

Fire Research Report

Work-related Fatal and Non-fatal Fire Injuries in New Zealand 1985-1999

Bridget Kool

October 2001

Data for 1985 to 1999 from the New Zealand Health Information Service and Accident Compensation Corporation was augmented by New Zealand Fire Service investigation reports and coronial records to identify personal, environmental and fire related factors associated with injury and death of New Zealand adults by fire in the work-place. On average there were 1.6 deaths to workers per year during the period. Younger males in the agricultural, fishing and manufacturing industries were at the highest risk. Welding torches were the primary source of ignition in fatal work-related fires. The risk of fatal work-place fire was highest in the afternoon.

On average there were 1.7 deaths per year to bystanders who were unintentionally killed or injured by fire directly as a result of someone else's work process. Elderly males were the most at risk with most incidents occurring in residential institutions.

On average there were 30.8 work-related fire injury hospitalisations per year. Those at highest risk of injury were younger males with the most risky location being industrial facilities.

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New Zealand Environmental and Occupational Health Research Centre

A report for the New Zealand Fire Service Commission

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INTRODUCTION

This report to the New Zealand Fire Service Commission describes features of work-related fire incidents in New Zealand that resulted in death (1985 – 1997) or injury (1995 – 1999).

This report is one of a series contracted for the New Zealand Fire Service Commission Contestable Research Fund for the 2000 – 2001 research year.

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The study was considered and approved by the Wellington, Auckland, and Otago Ethics Committees. Identifying information was held separately from the study dataset and was retained as long as was required to data match. Analysis was carried out on anonymised data.

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	7
2	RECOMMENDATIONS	9
3	BACKGROUND	10
3.1	Overview	10
3.2	What is the extent of the occupational fire-related injury problem?	10
3.2.1	International mortality and morbidity	10
3.2.2	New Zealand work-related mortality and morbidity	11
3.2.3	New Zealand work-related fire tragedies	11
4	OBJECTIVES	13
5	METHOD	14
5.1	Case identification and classification	14
5.2	Data sources	15
5.2.1	Morbidity and mortality data	15
5.2.2	Accident Compensation Corporation data	16
5.2.3	Ethnicity	16
5.3	Analysis	16
5.4	Denominators	17
6	RESULTS	18
6.1	Work-related fatal fire injury of workers 1985-1997	18
6.1.1	Overall results	18
6.1.2	Age, gender, and ethnicity	18
6.1.3	Industry	19
6.1.4	Occupation	19
6.1.5	Fire incident characteristics	20
6.2	Work-related fire injury bystander deaths 1985 - 1997	23
6.2.1	Results	23
6.3	Work-related nonfatal fire injury of workers 1995 - 1999	25
6.3.1	Hospitalisations 1995 - 1999	25
6.3.2	Accident Compensation Corporation entitlement claimants 1994/95 - 98/99 financial years	28
7	DISCUSSION	30
7.1	Study implications	30
7.1.1	Intervention strategies	30
7.1.2	Data quality	33
8	REFERENCES	35

LIST OF TABLES

Table 1. Study inclusion and exclusion criteria.....	15
Table 2. ICD-9-CM location codes used in the study.....	15
Table 3. Numbers of fatalities of work-related fire injury among workers aged 15 years and over, by age group. New Zealand 1985-1997 (N= 21).....	19
Table 4. Industry of fatalities as a result of work-related fire injury among workers aged 15 years and over in New Zealand 1985-1997: Rate (95% confidence interval) for major industry groups (ANZSIC 1996 ¹⁸).....	19
Table 5. Location where fatal work-related fire injury incidents occurred, New Zealand 1994/95 – 1998/99 (N= 17).....	22
Table 6. Presumed source of ignition in work-related fatal fire incidents, New Zealand 1985 - 1997 (N = 17).....	22
Table 7. Volatile substances involved in fatal work-related fire injury incidents, New Zealand 1985-1997.....	22
Table 8. Numbers of fatalities of work-related fire injury among bystanders aged 15 years and over, by age group. New Zealand 1985-1997 (N=19).....	23
Table 9. Location where work-related fatal bystander fire incidents occurred, New Zealand 1985 – 1997 (N = 11).....	23
Table 10. Presumed source of ignition in work-related fatal bystander fire incidents, New Zealand 1985 – 1997 (N = 11).....	24
Table 11. Numbers of work-related fire injury primary hospital admissions per year, by age group. New Zealand 1994/95-1998/99 (N=154).....	26
Table 12. Ethnicity of work-related fire-injury primary hospital admissions: Number of admissions, New Zealand 1995-1999 (N= 154).....	26
Table 13. Location where work-related fire injury resulting in hospitalisation occurred, New Zealand 1994/95 – 1998/99 (N= 154).....	27
Table 14. Location where ACC entitlement claimants work-related fire injury occurred, New Zealand 1994/95 – 1998/99 (N = 183).....	29

LIST OF FIGURES

Figure 1. Number of work-related fatal fire injuries of workers per year, New Zealand 1985-1997 (N=21)	18
Figure 2. Occupation of fatal work-related fire injury cases – major occupational groups (NZSCO99 ¹⁹ , New Zealand 1985-1997 (N = 21).....	20
Figure 3. Fatal work-related fire incidents of workers: day of week of occurrence, New Zealand 1985-1997(N= 17)	20
Figure 4. Fatal work-related fire incidents of workers: time of day of occurrence, New Zealand 1985-1997(N= 17)	21
Figure 5. Fatal work-related fire incidents of workers: month of occurrence, New Zealand 1985-1997 (N= 17)	21
Figure 6. Number of work-related fire injury hospitalisations per year, New Zealand 1995 – 1999 (N=154)	25
Figure 7. Number ACC entitlement claimants with work-related fire injury per financial year, New Zealand 1994/95 – 1998/99 (N=183).....	28
Figure 8. Age distribution of work-related fire injury ACC entitlement claimants in New Zealand 1994/95-1998/99 by age group (N= 183)	28

1 EXECUTIVE SUMMARY

Data from the New Zealand Health Information Service (NZHIS), and the Accident Compensation Corporation was augmented by New Zealand Fire Service Investigation Reports, and coronial records to identify personal, environmental and fire related factors associated with injury and death of New Zealanders aged 15 years and over by fire in the work-place. In this study work-place fire injury included all unintentional fire injury of people aged 15 years and over, in which work-place exposure contributed. Excluded were injury due to traffic crashes on public roads or whilst travelling to and from work, and injuries occurring in the home which were work-related.

Work-related fatal fire injury of workers 1985 - 1997

During the period 1985-1997 the study identified 17 work-place fire incidents that resulted in 21 deaths. There were on average 1.6 deaths per year during the 13-year period reviewed. The overall work-related fire injury mortality rate was 0.06 per 100,000 person years. There were insufficient fatality numbers to detect any trends during the study period. The work-related fire injury deaths occurred predominantly in the 20 to 24 and 35 to 39 year old age groups. All workers who died from fire injury were males.

There were only sufficient fatality numbers to calculate mortality rates for two industry types in the study. The *Agricultural* industry (included *fishing*) had the highest mortality rate at 0.4 per 100,000 person years, whilst the *Manufacturing* industry had a rate of 0.3 per 100,000 person years. No denominator data were available to calculate mortality rates for occupations, however the occupations *Trades Workers* had the highest frequency of fatalities followed by *Agriculture* (included *fishing*). A third of the incidents resulting in work-related fire injury deaths of workers, occurred in the *Agricultural* sector. Four of the six incidents occurred on fishing boats, three as a result of electrical malfunction and the fourth as a result of a cigarette lighter igniting leaking LPG. The remaining two incidents occurred on farms.

Forty-one percent of fatal work-related fire incidents occurred between the hours of midday and 6:00 p.m. Welding torches were the source of ignition in 41 percent of fatal fire incidents and were responsible for 33 percent of work-related fire injury deaths in the study.

Work-related fire injury bystander deaths 1985 - 1997

Work-related bystander fire-injury deaths included those people aged 15 years or older who were unintentionally killed or injured by fire, directly as a result of someone else's work process. Excluded were work-related bystander deaths in traffic crashes on public roads. During the period 1985-1997 the study identified 11 work-place fire incidents that resulted in 19 bystander deaths. There were on average 1.7 deaths per year during the 13-year period reviewed. The rate of fatal work-related fire injury of bystanders for the population of New Zealand was 0.05 per 100,000 person years. There were insufficient fatality numbers to detect any trends during the study period. Nearly three quarters of cases were aged 60 years or older. Fifty-seven percent of bystander who died from fire injury were males. Seventy-three percent of incidents occurred in *residential institutions* (seven in rest homes, and one in a hospital). Fires

with electrical malfunction as the source of ignition were responsible for 36 per cent of fatal work-related bystander fire incidents and 37 percent of bystander fatalities.

