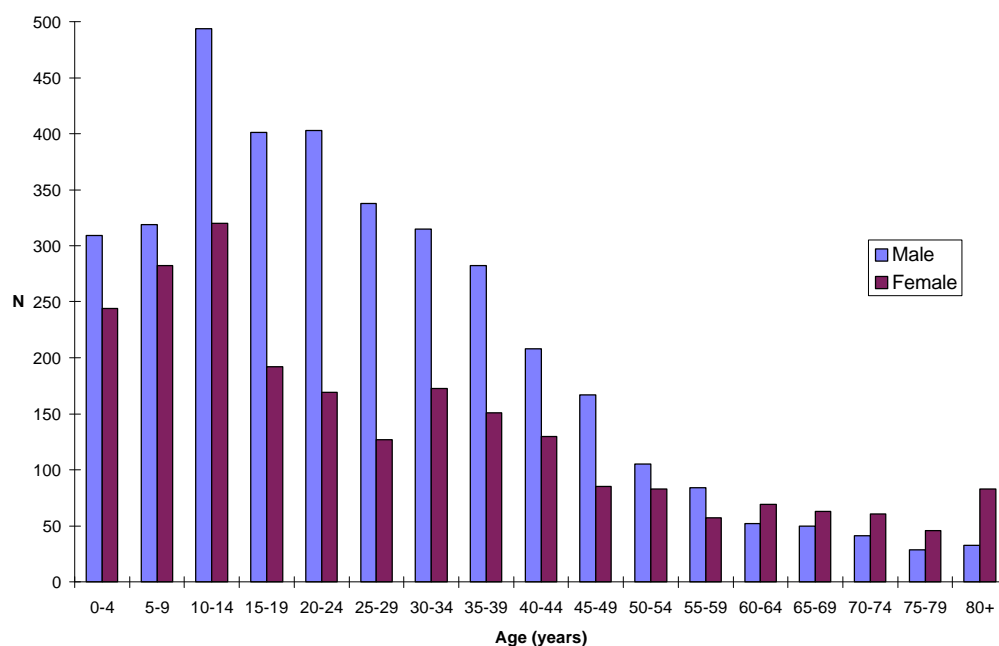
Town	Injury Cases	
	N	%
Morwell	1639	27
Moe	1362	23
Traralgon	1170	19
Churchill	817	14
Trafalgar	273	5
Unknown	734	12
Total	5995	100

3.2.2 Age and sex distribution

There were 5995 injuries recorded in the database for the 12 month period. Children under 15 years made up almost a third of these injuries. Injuries occurred most frequently in the 10 to 14 year age group, with a broad peak across the ages of 5-24 years (Table 3). More males than females presented with injuries in each age group until the age of 60 years and over. (Figure 1) The male:female ratio for all injuries was 1.6 to 1, the highest ratio of 2.7 to 1 being in the 25 to 29 year age group. Nine of the cases had no sex type recorded.

Table 3 Distribution of general practice injury presentations by age and sex, Latrobe Valley, Victoria, 1994/95

Age group	Male	Female	Unknown	Total	% of Total
0-4	309	244		553	9
5-9	319	282	2	603	10
10-14	494	320		814	14
15-19	401	192		593	10
20-24	403	169		572	10
25-29	338	127		465	8
30-34	315	173		488	8
35-39	282	151		433	7
40-44	208	130		338	6
45-49	167	85		252	4
50-54	105	83		188	3
55-59	84	57		141	2
60-64	52	69		121	2
65-69	50	63		113	2
70-74	41	61		102	2
75-79	29	46		75	1
80+	33	83		116	2
Unknown	15	6	7	28	0
Total	3645	2341	9	5995	100

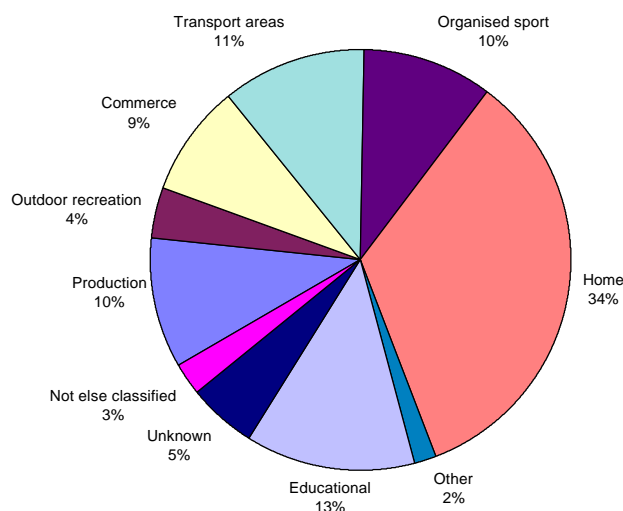


N = 5986

Figure 1 Distribution of general practice injury presentations by age and sex, Latrobe Valley, Victoria, 1994/95

3.2.3 Location of injury

A third of the injuries occurred in the home, especially garden or garage (16%) and in the living and sleeping areas (11%). (Figure 2) Injuries in transport areas included mostly public roads (5%) and footpaths (3%). The majority of injuries in educational areas occurred in the school playground (10%). In 5% of the cases the location of injury was not specified. The not elsewhere classified category includes cases where location was specified but for which the system did not have an appropriate code.



N = 5995

Figure 2 *Distribution of general practice injury presentations by location of injury, Latrobe Valley, Victoria, 1994/95*

3.2.4 Activity at the time of injury

Most injuries occurred while people were participating in a leisure/recreation activity (37%) and over half of these occurred during play, mainly among children under 10 years old (Figure 3). Most of the occupational activities involved people who were employed in a trade (7% of injuries) or labourers (4%). The trades most frequently associated with injuries were boiler making and welding, and metal fitting and machining, probably reflecting the employment patterns in the Latrobe Valley. The sports most frequently associated with injuries were Australian rules football (4% of total injuries), basketball (3%), cricket (1%) and netball (1%). Transportation included pedestrians (4%), motor vehicle occupants and bicyclists (3% each).

