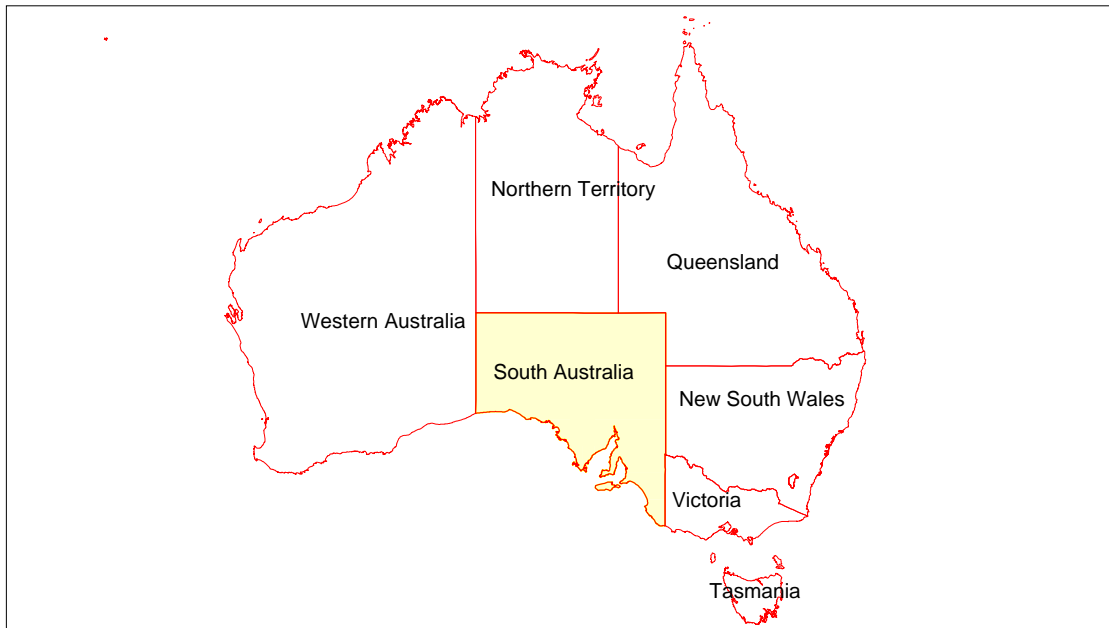


The Health and Safety of South Australian Farmers, Farm Families and Farm Workers



Richard Franklin
Lyn Fragar
Andrew Page

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Executive Summary

Title: The Health and Safety of South Australian Farmers, Farm Families and Farm Workers

Authors: Richard Franklin, Lyn Fragar & Andrew Page

ISBN: 1 876491 54 X

This report provides a profile of injury and death due to farm related work activity and other health issues current to the farming community of South Australia. South Australia is the fifth largest state in Australia, with a population of 1,427,936 in 1996. In 1990-1991, Australian Bureau of Statistics data recorded the farm population to be 45,875, residing on 14,482 agricultural holdings. Therefore the farming population represents approximately 3.2% of the state population. The most commonly produced commodities include sheep and lambs, cereal crops for grain, and meat cattle.

South Australian farmers have a death rate 50 % higher than the Australian male rate for the period 1990-1993. For the period 1991-1996, there was a total of 55 farm injury related deaths, of which 20 % were children aged less than 15 years. These data suggest that on average there are nine deaths on all South Australian farms per annum. *Machinery in operation* was the largest external cause of death, with *mobile farm machinery/plant* and *tractors* predominating. Children aged less than 15 years accounted for 11 deaths in South Australia, of which five involved *machinery in operation*.

Injuries are also described in terms of workers compensation claims. Australian agriculture pays higher insurance premiums in comparison to other industries. South Australia had 962 workers compensation claims for the period 1995/6-1997/8. On average this represents approximately 320 claims per annum. *Farm hands/assistants* and *shearers* represent the largest occupational groups seeking compensation. The largest numbers of claims involve *sprain and strain injuries* and *muscular stress while handling objects other than lifting*, with *upper extremities* of the body being predominantly involved. The majority of claims were by people aged between 20-49 years.

South Australian Ambulance data pertaining to farm injury are also provided, however the data includes injuries sustained in the forestry and mining industries and therefore conclusions are limited. This database describes 349 cases of injury where the location was agriculture, forestry, or mining, the majority of which were industrial or work related. The average age of cases was 43 years, with the most common injuries being *limb* and *hand* injuries. Primary causes were predominantly *blunt trauma*, *falls*, *crush injuries* and *penetrating injuries*.

Admissions data from South Australian hospitals was also used to further establish patterns of farm related injury. Using a selection of E-Codes identified by Farmsafe Australia for the purposes of monitoring farm injury, there were 447 relevant injuries in 1996. The largest numbers of injuries were due to *cutting and piercing*. Causes identified included *farm machinery*, *farm vehicles* (including ag-bikes), and *animals* (including horses). Of these injuries, 118 involved children less than 15 years of age, with most injuries resulting from *cutting/piercing* and *motorcycles*. Trends relating to the day and month of injury are also given.

Other local sources of data are outlined to provide further information about injury in the South Australian farming community. The Eyre Peninsula Division of General Practice data obtained from hospitals, GPs and physiotherapists, provides information relating to farm injury. In comparison to other studies, these estimates are relatively low. This may be attributable to collection methods and participation rates. For the period 1997-1998 there were 145 farm injuries reported. The main occupation represented was *farmer/farm owner*, predominantly from *sheep and grain* farms. The most common injuries reported were cuts and lacerations to *upper extremities*.

The Yorke Peninsula Division of General Practice recorded injuries through 7 medical practices. There were 75 people with agricultural injuries who presented to GP surgeries between 1996-1998. These injuries occurred predominantly to males aged 25-34 years, with the mechanism of injury being *fall/struck*. *Lacerations* to the *hand* were the most common injuries. For 58 of these cases, no hospitalisation was required. Collection methods suggest that this number is an under-representation of farm injuries in the Yorke Peninsula.

Other health issues pertinent to the South Australian farming community are also discussed. Issues pertaining to pesticide exposure, mixing, handling, storage and cleaning down are outlined. Respiratory disease is also addressed in terms of diagnosis, numbers in South Australia and the nature of exposure. The nature of noise injury is described including the nature and effects of exposure and current screening strategies. Finally, this section discusses zoonotic diseases that farmers and farm families are often exposed to. Rates, diagnostic issues and the nature of exposure are addressed for Q Fever, leptospirosis, hydatid infection and brucellosis.

Recommendations from the collected data, include issues relating to improved data collections and reporting. Key issues addressed in farm injury prevention programs in South Australia should include:

- Tractors
- Farm machinery
- Farm vehicles
- Motor cycles
- Animal handling
- Children
- Manual handling
- Ladders
- Falls
- Hand injuries
- Major agricultural industry groups.

Key Words:

Rural, farm, safety, injury, South Australia, health

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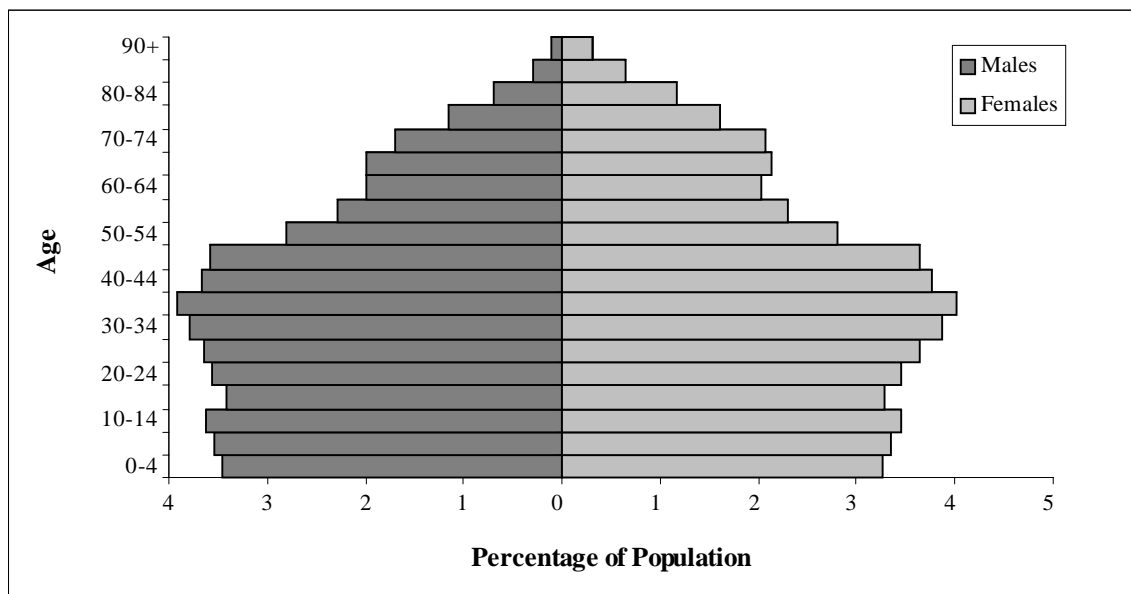
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Section 1: Introduction

South Australia is the 5th largest state within Australia (12.8% of Australia), comprising 984,377 km². This represents one eighth of the Australian continent and 3,700 km of coastline. The capital of South Australia is Adelaide. It is the driest state in Australia with 83% of the state receiving less than 250 mm of rain per annum (McLennan, 1997).

In 1996 South Australia had a population of 1,427,936, which is 8.0% of the Australian population. Within South Australia 702,215 (49.2%) are male and 725,721 (50.8%) are female (ABS 1998). In 1996 there were 33,107 people working in the agriculture, forestry and fishing industry. Of these 23,537 (71.1%) were males and 9,570 (28.9%) were females.

Figure 1.1 Population pyramid for South Australia age-sex distribution – 1996



Source: ABS, 1998

The 1993/94 agricultural census conducted by the Australian Bureau of Statistics collected information from 16,345 producers in South Australia, each having an estimated value of agricultural output (EVAO) greater than \$5,000. Although this does not represent all South Australian farms it is a very close approximation. Producers with more than one property can fill in separate forms for each farm or one form for all. The net effect of this is unknown (ABS, 1994).

Figure 1.2a Australian Agricultural Zone 1993-1994

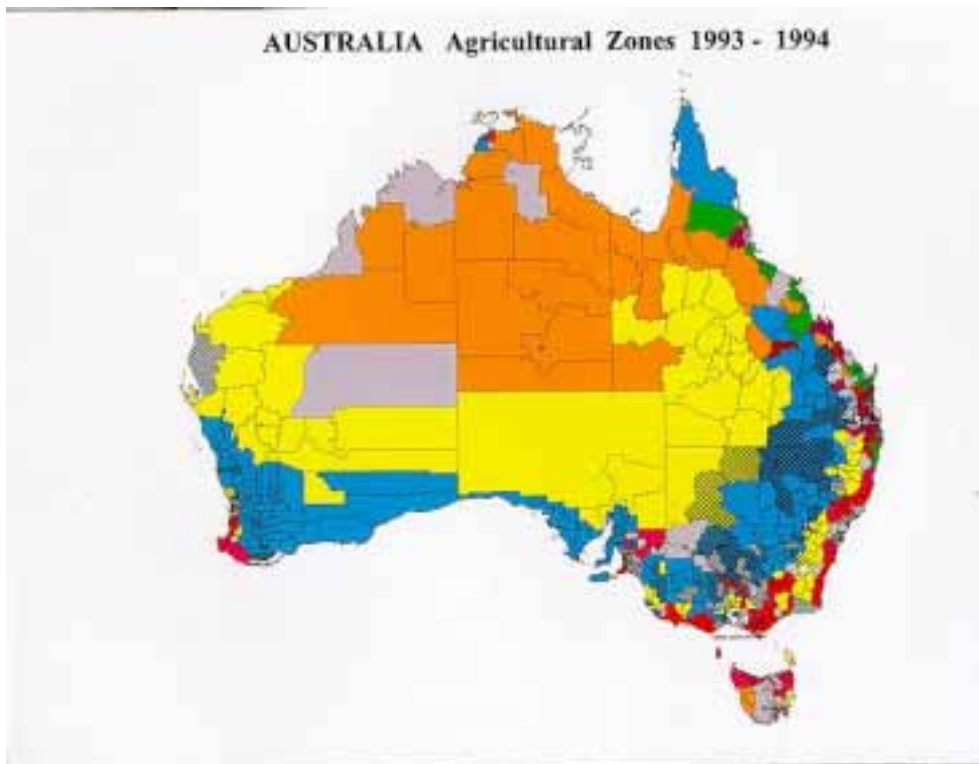
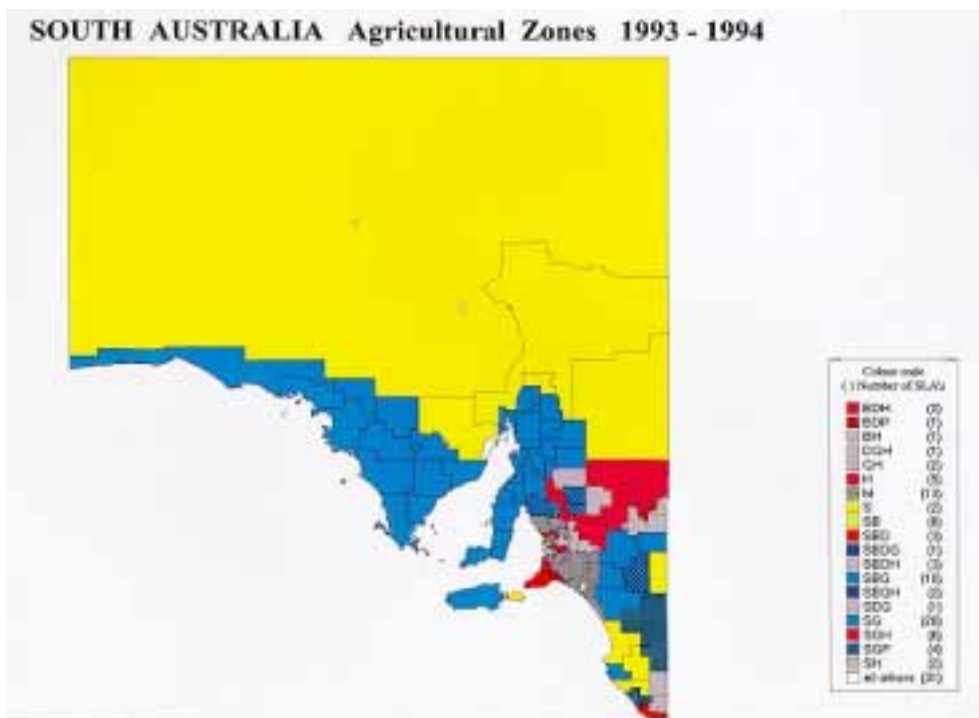


Figure 1.2b South Australian Agricultural Zones 1993-94



Source: Fragar, Gray, Franklin & Petrauskas, 1997

Codes used in figure 1.2:

B=Beef, C=Cane, D=Dairy, G=Grains, H=Horticulture, I=Irrigation, M=Mixed, P=Pigs, S=Sheep

Table 1.1 Total farming area ('000 ha) for Australia by states

Year	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
1990-91	4073	2063	2872	2933	5359	75	6	0	17382
1991-92	3846	2039	2302	2920	5216	76	5	0	16404
1992-93	3906	2258	2316	3073	5668	73	4	1	17297
1993-94	4209	2317	2394	2940	6100	78	5	0	18043
1994-95	3432	2296	2055	2991	6181	70	4	0	17030

Source: McLennan, 1997

Table 1.1 displays the total farming area in hectares by state by financial year. It can be seen that the amount of area farmed has remained the same from 1990-91 till 1994-95 with an average land use during this period of 2,971,400 ha.

In 1997 the Australian Agricultural Health Unit mapped all of Australia into agricultural zones based on production data for 1993/4 (Fragar, Gray, Franklin & Petrauskas, 1997). This can be seen for South Australia in Figure 1.2. The mapping of agricultural zones was accomplished through looking at statistical local areas (SLA) for South Australia and defining the major commodities in an SLA. In South Australia there are 130 SLA, of these 99 had significant agricultural activity. The five major groups of agricultural commodities were: Sheep/Grain (28 SLA's), Mixed (13 SLA's), Sheep/Beef/Grain (10 SLA's), Horticulture (9 SLA's) and Sheep/Beef (5 SLA's). Of the SLA's 50.7% (70) had significant sheep production, 40% (55) had significant grain production and 30.3% (30) had significant beef production.