Work-related nonfatal fire injury of workers 1995 - 1999

During the five-year period 1995 to 1999, the study identified 154 cases admitted (primary admissions only) to New Zealand public hospitals as a result of work-related fire injury. It is estimated from information contained in the accident descriptor field of the NZHIS dataset, that at least 24 percent of the work-related fire injury hospitalisation cases were bystanders. On average there were 30.8 work-related fire injury hospitalisation cases per year. The overall hospitalisation rate for work-related fire injury for the 15 to 64 year age-band was 1.0 per 100,000 person years. Work-related fire injury requiring hospitalisation occurred predominantly in the 15 to 19 year and 20 to 24 year age groups. Eighty-four per cent of the cases were male. Forty-six percent of work-related fire injuries resulting in hospitalisation occurred in an *industrial place*, 14 percent on *farms*, and 14 percent occurred in *residential institutions* (included rest homes and hospitals). At least 14 percent of incidents involved a welding torch.

During the financial period 1994/95 to 1998/99 the study identified 183 ACC entitlement claimants aged 15 years or older who sustained a work-related fire injury in New Zealand (excludes bystander work-related fire injuries). On average there were 36.6 claimants per year. The overall rate for work-related fire-injury ACC entitlement claims for the study period was 1.3 per 100,000 person years. Eighty-seven percent of claimants were male. The age distribution of claimants is similar to that of the working population of New Zealand. Fifty-two percent of injuries occurred in an *Industrial Place*, 26 percent in *commercial or service locations*, and nine percent occurred on *farms*. No information was available concerning source of ignition.

Currently it is not possible to accurately describe the incidence of work-related fire injury in New Zealand based on routinely collected agency data. However, despite relatively low numbers the present study has demonstrated there appear to be at risk groups for work-related fire injury, these include people involved in the agricultural (includes fishing) industry; in welding activities; and workers in the 20 to 24 year age group. The inclusion of bystander work-related fire injury morbidity and mortality has added a new dimension to the magnitude of fire injury in the work-place setting.

2 RECOMMENDATIONS

- 1) That the New Zealand Fire Service Commission ensures that the findings of this study are disseminated among agencies and individuals concerned with the wellbeing of New Zealand workers, including Occupational Safety and Health; Accident Compensation Corporation; Public Health service providers; industry groups; and training providers.
- 2) That the New Zealand Fire Service Commission liaises with agencies and individuals concerned with the wellbeing of New Zealand workers to incorporate fire safety strategies in individual and population based health promotion strategies. Such strategies will include promoting awareness of fire safety precautions in the workplace; and ensuring staff and management have adequate training in actions to take in the event of a fire, and in evacuation procedures. Such groups will include Occupational Safety and Health; Accident Compensation Corporation; Public Health service providers; industry groups; and training providers.
- 3) That the New Zealand Fire Service Commission collaborates with agencies involved in the setting of work place standards and practices to undertake further research to investigate the prevalence and causative factors of fire-related injury within the agricultural (including fishing) industry in New Zealand. And that the information obtained be used in the development of targeted injury prevention initiative sat both an individual and population level to reduce the risk of fire injury within the agricultural industry.
- 4) That the New Zealand Fire Service Commission collaborates with agencies involved in the setting of work place standards and practices to undertake further research to investigate the prevalence and causative factors of welding injuries in New Zealand. And that information obtained be used in the development of targeted injury prevention initiatives at both an individual and population level to reduce the risk of welding injuries.
- 5) That the New Zealand Fire Service Commission include bystanders casualties in all age groups in any future work-related fire injury epidemiological research.
- 6) That the New Zealand Fire Service Commission liaises with all Local Authorities to ensure rest homes, hotels and motels achieve compliance with the building code; promote awareness of fire safety precautions among operators of such businesses; and ensure staff have adequate training in evacuation procedures and fire safety issues.
- 7) That the New Zealand Fire Service Commission is involved in future consultative process supporting a change from voluntary to mandatory use of NZSCO codes in NZHIS datasets, to assist in the identification of work-related injury cases for future epidemiological research.
- 8) That the New Zealand Fire Service Commission is involved in future consultative process supporting a change from voluntary to mandatory use of narrative fields NZHIS datasets for injury cases.
- 9) That the New Zealand Fire Service Commission is involved in any future consultative process to establish a national coronial system in New Zealand.

3 BACKGROUND

3.1 Overview

The past forty years has seen a decline in the number of fatal occupational incidents in most developed countries ¹. An OECD study of occupational fatal injuries, showed that in the fatal accident frequency of the countries in the study was between 5 to 24 per 100,000 persons employed in 1965, and dropped to between 2 to 19 per 100,000 persons employed in 1986/87 ². The International Labour Office, estimated the average fatal occupational accident rate for the world in 1994 was 14.0 per 100,000 workers, with an estimated annual total of 335,000 fatal occupational accidents for the world ³. The reported annual fatal occupational accident rate for New Zealand in 1993 was 5.3 per 100,000 workers, the identical rate reported to that in America ³. Unlike domestic fire-related injuries, there is little data available in the published literature regarding fire-related burn injuries in the workplace ^{4, 5}.

The Occupational Safety and Health Service (OSH) and the Accident Compensation Corporation (ACC), are the two main sources of New Zealand work-related injury data. Underestimation of the magnitude of the problem has been identified as an issue with both of these sources ^{6, 7}. Currently there is no routine surveillance system in New Zealand to monitor work-related non-fatal or fatal injuries ⁸.

Occupational injury is a significant cause of avoidable premature mortality ^{3, 8, 9}. Fire - related injury is a relatively small component of work-related injury but its effect is often in the least instance disfiguring and in the extreme but often frequent case, fatal. This report describes the fatal and nonfatal work-related burn injuries occurring during a 12-year period in New Zealand, using data available from routinely collected sources. Descriptive epidemiological studies such as this are an initial step in the development of interventions aimed at reducing this unnecessary loss of life, and morbidity associated with fire injury in the workplace in the future.

3.2 What is the extent of the occupational fire-related injury problem?

3.2.1 International mortality and morbidity

Occupational injury comparisons between countries are problematic due to numerous potential differences including levels of underreporting, definitions and recording of occupational accidents, and coverage of statistics. An additional difficulty when making international comparisons is that countries may cover different populations in their national statistics. For example some countries include self-employed whilst other countries do not, similarly some sectors may be excluded. Differences in types of enterprise and industrial structure may result in varying frequency levels of occupational injury incidents between countries ¹.

Ng *et al.* in a study of 193 patients admitted to a Canadian regional burn centre during a six-year period, with work-related burns, reported flame burns as the second leading cause of burn injury resulting in 24.4 per cent of cases ¹⁰. Ninety four per cent of cases in the study were male, and the median age was 32.5 years (range 18-64 years).

The burns tended to be extensive in nature, with a reported median body surface area (BSA) burn of 16.5 per cent. The average length of hospital stay was 20 days¹⁰.

A 1994 study of fatal and non-fatal occupation-related burns carried out in North Carolina (USA) reported 73.5 percent of fatal burns were fire-related, of these 68 percent were in or related to motor vehicles⁴. Flame was responsible for only a minority (less than five percent) of non-fatal occupational injuries in the study. The majority of those burned from all causes were aged 25 to 35 years old, and the average age was 30.7 years. The extremities and the head were the body parts most frequently injured (57.6 per cent). Flame burns caused 75 percent of the workplace burn fatalities in the study⁴.

Few English language international studies have examined specific mechanisms of injury such as flame injuries in relation to work-related fatality. Detailed population-based epidemiological studies of flame burn injuries in the workplace are valuable to assist in the design of effective prevention interventions.

3.2.2 New Zealand work-related mortality and morbidity

The focus of published studies in New Zealand relating to injuries to workers during work time, fall into two main categories: those investigating occupations with comparatively high injury rates, and those investigating the outcome of the injury (fatal, or nonfatal injury)^{7, 11-15}. No published New Zealand studies have specifically looked at work-related fire injuries.

Two comprehensive work-related fatal injury studies have been conducted in New Zealand. The first carried out by Cryer and Flemming in 1987, for the period 1975 – 1984, revealed that work-related injury fatality is a major public health problem in New Zealand⁷. The second study was conducted by Feyer *et al.* and reviewed traumatic work-related fatalities occurring in New Zealand for the period 1985 to 1994¹⁶. The work-related injury death rate for the study period was 5/100,000 person years, with a steady decline seen over the study period. The male death rate was 30 times greater than the female rate. The rate of work-related injury death increased dramatically for those over the age of 65 years. Mining, agriculture (includes forestry and fishing), and construction were the three leading industries with the highest rates of death¹⁶.