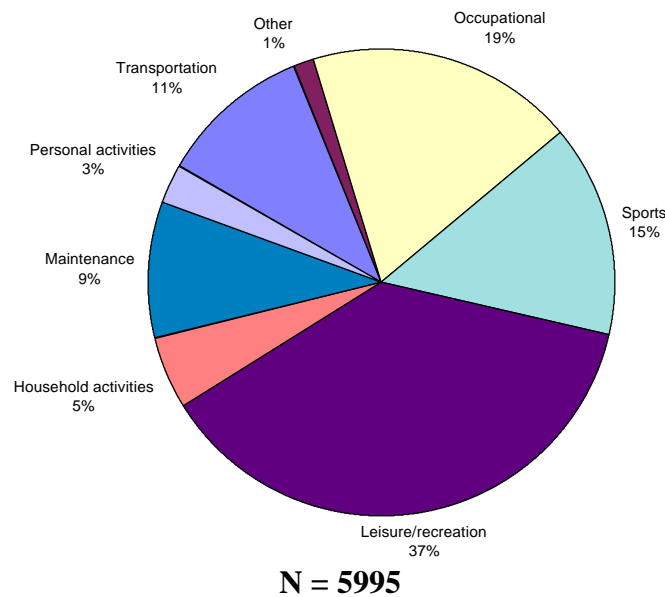


Figure 3 *Distribution of general practice injury presentations by activity at the time of injury, Latrobe Valley, Victoria, 1994/95*

3.2.5 External cause of injury (E-code)

The major causes of injuries were falls (24%), mainly falls on the same level from slipping, tripping or stumbling; hit, struck or crushed 15%, and cutting or piercing (13%) (Figure 4). Natural/environmental factors contributed to 7% of injuries, of which over two-thirds were insects bites. Sports related injury accounted for 7.9% of the total, when the two E-codes relating specifically to sports injury were combined (E886.0 Falls on the same level from collision, pushing, shoving, by or with another person in sports; E917.0 Striking against or struck accidentally by objects or persons in sports).

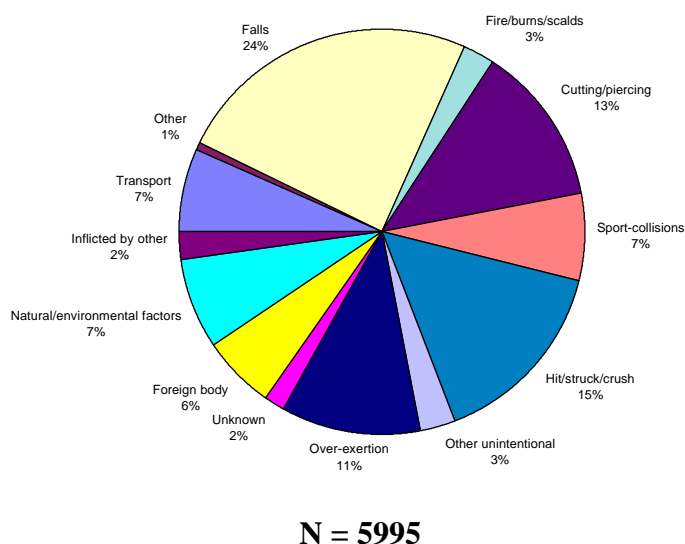


Figure 4 *Distribution of general practice injury presentations by external cause of injury, Latrobe Valley, Victoria, 1994/95*

3.2.6 Nature of injury and body part injured

The upper limbs were the most frequent body part injured (36%), mainly the hands (including fingers), wrists and forearms (Table 4). Injuries to the lower limbs accounted for 30% of injuries, mainly to the foot, ankle and knee. Over a third of the injuries to the head and face were to the eyes.

Table 4 Distribution of general practice injury presentations by body region injured, Latrobe Valley, Victoria, 1994/95

Body region	N	%
Upper limbs	2165	36
Lower limbs	1767	30
Head and face	1273	21
Trunk	564	9
Other	25	0.4
No injury detected	85	1.4
Body part not required	99	2
Not specified	17	0.3
Total	5995	100

The nature of injuries that were seen at the participating practices during the study were: sprain and strains (21%), mainly ankle, knee, lower back; bruising (17%), mostly to the face, scalp and hand; and lacerations (19%), mainly hand, face and scalp. (Figure 5) Concussion and poisoning accounted for 1% each.

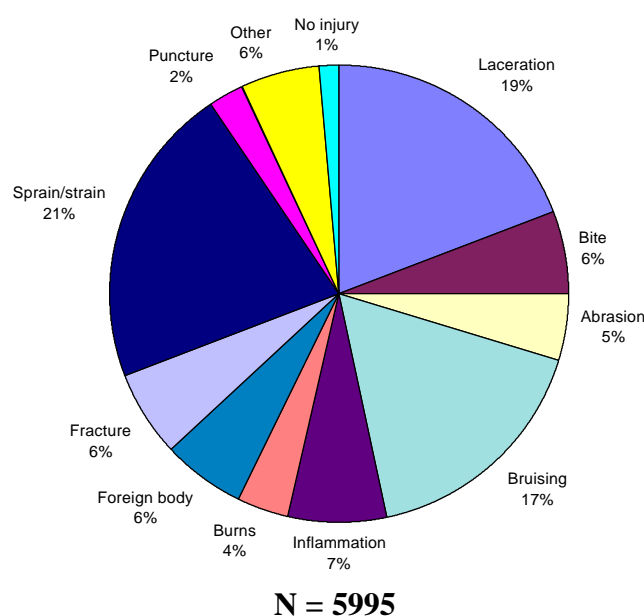


Figure 5 Distribution of general practice injury presentations by nature of injury, Latrobe Valley, Victoria, 1994/95

3.2.7 Reasons for visiting general practice

The reason most frequently recorded for choosing to present to general practice was that patients preferred to see a doctor who they know (33%). A listing of the preferences and the frequency is shown in Table 5. Note that multiple responses may be recorded for this variable. "Prefer to see doctor I know" was the most frequently recorded response by patients who attended general practices in Traralgon, Morwell and Churchill (over a third of responses in each area). "Injury not severe" was the most frequent reason recorded for practices in Moe. General practitioners based in Moe may have allowed patients to access a doctor they knew in the emergency department, as Moe general practitioners formed part of the emergency department staff at the Moe campus of the Latrobe Regional Hospital. A high proportion of people attending a general practice in the Churchill and Trafalgar areas (36% and 32% respectively) presented because it was closer to home than a hospital. This response was chosen by 4% of those attending general practices in Traralgon, the site of the other Latrobe Regional Hospital.