Table 1.2 Establishments by industry, EVAO \$5,000 and over, at 31 March 1996 – ABS Statistics

ANZIC Code	SA	Percent	Australia	Percent
Plant nurseries	125	0.8	1,981	1.4
Cut flowers and flower seed	125	0.8	914	0.6
Vegetable growing	561	3.6	4,825	3.4
Grape growing	1,769	11.4	4,714	3.3
Apple and pear growing	130	0.8	1,266	0.9
Stone fruit growing	330	2.1	1,333	0.9
Kiwi fruit growing	0	0	53	0.04
Fruit growing nec	666	4.2	5,287	3.7
Grain growing	3,732	24.0	14,647	10.2
Grain-sheep/beef cattle farming	2,753	17.7	18,557	13.0
Sheep-beef cattle farming	1,084	7.0	11,040	7.7
Sheep farming	1,468	9.4	14,495	10.1
Beef cattle farming	1,203	7.7	34,971	24.4
Dairy cattle farming	825	5.3	13,971	9.8
Poultry farming meat	71	0.5	733	0.5
Poultry farming eggs	43	0.3	500	0.4
Pig farming	169	1.1	1,324	0.9
Horse farming	106	0.7	1,675	1.2
Deer farming	50	0.3	388	0.3
Livestock farming nec	216	1.4	2,911	2.0
Sugar cane growing	0	0	5,065	3.5
Cotton growing	0	0	973	0.7
Crop and plant growing nec	136	0.9	1,493	1.0
Total	15,562	100	143,116	100

The establishments by agricultural industry for South Australia are displayed in Table 1.2. As can be seen by both Figure 1.2 and Table 1.2, South Australia has a diverse range of agriculture.

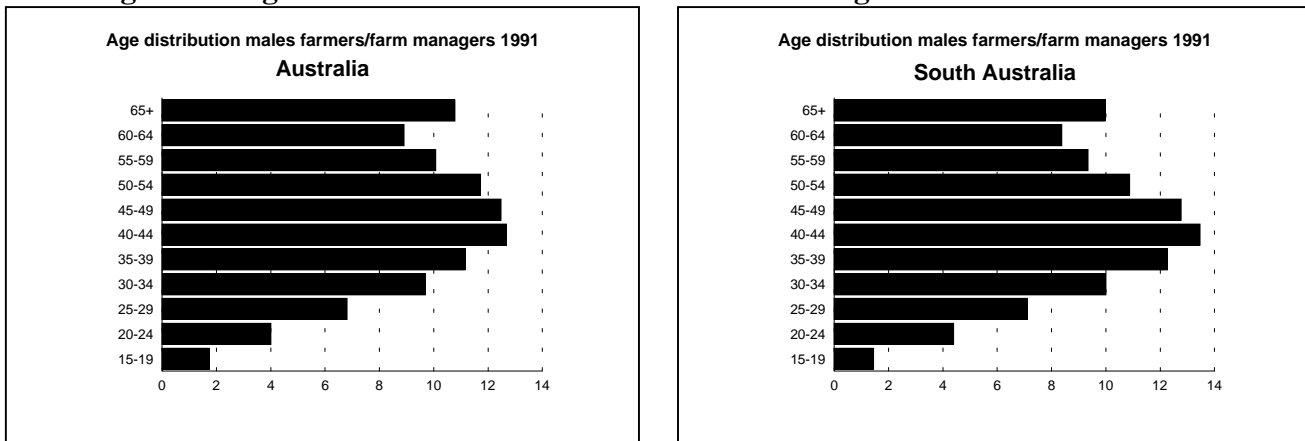
In the 1990/91 agricultural census conducted by the Australian Bureau of Statistics (ABS) resident farm population information was collected. In this census there was a total of 45,875 people residing on 14,482 South Australian agricultural holdings, of these 24,739 (53.9%) were males and 21,136 (46.1%) were females. This represents an average of three people per agricultural holding or 317 people per 100 farms. This is the latest information on resident population available in Australia produced by the ABS, as it has not included this question in subsequent censuses.

A survey conducted by the Australian Bureau of Agricultural and Resource Economics (ABARE) of farm managers / owner operators of broadacre and dairy farms in Australia in 1993/1994, found that the average age was 52 years and increasing (Garnaut & Lim-Applegate, 1998).

Figure 1.3 displays the age structure of male farmers/farm managers for Australia and for South Australia in 1991 (Fragar, Gray, Franklin & Petrauskas, 1997). Data are inadequate to display information about the age structure of female farmers/farm managers.

The proportion of farmer/farm managers over the age of 65 is of significance to health. The increasing age of farmers sees them continuing their agricultural activities, with a concomitant increase in the prevalence of chronic and degenerative medical conditions. Due to declining mobility and poorer health, further stresses (both physical and mental) are placed upon the farmer, and risk of injury is increased.

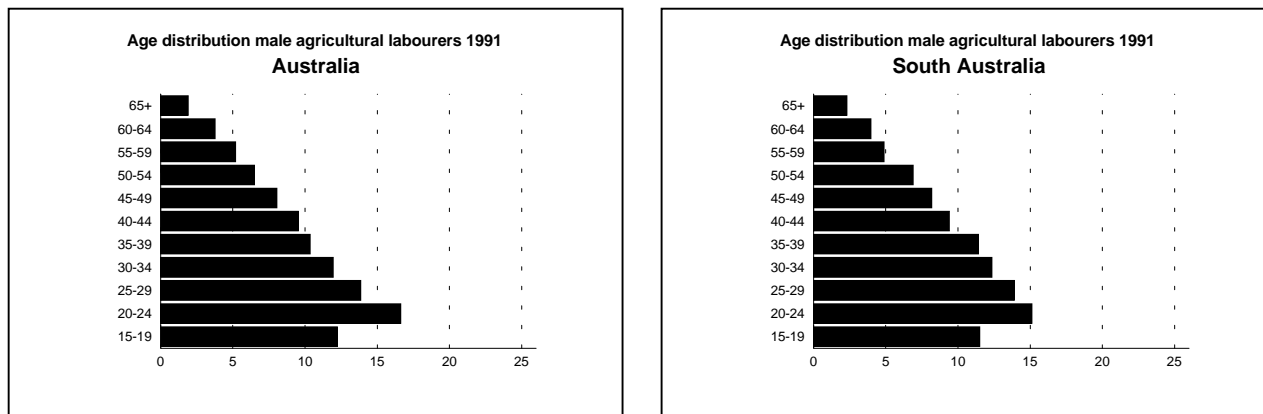
Figure 1.3 Age distribution of Farmers and Farm Managers 1991 - Percent



Source: Fragar, Gray, Franklin & Petrauskas, 1997

Figure 1.4 demonstrates the age structure of male agricultural labourers in 1991 for Australia and for South Australia as reported in the Population Census.

Figure 1.4 Age distribution of agricultural labourers 1991 – Percent



Source: Fragar, Gray, Franklin & Petrauskas, 1997

Agriculture was rated as the third most dangerous occupation in Australia in the years 1982-84 with a rate of 19.4 per 100 000 employed persons after “miners and quarry workers” (69.9/100 000 per year) and "transport and communication workers” (38.0/100 000 per year) (Erllich, et al 1993). For the years 1989-1992 it was found that agriculture (316 working deaths) had the second largest number of working deaths after transport and storage (374 deaths). It had the fifth highest rate after forestry and logging (93 deaths per 100,000 persons per year), fishing and hunting (86 deaths per 100,000 persons per year) (Driscoll & Mitchell, 1999).

Table 1.3 Farm related injury rates in Australia

Injury or poisoning leading to	Annual rate for farm injury	Comparison rates	Data Source
Death	19.4/100,000 employed 22/100,000 farm workers	8.1 per 100,000 Australian labour force	Erlich, et al 1993
Hospital admission	13,400 per 100,000 farmers (280 per 1,000 farms)		Harrison et al. 1989 Clarke and Wolfenden, 1991
Emergency Department presentation	339 per 1,000 farms [#] in Latrobe Valley		Valuri and Routley, 1994
Medical treatment, one day off work, 5 days restricted activity	200 per 1,000 farms in selected shires in New South Wales		Low and Griffith 1994
Five or more days off work	83 per 1,000 farms in selected shires in New South Wales		Low and Griffith, 1994

based on 705 farms as at 31/3/92 from the ABS

As shown in Table 1.3 the rate of injury on farm can vary from 8.3 per 100 farms to 33.9 per 100 farms depending on the severity of the injury.

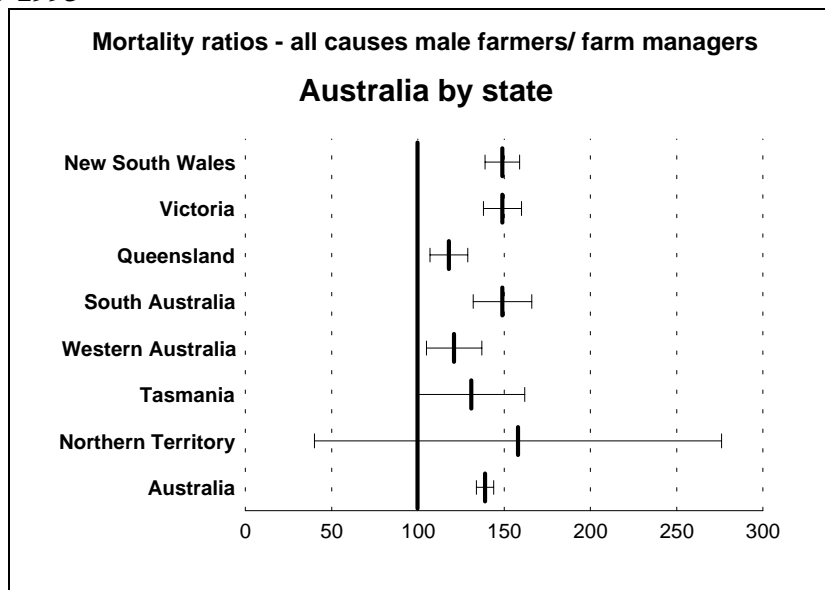
Information for this report has been collected from the following sources: Coroners records, ABS, WorkCover corporation, South Australian Ambulance Service and ad hoc studies.

Section 2: Farm Deaths in South Australia

The information used in this section is a selection of farm fatalities collected from the South Australian Coroners Office, by Ms Merelyn Boyce (Farm Injury Reference Group) and Ms Jane Mackereth (South Australian Divisions of General Practice Inc).

South Australian farmers have an annual death rate 50% higher along with New South Wales and Victoria than the Australian male rate as seen in Figure 2.1 and Table 2.1 (Fragar, Franklin, Gray & Petrauskas, 1997)

Figure 2.1 Age standardised mortality ratios male farmers/ farm managers - all causes by state 1990-1993



Source: Fragar, Franklin, Gray & Petrauskas 1997

Worksafe Australia conducted a work-related fatalities study in Australia for the years 1982-1984. During this period there were 257 farm fatalities which represented 15% of all identified work-related deaths. The annual death rate for Australia was 19.4 per 100 000 persons per year in the farm labour force (Erlich et al 1993).

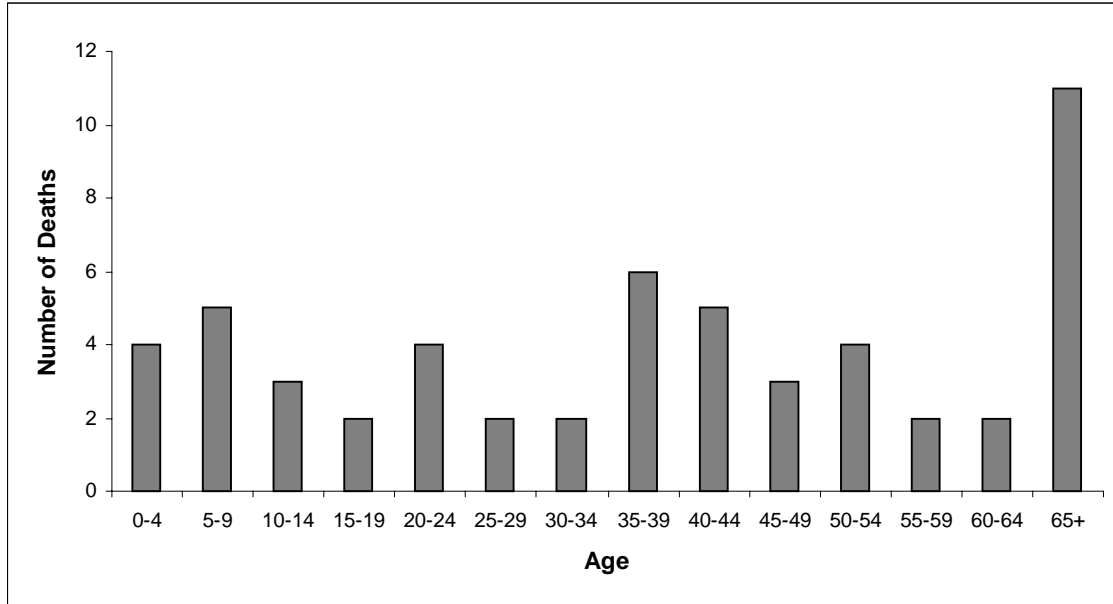
Harrison et al (1989) found that *farming, fishing, hunting and timber-getting* had the third highest annual incidence of fatalities (22.09/100,000 persons in labour force) after *mining and quarrying* (69.85/100,000 persons in labour force) and *transport and communication* (38.00/100,000 persons in labour force).

Erlich et al (1993) found that for farm deaths, the mean age for males was 46.9 years and for females 37.9 years. They also found that as age increases, the incidence in the number of deaths due to farm injury also increases. The authors also identified that males had a higher rate than females, and non-managers had a higher rate than managers.

A study currently being undertaken by the National Occupational Health and Safety Commission (NOHSC) (Driscoll, 1998), looking at work related fatalities for 1989-1992, has reported 609 farm-related deaths in Australia. For South Australia during this period there were 38 (6.4%) farm related deaths, of these 36 (94.7%) were males and 2 (5.3%) were females.

Information collected by Ms Merelyn Boyce and Ms Jane Mackereth from the South Australian Coroners Office recorded 55 deaths that occurred on a farm from 1991 to 1996. The Coroners Office originally recorded all fatalities in a paper based register. All farm fatalities between 1991 and 1996 were identified and entered into a database in Epi-info and coded using the Farm Injury Optimal Dataset (Coleman, 1995).

Figure 2.2 Age distribution of farm fatalities in South Australia 1991-1996 (N=55)



Of the 55 deaths on South Australian farms, 44 (80.0%) were males and 11 (20.0%) were females. The average age was 38 years, with ages ranging from 1 to 86 years. Figure 2.2 displays the age distribution of South Australian farm fatalities for 1991 to 1996.

There were 12 (21.8%) deaths of children under the age of 15 years. This is slightly above the percentage found for Australia which was 34 (13%) (Erlich et al, 1993).

Figure 2.3 Deaths on farms per annum South Australia, 1991 – 1996 (N=55)

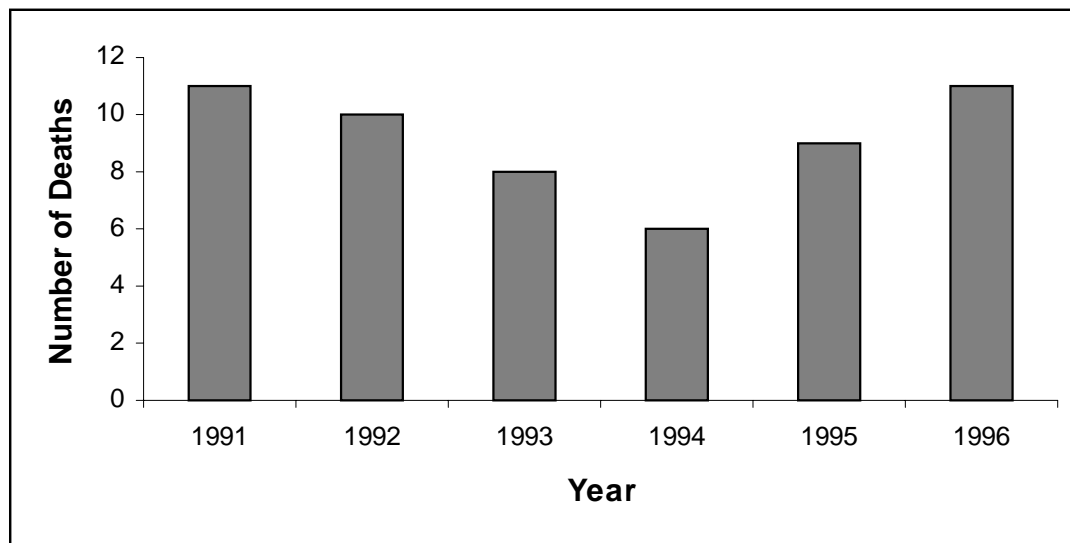


Figure 2.3 displays the number of deaths each year from 1991 to 1996. There was on average nine farm deaths each year or one death per 2,000 agricultural establishments per annum (0.5/1000 agricultural establishments per annum). The number of deaths was lowest in 1994.