Firth in a study of attendances for work-related injury to Dunedin Hospital accident and emergency department during a 10-week period reported, 5.3 percent of attendances had sustained a burn injury¹³.

3.2.3 New Zealand work-related fire tragedies

There have been two major work-place fires in New Zealand resulting in large numbers of fatalities. The first in December of 1942 took place in the rurally isolated Scacliffe Mental Hospital, in which 37 out of 39 female patients died¹⁷. The building built in the late 1890's, was two-storeyed and of wooden construction, with heavily waxed floors. All of the rooms in which the patients slept were locked, and almost all of the windows were locked and shuttered. At the time the fire started, the patients were unattended. Within an hour of the blaze starting, the building had been reduced to ashes. A commission of inquiry was set up by the then Minister of Health to investigate factors that contributed to the tragedy. Due to the devastation of the site

a conclusive cause of the fire was never determined but the three most likely possibilities included rats chewing on electrical cables; sparking from electrical equipment; or patients smoking. In making its recommendations the commission suggestions included a single-story design for future hospitals; the use of fire-resistant materials in all new construction; automatic fire alarms, and compulsory sprinkler systems.

The second biggest work-place fire tragedy in New Zealand took place in the long established Christchurch department store J. Ballantyne & Co. The fire began mid afternoon in November 1947, it eventually spread through all three stories of the building. At the time of the fire there were 458 employees and 250 shoppers in the building. All of the shoppers were successfully evacuated. The final employee death toll was 41. A Royal Commission of Inquiry was undertaken, and again the cause of the fire could not be determined but was suspected as either a dropped cigarette butt or an electrical fire. Contributing factors identified by the Commission included absence of fire drills; no method of automatically summoning the fire brigade; absence of a sprinkler system; and no chain of command for dealing with emergencies. Recommendations from the Commission included instructing staff in the principles of fire prevention, evacuation and elementary firefighting; amending the Factories Act to strengthen fire standards.

These two examples of work-place fire tragedies in New Zealand have graphically illustrated how both employees and bystanders in the workplace are at risk for harm from fire injury. The two scenarios have highlighted some of the multi-faceted factors at play in the work environment that can turn a potentially containable fire into a catastrophe.

4 OBJECTIVES

The objectives of this report are:

- 1) To investigate the nature, type, severity, and determinants of fire-related occupational fatal and nonfatal injury in New Zealand 1985 to 1999
- 2) To determine if there are priority areas specific to certain occupations, age, sex, ethnicity, and socioeconomic subgroups with respect to occupational fire-related injury prevention.

5 METHOD

This study identified work-related fatal and nonfatal fire injury cases from the New Zealand Health Information Service (NZHIS) electronic national morbidity and mortality data sets, and the Accident Compensation Corporation (ACC) entitlement claim data set. Circumstances surrounding each incident were reviewed from information contained in those datasets. In addition for fatalities coronial and Fire Service records were reviewed.

5.1 Case identification and classification

The definition of a work-related fire injury used in this study was broad, and included all fire injuries in New Zealand resulting in death (1985 – 1997), or hospitalisation (1995- 1999) (primary admission only), or an ACC entitlement claim (1994/95 – 1998/99 financial years), in which workplace exposure contributed. The use of this broad definition of work-relatedness is similar to that used in Feyer *et al*'s New Zealand study of work-related fatalities¹⁶. Categories of work-related injury excluded from the study included: intentional injury (eg. self harm, assault), injury due to traffic crashes on public roads, and deaths whilst travelling to and from work, injuries occurring in the home which were work-related, and injury to people aged under 15 years of age.

Due to limitations of the data reviewed it was not possible to determine if injuries occurring in the home were work-related or not, therefore this category were excluded. It is acknowledged that fire-related injury occurring whilst driving to or from work, or occurring on public roads whilst in the course of work, may be a potentially significant contributor to work-related fire injury statistics, but for pragmatic reasons this cause of injury has been excluded from this study.

The Australian and New Zealand Standard Industrial Classification – New Zealand Version 1996 (ANZSIC96), is used for the collection, compilation and publication of statistics relating to industry in New Zealand¹⁸. This system was used in the study to classify the industry in which cases were working in at the time of injury. Similarly, the New Standard Classification of Occupations 1999 was used to classify the occupation of cases at the time of injury¹⁹. It should be noted that the industry and the occupation cases were involved in at the time of injury has been used for analysis in this study, in some cases this may not have been the usual occupation or industry.

The Health and Safety and Employment Act 1992, provides protection for people affected by the work of others, hence the inclusion of bystander fire related injuries occurring in a work place setting in this study. The definition of bystander was the same as that used by Feyer *et al*. '*persons not working but who were (unintentionally) killed (or injured) directly as a result of someone else's work process*' (Feyer *et al*, 1999, page 40)¹⁶. In keeping with the definition used by Feyer *et al*, bystanders were excluded if they were engaged in an illegal or criminal activity, or if their primary activity was recreational.

Table I displays inclusion and exclusion criteria for the study.

Table 1. Study inclusion and exclusion criteria.

Inclusion criteria for fire-related injuries
Unintentional injuries i.e. accidental
People injured working for pay, profit or payment in kind
Incidents occurring in New Zealand waters
Bystanders injured in a place of work
Exclusion criteria for fire-related incidents
Intentional injuries eg. homicide, suicide
Injuries sustained away from the workplace but to which work contributed
Injuries sustained whilst travelling to or from work
Traffic-related injuries on public roads which occurred in the course of a person's work activity
Work-related injuries occurring in the home
Death occurring three months or longer after the injury
Medical misadventure or complications
Individuals less than 15 years of age

Whether the injured was employed or self-employed or employed on a part or full time basis was not investigated due to limitations of the data reviewed and the scope of the project.

5.2 Data sources

5.2.1 Morbidity and mortality data

Work-related fire injury cases resulting in hospitalisation (primary admission only), or death were identified from the NZHIS national mortality and morbidity data sets using the World Health Organisation's International Classification of Diseases codes ²⁰. Initially all cases with external cause codes (E codes) E890 – 899 (*Accidents caused by fire and flame*) and E923 (*Accidents caused by explosive material*) were identified, free text descriptors were reviewed to establish if fire and work exposure were factors in the event. Location codes where the incident occurred were also reviewed to aid in establishing if the injury was work-related (Table 2)

Table 2. ICD-9-CM location codes used in the study

Location code	Description
0	Home*
1	Farm
2	Mine/quarry
3	Industrial
6	Public building (includes hotel/motel)
7	Residential institution (includes rest home, hospital)
8	Other specified (includes harbour)
9	Unspecified

Source: *International Classification of Diseases, 9th Revision, Clinical Modifications (ICD-9-CM), Vol.1:diseases tabular list* ²⁰

Case identification data from both sources was cross-referenced to ensure completeness of the study population.

Information pertaining to fatal incidents was abstracted from coronial records, the NZHIS mortality dataset, and the New Zealand Fire Service (NZFS) fire-investigation reports. Data were recorded on the age, gender, occupation at time of injury, scene of injury, activity of the victim immediately prior to the incident, the injury event, and nature of the injury.

Information pertaining to incidents resulting in hospitalisation was abstracted from the NZHIS morbidity dataset. Data were recorded on the age, ethnicity (where available), gender, occupation, scene of the injury, injury event, and nature of the injury.

5.2.2 Accident Compensation Corporation data

ACC entitlement claim data were used as an additional source of information to aid in quantifying the magnitude of the problem of work place fire-related injury. ACC entitlement claim data includes people who have received compensation from ACC for more than medical treatment. Entitlement categories might include any or all of the following: weekly compensation (income maintenance), independence allowance (a quarterly allowance for impairment), social rehabilitation (eg. home help, child care etc), other (includes vocational rehabilitation, hospital and dental treatment, etc) (Personal communication. August 2001. David Ohlsson Information Analyst, Accident Compensation Corporation). It should be noted that of all ACC claims received, only around 10% become entitlement claims ²¹.

The ACC dataset will have some overlap with the NZHIS morbidity dataset, as some ACC entitlement claimants will have been hospitalised. Due to the use of unidentifiable patient data from the Morbidity and ACC databases it was not possible to quantify the overlap in this study. ACC cases were identified using the term *fire* as “cause of accident” variable, and or *fire, flame etc* as the “agent” involved in the accident. Incidents where the “scene” of accident was *home* were excluded.

Information pertaining to ACC entitlement claimant incidents included the age, gender, scene of the injury, and nature of the injury event. Information regarding whether or not the injured was employed or self-employed, or worked on a full or part time basis was not obtained.

5.2.3 Ethnicity

Limited ethnicity data were analysed in this study due to inconsistencies in the recording of this information in the data sources examined for the study period that was reviewed.