Table 5 Reasons for visiting general practice for injury, Latrobe Valley, Victoria 1994/95

Reason	N	%
Prefer to see doctor I know	2486	33
Injury not severe enough for hospital	1876	25
Closer to home than hospital	1406	19
Waiting time shorter than hospital	922	12
Referred by hospital	84	1
Other	656	9
Total responses	7430*	100

*NB: multiple responses may be recorded. Total number of cases = 5995

3.2.8 Disposal

Almost two thirds of the patients seen in the general practices required minor treatment, ie. medical assessment only or treatment without follow-up (62%). In 36% of the cases, the patients required significant treatment, ie. treatment with follow-up or referral.

Table 6 Distribution of general practice injury presentations by disposal, Latrobe Valley, Victoria, 1994/95

Disposal	N	%
Treated, no referral	2831	47
Treated, reappointment for review (without investigation)	1083	18
Assessment only	869	15
Treated, reappointment for review (with investigation)	784	13
Treated, other referral	162	3
Treated, referred to specialist	149	2
Short-stay observation in practice	9	0.2
Direct admission to hospital by treating GP	7	0.1
Dead on arrival or died in practice	1	0
Unknown	100	2
Total	5995	100

3.3 DATA QUALITY

3.3.1 Capture rate

A total of 15093 records were audited over the 12 month period. During the audit, 450 injuries were identified, 347 of which were captured in the ELVIS database. Therefore, the overall case capture rate for the twelve months was 77%, somewhat lower than that obtained through the emergency department at Latrobe Regional Hospital (88%). The capture rate varied considerably between practices (Table 7). Very few patients refused to participate in the data collection. The missing cases appeared to be different, in some respects, from those captured by the surveillance system. On the basis of the limited information available, the missing cases tended to be over 15 years of age and more likely to have been playing sport than the captured cases.

3.3.2 Variable completion rate

There was a high rate of completion for each of the data variables ranging from 94.3% to 99.9% (Table 8). Completion rates exceeded 99% for all but two variables, location and disposal. Insufficient information was provided to assign a location code or disposal in 5.3% and 1.7% of cases respectively.

Table 7 Injury surveillance capture rates by practice, Latrobe Valley, Victoria, 1994/95

Practice Number	Capture Rate (percent)
1	75
2	100
3	91
4	75
5	43
6	44
7	67
8	96
9	57
10	93
11	70
12	80
13	100
16	84
17	25
18	43
19	63
20	80
21	100

*Practices 14 and 15 had no injury presentations on audit days, and therefore no capture rate was calculated.

Table 8 Distribution of missing data items, general practice injury presentations, Latrobe Valley, Victoria 1994/95

Variable	Number of cases with missing/unknown data	Percent of cases
Age	28	0.5
Sex	9	0.2
Location	320	5.3
Nature of injury	14	0.2
Body part	17	0.3
Disposal	100	1.7
External cause of injury	36	0.6

3.3.3 Narrative quality scores

A random sample of 100 narratives were selected from both the general practice and emergency department databases. Both samples had been entered by the same data processor.

The average score for the 100 randomly selected narratives from the general practice presentations was 3.5 (highest possible score is 6) compared to 3.1 for those of the emergency department presentations. Fifty-nine percent of general practice cases received a score of over 3 compared with 47% of emergency department cases.

Table 9 shows the number of narratives, from both sources, that contained each desired characteristic. The lower numbers for product and bonus information are partly explained by these items not being applicable for all cases.

3.3.4 Completeness of general practitioner coding

It was found that only 4 forms, from the sample of 100, had missing data from the section completed by the general practitioner. Two of the forms had no intent indicated, one had no treatment code and one indicated 2 body parts, rather than indicating the body part most severely injured.

Table 9 Narrative characteristics of general practice and emergency department injury presentations, Latrobe Valley, Victoria 1994/95

Narrative characteristic	Number of general practice presentation narratives	Number of emergency department presentation narratives
Activity	89	65
Location	90	54
What went wrong	85	97
What actually produced bodily harm	73	78
Product involvement described	12	6
Bonus information	60	47

3.4 COMPARISON OF EMERGENCY DEPARTMENT AND GENERAL PRACTICE INJURY PRESENTATIONS IN THE LATROBE VALLEY

Full comparative tables, including proportions of cases within each category for each variable and the results of the statistical testing, can be found in Appendix 2.

3.4.1 Ratio of emergency department to general practice presentations

The VISS had 8221 cases recorded from the Latrobe Regional Hospital Emergency Department, for the same time period. After adjusting the number of cases collected in both

databases by the respective capture rates, the emergency department : general practice ratio was 1.2 : 1.0, and the general practice : emergency department ratio was 0.83 : 1.0. This ratio varied with the postcode of residence (Table 10). The emergency department : general practice ratio was observed to be greater than one, only for people living in the two towns where there is ready access to the hospital emergency department.

3.4.2 Age and sex distribution

Among the general practice presentations, there were higher proportions of under 15 year olds (33% compared with 31%) and over 50 year olds (14%, 9%), and lower proportions of 15-29 year olds (28%, 34%), compared with emergency department presentations. A lower proportion of general practice presentations were male (61%, 66%).

Table 10 Emergency department : general practice ratios for the major towns of Latrobe Valley, Victoria, 1994/95

Patient postcode of residence	Major town	Emergency department : general practice ratio
3842	Churchill	0.34
3869	Yinnar	0.41
3870	Boolarra/Mirboo East	0.45
3840	Morwell	0.64
3824	Narracan	0.99
3825	*Moe/Newborough	1.54
3844	*Traralgon	1.94

*Location of the campuses of Latrobe Regional Hospital

3.4.3 Location of injury

A lower proportion of general practice presentations sustained their injury in residential, transport and outdoor recreation areas and a higher proportion in educational and commercial areas.