Table 2.1 Enterprise of farm at time of death for South Australian farm fatality 1991-1996 (N=55)

Farm Enterprise	Number of Deaths
Cereal Grains, Sheep, Cattle and Pigs	9
Orchard and Other Fruit	1
Cereal Grains	10
Sheep - Cereal Grains	10
Meat Cattle - Cereal Grains	4
Sheep - Meat Cattle	3
Sheep	2
Meat Cattle	1
Milk Cattle	1
Agriculture NEC	4
Aerial Agricultural Services	1
Services to Agriculture NEC	1
Unknown	8
Total	55

In South Australia there were 24 farm deaths where sheep were being kept on the properties, 33 deaths on farms with cereal crops and 17 deaths on farms with meat cattle. These were the three largest commodities represented in the deaths. Due to the nature of the collections it is not possible to define death rates for each commodity except to state that the three aforementioned commodity groups constituted the bulk of deaths in South Australia in 1994 as shown in Table 2.1. An attempt at crude rates for some commodity groups is presented in Table 2.2.

Table 2.2 Farm deaths by enterprise type 1991-1996

Farming Enterprise	Number of enterprises in South Australia	Number of Fatalities	Annual Death Rate per 1,000 farms*
Fruit growing NEC	1221	1	0.14
Grain growing	2652	10	0.63
Grain-sheep/beef cattle farming	3588	23	1.07
Sheep-beef cattle farming	1108	3	0.45
Sheep farming	1617	2	0.21
Beef cattle farming	1224	1	0.14
Dairy farming	850	1	0.20
Total Farm Deaths**	15635	55	0.59

* Rates are crude and do not take into account age.

**Note: Numbers do not sum.

Table 2.2 displays the annual death rate per 1,000 farms by enterprise. The enterprise with the highest rate is Grain-sheep/beef cattle farming, at 1.07 per 1000 farms.

Figure 2.4 Time of death, deaths on South Australian farms, 1991-1996 (N=55)

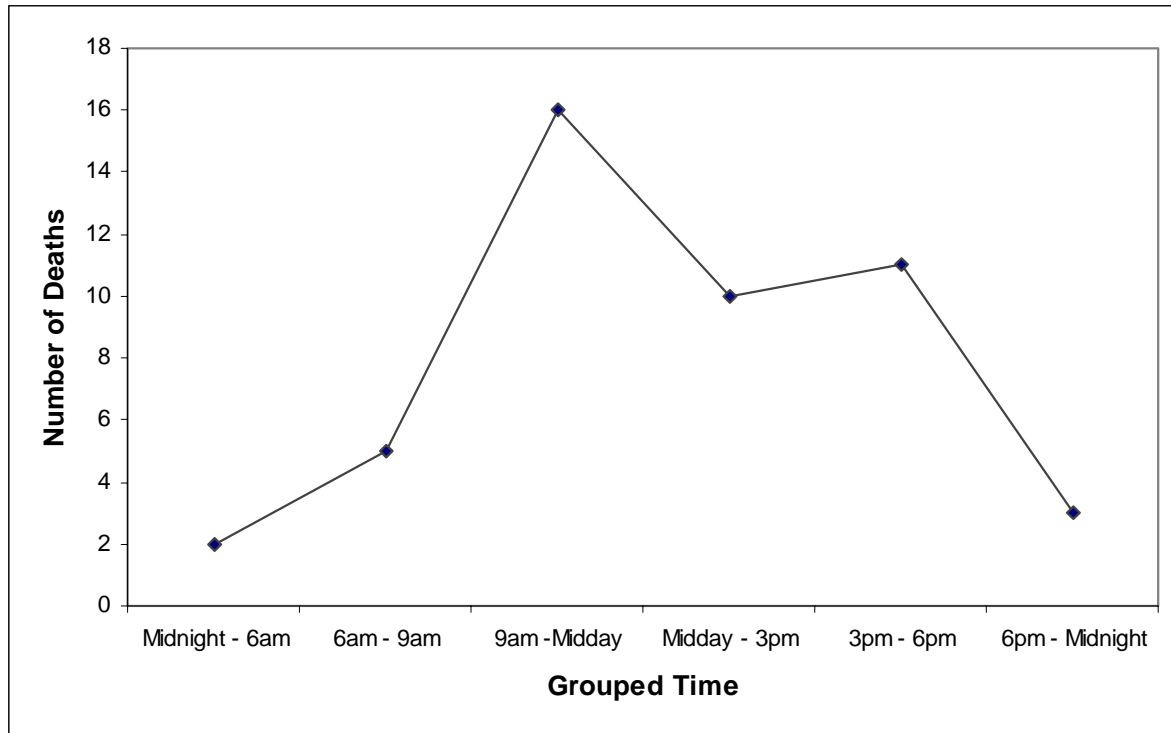


Figure 2.4 displays the time of death, for deaths on South Australian farms. It can be seen that 9am to midday, is the time period with the highest number of deaths on farms. There were few deaths between 6pm and 6am. This trend is also seen for non-fatal injuries (Franklin et al 1998).

Table 2.3 Agent of Death – South Australian Coroners records 1991-1996

Agency of death	Specific Agent	Number of deaths	Percent	Mechanism of injury	
Farm Vehicle	Truck	2	3.6	Hit by moving object (2)	
	Utility	3	5.5	Hit by moving object (2)	
	Motorcycle - 2 Wheel	2	3.6	Hit by moving object (2)	
	Motorcycle - 4 Wheel	2	3.6	Hitting object with part of body (1)	
	Mobile Bin	1	1.8	Hit by moving object (1)	
	Aircraft	2	3.6	Hitting object with part of body (1)	
	Total		12	21.8	
Mobile Farm Machinery / Plant	Tractor	9	16.4	Fall, slips and trip (1) Hit by moving object (7)	
	Harvesting machine	1	1.8	Hit by moving object (1)	
	Grain Auger	2	3.6	Heat, radiation & electricity (2)	
	Slasher	1	1.8	Fall, slips and trip (1)	
	Cherry Picker	1	1.8		
	Posthole Digger	2	3.6	Hitting object with part of body (1) Hit by moving object (1)	
	Hay Baler	1	1.8		
	PTO	1	1.8	Hit by moving object (1)	
	Total		18	32.7	
	Fixed Plant / Equipment	Total	1	1.8	
Workshop Equipment - Powered	Angle grinder	1	1.8		
	Total	1	1.8		
Farm Structure	House	1	1.8	Fall, slips and trip (1)	
	Tank	1	1.8		
	Dam	3	5.5	Body Stressing (1)	
	Windmill	1	1.8	Fall, slips and trip (1)	
	Embankment	1	1.8	Fall, slips and trip (1)	
	Field Bin	1	1.8	Sound & Pressure (1)	
	Water storage NEC	1	1.8	Chemicals & Other substances (1)	
	Total	9	16.4		
Animal	Horse	3	5.5	Fall, slips and trip (2) Hit by moving object (1)	
	Cattle	1	1.8		
	Total	4	7.3		
Farm Chemicals	Total	1	1.8	Chemicals & Other substances (1)	
Working Environment	Water	1	1.8		
	Fire / Smoke	2	3.6	Heat, radiation & electricity (1)	
	Total	3	5.5		
Other	Firearms	2	3.6		
	Other NEC	3	5.5	Heat, radiation & electricity (1)	
	Total	5	9.1		
Unknown	Total	1	1.8		
Total		55	100.0		

Table 2.3 displays the agent of death. The most common cause of injury was *mobile farm machinery / plant* which accounted for 18 (32.7%) deaths. The next most common agent of death was *farm vehicle* 12 (21.8%). *Tractors* represented half of all *mobile farm machinery / plant* deaths nine (50.0%) and of these two (22.2%) were *roll-overs*, four (44.4%) were *run-overs*, two (22.2%) were *entanglements* and one (11.1%) was *hit by a falling object*. The diversity of the other *mobile farm machinery / plant* makes it difficult to plan preventative action. Farmsafe Australia is currently investigating the mechanism of injury for *power take offs*, *grain augers* and *posthole diggers*.

Farm vehicle accounted for 12 (22.6%) deaths, of these, four (33.3%) were motorcycle related. The two deaths where the *motorcycle – 2 wheel* was involved were due to the

person hitting a moving object. In contrast the two deaths where the *motorcycle – 4 wheel* was involved was due to the person hitting an object with a part of their body. *Hit by moving object* and *hitting object with part of body* made up 10 (83.3%) of the mechanism of injury for farm vehicle group.

Of the nine (17.0%) deaths where a *farm structure* was the attributed agent of death seven (77.8%) can be accounted for by water. Deaths where animals were involved were predominantly due to horses three (5.7%).

Table 2.4 Employment status by age for South Australian farm fatalities 1991-1996

Age	Number of Deaths						Total
	Child not at school	Student	Employed	Unemployed	Home Duties	Other	
0-4	4						4
5-9		5					5
10-14		3					3
15-19		1		1			2
20-24		1	1	1		1	4
25-29			2				2
30-34			2				2
35-39		1	3		1	1	6
40-44			4		1		5
45-49			2			1	3
50-54			4				4
55-59			2				2
60-64			2				2
64+			5			6	11
Total	4	11	27	2	2	9	55

Of those fatalities on farms in South Australia between 1991-1996, people employed accounted for 27 (49.1%) of the fatalities. The other notable aspect of this data was the 11 (20.0%) deaths that fell into the *student* category at the time of their death.

Table 2.5 Farm location where death occurred in South Australia 1991-1996.

Location	Number
Paddock	9
Water	8
Shed	7
Farm excluding residence NEC	7
Unspecified	6
Roads / Lanes	6
Farm House / yard /garden	5
Natural Vegetation	3
Yards	3
Workshop	1
Total	54

Farming is predominantly an outdoor occupation and this is reflected in the 31 (56.4%) deaths occurring outside compared to 11 (20.0%) indoors and 13 (23.6%) unknown as presented in Table 2.5.

Table 2.6 General activity of people killed on South Australian farms, 1991-1996

General Activity	Frequency
Working for income	23
Leisure activity	13
Other type of work	7
Being cared for	7
Resting, eating, sleeping, other personal activity	2
Other specified activity	1
Unspecified activity	1
Total	53

Twenty-three (43.4%) people who died on South Australian farms between 1991 and 1996 were *working for income* and seven (13.2%) were doing *other types of work*. People who were undertaking *leisure activities* at the time of their death accounted for 13 (24.5%) deaths.

Table 2.7 External cause of death on South Australian farms 1991-1996

External Cause	Male	Female	Total
Machinery in Operation	10	4	14
Drowning, submersion - other	4	2	6
Fall - high	5		5
Motorcycle - driver	3	1	4
Other transport related circumstance	4		4
Motor Vehicle - passenger	1	2	3
Horse related	2	1	3
Struck by object or person	3		3
Electricity	3		3
Other threat to breathing	2		2
Motorcycle - passenger		1	1
Fire, flames, smoke	1		1
Poisoning - other substance	1		1
Firearm	1		1
Dog related	1		1
Animal related	1		1
Hot conditions	1		1
Other specified external cause	1		1
Total	44	11	55

Table 2.7 details the external cause of death on South Australian farms 1991-1996 using the International Classification of Disease (ICD) version 9 (WHO, 1991). As observed the largest cause is attributed to *machinery in operation* 14 (25.5%). There were 6 (10.9%) drownings during 1991-1996, three of these were under the age of 15 years, two had an unknown age and one was an adult. There were five (9.1%) deaths attributed to *falls from a height* and five (9.1%) which were *motorcycle related deaths*. Transport related deaths, including horses, accounted for 15 (27.3%) of all deaths.

Of the 55 people killed on South Australian farms, 36 (65.5%) were residents, 16 (29.1%) were visitors and three (5.5%) were unknown.

Child Deaths

Children present a unique problem to Australian farms, as the farm is both a workplace and a residence. The major sources of child injury on Australian farms are usually mobile farm machinery (including tractors), animals, motorcycles, water and farm chemicals (Australian Agricultural Health Unit, 1997g). The physical, cognitive and behavioural characteristics that make an environment hazardous for children include:

- Size in relation to environment
- Small body mass
- Learning behaviour - using the mouth
- Poorly developed sense of danger
- Increasing mobility
- Increasing independence
- Peer pressure
- Risk-taking behaviour

For the purpose of this report, people under the age of 15 years are considered to be children. Of the deaths on South Australian Farms between 1991 and 1996, 12 (21.8%) were children. In all cases these injuries occurred between 7am and 7pm

Table 2.8 Age by farm location for children South Australia 1991-1996

Age	Paddock under crop	Natural Vegetation	Roads and Lanes	Dam / Water Reservoir / Irrigation Channel	Farm excluding residence - NEC	Farm Yard / Garden	Yards	Unspecified	Total
0-4				2	1			1	4
5-9	2			1		1	1		5
10-14	1	1	1						3
Total	3	1	1	3	1	1	1	1	12

There were three (27.3%) deaths where water was stored (*dam / water reservoir / irrigation channel*) and three (27.3%) deaths where a *paddock was under crop*. *Water storage* location deaths were to younger children and *paddock under crop* location deaths were to older children.

Those children who died out in the paddock were older, whereas those who drowned were younger. This phenomenon is consistent with current information (Fragar, Franklin, Gray & Petrauskas, 1998). The two younger age groups represent nine (81.8%) of all child deaths on South Australian farms, whereas there were two (18.2%) deaths in the 10-14 year age group. The latter occurred on *roads & lanes* and *paddock under crop*.

Table 2.9 External cause of death for children, South Australian farms, 1991-1996

External Cause	0-4 Years	5-9 Years	10-14 Years	Total
Motor vehicle passenger		1	1	2
Motorcycle -driver			1	1
Fall -High		1		1
Drowning	2	1		3
Machinery in Operation	2	2	1	5
Total	4	5	3	11

In Table 2.9 it can be seen that five (45.4%) of the deaths are attributed to *machinery in operation*. This was the most common cause of death to children on South Australian farms followed by *drowning* with three (27.3%) cases. In the children aged 0-4 years category, *drowning* and *machinery in operation* both accounted for two (18.2%) deaths and were the only external causes of death in this age group. The most common cause of death to 5-9 year olds was *machinery in operation*, which accounted for two (18.2%) deaths.

Table 2.10 General activity of children at time of death, South Australian farms 1991-1996

General Activity	0-4 Years	5-9 Years	10-14 Years	Total
Leisure activity		2	2	4
Working for income			1	1
Being cared for	4	3		7
Total	4	5	3	12

There were seven (63.6%) children on South Australian farms during 1991-1996 who were being cared for when their death occurred. All were under the age of 9 years. There were three (27.3%) children who were involved in leisure activities at the time of death and one child in the 10-14 year age group who was working for an income.

Table 2.11 Agent of Death for children, South Australian farms 1991-1996

Agent	Frequency of Occurrence	Common Mechanisms
Motor Cycle 2 Wheel	1	Being Hit by moving object
Tractor	2	Falls, trips and slips of a person Being Hit by moving object
Utility	1	Other & Unspecified mechanisms of injury
Slasher	1	Falls, trips and slips of a person
PTO	1	Being Hit by moving object
Tank	1	Other & Unspecified mechanisms of injury
Dam	2	Other & Unspecified mechanisms of injury
Field Bin	1	Sound and Pressure
Fire/ Smoke	1	Heat, radiation and electricity
Other NEC	1	Falls, trips and slips of a person
Total	12	

There were ten agents involved in the death of children on South Australian farms during 1991-1996. The two common agents were *tractors*, where one child fell and the other was run-over, and *dams* where both children drowned. Of the 11 deaths 10 (90.9%) occurred outside and one was unknown.

Table 2.12 Nature of injury that caused death of children, South Australian farms, 1991-1996

Nature of injury	0-4 Years	5-9 Years	10-14 Years	Total
Crushing injury	1	1	3	5
Asphyxiation or respiratory difficulty	2	2		4
Haemorrhage		1		1
Burn / full thickness		1		1
Amputation	1			1
Total	4	5	3	11

Table 2.12 displays the nature of injury associated with the death of children on South Australian farms during 1991-1996. The most common cause was *asphyxiation or respiratory difficulty*, followed by *crushing injury*. Drowning caused three of the *asphyxiation or respiratory difficulty* deaths and the other was a child caught in a utility when a burn-off spread under the vehicle.