5.3 Analysis

Results of this study are presented for three distinct groups: fatal work-related fire-injury of workers, work-related bystander fatalities, and nonfatal work-related fire injury of workers. Nonfatal work-related fire injury of workers is presented for hospitalisations, and for ACC entitlement claimants. Incidence was established for the different occupations, age and gender groups, location of the injury event, and activity being undertaken at the time of injury.

Rates were calculated where numerators were greater than three, and where dominator data was available. Rate ratios and confidence intervals were calculated using EpiInfo statistical software (CDC 1996).

5.4 Denominators

Feyer *et al.* described the difficulties in obtaining necessary denominator data with respect to occupation and industry in New Zealand ¹⁶. Difficulties identified include change in classification of industry and occupation variables from one census to the next, and absence of concordance maps for industry and occupation classifications ¹⁶. In this study denominator data for industry was derived from census collection data. The numbers for both full and part time workers for each of the three census collections (1986, 1991, 1996) encompassed in the study, were summed and then divided by three, to give an average annual number of workers for the respective industries discussed during the study period.

The total population of New Zealand aged 15 years or older was used to derive denominators for the bystander death rates.

6 RESULTS

6.1 Work-related fatal fire injury of workers 1985-1997

6.1.1 Overall results

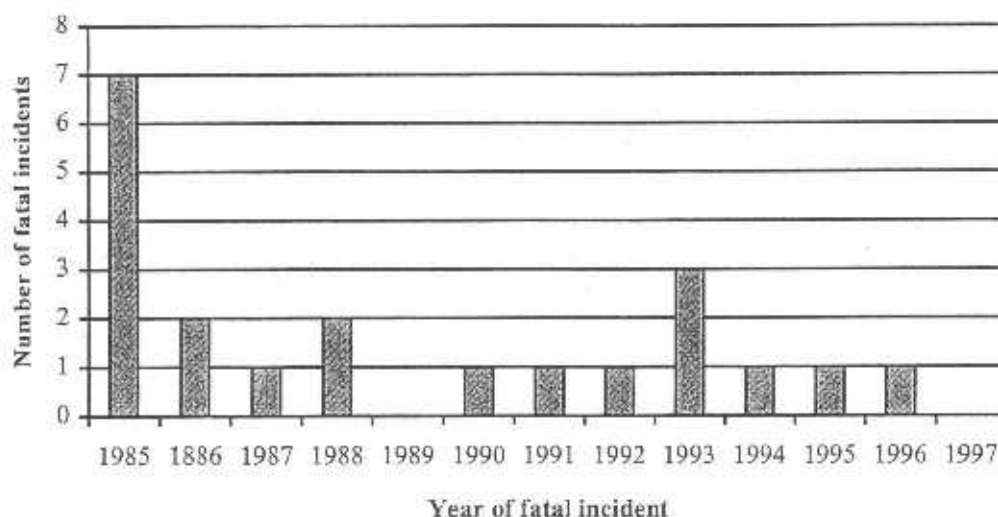
Between 1985 and 1997 inclusive, this study identified 21 deaths due to work-related fire injury of workers. On average 1.6 deaths per year. The overall work-related fire injury mortality rate for the study period was 0.06 per 100,000 person years (95% CI 0.03 – 0.09).

The fire-related fatalities occurred in 17 incidents, of these two incidents resulted in multiple fatalities. In the first a mining explosion resulted in four deaths, in the second a fire on a fishing boat lead to two deaths.

Blood alcohol levels were recorded in the documentation reviewed for four of the 21 workers who died as a result of fire injury. Three of these had nil blood alcohol present the fourth case was documented in the coroner's record as being "intoxicated".

Numbers were insufficient to detect any trends, although there appears to be an overall decline in fatality numbers during the study period (Figure 1). The higher number of work-related fire-injury fatalities in 1985 is a result of the multiple-fatality-mining incident of that year.

Figure 1. Number of work-related fatal fire injuries of workers per year, New Zealand 1985-1997 (N=21)



Data source: NZHIS Mortality data

6.1.2 Age, gender, and ethnicity

Table 3 displays the frequency of deaths by age groups. The categories of age groups chosen reflect the age distribution of fatal work-related fire injury among workers. The 21 work-related fire-injury deaths of workers aged 15 years and over, occurred

predominantly in the 20 to 24, and 35 to 39 year age groups. Due to the relatively low numbers of fatalities in this study age standardised mortality rates were not calculated.

Table 3. Numbers of fatalities of work-related fire injury among workers aged 15 years and over, by age group. New Zealand 1985-1997 (N= 21)

Age group (years)	Total deaths	Percentage of deaths
15 - 24	5	24
25 - 34	6	28
35 - 44	6	29
45 +	4	19
Total/Overall	21	100

Data sources: NZHIS Mortality data

All workers who died from work-related fire injury were males.

Ethnicity was recorded on only two of the fatality cases in the NZHIS mortality dataset reviewed and was therefore not analysed.

6.1.3 Industry

Although the manufacturing industry had the highest frequency of work-related fatal fire injuries of workers in New Zealand for the study period, the rate of fatal fire injury per 100,000 workers was highest for the agricultural (included fishing) industry (Table 4). Rates were not calculated for the mining industry as all of the fatalities occurred in one incident.

Table 4. Industry of fatalities as a result of work-related fire injury among workers aged 15 years and over in New Zealand 1985-1997: Rate (95% confidence interval) for major industry groups (ANZSIC 1996¹⁸)

Industry	Total deaths	Rate per 100,000	95% CI
Agriculture :	7	0.4	0.09 – 0.6
-fishing:	5		
-farming	2		
Manufacturing:	9	0.3	0.09 – 0.4
(included chemical manufacturing, aluminium factory, brewery, panel-beaters, truck wreckers etc)			
Mining	4	**	
Other	*	*	

** = Rate not calculated as all fatalities occurred in one incident.

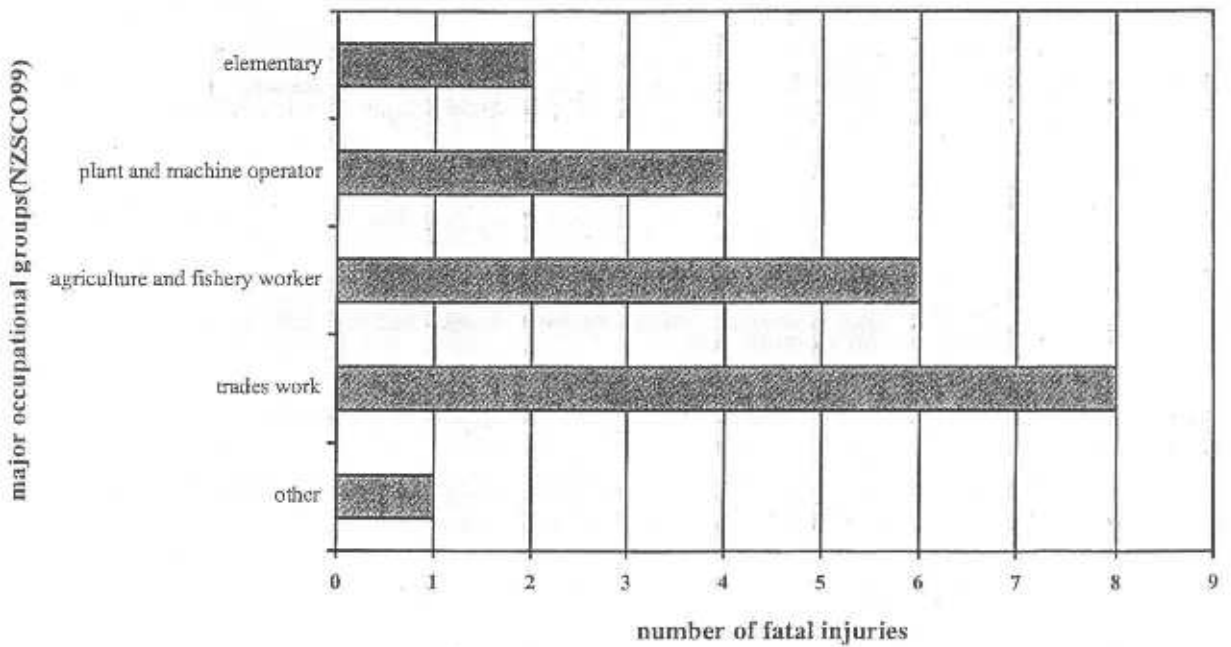
* = Less than 3 deaths per industry.