3.4.4 Activity at the time of injury

Lower proportions of leisure/recreational and maintenance associated injuries, and higher proportions of occupational and sports injuries were seen in general practice. The occupations and sports that were more frequently involved were similar. Motor vehicle occupants comprised a greater proportion of emergency department than general practice presentations, whereas pedestrian injuries comprised a greater proportion of general practice presentations. Injuries from fights and quarrels were more frequently seen at the hospital than in general practice.

3.4.5 External cause of injury (E-code)

Direct comparison with emergency department data cannot be made on the basis of external cause of injury, as this variable is not included in the VISS database. However, some categories can be compared by extracting information from VISS using tailored selection criteria. Falls among general practice presentations constituted a slightly lower proportion of injuries than among emergency department presentations. Lower proportions of injuries from motor vehicle traffic accidents and injuries inflicted by others were recorded among general practice presentations. Similar proportions of injuries from foreign bodies were found among both emergency department and general practice presentations.

3.4.6 Nature of injury and body part injured

There were more lower limb and trunk injuries seen in general practice than in emergency departments, whereas head and face related injuries presented more frequently at the emergency departments. Sprains, strains, bruising and bites were more frequent among general practice presentations. The proportions of lacerations and fractures were higher among emergency department presentations.

3.4.7 Disposal

There was a higher proportion of people requiring minor treatment who presented to general practice compared to those who presented to the emergency department. Close to half of the emergency department presentations required significant treatment.

3.4.8 Statistical analysis

The differences described above were all significant when tested with the chi square statistic with the probability of a type 1 error set at 0.01 (Appendix 2). However, the number of cases was large ie., 5995 for general practice and 8221 for the emergency department, providing the power to detect small differences with a high degree of confidence. In some instances, the difference in the proportions were small ie., less than 5%. The differences were larger than 5% for age group, location, nature of injury, body part injured, and treatment required. Specifically, general practice presentations had higher proportions of:

- injuries occurring in educational settings (13%, 6%)
- sprains (21%, 12%) and bruising (17%, 11%)
- lower limb injuries (30%, 23%)
- injuries requiring minor treatment (62%, 40%)

and lower proportions of:

- 15-29 year olds (28%, 34%)
- fractures (6%, 13%)
- head and facial injuries (21%, 29%)

3.5 COMPARISON OF PERIODIC AND CONTINUOUS INJURY SURVEILLANCE IN GENERAL PRACTICE

There were statistically significant differences, with the probability of a type 1 error set at 0.01, for location and external cause of injury between the full 12 months ELVIS data and the combined 4 months of ELVIS data selected to reflect the seasonal variation of injury patterns (Appendix 3). Specifically, there was a higher proportion of injuries occurring in residential locations, and lower proportion occurring in educational settings for the periodic surveillance. There was also higher proportions of cutting/piercing injuries and lower proportions of falls and over exertion injuries for the periodic surveillance. However, these differences were relatively small, mostly being 1 or 2%, with none being greater than 4%.

3.6 COMPARISON OF GENERAL PRACTICE PRESENTATIONS IN LATROBE VALLEY AND AUSTRALIA

There were differences between these two data sets for all the variables considered. None of these were statistically significant, although the number of cases available for analysis was relatively small ie., 167 for Latrobe Valley, and 293 for Australia, requiring larger differences to reach statistical significance (Appendix 4). The differences were larger than 5% for age group, sex, location, activity, external cause, body part injured, and treatment required. Specifically, general practice presentations in the Latrobe Valley had higher proportions of:

- under 15 year olds (35%, 27%)
- injuries occurring in educational settings (18%, 10%)
- head and facial injuries (28%, 20%)

and lower proportions of:

- over 60 year olds (7%, 19%)
- males (59%, 65%)
- occupational injuries (19%, 25%)
- fall related injuries (27%, 33%)
- injuries requiring referral (4%, 10%)

4. DISCUSSION

This study has produced a comprehensive good quality general practice data collection which will be a rich source of information for injury research and prevention in the Latrobe Valley and beyond.

The prospective survey method developed for injury surveillance in hospital emergency departments proved adaptable for use in the general practice setting. The general practitioner participation rate was exceptional and is probably the best achieved in a relatively large research network in Australia. A general practitioner participation rate of 55% was achieved in the Shire of Bulla pilot, where no project officer was available (Ozanne-Smith et al., 1994). The capture rate, although less than the 85% aimed for, is quite acceptable. However, the limited information on the missing cases indicated that these were different in some respects, creating a potential source of bias in the data collection.

The record audit used to determine the capture rate was not entirely satisfactory. It was necessary that the practice staff were aware that an audit was to be conducted on a particular date, so that the records could be kept aside for audit. Consequently, the potential existed for that awareness to translate to artificially high capture rates. Anecdotal evidence from practice staff indicate this to be unlikely, particularly if the practice was busy on the day of audit. It was believed that the number of patients being seen on a particular day had a greater influence on the capture rate than the conduct of an audit on that day.

Concerns regarding patient confidentiality, despite project approval by two institutional ethics committees, resulted in a small number of practices conducting their own audits. The reliability of these results could be questioned. One such practice reported 100% capture throughout the study, while the other self-auditing practices reported capture rates below 70%.

Data quality proved to be good to excellent as evidenced by high completion rates for each variable and acceptable narrative scores.

Factors likely to have contributed to participation, data capture and data quality included consultation with the general practitioners and their reception staff during the development and implementation stages, development of acceptable data collection processes, personal recruitment to the research network, the availability of quality assurance points awarded for participation, and the recognition of the value of staff and general practitioner time by payment. The impact of a full time project officer to provide technical assistance, support and ongoing encouragement should not be under-estimated.

Some differences observed between general practice and emergency department injury presentations in this study are similar to those of other Australian comparative studies. Differences in the Australian Capital Territory (McClure and Ozanne-Smith, 1996), in the 1989-90 National Health Survey (McClure 1995), and in this study were observed for age, with higher proportions of older patients presenting to general practice. Lower proportions of fractures, higher proportions of trunk injuries, and lower proportions of more severe injury (based on treatment required) were observed in both the Australian Capital Territory study (McClure and Ozanne-Smith, 1996) and in this study.