Table 2.13 Body part injured of children who died, South Australian farms, 1991-1996

Body Part Injured	0-4 Years	5-9 Years	10-14 Years	Total
Head	1	1	3	5
Systemic and special injury	2	2		4
Upper extremity	1			1
Trunk		1		1
Respiratory tract		1		1
Total	4	5	3	12

Table 2.13 displays the body part injured of children who died on South Australian farms 1991-1996. Injuries that were caused by drowning or fire are classified in the *systemic and special injury* category of Table 2.15. There were four injuries to the *head* that resulted in death and one each of *upper extremity*, *trunk* and *respiratory tract*.

Table 2.14 Visitor status of children who died on South Australian farms 1991-1996

Visitor	0-4 Years	5-9 Years	10-14 Years	Total
No	3	3	1	7
Yes	1	2	2	5
Total	4	5	3	12

Table 2.14 shows the visitor status of the children who died on South Australian farms in 1991-1996.

Summary

- The profile of injury deaths on farms in South Australia is not dissimilar to that of Australia as whole.
- Between 1991 and 1996 there were 55 injury deaths on South Australian farms.
- There are on average 9 deaths per annum on South Australian farms reported in coronial files.
- There were 17 (32.1%) of deaths on South Australian farms which were caused by mobile farm machinery / plant.

- There were 9 deaths due to tractors on South Australian farms between 1991 and 1996, of these 4 were run-overs, 2 were roll-overs, 2 were entanglements and 1 was hit by a falling object.
- Thirty of the fifty-five deaths occurred while people were engaged in work activities, either paid (23) or other (7).
- Machinery in operation caused was the largest external cause of death.
- There were 11 children killed on South Australian farms between 1991 and 1996.
- Machinery in operation was involved in 5 child deaths.

Recommendations

1. Programs aimed at preventing deaths on South Australian farm should focus on:
 - Tractors
 - Other mobile machinery
 - Child deaths on farms
2. Mechanisms for South Australia to contribute to the National Tractor Death Register and the National Child Deaths on Farms Register should be established.

Section 3: WorkCover South Australia reported injury

WorkCover South Australia provided the data for this section.

The WorkCover scheme commenced operation on 30th September 1987. In South Australia there are two types of employers, self-insurers (state government, statutory bodies, local governments and some private organisations) and non-exempt employers. This study only looked at non-exempt employers who cover 60% of the workforce. The total number of claims from non-exempt employers from 1995/96 to 1997/98 was 78,480 for males and 25,470 for females. In 1994/95 journey claims were removed and on May 25, 1995 legislation was changed so that employers pay the first two weeks off work due to an injury rather than only the first week. (WorkCover Research & Analysis Unit, 1998).

The average levy rate is 2.86% for all industries, with \$298.43 million collected from all industries in 1996/7. Agriculture contributed \$13.95 million of this total.

Table 3.1 WorkCover Corporation of South Australia – WorkCover levy rates per \$100 wages remuneration – Effective 1 July 1997 for Agriculture, Forestry and Fishing

Description	Levy Rate per \$100 Wages
Oyster Farming and Inland Fishing (incl. Services to Fishing NEC)	2.20
Fruit Growing	3.70
Grape Growing (incl. Sun-Drying)	3.70
Plant Nurseries	3.70
Poultry Farming	3.90
Grain Growing	4.10
Vegetable Growing	4.10
Grain-Sheep and Grain-Beef Cattle Farming	4.20
Services to Agriculture NEC	4.20
Forestry and Services To Forestry	4.30
Rock Lobster Fishing	4.40
Aerial Agriculture Services	4.50
Hunting and Trapping	4.50
Prawn Fishing	4.50
Ocean and Coastal Fishing NEC	4.60
Sheep-Beef Cattle Farming	4.80
Logging	5.30
Agriculture NEC	5.50
Dairy Cattle Farming	5.60
Pig Farming	5.70
Cotton Growing	7.50
Shearing Services	7.50
Tobacco Growing	7.50

Levies on the agricultural industry range from 2.20 per \$100 for *oyster farming and inland fishing*, to 7.50 per \$100 for *cotton, shearing services and tobacco growing* in South Australia. Based on an average income of \$25,000 for a farm employee, farmers could be paying between \$550 and \$1,875 in workers compensation insurance.

From July 1995 to June 1998, there were 962 workers compensation claims in agriculture. Females made 190 (19.8%) claims for injuries sustained in the agricultural industry and males 772 (80.2%) claims. Of the 190 female injuries \$2,781,327 was paid out with an average cost of \$14,639 per injury. For the 772 injuries claimed by males \$9,964,058 was paid out with an average of \$12,907 per injury.

Table 3.2 Nature of injury, 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, males, South Australia agriculture, WorkCover statistics

Nature of Injury Disease	Number of Claims	Cost of Claims (\$)	Average cost per claim (\$)
Sprains and Strains	263	3,685,547	14,013
Fractures	138	1,313,609	9,519
Musculoskeletal/connective tissue	109	1,862,745	17,089
Open wound	75	419,263	5,590
Contusion with intact skin	41	496,629	12,113
Skin / subcutaneous tissue	22	56,364	2,562
Nervous system/sense organs	17	185,825	10,931
Digestive system	15	121,686	8,112
Infectious / parasitic diseases	14	121,161	8,654
Traumatic amputation	13	168,819	12,986
Other and Unspecified injuries	13	641,067	49,313
Dislocation	10	114,991	11,499
Foreign Body, eye, etc	7	89,035	12,719
Burns	6	77,991	12,999
Intracranial injury, including concussion	5	61,294	12,259
Multiple injuries	5	141,996	28,399
Mental Disorders	5	108,421	21,684
Not Coded	3	218,346	72,782
Internal injury of chest abdomen and pelvis	3	22,004	7,335
Superficial Injury	3	3,441	1,147
Circulatory System	2	9,766	4,883
Poisoning and toxic effects of substance	1	1,009	1,009
Respiratory System	1	37,214	37,214
Other Diseases	1	5,835	5,835
Total	772	9,964,058	12,907

The largest number of claims made by males was for *sprains and strains* 263 (34.1%). The total cost of these claims was \$3,685,547 (37.0%), with an average of \$14,013. *Fractures* 138 (17.9%) were the second largest number of claims, with an average cost of \$9,519. The third major nature of injury for males was *musculoskeletal / connective tissue* 109 (41.1%), with an average cost per claim of \$17,089.

Table 3.3 Nature of injury, 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, females, South Australia agriculture, WorkCover statistics

Nature of Injury Disease	Number of Claims	Cost of claims (\$)	Average cost per claim (\$)
Sprains and Strains	74	923,898	12,485
Musculoskeletal/connective tissue	36	556,105	15,447
Fractures	24	491,947	20,498
Contusion with intact skin	13	187,581	14,429
Nervous system/sense organs	12	241,282	20,107
Skin / subcutaneous tissue	6	44,236	7,373
Open wound	4	118,887	29,722
Intracranial injury, including concussion	3	12,495	4,165
Foreign Body, eye, etc	3	322	107
Superficial Injury	2	70,980	35,490
Poisoning and toxic effects of substance	2	8,295	4,148
Other and Unspecified injuries	2	38,551	19,276
Infectious / parasitic diseases	2	24,929	12,465
Respiratory System	2	9,481	4,741
Mental Disorders	2	47,750	23,875
Not Coded	1	2,043	2,043
Traumatic amputation	1	2,427	2,427
Burns	1	118	118
Total	190	2,781,327	14,639

The largest number of claims for females between July 1995 and June 1998 were from *sprains and strains* 74 (38.9%) costing \$923,898 (33.2%), with an average cost of \$12,485 per injury. *Musculoskeletal/connective tissue* was the next largest group with 36 (18.9%) injuries and an average cost of \$15,447 per injury. The third largest group was from *fracture* 24 (12.6%), with an average cost of \$20,498 per injury.

Table 3.4 Occupation for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, males, South Australia agriculture, WorkCover statistics

Occupation	Number of claims	Cost of claims (\$)	Aver cost per claim (\$)
Farm hands and assistants	413	4,147,405	10,042
Sheep shearers	151	2,474,216	16,386
Farmers and farm managers	60	819,443	13,657
Other*	32	740,792	23,150
Agricultural Plant Operators	27	406,310	15,049
Truck drivers	20	315,663	15,783
Nursery and garden labourers	19	213,471	11,235
Other labourers and related workers	16	357,026	22,314
Other trades assistants and factory hands	9	28,122	3,125
Hand Packers	7	147,720	21,103
Metal Fitters and Machinists	6	153,600	25,600
Aircraft Pilots	3	57,732	19,244
Food processing machine operators	3	16,446	5,482
Other construction and mining labourers	3	57,087	19,029
Other para-professionals	3	29,025	9,675
Total	772	9,964,058	12,907

*Includes occupation where there was only 1 or 2 people.

The three largest occupation groups claiming workers compensation between July 1995 and June 1998 were *farm hands and assistants* 413 (53.5%), *sheep shearers* 151 (19.6%) and *farmers and farm managers* 60 (7.8%). The average cost per claim for the *farm hands and assistants* was \$10,042, for the *sheep shearers* \$16,386 and for the *farm managers* \$13,657.

Table 3.5 Occupation for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, females, South Australia agriculture, WorkCover statistics

Occupation	Number of claims	Cost of claims (\$)	Aver cost per claim (\$)
Farm hands and assistants	140	2,145,680	15,326
Other*	16	107,470	6,717
Nursery and garden labourers	15	239,867	15,991
Hand Packers	9	103,337	11,482
Other trades assistants and factory hands	4	124,309	31,077
Packing machine operators	3	42,094	14,031
Quality controllers	3	18,569	6,190
Total	190	2,781,326	14,639

*Includes occupation where there was only 1 or 2 people.

Of those females who had workers compensation claims between July 1995 and June 1998, 140 (73.7%) identified their occupation as *farm hands and assistants*. The total cost of claims for this group was \$2,145,680 (77.1%) with an average cost per claim of \$14,639.

Table 3.6 Accident type for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, males, South Australia agriculture, WorkCover statistics

Accident type	Number of claims	Cost of claims (\$)	Average cost per claims (\$)
Muscular stress while handling objects other than lifting	179	2,621,675	14,646.23
Falls on the same level	78	1,033,888	13,254.97
Vehicle accident	69	610,494	8,847.74
Muscular stress while lifting, carrying, or putting down object	62	952,576	15,364.13
Falls from a height	57	1,008,027	17,684.68
Being hit by an animal	54	722,664	13,382.67
Being hit by moving objects	42	416,492	9,916.48
Hitting moving objects	42	126,782	3,018.62
Being trapped by moving machinery	31	516,131	16,649.39
Repetitive movement, low muscle loading	30	333,379	11,112.63
Being trapped between stationary and moving objects	24	179,925	7,496.88
Hitting stationary objects	14	93,248	6,660.57
Contact with, or exposure to biological factors	13	107,698	8,284.46
Muscular stress with no objects being handled	12	49,716	4,143.00
Being hit by falling objects	11	111,346	10,122.36
Other and multiple mechanisms of injury	11	375,267	34,115.18
Exposure to mechanical vibrations	8	65,529	8,191.13
Exposure to mental stress factors	6	114,369	19,061.50
Contact with hot object	5	76,457	15,291.40
Single contact with chemical or substance	4	15,044	3,761.00
Stepping, kneeling or sitting on objects	4	17,208	4,302.00
Unspecified mechanisms of injury Vehicle accident	4	43,074	10,768.50
Long term contact with chemicals or substances	3	39,419	13,139.67
Exposure to environmental cold	2	116,644	58,322.00
Falls, trips and slips of a person	2	190,263	95,131.50
Rubbing and chafing	2	4,923	2,461.50
Being bitten by an animal	1	5,332	5,332.00
Insect and spider bites and stings	1	13,463	13,463.00
Slide or cave-in	1	3,024	3,024.00
Total	772	9,964,057	12,906.81

Table 3.6 displays the accident type for males. The largest number of claims were from *muscular stress while handling objects other than lifting* 179 (23.2%). This was followed by *falls on the same level* 78 (10.1%), *vehicle accident* 69 (8.9%) and *muscular stress while lifting, carrying, or putting down object* 62 (8.0%).

Table 3.7 Accident type for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, females, South Australia agriculture, WorkCover statistics

Accident type	Number of claims	Cost of claims (\$)	Average cost Per claim (\$)
Muscular stress while handling objects other than lifting	45	692,645	15,392.11
Falls on the same level	28	421,878	15,067.07
Falls from height	16	240,458	15,028.63
Repetitive movement, low muscle loading	16	231,932	14,495.75
Muscular stress while lifting, carrying, or putting down object	15	220,016	14,667.73
Muscular stress with no objects being handled	14	239,315	17,093.93
Being hit by moving objects	8	153,030	19,128.75
Hitting stationary objects	7	107,760	15,394.29
Vehicle accident	7	46,402	6,628.86
Being trapped by moving machinery	5	190,193	38,038.60
Single contact with chemical or substance	4	45,270	11,317.50
Being hit by falling objects	3	22,746	7,582.00
Hitting moving objects	3	11,071	3,690.33
Other and multiple mechanisms of injury	3	33,204	11,068.00
Stepping, kneeling or sitting on objects	3	3,394	1,131.33
Being hit by an animal	2	7,830	3,915.00
Exposure to mental stress factors	2	47,750	23,875.00
Insect and spider bites and stings	2	8,295	4,147.50
Unspecified mechanisms of injury	2	27,528	13,764.00
Vehicle accident			
Being bitten by an animal	1	6,404	6,404.00
Being hit by a person	1	3,685	3,685.00
Being trapped between stationary and moving objects	1	804	804.00
Contact with hot object	1	118	118.00
Contact with, or exposure to biological factors	1	19,602	19,602.00
Total	190	2,781,330	14,638.58

Table 3.7 displays the accident type for females. The largest number of claims were from *muscular stress while handling objects other than lifting* 45 (23.7%). This was followed by *falls on the same level* 28 (14.7%), *fall from height*, *repetitive movement*, and *low muscle loading* 16 (8.4%).

Table 3.8 Male age breakdown for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, South Australia agriculture, WorkCover statistics

Age	Number of claims	cost of Claims (\$)	Average cost per claim (\$)
15-19	65	366,033	5,631.28
20-24	90	716,331	7,959.23
25-29	109	920,999	8,449.53
30-34	107	1,590,046	14,860.24
35-39	97	1,235,713	12,739.31
40-44	103	1,542,087	14,971.72
45-49	79	1,477,240	18,699.24
50-54	56	897,321	16,023.59
55-59	41	894,611	21,819.78
60-64	24	323,555	13,481.46
65-69	1	122	122.00
Total	772	9,964,058	12,906.81

Table 3.8 displays the age breakdown for males. In the table, the majority of claims are in the 20-49 age group. There is a steady decline in the number of workers compensation cases from the age of 50 years.

Table 3.9 Female age breakdown for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, South Australia agriculture, WorkCover statistics

Age	Number of claims	Cost of claims (\$)	Average cost per claim (\$)
15-19	10	64,695	6,469.50
20-24	20	220,913	11,045.65
25-29	26	238,706	9,181.00
30-34	27	457,104	16,929.78
35-39	28	382,990	13,678.21
40-44	24	426,642	17,776.75
45-49	25	487,930	19,517.20
50-54	17	340,912	20,053.65
55-59	12	140,625	11,718.75
60-64	0		
65-69	1	20,811	20,811.00
Total	190	2,781,328	14,638.57

Table 3.9 displays the age breakdown for females. In the table, the majority of claims are in the 25-49 age group with a peak at the 35-39 age group. There is a sharp decline in the number of claims in workers compensation by females from the age of 50 years.

Table 3.10 Body region of injury for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, males, South Australia agriculture, WorkCover statistics

Body Location	Number of claims	Cost of claims (\$)	Average cost per claim (\$)
Upper Extremity	341	3,752,375	11,004.03
Lower Extremity	225	2,767,699	12,300.88
Trunk	163	2,653,211	16,277.37
Systemic and special injury (Incl multiple injury)	21	411,287	19,585.10
Head	16	135,130	8,445.63
Respiratory Tract	2	47,681	23,840.50
Digestive Tract	2	6,414	3,207.00
Missing	2		
Total	772	9,773,797	12,660.36

Table 3.10 displays the body location where the injuries occurred for males. The *upper extremity* 341 (44.3%) was the area most commonly involved in the injury, followed by *lower extremity* 225 (29.2%) and *trunk* 163 (21.2%).

Table 3.11 Body region of injury for 1995/6 to 1997/8 by number of claims, cost of claims and average cost per claim, females, South Australia agriculture, WorkCover statistics

Body Location	Number of claims	Cost of claims (\$)	Average cost per claim (\$)
Upper Extremity	80	1,390,975	17,387.19
Lower Extremity	50	557,291	11,145.82
Trunk	41	583,927	14,242.12
Head	9	98,859	10,984.33
Systemic and special injury (Incl multiple injury)	7	138,750	19,821.43
Respiratory Tract	2	9,481	4,740.50
Missing	1		
Total	190	2,779,283	14,627.81

Table 3.11 displays the body location where the injuries occurred for females. The *upper extremity* 80 (42.1%) was the area most commonly involved in the injury, followed by *lower extremity* 50 (26.3%) and *trunk* 41 (21.6%).