Data Sources: NZHIS Mortality dataset, and Statistics New Zealand

6.1.4 Occupation

The occupation with the highest frequency of fatal fire injuries to workers was trades workers (n= 8) (6 of whom were welders), followed by agriculture (included fishing) workers (Figure 2). Rates per 100,000 workers per occupation were not calculated due to changes in coding of occupations during the study period resulting in a lack of comparable denominator data.

Figure 2. Occupation of fatal work-related fire injury cases – major occupational groups (NZSCO99 ¹⁹, New Zealand 1985-1997 (N = 21))

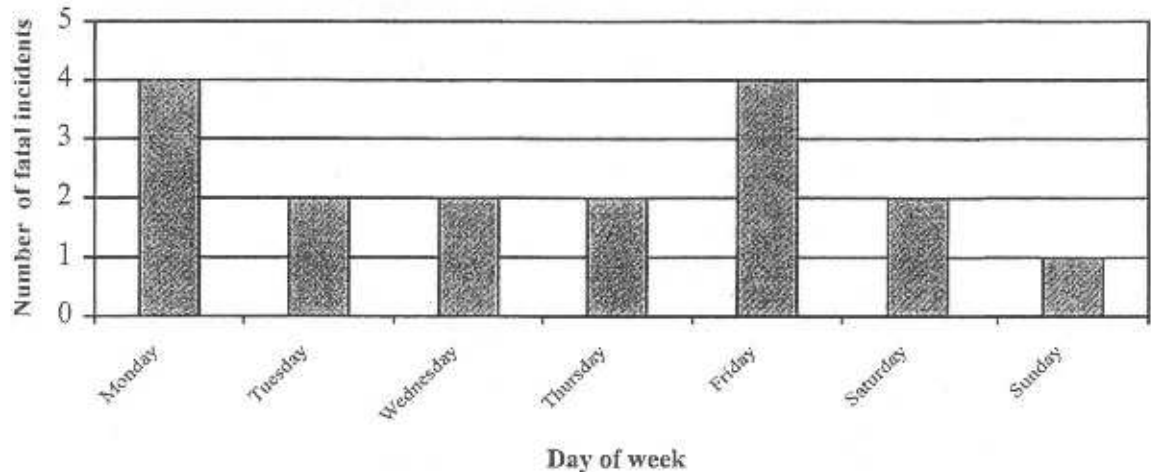


Data Sources: NZHIS Mortality dataset, Statistics New Zealand, and the Department of Courts

6.1.5 Fire incident characteristics

There was little variation in the day of the week when incidents occurred (Figure 3).

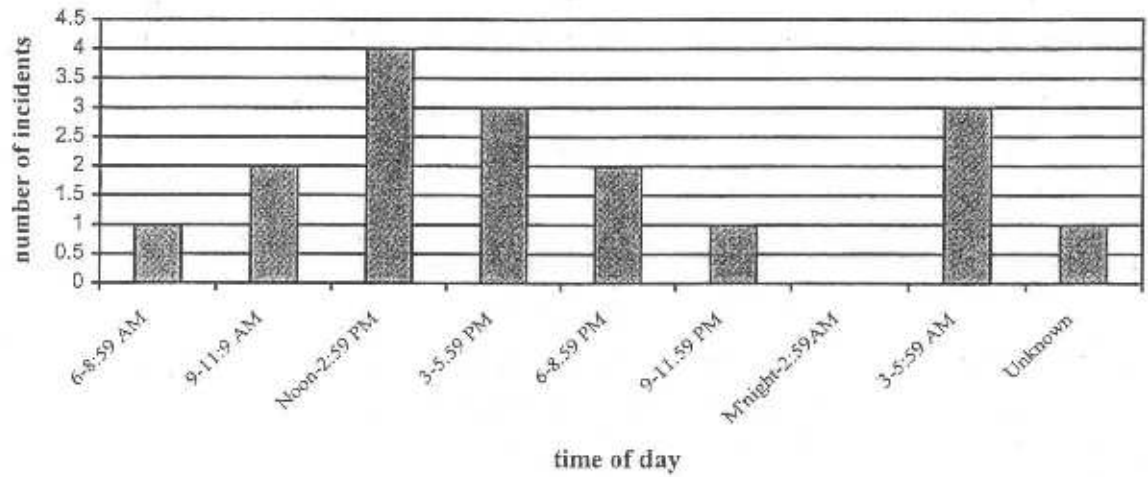
Figure 3. Fatal work-related fire incidents of workers: day of week of occurrence. New Zealand 1985-1997 (N= 17)



Data Source: The Department of Courts, and the New Zealand Fire Service

The time when the work-related fatal fire incidents occurred was available for 16 of the 17 incidents (Figure 4). Despite the low study numbers, incidents appear to occur most predominantly in the mid to late afternoon, with 41 percent occurring between midday and 6:00 p.m. Two of the three incidents that occurred between the hours of 3:00 a.m. and 5:59 a.m. involved fires breaking out in sleeping quarters of off duty workers (one fishing boat fire, and one motel fire).

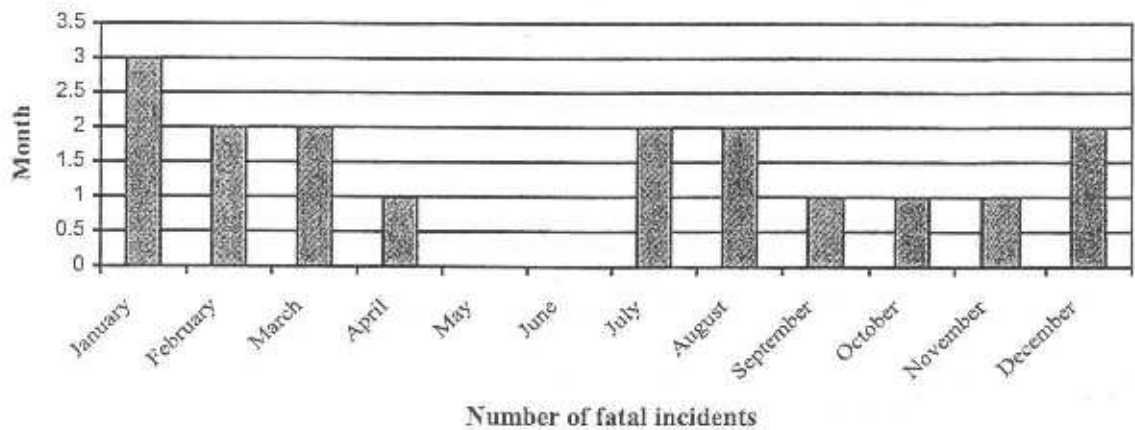
Figure 4. Fatal work-related fire incidents of workers: time of day of occurrence, New Zealand 1985-1997(N= 17)



Data Sources: The Department of Courts, and the New Zealand Fire Service

The frequency distribution of incidents by months is shown in Figure 5.

Figure 5. Fatal work-related fire incidents of workers: month of occurrence, New Zealand 1985-1997 (N= 17)



Data Sources: The Department of Courts, and the New Zealand Fire Service

Table 5 shows the location where fatal work-related fire injury incidents occurred. Fifty-two percent of fatal work-related fire injury incidents occurred in an *industrial place*, 24 percent on *fishing boats*, and 12 percent occurred on *farms*. Of the four fatal incidents occurring on fishing boats, in three the source of ignition was electrical malfunction and the fourth was the result of a lighter igniting liquid petroleum gas (LPG).

Table 5. Location where fatal work-related fire injury incidents occurred, New Zealand 1994/95 - 1998/99 (N= 17)

Location	Number	Percentage of total cases
Industrial Site	9	52
Farm	2	12
Mine/quarry	1	6
Other:	5	30
-motel	1	
-fishing boat	4	
Total	17	100

Source: NZHIS morbidity dataset

The source of ignition was able to be determined in 16 of the 17 fatal work-related fire incidents. The most striking finding was the high proportion (41 percent) of fatal incidents in which a welding torch was the source of ignition (Table 6). Incidents in which welding torches were the source of ignition of the fire were also responsible for the highest proportion of work-related fire injury deaths in the study (33 percent).

Table 6. Presumed source of ignition in work-related fatal fire incidents, New Zealand 1985 - 1997 (N = 17)

Presumed source of ignition	Number of incidents (%)	Number of fatalities (%)
Welding torch	7 (41)	7 (33)
Electrical malfunction:	3 (18)	4 (19)
Lighter/matches	2 (12)	2 (10)
Spontaneous combustion:	2 (12)	5 (24)
-1 fumes in a coal mine		
-1 pool chemicals combined with oil or other contaminant		
Other	2 (12)	2 (10)
Unknown	1 (5)	1 (4)
Total	17 (100)	21 (100)

Data Source: The Department of Courts, and the New Zealand Fire Service

In eleven of the 17 fatal work-related incidents the ignition source combined with a volatile substance to cause the fire incident (Table 7). Solvent based-products were the most common volatile substance identified.