The finding of statistically significant differences, for all variables tested, between general practice and emergency department injury presentations should be treated cautiously due to the large numbers of cases involved. However, given that the differences were greater than 5% for

age, location, nature of injury, body part injured and treatment required, the results of this study support the conclusion of others that the spectrum of injury seen in emergency departments can not necessarily be generalised to general practice (McClure 1995, McClure and Ozanne-Smith, 1996).

The observed differences between general practice and emergency department presentations may be explained by two factors. The largest difference was found between the proportions of patients requiring minor and significant treatment for their injury, with general practices treating a greater proportion of people requiring minor treatment. The generally less severe nature of injury presenting to general practice is likely to influence patterns associated with age, type of injury sustained and body part injured.

Secondly, the hours of operation of general practice and emergency departments are likely to influence patterns of presenting injury. General practitioners may see a greater proportion of educational and commercial injuries since these injuries would tend to occur during practice opening hours. Seventy-nine percent injuries presenting to general practitioners occurred during the week compared to 62% of injuries presenting to emergency departments. The higher severity of injuries occurring in transport areas, in addition to their higher frequency outside normal business hours, could account for the greater proportion seen among the emergency department presentations.

There is no obvious association of activity and external cause of injury with either injury severity or hours of operation, so these factors may not explained the less than 5% differences observed for these two variables.

The results of this study suggest that the conventional view of the injury pyramid, where the general practice to emergency department presentation ratio is greater than 1, may need to be reviewed. Other published general practice to emergency department injury presentation ratios for Australia are 1.5 : 1.0 (McClure, 1995), and 0.99 : 1.0 (McClure and Ozanne-Smith, 1996), and the ratio for this study was 0.83 : 1.0. The differences observed in this ratio for the various postcodes suggests that it is very much dependent on the local conditions, such as proximity to hospital services and possibly familiarity where the hospital emergency department is staffed by local general practitioners. Reliance on general practice for treatment of acute injuries was greater in areas further away from the two towns where the Latrobe Regional Hospital campuses are located.

Although statistically significant differences were found between periodic and continuous surveillance, none were greater than 4%. Periodic surveillance may therefore be suitable for the identification of overall patterns of injury, but may not be sensitive enough to detect emerging or new injury problems. Further, it is not clear from this study whether the four months chosen adequately reflected the seasonal variation of injury. An added challenge for periodic surveillance is the temporal variation in the timing of the peak of each season. Further, the impact, on data capture and quality, of starting and stopping data collection 4 times during a 12 month period has yet to be determined.

The 2 week national general practice collection may not have been ideal for the purposes of comparing general practice injury presentations in Latrobe Valley with those for Australia. However, this national collection is the most detailed currently available for comparison. Firm conclusions regarding the representativeness of general practice injury presentations in the Latrobe Valley can not be made from this study.

In addition to a contribution towards establishing the epidemiology of minor injury, this study has had a number of other significant outcomes. A guide to injury data collection in general practice has been produced and includes a description of the methodology, sample data collection forms, operational definitions and a copy of the special purpose data entry screens and analysis program on computer disk. A local community based injury prevention project, La Trobe Safe Communities, has been supplied with the general practice overview data to assist in the implementation of injury prevention activities in the Latrobe Valley. The general practice injury data collected during this study has been used in the estimation of the cost of consumer product related injury in Australia (Watson and Ozanne-Smith, 1996), and is being used in the estimation of injury costs in Victoria. The data are also being used in epidemiological injury studies including sports related injury in the Latrobe Valley, and injury among women. The existence of a good quality general practice data collection for the Latrobe Valley also now provides the opportunity to calculate a more accurate estimate of the rate of medically treated injuries in a defined population.

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APPENDIX 1

**DATA COLLECTION FORMS AND OTHER PROJECT
MATERIALS**

ELVIS

Extended Latrobe Valley Injury Study

*Central West Gippsland Division of General Practice
Monash University Accident Research Centre
Monash University Centre for Rural Health*

WHAT IS THE STUDY ABOUT?

Injuries are an important public health problem in Australia. Little is known about the kind of injuries for which people see their general practitioner.

How common are such injuries? How can they be prevented?

ELVIS aims to find out. This study will run in the Latrobe Valley for one year.

HOW CAN I HELP?

Taking part in the study involves filling out a form about how your injury happened. Please give as much detail as you can. This should take less than five minutes. This can usually be done while you are waiting to see the doctor. Your doctor (who is also taking part in the study) will fill in the other side of the form, saying what your injury was and how it was treated.

WILL MY PRIVACY BE PROTECTED?

The information you provide will remain confidential.

The only personal details used in the study will be age, sex, and postcode.

The form you fill in will be destroyed after the study is completed.

Only anonymous summary results will be made public.

DO I HAVE TO TAKE PART? CAN I CHANGE MY MIND?

We hope that you will answer our questions, but it is entirely up to you.

If you decide not to, the care you receive will not change in any way.

Even if you agree at first, you can change your mind at any time.

WHAT SHOULD I DO NOW?

If you agree to help, please fill in the form before seeing the doctor.

Please hand the form to the doctor, either filled in (if you are taking part) or blank (if you are not).

For further information about the study, contact: Dr Robert Hall Ph: 051 270 735

Should you have any complaint concerning the manner in which this research is conducted, please do not hesitate to contact:

The Secretary, The Standing Committee on Ethics in Research in Humans
Monash University, Wellington Road, Clayton, VIC 3168
Telephone: 03 905 2052 Fax: 03 9905 5342

If you are here today because of an

Accident
Injury
Bite/Sting
Burn
or
Sunburn

Please tell the Receptionist
before you sit down

ELVIS

Extended Latrobe Valley Injury Study

ELVIS: Helping make the Latrobe Valley a safer place to live

IS THIS AN
ELVIS
PATIENT?