Table 3.12 Industry classification by number of injuries, South Australia WorkCover 1996/97 –1997/98 as at 28/09/98

Industry	Number of Injuries	Claims per 1000 enterprises
Grain-sheep & grain-beef cattle farming	98	35.6
Grape growing	89	50.3
Fruit growing	69	150.0
Vegetable growing	54	96.3
Services to agriculture NEC	53	-
Shearing services	46	-
Sheep farming	40	27.2
Sheep-beef cattle farming	35	32.3
Plant nurseries	32	256.0
Beef cattle farming	27	22.4
Poultry farming	27	236.8
Pig farming	21	124.3
Dairy cattle farming	20	24.2
Grain Growing	8	2.1
Agriculture NEC	6	-
Aerial agricultural services	4	-
Total	629	40.4

Table 3.12 displays the injuries for all agriculture industries for 1996/7 to 1997/8 from South Australian WorkCover in ascending order. The rate of workers compensation claims on an enterprise rate basis, probably best reflects the proportion of workers who are employees.

Table 3.13 Industry classification by number of injuries, South Australia WorkCover 1996/97 –1997/98 as at 28/09/98

Agent of Injury	Number of Injuries	Agent of Injury	Number of Injuries
Farm Vehicle	74	Powered Implements	7
Truck	14	Chainsaw	2
Utility	2	Other powered implement NEC	5
Car	2		
Trailer	8	Materials	83
Motorcycle 2 Wheel	40	Wire other	4
Motorcycle 4 Wheel	1	Steel	4
Aircraft	4	Timber	1
Farm Vehicle other NEC	3	Stockfeed	2
		Round Bales	1
Mobile Farm Machinery / Plant	81	Laden Carton/bin/bucket/pallet	20
Tractor	17	Laden bag	15
Linkage	2	Materials other NEC	9
Tillage NEC	2	Pipe (Both metal and Plastic)	8
Spraying Equipment	1	Clothing (including boots)	1
Fertiliser Spreader	2	Post	8
Harvesting machine	14	Wool bales	6
Grain Auger	10	Wool	4
Hay Rake	1		

Agent of Injury	Number of Injuries	Agent of Injury	Number of Injuries
Mobile Farm Machinery / Plant continued		Farm Structure	42
Hay Baler	1	Tank	2
Cherry Picker	2	Fence	2
Posthole Digger	3	Gate	3
Power Take Off (PTO)	1	Ramp / Grid	1
Forklift	5	Stockyard	2
Other tractor mounted load lifting attachments	5	Animal Crush / Restraint	1
Post Driver	5	Silo-Grain	3
Crane	1	Field Bin	3
Mobile Farm Machinery / Plant other NEC.	14	Shearing Shed	1
		Other Shed	8
Fixed Plant / Equipment	40	Dairy	3
Shearing Handpiece	32	Other farm structure NEC	12
Irrigating Equipment	1	Trench	1
Pump	1		
Hammer Mill	1	Animal	109
Fixed Plant / Equipment NEC	5	Horse	11
		Cattle	18
Workshop Equipment - Powered	13	Sheep	55
Bench Grinder	2	Pig	8
Angle Grinder	1	Poultry	3
Ladder excluding ladder attached to structure	18	Spider	1
Lifting equipment powered	2	Insect	2
		Other biological	11
Hand Tools	52	Farm Chemicals	8
Hooks	1	Fertiliser	1
Knife	2	Veterinary Chemicals	1
Hand Tools incl. Hammer / Handsaw NEC	30		
Hoe	5	Insecticides	1
Shovel	3	Rodenticides / other baits	1
Vaccinating equipment	1	Petrol	1
Trolleys / handcart / wheel barrows	10	Other Farm Chemical NEC	2
		Hydraulic oil	1
Working Environment	90	Other	8
Dust Particle	2	Drums	1
Bush / Vegetation	56	Battery	1
Ground / Rock / Stump	21	Tyres	6
Cold	1		
Other Working Environment NEC	1	Unknown	13
Furniture	2		
Stress/anxiety	7		
		(NEC= Not Elsewhere Classified)	

Table 3.13 displays the agent involved in the injury. Agents that caused the majority of injuries include; *bush / vegetation / ground / rock / stump* 77, *sheep* 55, *motorcycles* 41, *bags*

/ buckets / bins / pallets 35, shearing handpiece 32, hand tools 30, cattle 18, ladders 18, tractors 17, harvesting machines 14 and trucks 14.

Summary

- There were 962 workers compensation claims between July 1995 and June 1998, of these 772 (80.2%) were males and 190 (19.8%) were females.
- There are on average 320 claims per annum.
- The largest number of claims for nature of injury was *sprains and strains* with an average cost per injury of \$14,013 for males and \$12,485 for females.
- Farm hands and assistants represent the largest occupational group seeking workers compensation, as this group represented 140 (73.7%) of female claims and 413 (53.5%) of male claims.
- Sheep shearers represent 151 (19.6%) of injuries sustained by males and had an average cost per claim of \$16,386.
- The largest numbers of claims were for injuries from *sprains and strains* 332 (35.1%) for both males and females.
- The majority 735 (76.6%) of workers compensation claims are for people aged between 20-49 years with a sharp decline after this age bracket.
- The *upper extremity* 421 (43.9%) was the most common body region involved in an injury resulting in a workers compensation claim.
- Average cost per claim tends to increase with age of worker, although this is not conclusive.

Recommendations

1. Workers compensation information should be made available on a yearly basis in an electronic form to allow annual agricultural statistics to be published, in a form that allows for adjustment to data as claims are finalised.
2. Prevention programs aimed at reducing workers compensation claims should include:
 - Key agricultural industries, including shearing, plant nurseries, poultry farming, fruit growing and pig farming.
 - Animal handling, especially sheep and cattle
 - Falls
 - Body stressing / strains – ergonomic and manual handling.
 - Agents:
 - Motorcycles
 - Bags / buckets / bins / pallets
 - Hand tools
 - Shearing handpiece
 - Tractors
 - Harvesters
 - Trucks
 - Ladders
3. In-depth investigation of industry related injuries should occur on a regular basis.
4. Prevention programs on farm workers.

Section 4: South Australian Ambulance reported injury

The South Australian Ambulance Service as part of their routine work, collected the following information. The cases were identified by the scene location reporting 'agriculture, forestry or mining'. There were a total of 349 cases on medical records in the financial years 1995/6, 1996/7 and 1997/8.

In South Australia there are four levels of ambulance stations.

1. Country Volunteer stations – These officers are volunteers. They provide ambulance service to their community.
2. Country Professional stations – Officers at these stations work full time as Ambulance officers.
3. Level 4 response – These stations have a role of primary response to incidents. When a level 4 crew is tasked to a case, the nearest available transporting ambulance is also despatched.

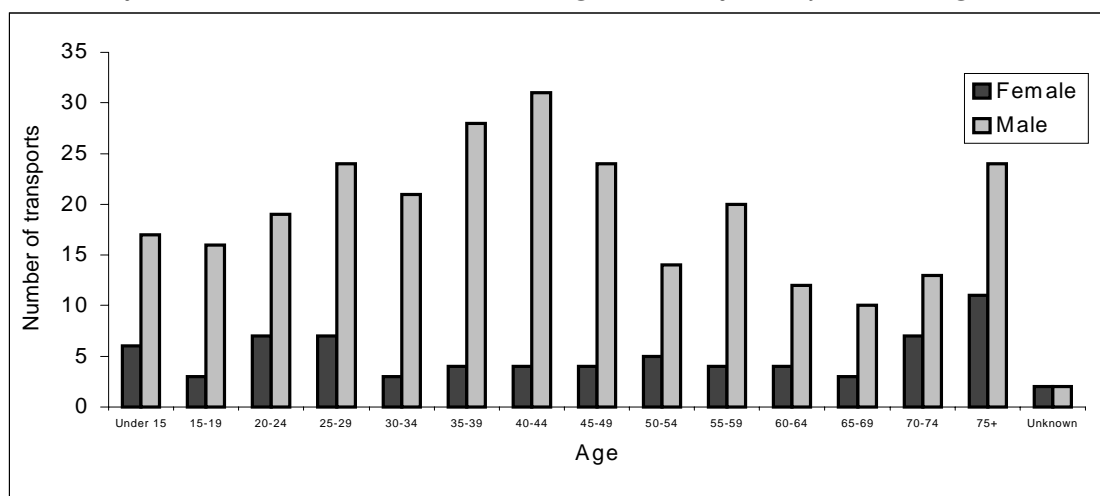
4. Metropolitan Stations

(South Australian Ambulance Service, Personal correspondence 1997)

The Level 1 stations are primarily found in country areas. All ambulance officers complete a case card (see Appendix 1) for every case they attend. However, if they do not carry the patient (ie they treat at scene, or the patient is carried by another means), much of the information on the case is not entered into the database. These cases are not included in this collection. For more information on level of skill and station location, see Appendix 2. South Australian ambulance service information.

Between 1 July 1995 and 30 June 1998, there were 349 cases identified by the South Australian Ambulance Service where the scene location was *agriculture, forestry, or mining*. For this study there were 116 cases in the 1995/96 financial year, 112 in 1996/97 and 121 in 1997/98. The South Australian Ambulance has 13 different locations of incident, but for this study only the farm locations was used, although farm injuries could also occur in the home and surrounds, outdoors and on roads.

Figure 4.1 Age / sex for South Australian ambulance transportations, 1995/96 –1997/98 financial years, where scene location was *agriculture, forestry, or mining*



Of the 349 people transported, there were 276 (79.1%) males and 73 (20.9%) females. The average age of people transported was 43.6 years where the scene location was *agriculture, forestry, or mining*. The average age for males was 43.6 years and for females 44.0 years.

Figure 4.1 shows the number of males transported steadily increased until the 40-44 years age group, after this there is a decline with the numbers levelling out after the 50-54 years age group. The female age structure is scattered throughout with no noticeable trend.

Table 4.1 Reason for ambulance transport, South Australian ambulance, 1995/6 – 1997/8 financial years, where scene location was *agriculture, forestry, or mining*.

	Females	Males
ELECTIVE CASES		
PUBLIC HOSPITALS		
Public Hospital Admission	*	8
Public Hospital Discharge	*	*
Public Hospital to Public Hospital	*	8
To/From Public Hospital	3	6
PRIVATE HOSPITALS		
Private Hospital Transport	*	5
Private X-ray / OPD / CAT	3	*
NURSING HOME		
Nursing Home to Public Hospital	*	
AIR AMBULANCE		
Other Air Ambulance		6
South Australian Air Ambulance	*	3
PRIMARY MEDICAL CONDITION		
CARDIAC	*	14
RESPIRATORY	*	18
NEUROLOGICAL	5	10
GENERAL		
Acute abdomen	*	6
Acute Allergic Reaction	*	3
Alcohol Intoxication		*
Diabetic		5
Infection		*
Maternity / Obstetric	*	
Neoplasm (Cancer)		*
Poisoning		*
Substance abuse/overdose – Non-Narcotic		*
Unknown Medical Condition	*	8
Other General	10	18
SEVEREST TRAUMA INJURY		
Abdominal Injury	3	7
Chest Injury	4	9
Head Injury	4	26
Head / Spinal injury	*	8
Limb Injury	9	54
Spinal Injury	3	11
Other	*	18
Null	10	18
Total	73	276

*Represent values less than three

Table 4.1 displays the reasons for ambulance transportation by the South Australian Ambulance Service. The largest number of cases fell into the *severest trauma injury* group. The largest number of transportations was *limb injury* 63 (18.1%), followed by *head injury* 30 (8.6%), *other general* 28 (8.0%) and *respiratory* 20 (5.7%).

Table 4.2 Primary trauma cause, South Australian ambulance, 1995/6 – 1997/98 financial years, where scene location was agriculture, forestry, or mining

Primary Trauma Cause	Female	Male	Total
Blunt Trauma	7	43	50
Fall	8	41	49
Other	5	15	20
Crush Injury	4	9	13
Penetrating Trauma		12	12
Burns		6	6
Sheering Force	*	5	6
Electrocution		4	4
Gas/Inhalation/Suffocation		4	4
Exposure	*	*	*
Total	26	140	166

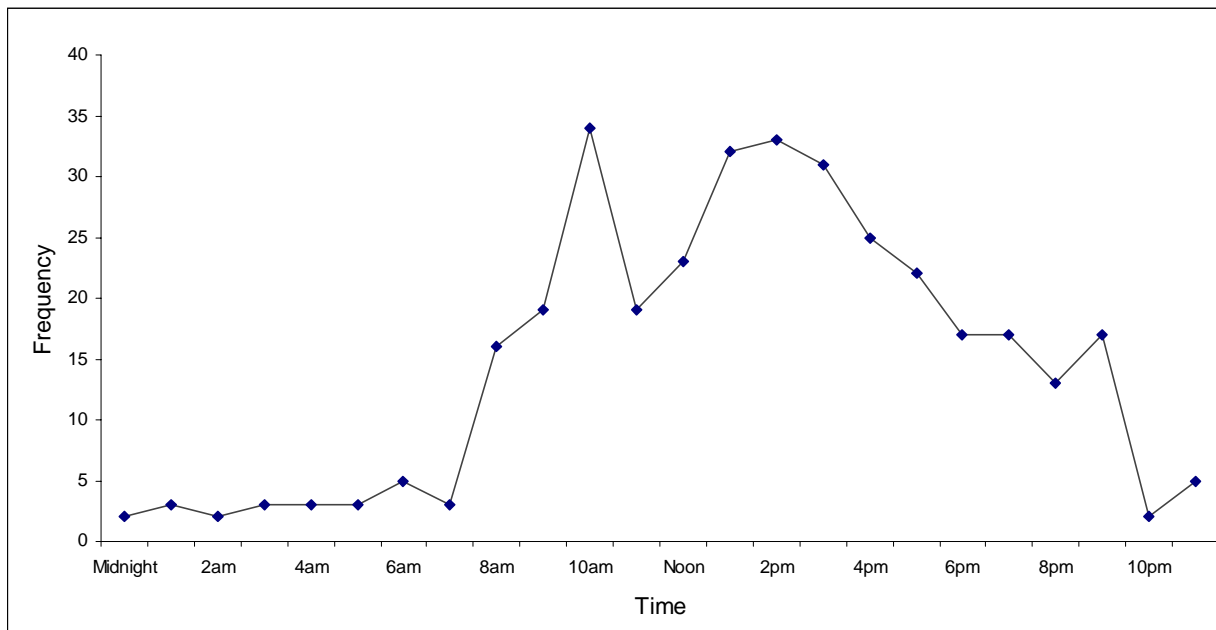
Table 4.2 displays the primary trauma cause. *Blunt trauma* 50 (30.1%), *fall* 49 (29.5%) and *other* 20 (12.0%), make up a high proportion of all injuries.

Table 4.3 Other trauma information, South Australian ambulance, 1995/6-1997/8 financial years, where scene location was agriculture, forestry, or mining

Other Trauma Information	Female	Male	Total
Industrial or Work related	6	83	89
Unknown / Other Trauma	4	7	11
Sporting / Recreational	*	8	10
Road – Motor Vehicle accident	*	7	8
Road – Other Accident	*	4	5
Animal Bites / Stings	*	3	4
Assault	*	3	4
Domestic		3	3
Attempted Suicide	*	*	*
Total	17	119	136

In Table 4.3 other trauma information is displayed with most injuries due to *industrial or work related* 89 (65.4%).

Figure 4.2 Dispatch time, South Australian ambulance, 1995/6 – 1997/8 financial years, where scene location was *agriculture, forestry, or mining*



In Figure 4.2 it can be seen that from 7am, as the day progresses towards noon there is a gradual increase in cases, although there is a peak between 10am and 10:59am and then a gradual decline. There are very few cases between 10pm and 8am 14 (12.1%).

Summary

- The value of this data is very limited for farm injury prevention or management purposes, as forestry and mining are included in the dataset. However, ambulance data has a high potential to be a very useful source of information about on-farm trauma and medical emergencies.
- There were 349 identified cases between 1 July 1995 and 30 June 1998 where scene location was *agriculture, forestry, or mining*.
- The average age of those transported by South Australian ambulance was 43.6 years.
- The largest number of transportations was due to *limb injuries* followed by *head injuries*.
- The primary trauma cause was due to *blunt trauma*, followed by *fall* and *other*.
- The majority of transportations 89 (65.4%) were *industrial or work related*.
- The majority of cases occur between 7am and 10pm.