Table 7. Volatile substances involved in fatal work-related fire injury incidents, New Zealand 1985-1997.

Volatile substance	Number of incidents
Solvent based products	4
Petrol / oil	3
LPG	2
Ammonia	1
Unknown volatile substance	1
Total	11

Data Source: NZHIS Mortality dataset, Department of Courts, and the New Zealand Fire Service

6.2 Work-related fire injury bystander deaths 1985 - 1997

6.2.1 Results

There were 19 work-related fire injury bystander deaths identified from the NZHIS mortality dataset during the period 1985-1997. The 19 deaths occurred predominantly in the 65 years and over age group (Table 8). The categories of age groups chosen reflect the age distribution of fatal work-related fire injury among bystanders. Nearly three quarters (74 percent) of cases were aged 60 years or older. Due to the relatively low numbers of bystander fatalities in this study, mortality rates were not calculated. The rate of fatal work-related fire injury of bystanders for the population of New Zealand was 0.05 per 100,000 persons per year (95% CI 0.03 – 0.08).

Table 8. Numbers of fatalities of work-related fire injury among bystanders aged 15 years and over, by age group. New Zealand 1985-1997 (N=19).

Age group (years)	Total deaths	Percentage of deaths
15 - 29	3	16
40 - 64	3	16
65+	13	68
Total/Overall	19	100

Data sources: NZHIS Mortality data, and Statistics New Zealand

Fifty-seven per cent of bystanders who died from fire injury were male.

Blood alcohol levels were recorded in the documentation reviewed for four of the 19 bystanders who died as a result of work-related fire injury. Three of these had nil blood alcohol present the fourth had a blood alcohol level of 32mg of ethyl alcohol per 100 mls of blood.

The 19 bystander deaths occurred in a total of 11 incidents giving a fatality rate of 1.7 deaths per incident. The vast majority of these incidents occurred in rest homes (n=7) (Table 9). Half of the rest home fires resulted in multiple fatalities.

Table 9. Location where work-related fatal bystander fire incidents occurred, New Zealand 1985 - 1997 (N = 11)

ICD-9-CM Location code	Number	Percentage of total cases
Residential institution :	8	73
rest home 7		
hospitals 1		
Public building (includes hotel/motel))	3	27
Total	11	100

Source: NZHIS mortality dataset, the Department of Courts, and the New Zealand Fire Service

Electrical malfunction, or smoking materials were the two leading presumed sources of ignition in fatal work-related bystander fire incidents, each responsible for 33 percent of fire incidents (Table 10). Fires with electrical malfunction as the source of ignition were responsible for 36 per cent of fatal work-related bystander fire incidents and 37 percent of bystander fatalities.

Table 10. Presumed source of ignition in work-related fatal bystander fire incidents, New Zealand 1985 – 1997 (N = 11)

Presumed source of ignition	Number of incidents (%)	Number of fatalities (%)
Electrical	4 (36)	7 (37)
Smoking materials	4 (36)	4 (21)
Lighter/matches	1 (10)	3 (16)
Unknown	2 (18)	5 (26)
Total	11 (100)	19 (100)

Data Sources: the Department of Courts, the New Zealand Fire Service

No reference was made in the documentation reviewed regarding volatile substances as a factor in any of the bystander work-related deaths.

It should be noted that two potentially important categories of work-related bystander fire injury deaths were not included in this study. These categories were deaths of persons aged below 15 years of age, and work-related deaths in traffic crashes on public roads.

6.3 Work-related nonfatal fire injury of workers 1995 - 1999

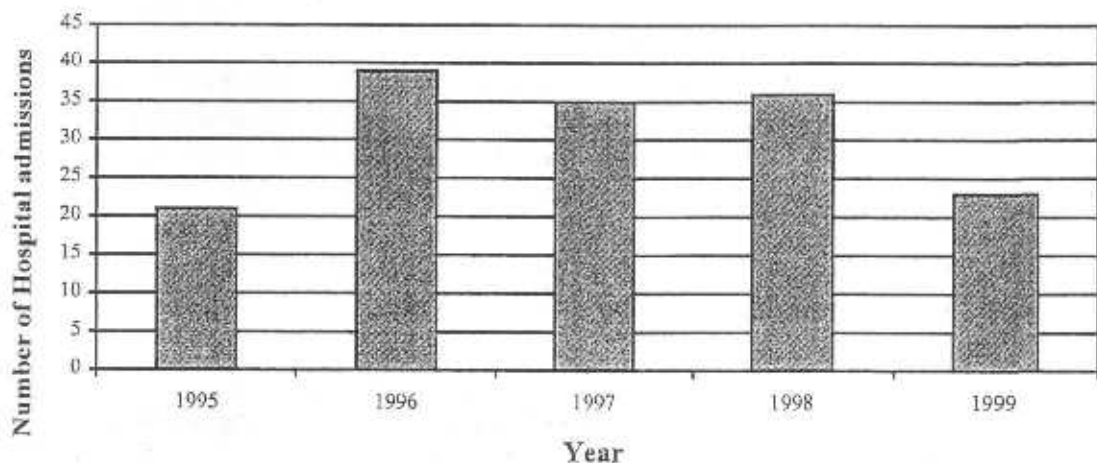
6.3.1 Hospitalisations 1995 – 1999

During the five-year period 1995 to 1999, this study identified 154 cases admitted (primary admissions only) to New Zealand public hospitals as a result of work-related fire injury. It is estimated from information contained in the accident descriptor field of the NZHIS dataset, that at least 24 percent of the work-related fire injury hospitalisation cases were bystanders. On average there were 30.8 cases per year.

The overall hospitalisation rate for work-related fire injury among 15 to 64-year olds was 1.0 per 100,000 person years (95% CI 0.9- 1.2). The overall hospitalisation rate for the study period was calculated for cases aged 15 to 64 years only (1996 working population census data, was used as the denominator data). The 65 and over age group was excluded from these calculations as 75 percent of incidents occurred in rest homes and using working population census data would have given a skewed rate due to the low numbers in the denominator.

Frequency of work-related fire injury hospitalisations during the five-year period are shown in Figure 6.

Figure 6. Number of work-related fire injury hospitalisations per year, New Zealand 1995 – 1999 (N=154)



Data Source: NZHIS Morbidity dataset

Work-related fire injury hospitalisations occurred predominantly in the 20 to 24 year age group during the study period (Table 11).

Table 11. Numbers of work-related fire injury primary hospital admissions per year, by age group. New Zealand 1994/95-1998/99 (N=154)

Age group (years)	Total number	Percentage of total
15 - 19	14	9
20 - 24	26	18
25 - 29	19	12
30 - 34	17	11
35 - 39	19	12
40 - 44	15	10
45 - 49	11	7
50 - 54	11	7
55 - 59	8	5
60 +	14	9
Total/Overall	154	100

Data sources: NZHIS Morbidity data, and Statistics New Zealand

Eighty-four per cent of the work-related fire injury hospitalisations were male.

Ethnicity of hospitalisation cases is displayed in Table 12.

Table 12. Ethnicity of work-related fire-injury primary hospital admissions: Number of admissions, New Zealand 1995-1999 (N= 154)

Ethnic group	Number	Percentage of total	Percentage of total working population in 1996 Census
European:	115	75	80
NZ/European = 106			
Other European = 9			
Other/Asian/unknown	28	18	5
NZ Maori	8	5	11
Pacific Island	3	2	4
Total	154	100	100

Data Source: NZHIS Morbidity dataset, and Statistics New Zealand

No data were available in the dataset reviewed regarding the occupation or industry that cases were involved in at the time of injury. However seven firefighters (two-volunteer) were identified from the free text descriptor field of the NZHIS mortality dataset. This field is non-mandatory and consequently inconsistently completed, therefore the figure of seven is unreliable, as there may have been more firefighters injured but reference to that fact was not made in the free text field.

Table 13 shows the location where work-related fire injury resulting hospitalisation occurred. Forty-six percent of work-related fire injuries resulting in hospitalisation occurred in *industrial places* and 14 percent occurred on *farms*. Fourteen percent occurred in *residential institutions* (rest home 17, hospital 1). There were two cases where the location was coded as *home* when in fact the injured was a fireman attending a house fire. The ICD-9-CM location codes used in NZHIS data during the

study period did not have the facility to code instances when a person was injured whilst working for pay in a *non work-environment* such as the above example. This issue will be discussed further in section 7.1.2 of this report.