ELVIS

PATIENT DETAILS

Surname: _____ Male/Female (circle) _____ Town: _____
First name: _____ Birth date: _____ Postcode: _____
Telephone: _____

Is this the first time you have seen a doctor for this injury? *Please tick appropriate box below*
Y (Please complete form, give to Doctor) N (Go no further, return form to Doctor)

PLEASE GIVE AS MUCH DETAIL AS POSSIBLE

1. When did the injury occur? Date Time am pm (please tick)

2. What is the date and time now? Date Time am pm (please tick)

3. Where did the injury occur? (Give exact place and town where injury or poisoning occurred)
(e.g. on Albert St on footpath - Moe; on the farm - Tanjil South; in the bathroom shower recess at home - Traralgon)

4. What was the injured person doing at the time the injury occurred? *Postcode of injury*
(e.g. having tea and playing around with sister; using a bench grinder; riding tractor; up ladder pruning tree)

5. What went wrong?
(e.g. chased by dog and lost control of bike; fell off top level of ladder; hot coffee knocked over; horse out of control)

6. What actually caused the injury?
(e.g. landed on concrete; cut hand on edge of broken toy; swallowed disinfectant and digoxin tablets; kicked by horse)

7. Was he/she injured at work? (please tick) Yes No

8. What is the injured person's occupation?

9. In what sort of business is he/she employed?

10. If a specific product or equipment was involved. Please give details (product, brand & model):

11. What safety precautions or devices were being used at the time the injury occurred?
(e.g. safety belt; child-resistant bottle cap; bicycle helmet; safety goggles; tractor rollover protector; machine guard; none)

12. Why did you choose to see a general practitioner for this injury/poisoning? (please tick)

waiting time shorter than hospital prefer to see doctor I know
closer to home than hospital referred by hospital
injury not severe enough for hospital other (please specify) _____

13. Sometimes additional information is needed for injury prevention.

If you do not wish to be contacted, please place an X here.

FOR OFFICE USE ONLY

E-Code •

Special Project

DTP

This is a joint Study between the Central West Gippsland Division of General Practice, Monash University Centre for Rural Health and Monash University Accident Research Centre.

Doctor's Injury Summary	Patient's Medical Record Number	Doctor's name (print)
--------------------------------	---------------------------------	-----------------------

1. NATURE OF THE INJURY	2. BODY PART
--------------------------------	---------------------

(If more than one injury, please record the most severe)

SYSTEMIC AND SPECIAL INJURY

- * 91 poisonings (thru skin/lungs/mouth etc)
- * 93 asphyxiation or respiratory difficulty
- * 94 electric shock
- * 95 over-exertion, heat/cold stress
- * 96 concussion
- * 97 dental injury
- * 99 no injury detected

* do not allocate a Body Part for these codes

SOFT TISSUE

- 01 cut/laceration
- 02 puncture
- 03 bite
- 04 superficial abrasion
- 05 penetrating wound
- 06 other wound, incl. amputation
- 07 haematoma/bruising
- 08 haemorrhage
- 09 inflammation/oedema/tenderness
- 10 burn, *full thickness*
- 11 burn, *partial thickness*
- 12 foreign body in soft tissues
- 13 damage to major blood vessel
- 14 crushing injury

BONE, TENDON OR JOINT

- 20 fracture
- 21 dislocation
- 22 sprain/strain

In these boxes write the body part code for corresponding injury recorded in Section 1 at left

HEAD

- 101 eye
- 102 ocular adnexum
- 103 nose
- 104 mouth *external*, e.g. jaw, lip
- 105 ear
- 106 face/cheek/forehead/scalp
- 107 skull *base*
- 108 skull *vault*
- 109 neck, NEC
- 198 other injury to head

UPPER EXTREMITY

- 201 clavicle
- 202 scapula
- 203 shoulder, NEC
- 204 humerus
- 205 upper arm, NEC
- 206 radius, ulna
- 207 elbow
- 208 forearm
- 209 wrist
- 210 carpal bone
- 211 metacarpal bone
- 212 digit/phalanx
- 213 hand, NEC
- 298 other injury to upper extremity

LOWER EXTREMITY

- 301 hip
- 302 femur
- 303 upper leg, NEC
- 304 knee
- 305 tibia/fibula
- 306 lower leg, NEC
- 307 ankle
- 308 tarsal bone
- 309 metatarsal bone
- 310 digit/phalanx
- 311 foot, NEC
- 398 other injury to lower extremity

TRUNK

- 401 rib(s)
- 402 sacroiliac joint
- 403 spine (inc. cervical), excluding cord
- 404 pelvis
- 405 chest, NEC
- 406 abdomen, NEC
- 407 upper back, NEC
- 408 lower back, NEC
- 409 genitalia
- 410 heart
- 498 other injury to trunk

RESPIRATORY TRACT

- 501 pharynx
- 502 larynx
- 503 trachea
- 504 bronchus
- 505 lung
- 598 other injury to respiratory tract

DIGESTIVE TRACT

- 601 mouth *internal*, e.g. gum, palate
- 602 oesophagus
- 603 stomach
- 604 small bowel
- 605 colon
- 606 rectum
- 607 liver
- 608 spleen
- 609 injury to other internal organs
- 698 other injury to digestive tract

NERVOUS SYSTEM

- 701 brain, *not concussion*
- 702 brain stem
- 703 cervical spinal cord
- 704 thoracic spinal cord
- 705 lumbar spinal cord
- 706 peripheral nerve
- 798 other injury to nervous system

3. INTENT OF INJURY	4. WHAT YOU DID WITH YOUR PATIENT
----------------------------	--

SELECT ONE CODE

- 0 accidental injury (ie, unintentional)
- 1 intentionally self-inflicted, or possibly so
- 2 victim of assault, or possibly so
- 3 unknown intent

SELECT ONE CODE

- 01 no treatment
- 02 treated - no referral, no review
- 10 treated - reappointment for review (without investigation)
- 11 treated - reappointment for review (following investigation)
- 03 treated - referred to specialist
- 04 treated - referred to emergency
- 05 treated - other referral
- 06 short-stay observation in practice
- 07 direct admission to hospital by treating GP
- 09 DOA or died in practice

Note: NEC means "not elsewhere classified"