Recommendations

1. Special coding should be established to define 'farm' as a location separate from 'forestry' and 'mining' for farm injury.
2. Improvements in coding and definitions would allow better compilation of injury information.
3. Collection of ambulance information should be collected annually and made available to Farmsafe South Australia and The National Farm Injury Data Centre.

Section 5: Farm injury cases admitted to South Australian hospitals

The South Australian Health Commission provided the information for this section.

In 1996 there were 2,118 in-patients identified by the South Australian health commission as being admitted with injury where the location was 'farm'. Of these 1,203 (56.8%) were males and 916 (43.2%) were females.

Farmsafe Australia has used a selection of E-coded injuries to monitor programs with farm injury prevention (FSA, 1996). These were selected in light of observed coding errors with some injuries.

Table 5.1 Hospital separations due to selected injury on farm South Australian - E-code 1996

E-Code	Description	Male	Female	All
E820-E829	Motor-vehicle non traffic accident & Other road vehicle accidents			
	Motorcycle	53	3	56
	Other Vehicle	45	8	53
	Animal ridden	16	15	31
E862	Poisoning by petroleum products	4	*	6
E863	Poisoning by agricultural chemicals	7	*	9
E864	Poisoning by corrosives & caustics	3	*	4
E866	Poisoning by gases and vapours	*	*	4
E891-899*	Fire and Flames	*	*	3
E905	Venomous animals and Plants	31	10	41
E906.0	Dog bite	9	4	13
E906.8	Injury by other animal	28	17	45
E919.0	Agricultural Machinery	45	*	46
E919.1-9	Other machinery	15	4	19
E920	Cutting and piercing	90	25	115
E922	Firearms	*	*	*
	Total Subset	352	95	447

* Farmsafe Australian defined E-Codes that were used for farm injury. Excluding: E893.0, E895 and E898.0

Table 5.1 displays the separations due to selected farm injury. There were 447 injuries, of these 352 (78.7%) were males and 95 (21.3%) were females. The largest number of injuries 115 (25.2%) were due to *cutting and piercing* followed by *motorcycles* 56 (12.5%) and *other vehicle* 53 (11.9%). There were also large numbers of injuries due to *agricultural machinery* 46 (10.3%), *injury by other animals* 45 (10.1%) and *venomous animals and plants* 41 (9.2%).

Table 5.2 Hospital separations due to selected injury on South Australian farms, 1996, children <15 years

E-Code	Description	Male	Female	All
Children				
E820-E829	Motor-vehicle non traffic accident & Other road vehicle accidents			
	Motor cycle	22	*	24
	Other Vehicle	14	4	18
	Animal ridden	*	4	6
E862	Poisoning by petroleum products	3	*	5
E863	Poisoning by agricultural chemicals	*	*	4
E864	Poisoning by corrosives & caustics	*	*	3
E866	Poisoning by gases and vapours	*	*	3
E890-899*	Fire and Flames			
E905	Venomous animals and Plants	6	4	10
E906.0	Dog bite	7	3	10
E906.8	Injury by other animal	4	3	7
E919.0	Agricultural Machinery	*		2
E919.1-9	Other machinery	*		*
E920	Cutting and piercing	16	9	25
E922	Firearms			
Total Subset		82	36	118

* Farmsafe Australian defined E-Codes that were used for farm injury. Excluding: E893.0, E895 and E898.0

Table 5.2 displays the South Australian separation data for the children by selected E-codes for 1996. Of the 118 injuries identified by the E-codes 82 (69.5%) were to males and 36 (30.5%) were females. The most common injury in children is *cutting and piercing* 25 (21.2%), followed by *motorcycles* 24 (20.3%) and *other vehicle* 18 (15.3%). There is also a large difference between males and females in the motorised vehicles category 36 to 6, ie for every 6 males injured 1 female is injured.

Figure 5.1 South Australian Hospital Separations – selected farm injury 1996. Age-sex profile (N=447)

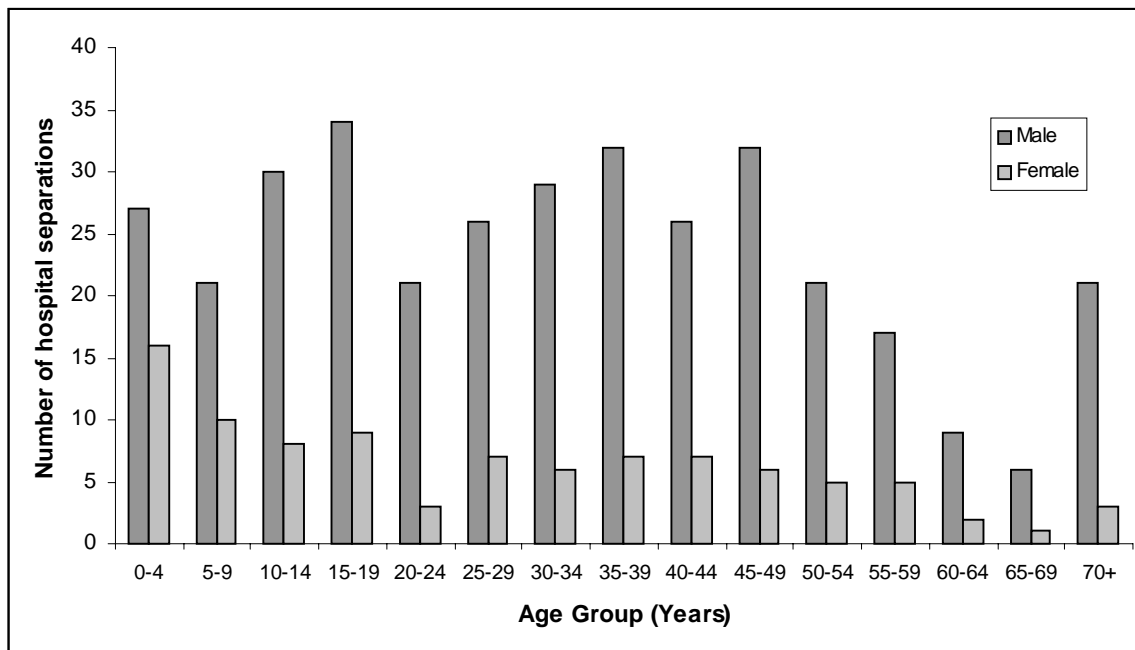


Figure 5.1 displays the age/sex distribution of South Australian hospital separations for selected farm injuries in 1996. The numbers of injuries are fairly consistent from 0-50 years of age with a steady decline after 50 years. It should be noted that the 5-9 year olds and the 20-24 year olds are the smallest age groups, before 50 years of age.

Figure 5.2 Day of the week the injury occurred. Admission to South Australian hospitals for selected farm injuries in 1996 (N=447)

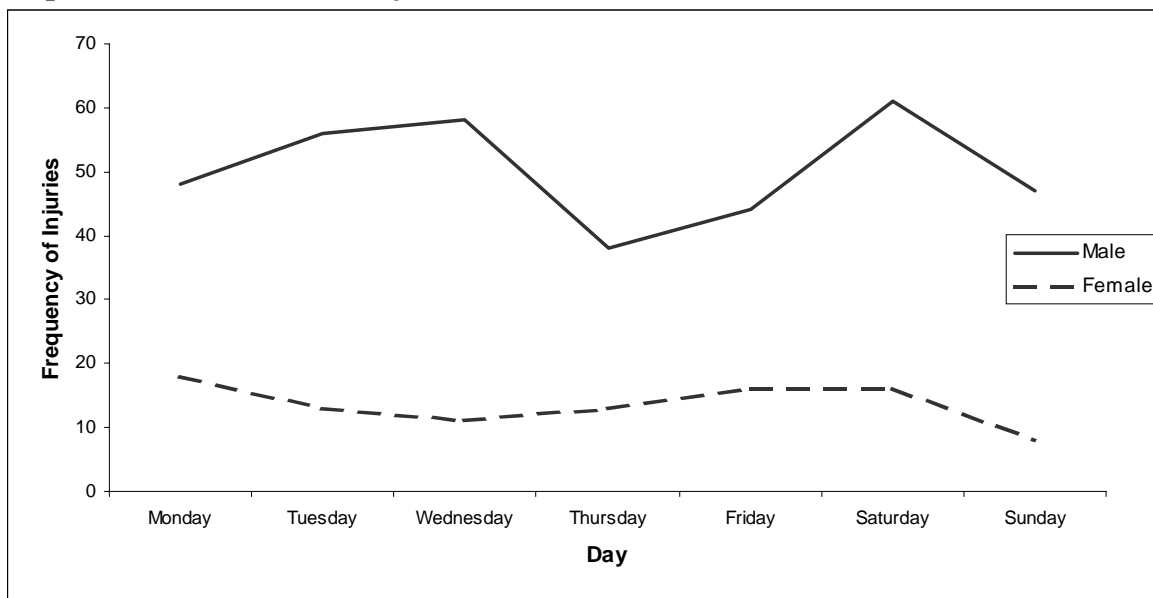


Figure 5.2 displays the number of injuries by day of week. Three days of the week where injuries were more common were Tuesday, Wednesday and Saturday. The day of the week with the least number of injuries was Thursday, although the injuries were reasonably spaced throughout the week.

Figure 5.3 Month of the year when selected farm injury occurred. Admission to South Australian hospitals for selected farm injuries in 1996 (N=452)

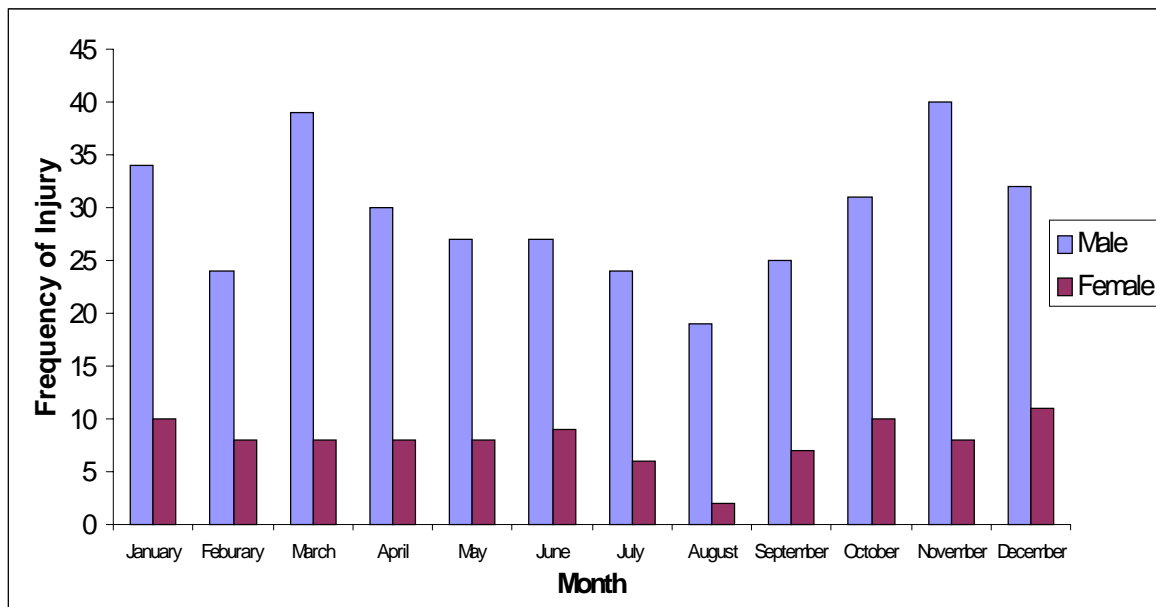


Figure 5.3 displays the monthly injury numbers. March and November for the males are the two peak months and August and February are the two lowest months. The numbers for females are fairly consistent throughout the year with the peaks being around harvest time and August having the lowest numbers.

Summary

- There were a total of 2,118 patients admitted to South Australian hospitals during 1996 where the location of place where injury occurred was coded as 'farm'.
- There were 447 hospital separations during 1996 in South Australia where 'farm' was the location for selected injuries.
- Of the 447 cases 352 (78.7%) were males.
- The largest numbers of injuries 115 (25.7%) were due to *cutting and piercing* cases.
- Farm machinery, farm vehicles including ag-bikes and animals are important causes of admission to South Australian hospitals.
- There were 118 (26.4%) children admitted to hospital for selected farm injuries. The largest numbers of these injuries were from *cutting and piercing* 25 (21.2%) and *motorcycle* 24 (20.3%).
- More injuries occurred on Saturday than any other day of the week.
- The two months with the most injuries were March and November.

Recommendations

1. Farm injury prevention programs in South Australia should include farm machinery safety, motorcycle safety, safe horse handling, safe animal handling and child safety on farms.
2. Regular collection of hospital information should be obtained and reported each year both through Farmsafe South Australia and Farmsafe Australia.

Section 6: General Practice studies of farm injuries

Eyre Peninsula farm study synopsis

Richard Franklin & Alex Van Rooijen

During 1997 and early 1998 the Eyre Peninsula Division of General Practice conducted a study into farm injury in the Eyre Peninsula. The following information is a synopsis of the Draft Final Report of the study by Alex Van Rooijen (1998).

The aims of the Eyre Peninsula Division of General Practice farm injury study were:

- 1. To develop and use an appropriate data collection tool which will provide information on the incidence, type and severity of farm injuries presenting to hospitals, GP surgeries and physiotherapists on the Eyre Peninsula.*
- 2. Disseminate the collected information to all GP's and hospitals on the Eyre Peninsula, the farming community, the South Australian Health Commission Grants Committee and any other interested organisations.*

The Eyre Peninsula is located North West of Adelaide and covers an area of over 30 000 square kilometres. The climate varies from cool and temperate in the south to arid in the west. Annual rainfall ranges from 250mm in the west to over 500mm in the east. The population of the Eyre Peninsula, excluding the industrial city of Whyalla (25,500) is approximately 34,000 people. The three largest towns in the study area are Port Lincoln (11,345), Ceduna (2,753) and Tumby Bay (1,147). The Eyre Peninsula contains 2,982 farmers on 1,618 farms. The main commodities produced in the Eyre Peninsula are cereals and sheep.

A questionnaire was used to collect information on people presenting at hospitals, GP surgeries and physiotherapists for treatment of a farm injury. The information collected in the questionnaire included the following areas;

- Demographic information about the patient
- What they were doing at the time of the injury
- How the injury occurred
- What equipment was involved
- Whether they were using safety equipment
- The amount of experience the injured person had with the activity
- The commodity / commodities produced on the farm

There were 29 collection sites for the questionnaires, of these 10 (34.5%) were hospitals, 15 (51.7%) were GP surgeries and 4 (13.8%) were physiotherapists. The 10 hospitals ranged in size from 12 to 50 beds.

The collection of farm injury data occurred between 1 February 1997 and 31 January 1998. During this period 145 questionnaires were completed. The injury rate was 1 injury per 11.2 farms for the study year or 9.0 injuries per 100 farms. Of the 145 injured 120 (82.8%) were collected from the hospitals, 20 (13.8%) were from GP surgeries, four (2.8%) from physiotherapist and there was one (0.7%) unknown.

Figure 6.1 Monthly total of completed questionnaires, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

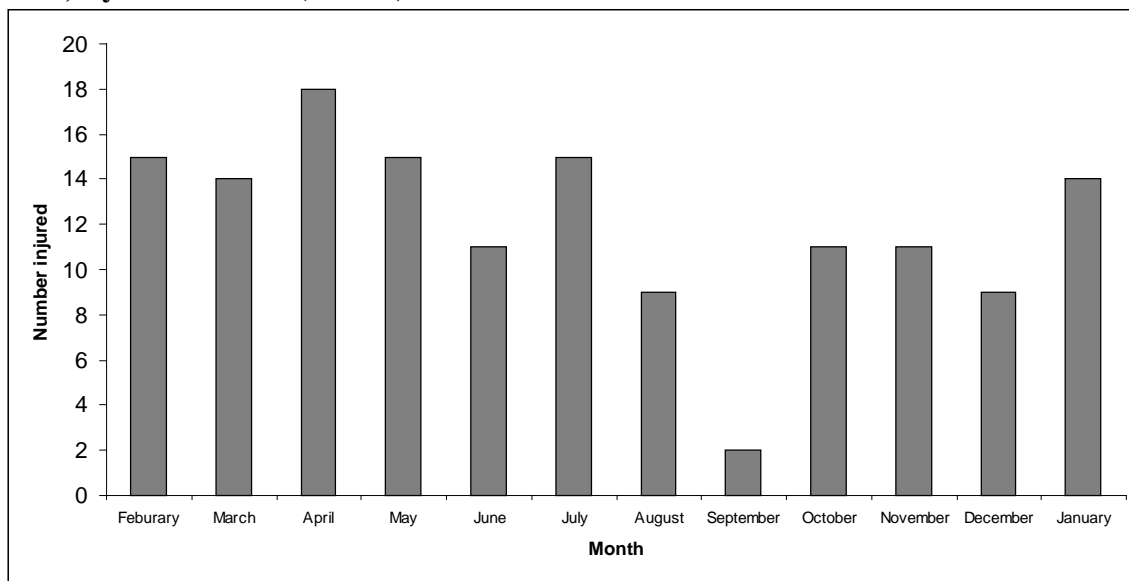


Figure 6.1 displays the number injured by month. There was a steady incline in the number of farm injury presentations from February to April with a peak at April and a decline from May to September and an increase from October until January. There was on average 12 presentations per month. The majority of these occurred between 9am and 6pm.