Table 13. Location where work-related fire injury resulting in hospitalisation occurred, New Zealand 1994/95 – 1998/99 (N= 154)

Location	Number	Percentage of total cases
Industrial Site	70	45
Farm	21	14
Residential Institution:	18	12
-rest home:	17	
-hospital:	1	
Public Building	16	10
Home/Mine or Quarry/ Place of recreation or Sport	5	3
Unknown	24	16
Total	154	100

Source: NZHIS morbidity dataset

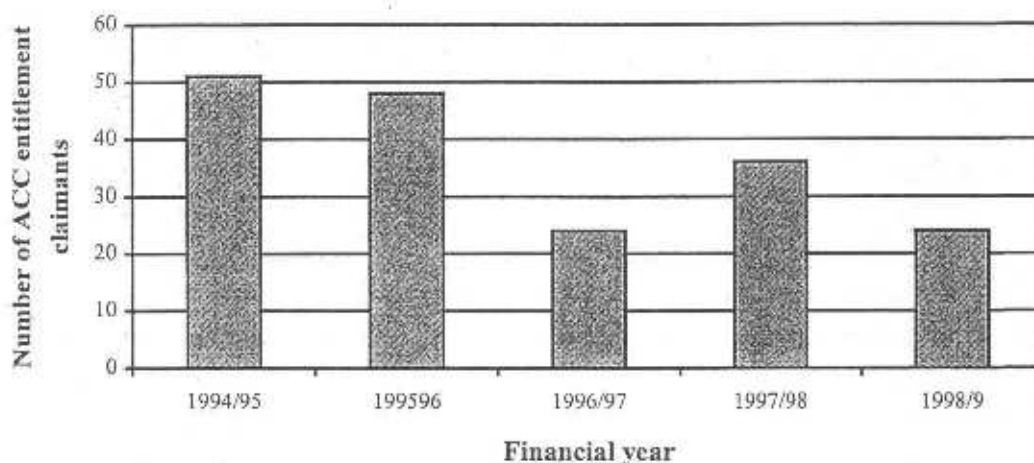
There was insufficient information in the dataset reviewed to establish what were the cause of ignition in fire-injuries requiring hospitalisation. However it was ascertained from information contained in the accident descriptor field of the NZHIS dataset, that at least 24 percent of injuries involved a welding torch.

In addition it was estimated that 24 percent of the work-related fire injury hospitalisation cases were bystanders.

6.3.2 Accident Compensation Corporation entitlement claimants 1994/95 – 98/99 financial years

During the financial period 1994/95 to 1998/99 inclusive, this study identified 183 ACC entitlement claimants aged 15 years or older who sustained a work-related fire injury in New Zealand (excludes bystander work-related fire injuries). On average there were 36.6 claimants per year. The overall rate for work-related fire-injury ACC entitlement claims for the study period was 1.3 per 100,000 person years (95% CI 1.1 – 1.5). Frequency of ACC claimants with work-related fire injury is shown in Figure 7.

Figure 7. Number ACC entitlement claimants with work-related fire injury per financial year, New Zealand 1994/95 – 1998/99 (N=183)

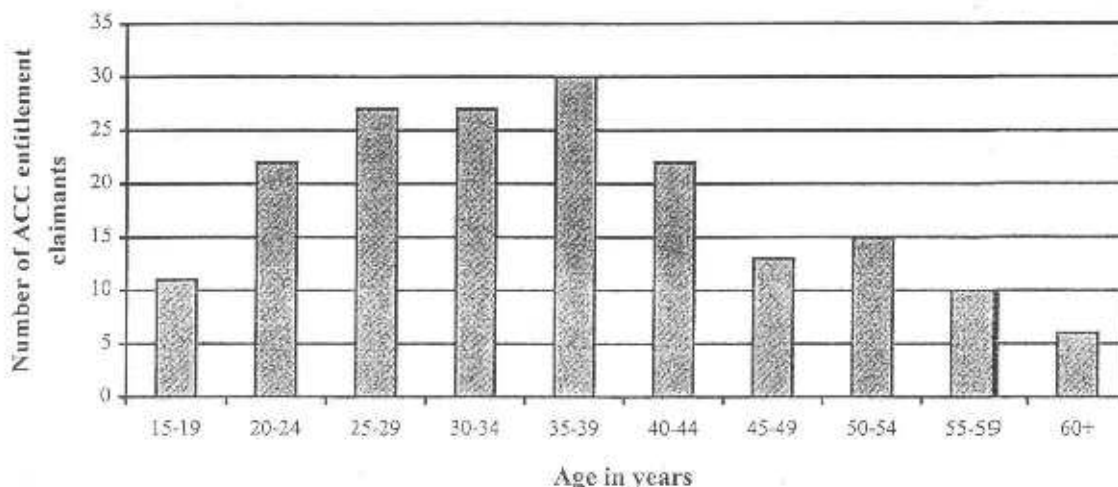


Source: Accident Compensation Corporation Entitlement Claims data

Eighty-seven per cent of the work-related fire injury claimants were male. No ethnicity data were reviewed for ACC Entitlement Claimants.

Figure 8 shows the age distribution of work-related fire injury ACC claimants by age group. The age distribution reflects that of the working population of New Zealand.

Figure 8. Age distribution of work-related fire injury ACC entitlement claimants in New Zealand 1994/95-1998/99 by age group (N= 183)



Source: Accident Compensation Corporation Entitlement Claims data

No data were reviewed regarding the occupation or industry that claimants were involved in at the time of injury.

The location where the injury occurred is shown in Table 14. Fifty-two percent of ACC entitlement claim injuries occurred in an *Industrial Place*, 26 percent in *commercial or service* locations, and nine percent on *farms*.

Table 14. Location where ACC entitlement claimants work-related fire injury occurred, New Zealand 1994/95 – 1998/99 (N = 183)

Location	Number	Percentage of total cases
Industrial Place	97	52
Commercial or Service Location	47	26
Farm	16	9
Other	20	11
Unknown	3	2
Total	183	100

Source: Accident Compensation Corporation Entitlement Claims data

No information was available from the data reviewed concerning the source of ignition in ACC Entitlement Claimant work-related fire injury cases.

7 DISCUSSION

This review of multiple data sources highlights some of the factors associated with fire injury in the work place setting to both workers and bystanders. In addition the study identifies some of the difficulties associated with the identification of work-related injury cases in New Zealand. International comparisons of results from this study were unable to be made due to an absence of English language published studies examining work-related fire injury.

The human and financial cost associated with burn injury is well recognised. This report has demonstrated that fire-injury in the workplace remains a relatively rare event, however the potential for an incident to progress to an uncontrolled fire situation always exists. In a press release in August 2001 Occupational Safety and Health Service General Manger, Bob Hill said *'No job is worth dying for'*. He goes on to say *'it is only through the combined efforts of employees, employers, industry organisations and OSH that there will be a significant drop in death and injury at work'* 22.

7.1 Study implications

7.1.1 Intervention strategies

Raising awareness

Both individual behaviour and physical / social environmental factors play a role in the causation of work-related fire injury. Interventions to reduce the incidence and impact of work-related fire injury must address all of these areas. Raising awareness of fire-injury risk among employers and employees, and providing information about appropriate strategies to reduce the risk are key prevention initiatives.

Recommendations

- 1) That the New Zealand Fire Service Commission ensures that the findings of this study are disseminated among agencies and individuals concerned with the wellbeing of New Zealand workers, including Occupational Safety and Health; Accident Compensation Corporation; Public Health service providers; industry groups; and training providers.
- 2) That the New Zealand Fire Service Commission liaises with agencies and individuals concerned with the wellbeing of New Zealand workers to incorporate fire safety strategies in individual and population based health promotion strategies. Such strategies will include promoting awareness of fire safety precautions in the workplace; and ensuring staff and management have adequate training in actions to take in the event of a fire, and in evacuation procedures. Such groups will include Occupational Safety and Health; Accident Compensation Corporation; Public Health service providers; industry groups; and training providers.

Agricultural Industry

Agriculture (includes fishing) was the *industry* with the highest mortality rate for work-related fire-injury, and was the *occupation* with the second highest number of

fire-related fatalities in this study. No industry or occupation information was reviewed for hospitalisation or ACC Entitlement data.

Farm was the location where fire-injury occurred in 14 percent of hospitalisations, nine percent of ACC entitlement claims cases, and six percent of work-related fire fatalities. Of the 21 work-related fire injury hospitalisations nine were as a result of outside fires, these included scrub fires, rubbish fires, and "burn offs", an additional nine cases were as a result of petrol burns either directly to the body or from ignited clothing. Twenty-seven percent of the hospitalisation cases were aged 15 to 24 years of age.

Three of the five fatalities that occurred on fishing boats were of Asian descent. In three of the four fire incidents on board fishing boats electrical malfunction was identified as the most probable source of ignition.