APPENDIX 2

COMPARISON OF EMERGENCY DEPARTMENT AND GENERAL PRACTICE INJURY PRESENTATIONS IN THE LATROBE VALLEY, VICTORIA, 1994/95

Table 1 Distribution by age groups and sex, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Age group	Emergency department presentations			General practice presentations		
	M	F	All	M	F	All
0-4	9	14	11	8	10	9
5-9	8	11	9	9	12	10
10-14	11	12	11	14	14	14
15-19	12	11	12	11	8	10
20-24	15	8	13	11	7	10
25-29	10	7	9	9	5	8
30-34	9	7	8	9	7	8
35-39	7	6	7	8	6	7
40-44	6	4	5	6	6	6
45-49	4	3	4	5	4	4
50-54	2	3	2	3	4	3
55-59	2	2	2	2	2	2
60-64	1	2	1	1	3	2
65-69	1	2	2	1	3	2
70-74	1	2	1	1	3	2
75-79	1	2	1	1	2	1
80+	1	4	2	1	4	2
Total	100	100	100	100	100	100

Age group (males): chi statistic 62.83, 16df, critical value 26.30 for a=0.05, 32.0 for a=0.01

Age group (females): chi statistic 64.55, 16df

Age group (all): chi statistic 114.48, 16df

Sex: emergency department 66% males

general practice 61% males

chi statistic 34.57, 1df, critical value 3.84 for a=0.05, 6.64 for a=0.01

Table 2 Distribution by location, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Location	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Residential	39	34
Transport areas	15	11
Production areas	8	10
Educational areas	6	13
Commercial areas	5	9
Areas for organised sport	10	10
Areas for outdoor recreation	7	4
Other	5	3
Unknown	5	5
Total	100	100

Chi statistic 595.35, 8df, critical value 15.51 for $\alpha=0.05$, 20.09 for $\alpha=0.01$

Table 3 Distribution by activity at the time of injury, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Activity	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Leisure and recreation	41	38
Working	14	19
Playing sport	12	15
Maintenance	10	9
Transport	10	11
Household activities	5	5
Personal activities	3	3
Other	5	1
Total	100	100

Chi statistic 200.07, 7df, critical value 14.07 for $\alpha=0.05$, 18.48 for $\alpha=0.01$

Table 4 Distribution by external cause of injury, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

External cause of injury	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Falls	26	24
Transport	9	7
Foreign body	7	6
Inflicted by other person	6	2
Other	52	62
Total	100	100

Chi statistic 1999.17, 4df, critical value 9.49 for $\alpha=0.05$, 13.28 for $\alpha=0.01$

Table 5 Distribution by nature of injury, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Nature of injury	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Laceration	24	19
Sprain/strain	12	21
Bruising	11	17
Fracture	13	6
Puncture	2	2
Bite	3	6
Abrasion	6	5
Foreign body	6	6
Burn	4	4
Inflammation	9	7
Poisoning	2	1
Concussion	2	1
Other	4	4
Not specified/no injury detected	2	1
Total	100	100

Chi statistic 752.36, 13df, critical value 22.36 for $\alpha=0.05$, 27.69 for $\alpha=0.01$

Table 6 Distribution by body part injured, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Body part	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Head/face	29	21
Upper limb	36	36
Lower limb	23	30
Trunk	6	9
Not applicable/not specified	5	3
Other	1	1
Total	100	100

Chi statistic 233.98, 5df, critical value 11.07 for $\alpha=0.05$, 15.09 for $\alpha=0.01$

Table 7 Distribution by disposal, emergency department and general practice injury presentations in the Latrobe Valley, Victoria, 1994/95

Disposal	Emergency department presentations (Percent of total)	General practice presentations (Percent of total)
Minor treatment	40	62
Significant treatment	48	36
Unknown/other	12	2
Total	100	100

Chi statistic 13.6, 2df, critical value 5.99 for $\alpha=0.05$, 9.21 for $\alpha=0.01$

APPENDIX 3

COMPARISON OF PERIODIC AND CONTINUOUS INJURY SURVEILLANCE IN GENERAL PRACTICE, LATROBE VALLEY, VICTORIA, 1994/95

Table 1 Distribution by age groups and sex, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Age group	Periodic surveillance (4 one month periods)			Continuous surveillance (full 12 months)		
	M	F	All	M	F	All
0-4	8	10	9	8	10	9
5-9	9	11	10	9	12	10
10-14	11	14	12	14	14	14
15-19	11	8	10	11	8	10
20-24	13	8	11	11	7	10
25-29	9	6	8	9	5	8
30-34	8	7	7	9	7	8
35-39	8	5	7	8	6	7
40-44	6	6	6	6	6	6
45-49	5	4	4	5	4	4
50-54	3	3	3	3	4	3
55-59	3	3	3	2	2	2
60-64	1	4	2	1	3	2
65-69	2	2	2	1	3	2
70-74	1	2	2	1	3	2
75-79	1	3	2	1	2	1
80+	1	4	2	1	4	2
Total	100	100	100	100	100	100

Age group (males): chi statistic 12.35, 16df, critical value 26.30 for $\alpha=0.05$, 32.0 for $\alpha=0.01$

Age group (females): chi statistic 8.93, 16df, critical value 26.30 for $\alpha=0.05$, 32.0 for $\alpha=0.01$

Sex: 61% males in both periodic and continuous surveillance

Table 2 Distribution by location, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Location	Periodic surveillance (4 one month periods)	Continuous surveillance (full 12 months)
Residential	38	34
Transport areas	11	11
Production areas	11	10
Educational areas	9	13
Commercial areas	9	9
Areas for organised sport	9	10
Areas of outdoor recreation	4	4
Other	1	3
Unknown	8	5
Total	100	100

Chi statistic 82.23, 8df, critical value 15.51 for $\alpha=0.05$, 20.09 for $\alpha=0.01$

Table 3 Distribution by activity at the time of injury, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Activity	Periodic surveillance (4 one month periods) (Percent of total)	Continuous surveillance (full 12 months) (Percent of total)
Leisure and recreation	38	38
Working	18	19
Playing sport	13	15
Maintenance	11	9
Transport	10	11
Household activities	5	5
Personal activities	3	3
Other	2	1
Total	100	100