Of the 145 injured there were 139 (95.9%) males and six (4.1%) females. Three of those injured were born outside of Australia and all patients came from an English speaking background. The ages of the patient ranged from three to 77 years old with an average age of 37.4 years. The mean age for males was 37.7 years and 36.1 years for the females.

Figure 6.2 Age groups of injured persons reporting farm injuries, percentage of respondents per age group, Eyre Peninsula, 1 February 1997 – 31 January 1998 (N=145)

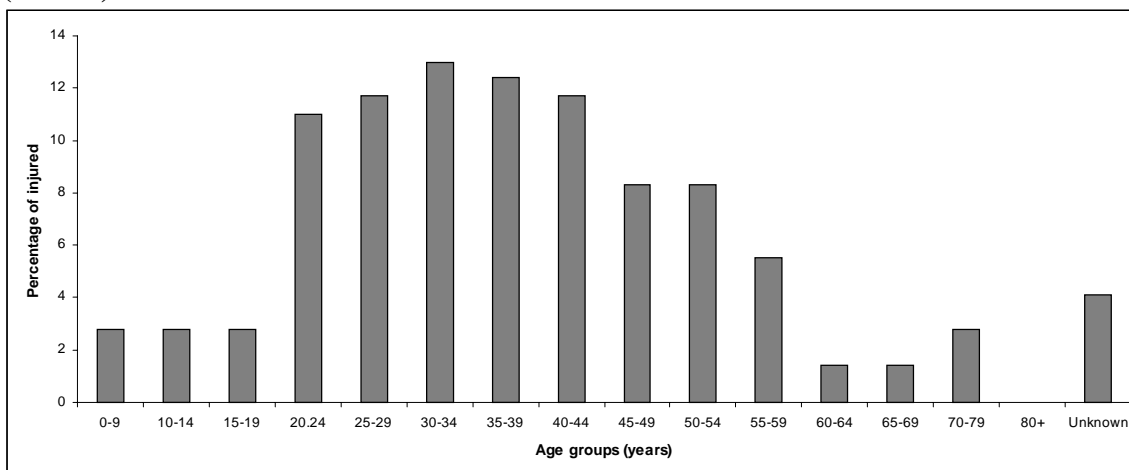


Figure 6.2 displays the age of those injured on a farm in the Eyre Peninsula in 5-year age groups. The majority of people injured were aged between 20 years and 55 years with a peak in the 30-34 age group. There was also a small number of people under the age of 20 years being injured.

The occupations of those injured ranged from *apprentice diesel mechanic* to *wool classer* with the majority being *farmers* 95 (65.5%), *shearers* 11 (7.6%) or *farmhands* nine (6.2%).

Figure 6.3 Injured persons role on the farm, percentage of respondents for each group, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

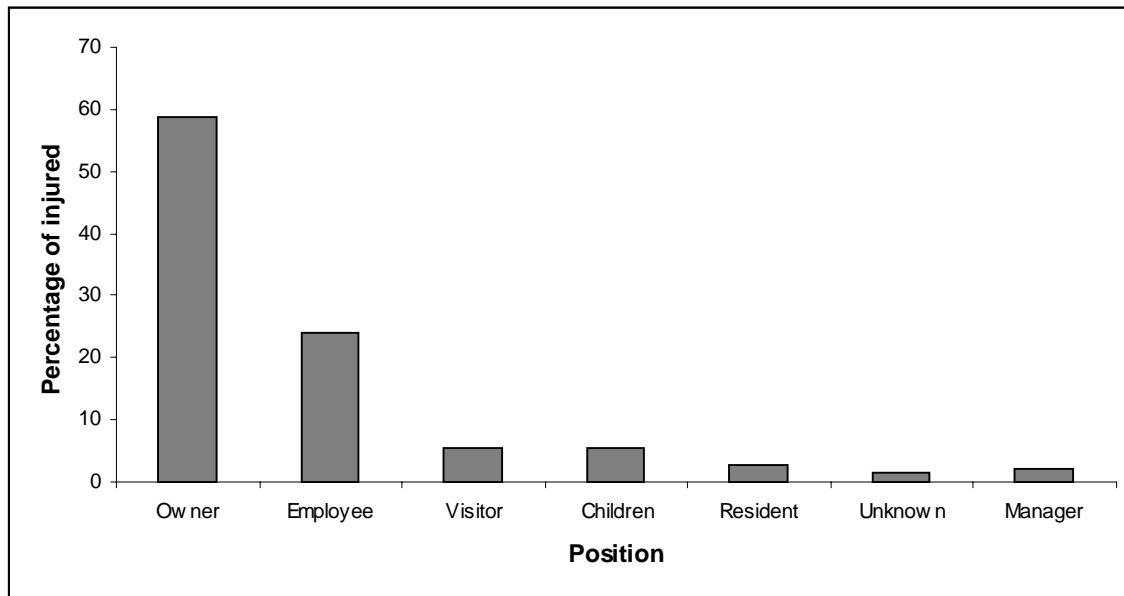


Figure 6.3 displays the injured person's role on the farm. The largest number of people injured were *owner* 85 (58.6%), followed by *employee* 35 (24.1%) and then *visitor* and *children* with eight (5.5%) each.

Figure 6.4 Hours worked per week by people reporting farm injuries, percentage of respondents per grouped hours worked, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

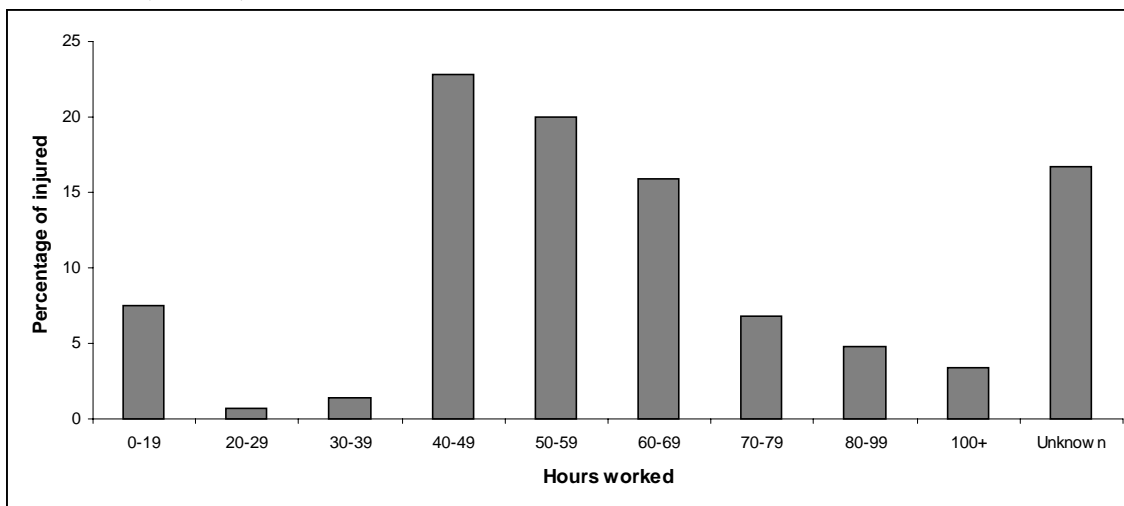


Figure 6.4 displays the hours worked per week for those who received an injury. Only 14 (9.7%) worked less than 40 hours per week in the weeks leading up to their injury, although 24 (16.7%) were *unknown or not applicable* for number of hours worked. Hours slept was also examined with half reporting they sleep 7.5-8 hours per night.

Figure 6.5. Farm classifications on which the injuries occurred, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

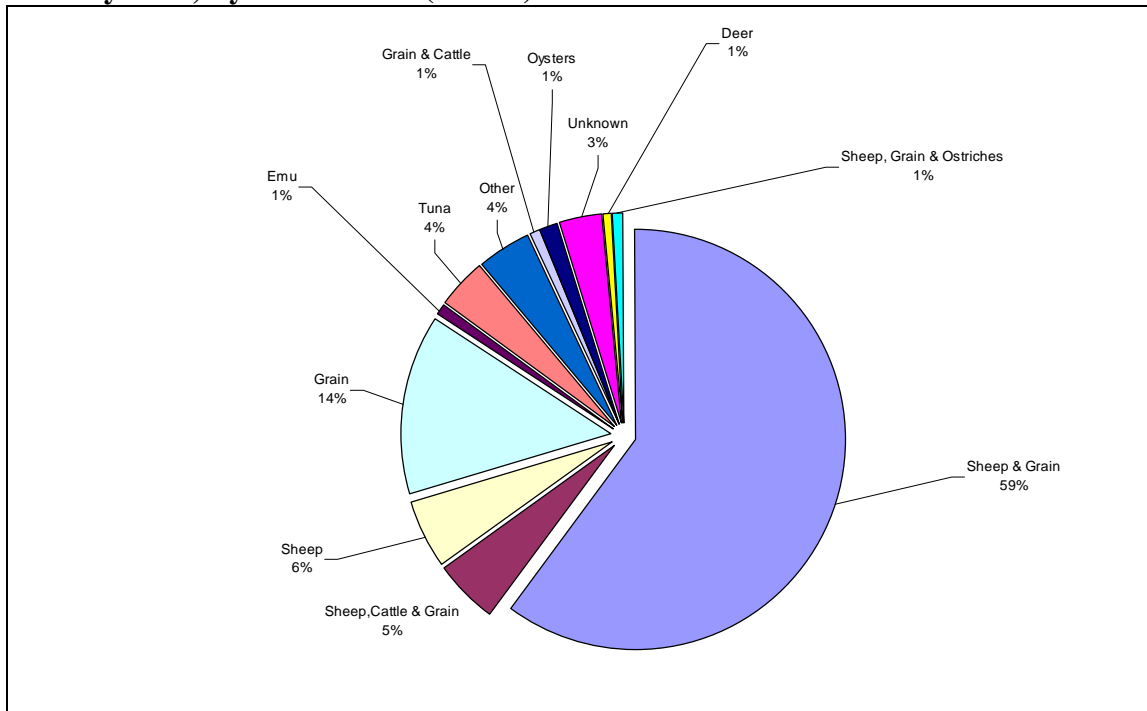


Figure 6.5 displays the farm commodity classification. It can be seen that *sheep & grain* 87 (60.1%) farms were the largest group followed by *grain* 20 (13.8%), then *sheep* eight (5.5%) and then *sheep, cattle & grain* seven (4.8%). Other commodities represented include tuna, oyster, deer, emu and ostrich farming.

Figure 6.6 Location on farm where the reported farm injuries occurred, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

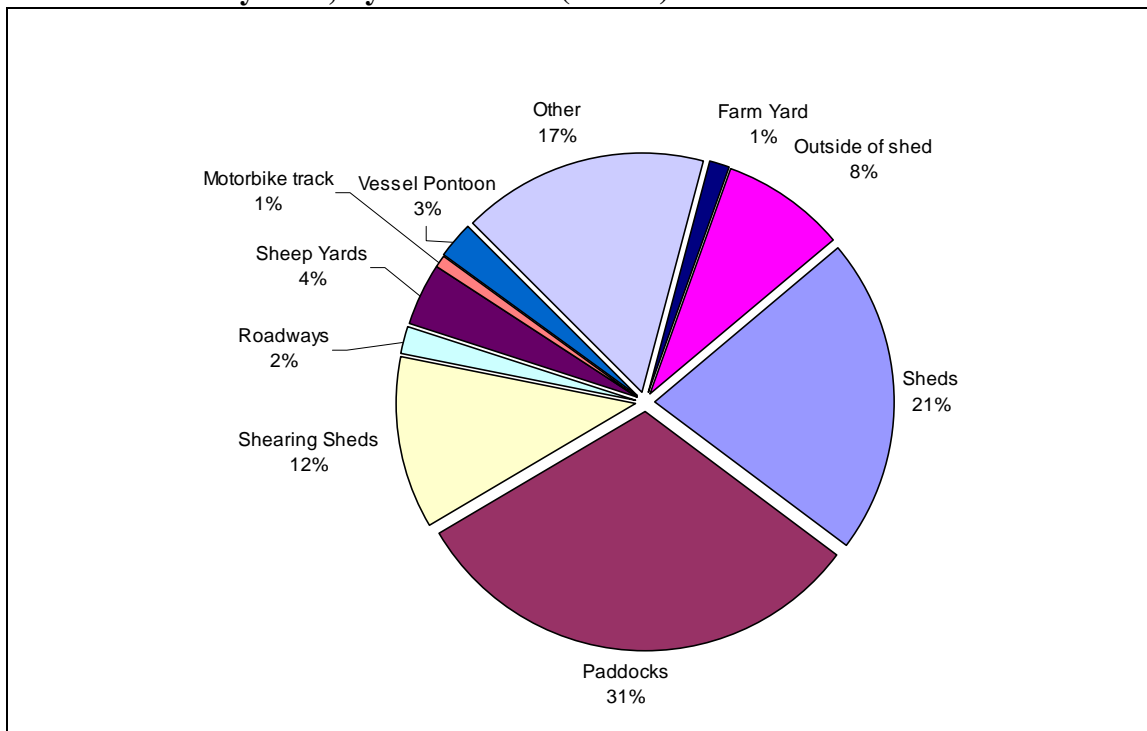


Figure 6.6 shows the location on farm where the reported farm injuries occurred. The largest group was *sheds* 48 (33.1%), followed by 45 (31.0%) *paddocks* and then 25 (17.2%) *other*.

Figure 6.7 Causes of the reported farm injuries, 1 February 1997 – 31 January 1998, Eyre Peninsula (N=145)

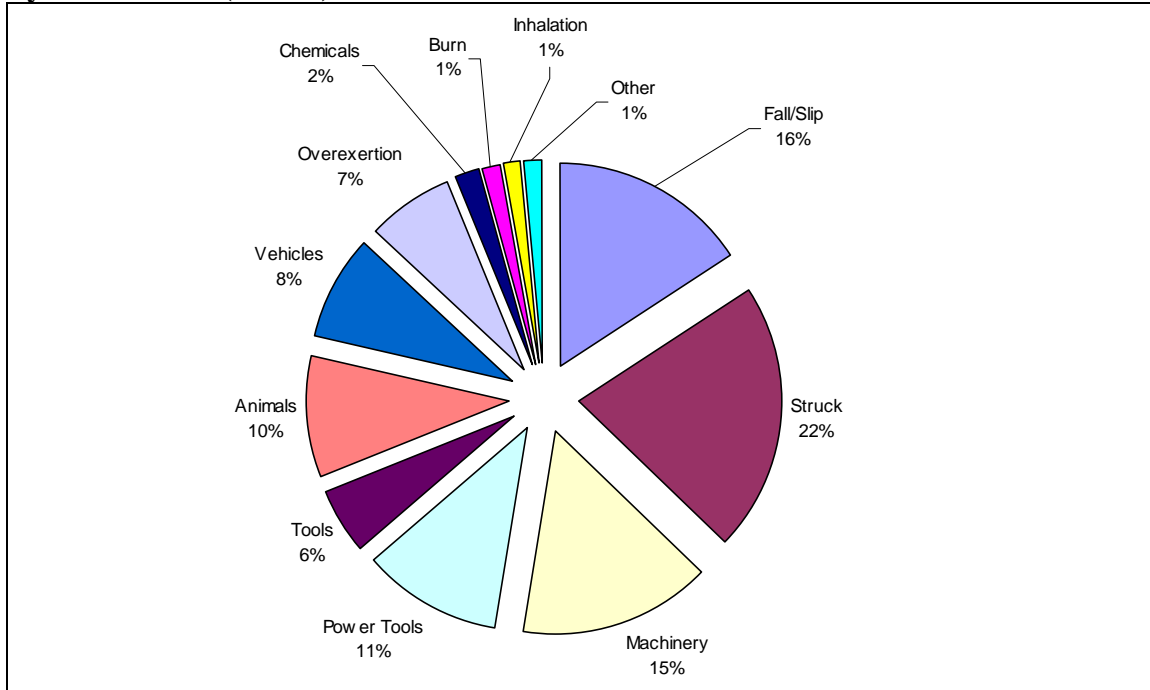


Figure 6.7 displays the causes of the reported farm injury. The largest group is *struck* 31 (21.4%), followed by 23 (15.9%) *fall/slip* and 22 (15.2%) *machinery*. The other significant groups were 16 (11.0%) *power tools*, 14 (9.7%) *animals*, 12 (8.3%) *vehicles*, 10 (6.8%) *overexertion* and eight (5.5%) *tools*.