The comparatively high rates of work-related fire injury morbidity and mortality within the agricultural sector in this study are supported by those of a 10-year study of work-related fatal injury in New Zealand. The study reported the agriculture (including forestry and fishing) industry as having the second highest male work-related injury mortality rate⁸. OSH investigated 40 work-related deaths in New Zealand during the 2000/2001 financial year, 42 percent were in the agricultural sector²². Feyer *et al.* compared work-related fatal injury statistics in New Zealand, the United States and Australia, they reported New Zealand as having the highest rate of fatally injured persons in the agriculture, forestry and fishing industry, and the second highest rate of fatally injured agriculture, forestry and fishing workers of the three countries²³.

The findings of this study reinforces the results of other studies in New Zealand highlighting the need for further investigation into the nature of agricultural (including fishing) industry occupational injuries in New Zealand and the ongoing development of appropriate injury prevention strategies.

Recommendation

- 3) That the New Zealand Fire Service Commission collaborates with agencies involved in the setting of work place standards and practices to undertake further research to investigate the prevalence and causative factors of fire-related injury within the agricultural (including fishing) industry in New Zealand. And that the information obtained be used in the development of targeted injury prevention initiative sat both an individual and population level to reduce the risk of fire injury within the agricultural industry.

Welding

The activity of welding appears to carry an increased risk of work-related fire injury in this study, responsible for 41 percent of work-related fatal fire injury and 20 percent of work-related fire injury hospitalisations in this study. A number of the incidents involved the use of welding torches either cutting or resting on containers that had in the past contained combustible materials. The New Zealand Labour Department published a booklet in 1988 entitled 'Hot Work' detailing safety procedures to be undertaken when welding containers that have previously contained combustible materials²⁴. It would be interesting to establish how many people who operate welding torches are aware of the existence of or have access to this booklet.

Recommendation

- 4) That the New Zealand Fire Service Commission collaborates with agencies involved in the setting of work place standards and practices to undertake further research to investigate the prevalence and causative factors of welding injuries in New Zealand. And that information obtained be used in the development of targeted injury prevention initiatives at both an individual and population level to reduce the risk of welding injuries.

Slater *et al.* undertook a study to assess the changes in work practice of welders after having shown in a previous study that welders working without local exhaust ventilation systems experienced an acute decrease in lung function. They reported that providing results to employers and participants was not a definitive vehicle for change in work practice or environment. They suggest spending time with workers and management to find out what evidence they need in order to change work practices would be more beneficial²⁵. Gas welding activities are undertaken by a number of occupations in a variety of industry settings. In addition gas welding can be used for recreational purpose in the home setting. Therefore injury prevention initiatives require a multifaceted evidence-based approach to reach all potential users of gas welding torches.

Bystanders

The concept of not needing to be working to be affected by work place practices or environments has been addressed in this study by the inclusion of work-related bystander deaths. However the exclusion of children aged less than 15 years from bystander deaths will have underestimated the magnitude of this issue, as in the home and farm environments children may be exposed to the effects of work-related activities. In addition on farms children may be involved in informal participation in work that may place them at risk for fire-related injury. The National Occupational Health and Safety Commission Work-related Traumatic Fatalities in Australia 1989-1992 study reported nearly half of all workplace bystander deaths were children aged less than 15 years of age²⁶.

Recommendation

- 5) That the New Zealand Fire Service Commission include bystander casualties in all age groups in any future work-related fire injury epidemiological research.

Eighty-three percent of bystander deaths, and 14 percent of work-related fire injury hospitalisations occurred in either a rest home or a hotel or motel. Narayanan *et al.* in a New Zealand study, reported rest homes as having the highest risk of fatality per 100 fires of all occupancy types²⁷. Half of the bystander rest home fire incidents resulted in multiple fatalities. Duncanson *et al.* in a report to the New Zealand Fire Service on fatal fire incidents among the elderly, stress the propensity for uncontrolled fires in rest homes, and highlights the need for statutory structural and operational fire safety practices in residential institutions²⁸. The report makes the following recommendation that also pertains to this study.

Recommendation

- 6) That the New Zealand Fire Service Commission liaises with all Local Authorities to ensure rest homes, hotels and motels achieve compliance with the building code; promote awareness of fire safety precautions among operators of such businesses; and ensure staff have adequate training in evacuation procedures and fire safety issues.

7.1.2 Data quality

The NZHIS datasets used to identify fatality and public hospitalisation cases in this study, are the most reliable and comprehensive mortality and morbidity datasets available in New Zealand. ICD-9-CM was the coding system utilised by NZHIS for during the study period. A number of factors contributed to the difficulty in identification of work-related injuries in this study including inconsistent use of occupation codes; ambiguity of ICD-9-CM place of occurrence code; and inconsistent use of free text descriptors.

The use of occupation codes is not mandatory for injury cases, but interestingly is mandatory for cancer cases. Work-related injuries were identified either by the place of occurrence of injury equalling a place of work (i.e. farm/industrial site/mine or quarry/public building/residential institution), or from the free text descriptor describing a work-related activity. An example of ambiguity of place of occurrence coding in NZHIS in this study data arose from the scenario of a fireman injured whilst attending a house fire, the place of occurrence was identified as *home* in the dataset, when in reality it was his place of work. Similarly people who work for an income from home were excluded from the study, as it was too hard to identify this group from data contained in the NZHIS minimum dataset. ICD-10 codes replaced ICD-9 codes in 2000, one of the key advantages of the upgraded codes for injury research is the inclusion of a broader range of external cause of injury codes. Most significant for work-related injury is the inclusion of mandatory Y93 codes, which denote the type of activity being undertaken at the time of injury, for example the code Y93.2 is *while working for income*. The addition of Y93 codes will facilitate the easy identification of work-related injury cases for future occupational research.

A change from voluntary to mandatory use of NZSCO codes in NZHIS morbidity and mortality datasets (as is the case with cancer cases), would aid in the identification and analysis of all injury causes and assist in the identification of at risk occupations for injury, thus enabling the development of targeted injury prevention activities.

Recommendation

- 7) That the New Zealand Fire Service Commission is involved in future consultative process supporting a change from voluntary use of NZSCO codes in NZHIS datasets to mandatory, to assist in the identification of work-related injury cases for future epidemiological research.

The limited use of free text descriptor or narrative fields in NZHIS data is well documented²⁹⁻³¹. Narrative fields provide valuable additional information that is missed when a data capture system relies solely on codes. For example the identification of specific work-place practices may be difficult if relying on occupation codes, for instance someone who undertakes welding activities could be involved in any one of the following occupations trades and work; plant and machinery; or agriculture. In this instance narrative fields would enable health information coders to state that welding was occurring at the time of injury.

When used appropriately the use of narrative fields in NZHIS data are a valuable adjunct to ICD-CM external causes of injury codes, providing rich information that can be used to clarify causative agents, circumstances surrounding injury, and injury prevention information such as use of protective clothing or equipment. A change to mandatory usage of narrative fields would increase the amount of useful routinely collected information available for injury research in New Zealand.

Recommendation

- 8) That the New Zealand Fire Service Commission is involved in future consultative process supporting a change from voluntary to mandatory use of narrative fields NZHIS datasets for injury cases..

The exclusion of place of occurrence of injury as home, traffic-related fire injury, and people under the age of 15 years will have resulted in an underestimation of the magnitude of work-related fire injury resulting in hospitalisation or death in New Zealand. The introduction of the ICD-10 *activity* codes will aid in the identification of home and traffic work-related injury cases in future injury research.

This study also is limited by the use of primary, public hospital admission data, as it is acknowledged that many work-related injuries do not require hospitalisation^{11, 13}. The inclusion of ACC entitlement claimant data added an additional dimension to the data, however the absence of a common coding systems used by both ACC and NZHIS make comparisons between the two sources difficult.

New Zealand Fire Service data were a useful adjunct to NZHIS data for work-related fatality cases, providing detailed information on the circumstances surrounding fire incidents. However for non-fatal fire work-related injuries it was not possible to establish the exact geographical location of the work-related incident that resulted in a fire injury from the data sources reviewed and therefore not possible to establish if the fire service had attended the incident. Thus fire service data were not used in non-fatal incidents.

Coronial records varied in detail surrounding circumstances of injury. The lack of a standardised coronial system for categorising cause of death and circumstances surrounding cause of death is a well documented hindrance for injury prevention research^{29, 32}. In New Zealand the establishment of a national coronial system would benefit all injury causes across all age groups, by ensuring injury deaths are investigated in a systematic manner and information obtained used to make informed prevention recommendations, and as a valuable reliable source of injury mortality data.

Recommendation

- 9) That the New Zealand Fire Service Commission is involved in any future consultative process to establish a national coronial system in New Zealand.

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