Chi statistic 6.85, 7df, critical value 14.07 for $\alpha=0.05$, 18.48 for $\alpha=0.01$

Table 4 Distribution by external cause of injury, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

External cause of injury	Periodic surveillance (4 one month periods) (Percent of total)	Continuous surveillance (full 12 months) (Percent of total)
Falls	23	24
Hit/struck/crushed	15	15
Cutting/piercing	15	13
Over exertion	10	11
Natural environment	7	7
Collisions in sport	7	7
Transport	7	6
Foreign body	6	6
Fire/burns	3	3
Other unintentional	3	3
Inflicted by other person	2	2
Other	1	1
Unknown	1	2
Total	100	100

Chi statistic 27.96, 12df, critical value 21.03 for $\alpha=0.05$, 26.22 for $\alpha=0.01$

Table 5 Distribution by nature of injury, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Nature of injury	Periodic surveillance	Continuous surveillance
	(4 one month periods) (Percent of total)	(full 12 months) (Percent of total)
Laceration	23	19
Sprain/strain	20	21
Bruising	16	17
Fracture	6	6
Puncture	2	2
Bite	5	6
Abrasion	4	5
Foreign body	6	6
Burn	4	4
Inflammation	7	7
Other	6	6
Not specified /no injury detected	1	1
Total	100	100

Chi statistic 14.73, 11df, critical value 19.68 for $\alpha=0.05$, 24.73 for $\alpha=0.01$

Table 6 Distribution by body part injured, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Body part	Periodic surveillance	Continuous surveillance
	(4 one month periods) (Percent of total)	(full 12 months) (Percent of total)
Head/face	21	21
Upper limb	37	36
Lower limb	29	30
Trunk	9	9
Other	1	1
Not applicable/not specified	3	3
Total	100	100

Chi statistic 1.49, 5df, critical value 11.07 for $\alpha=0.05$, 15.09 for $\alpha=0.01$

Table 7 Distribution by disposal, periodic and continuous injury surveillance in general practice, Latrobe Valley, Victoria, 1994/95

Disposal	Periodic surveillance (4 one month periods) (Percent of total)	Continuous surveillance (full 12 months) (Percent of total)
Treated, no referral	48	47
Treated, reappointment without investigation	18	18
Assessment only	13	15
Treated, reappointment with investigation	14	13
Treated, other referral	2	2
Treated, referred to specialist	2	2
Referred to emergency department	1	1
Unknown	1.3	1.6
Other	0.2	0.3
Total	100	100

Chi statistic 3.36, 8df, critical value 15.51 for $\alpha=0.05$, 20.09 for $\alpha=0.01$

**COMPARISON OF GENERAL PRACTICE PRESENTATIONS IN
LATROBE VALLEY, VICTORIA, OCTOBER 1995 WITH
AUSTRALIAN SURVEY OCTOBER 1994**

Table 1 Distribution by age groups and sex, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Age group	Latrobe Valley general practice injury presentations			Australian survey general practice injury presentations		
	M	F	All	M	F	All
<15	32	40	35	41	26	27
15+	68	60		59	74	
15-19			9			7
20-29			18			17
30-39			13			11
40-49			12			12
50-59			6			7
60-69			3			6
70+			4			13
Total	100	100	100	100	100	100

Age group (all): chi statistic 10.39, 5df, 11.07 critical value for a=0.05, 15.09 for a=0.01
 (Note: for chi square testing, the age range from 50 upwards were collapsed into one category 50+)

Age group (males): chi statistic 0.21, 1df, 3.84 critical value for a=0.05, 6.63 for a=0.01

Age group (females): chi statistic 3.69, 1df, 3.84 critical value for a=0.05, 6.63 for a=0.01

Sex: Latrobe Valley 59% males

National 65% males

chi statistic 1.5, 1df, critical value 3.84 for a=0.05, 6.64 for a=0.01

Table 2 Distribution by location, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Location	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Residential	34	39
Transport areas	15	12
Production areas	13	11
Educational areas	18	10
Commercial areas	4	8
Areas for organised sport	4	7
Other	12	13
Total	100	100

Chi statistic 11.31, 6df, critical value 12.59 for $\alpha=0.05$, 16.81 for $\alpha=0.01$

Table 3 Distribution by activity at the time of injury, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Activity	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Leisure and recreation	36	32
Working	19	25
Playing sport	11	14
Maintenance	11	11
Transport	13	11
Other	10	7
Total	100	100

Chi statistic 4.19, 5df, critical value 11.07 for $\alpha=0.05$, 15.09 for $\alpha=0.01$

Table 4 Distribution by external cause of injury, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

External cause of injury	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Falls	27	33
Cutting/piercing	15	20
Transport	9	7
Sport-collision	7	6
Fire	6	2
Other	36	32
Total	100	100

Chi statistic 2.47, 3df, critical value 7.82 for $\alpha=0.05$, 11.35 for $\alpha=0.01$
 (Note: other consists of a range of categories, none of which were more than 6%)

Table 5 Distribution by nature of injury, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Nature of injury	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Laceration	24	23
Sprain/strain	16	18
Bruising	13	14
Fracture	11	8
Abrasion	5	5
Foreign body	4	4
Burn	7	4
Inflammation	7	4
Other	13	20
Total	100	100

Chi statistic 11.10, 8df, critical value 15.51 for $\alpha=0.05$, 20.09 for $\alpha=0.01$

Table 6 Distribution by body part injured, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Body part	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Head/face	28	20
Upper limb	40	36
Lower limb	22	28
Trunk	7	8
Other	3	8
Total	100	100

Chi statistic 8.91, 4df, critical value 9.49 for $\alpha=0.05$, 13.28 for $\alpha=0.01$

Table 7 Distribution by disposal, general practice presentations in Latrobe Valley, Victoria, October 1995 and Australian survey October 1994

Disposal	Latrobe Valley general practice injury presentations	Australian survey general practice injury presentations
Assessment only	12	7
Treatment, no referral	51	51
Treatment, other referral	4	10
Treatment, reappointment	31	30
Other	1	2
Total	100	100

Chi statistic 8.08, 4df, critical value 9.49 for $\alpha=0.05$, 13.28 for $\alpha=0.01$