For those injuries where an animal was involved, *sheep* 22 (78.6%) were involved more often. Other animals included two (7.1%) *cattle* and one (3.6%) each of *emu*, *bee*, *tuna* and *horse*. *Chemicals* were involved in three injuries. There were 20 different types of farm equipment involved in 28 equipment-related injuries. The largest group was *headers* 12 (42.9%) followed by *augers*, *cultivator* and *welders* with five (17.9%) each and then *boom sprays* and *pontoons* with four (14.3%) each.

Of the 19 injuries that involved a power tool (including plant equipment), the majority 10 (52.6%) were from *angle grinders* followed by *hand piece* five (26.3%), *chain saw* three (15.8%) and *bench grinder* 2 (10.5%). *Tools* were involved in 16 injuries and six (37.5%) of these were from a *knife*. Two (12.5%) injuries from a *hammer* and two (12.5%) from a *spanner* and one (6.2%) injury from each of the following: *wire cutters*, *pliers*, *jack*, *file* and *post rammer*.

Figure 6.8 Vehicles involved in farm injuries, percentage of injuries, Eyre Peninsula, 1 February 1997 – 31 January 1998 (N=35)

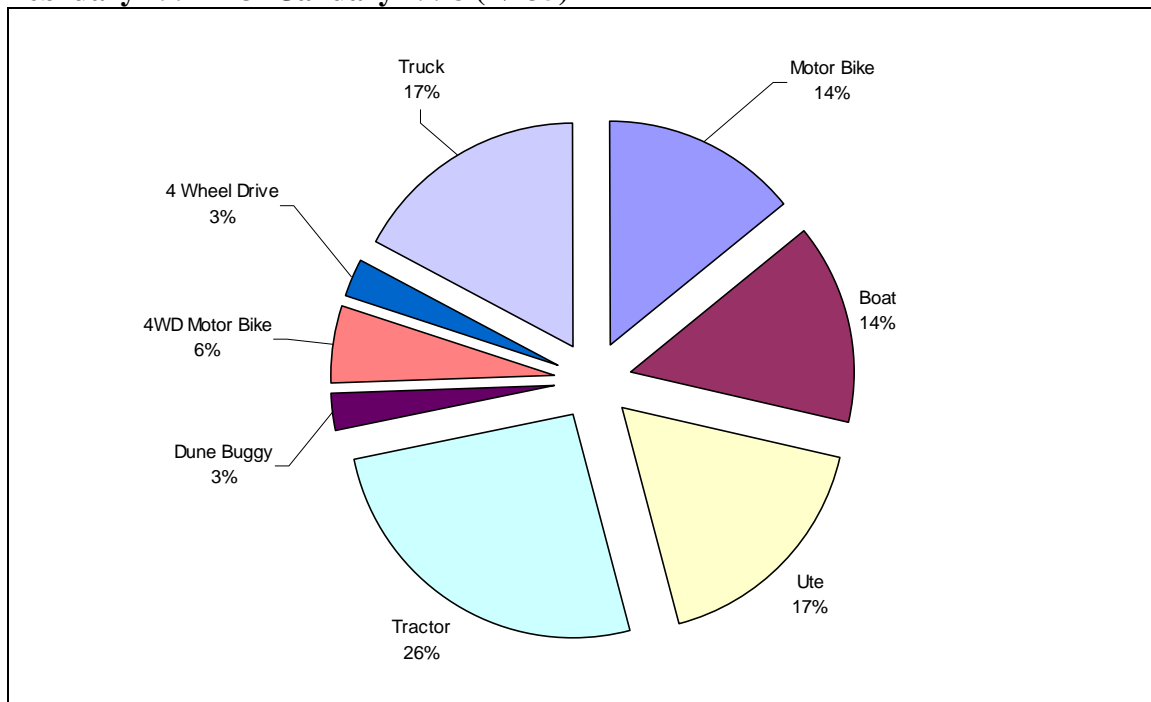


Figure 6.8 displays the vehicles involved in farm injuries. *Tractors* caused the nine (26.0%) injuries followed by *utilities* and *trucks* which caused six (17.1%) injuries each, *motorbikes* and *boats* which caused five (14.3%) injuries each. *Dune buggies*, *4-wheel drive motor bikes* and *4-wheel drive* - were there other vehicles involved in vehicle injuries.

Figure 6.9 Types of injuries sustained on farm from the Eyre Peninsula study, 1 February 1997 – 31 January 1998 (N=176)

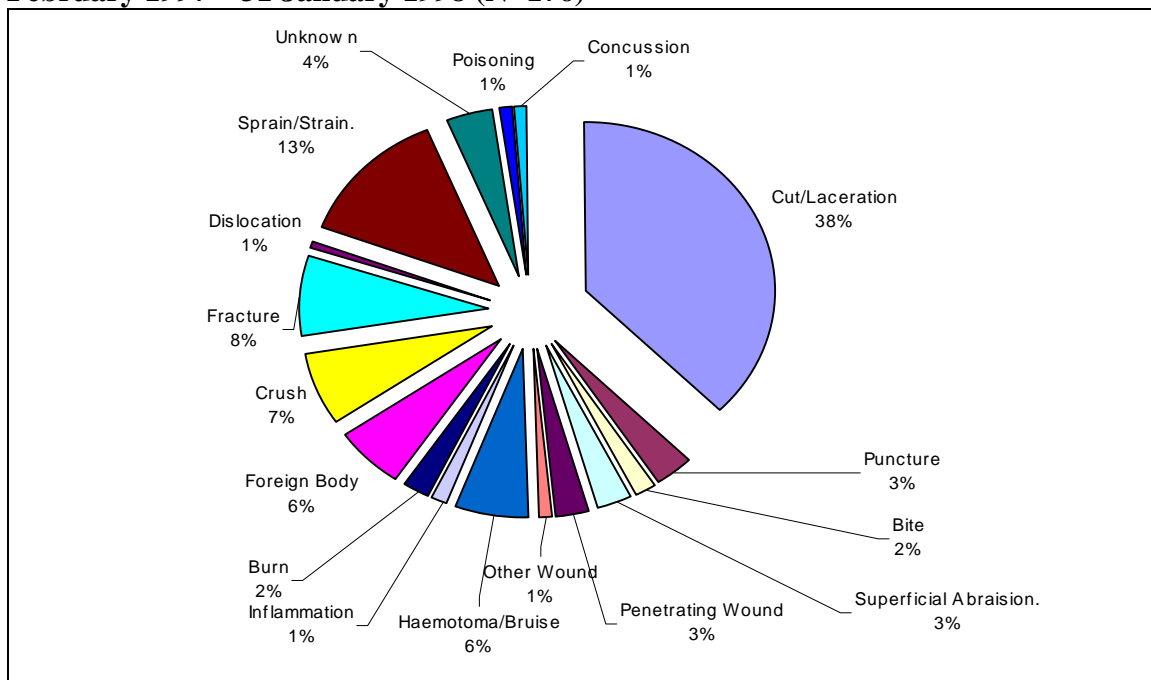


Figure 6.9 displays the types of injuries sustained. Of those injured 67 (38%) were from *cut/laceration*, 23 (13%) were from *sprain/strain*, 14 (7%) were *fracture* injuries, 12 (7%)

were *crush* injuries, 11 (6%) were *foreign body* and 11 (6%) were *haematoma/bruise* injuries.

Table 6.1 Body location of injuries of farm injury patients, Eyre Peninsula, 1 February 1997 to 31 January 1998, (N=176)

Body Location	Frequency of Injury
Arms	74
Legs	42
Eyes	18
Head/Face	16
Back	7
Unknown	5
Neck	3
Trunk	3
Chest	2
Nervous system	2
Lungs	2
Stomach	1
Kidneys	1
Total	176

Table 6.1 displays the body location injured from a farm injury. The body location most injured was the *arms* 74 (73.9%) followed by the *legs* 42 (42.2%), *eyes* 18 (17.6%) and *head/face* 16 (15.8%).

Summary

- During the period 1 February 1997 to 31 January 1998, there were 145 farm injuries reported in the Eyre Peninsula, which is a rate of 8.96 injuries per 100 farms.
- The majority of cases were collected from hospitals 120 (82.8%).
- The largest number of injuries for any one month occurred in April with 18 (12.4%) injuries. There were on average 12 farm injuries per month.
- Males represented 139 (95.9%) of the injuries reported.
- The average age was 37.4 years.
- The main occupation was *farmer* with 95 (65.5%) injuries recorded.
- The *owner* was the person most often involved in a farm injury, with 85 (58.6%) injuries recorded.
- Mixed *sheep and grain* farms had the most farm injuries with 87 (60.1%) injuries recorded.
- The area on the farm where the largest number of injuries occurred was *sheds*, with 48 (33.1%) cases being recorded.
- The largest cause of farm injury was *struck* 31 (21.4%).
- *Tractors* were the cause of nine (6.2%) injuries.
- *Cut / laceration* 67 (38.1%) was the largest type of farm injury.
- The *arm* 74 (51.0%) was the most common body location of a farm injury.
- The rate of farm injuries reported is low compared to other Australian studies. No information is provided about the proportion of people injured on farms participating in the study.

Yorke Peninsula Division of General Practice

Richard Franklin

The Yorke Peninsula Division of General Practice is located North West of Adelaide on the Yorke Peninsula. Major towns in the area include Kadina, Moonta, Minlaton, Warooka, Yorketown, Maitland, Wallaroo, Bute and Port Broughton. A picture of the region can be seen in Figure 6.1.1. The area is comprised of eight Statistical Local Area's (SLA's). These are: Warooka, Yorketown, Minlaton, Central Yorke Peninsula, Northern Yorke Peninsula, Wallaroo, Bute and Port Broughton. All of these SLA's are classified as 'other rural areas' (Fragar, Gray, Franklin & Petrauskas 1997).

There are 23,244 people living in the area serviced by the Yorke Peninsula Division of General Practice. Of these 11,664 (50.2%) are males and 11,580 (49.8%) are females.

Figure 6.10 Population pyramid for the Yorke Peninsula Division of General Practice

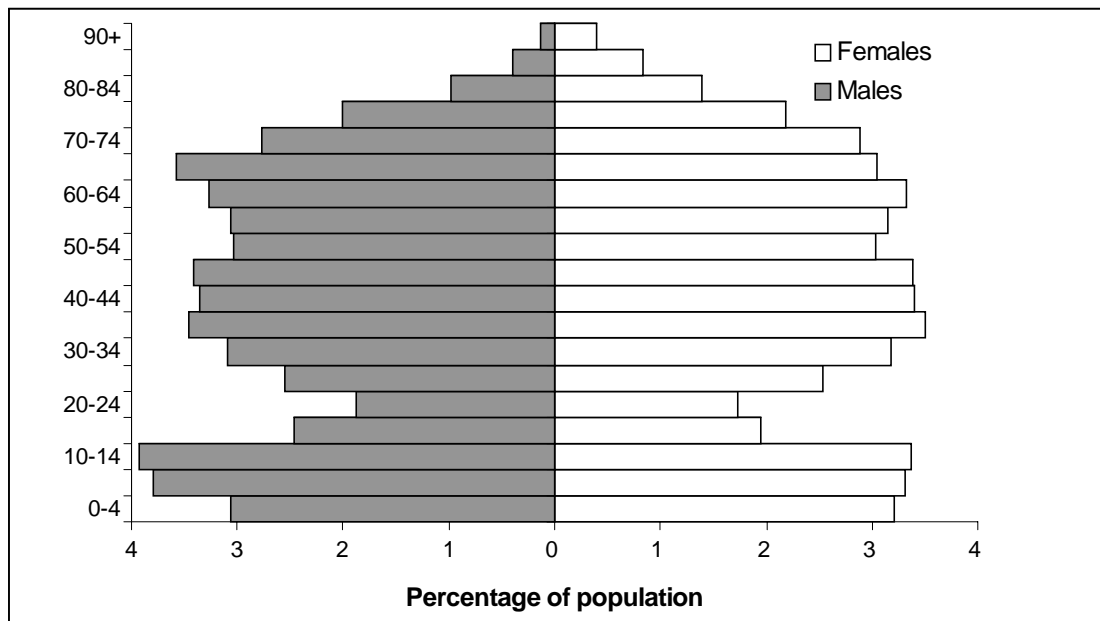
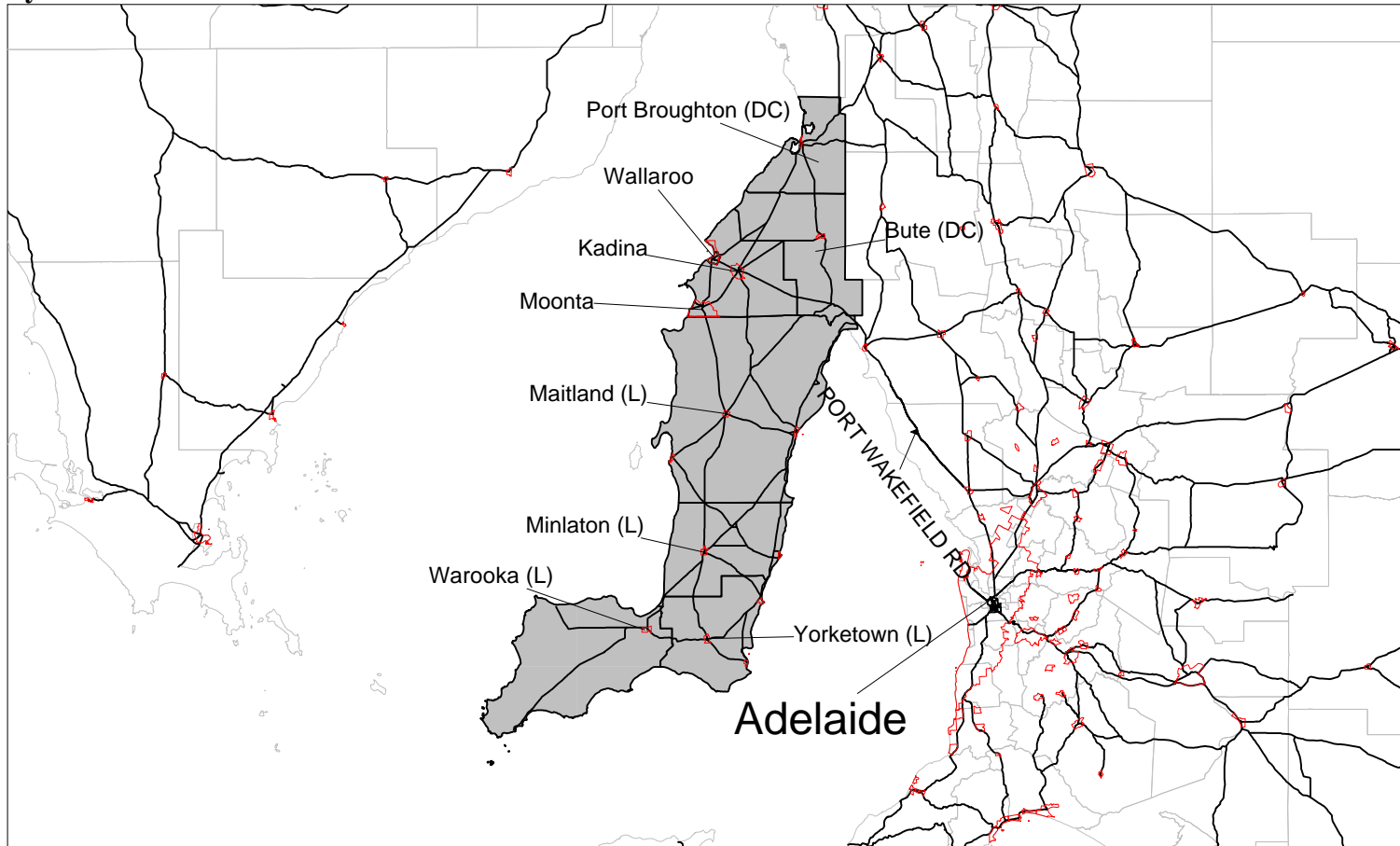


Figure 6.10 displays the age/sex distribution of the area. As with many other rural areas there is a noticeable scarcity of people in the 15-34 year age range (Fragar, Gray, Franklin, Petrauskas 1997). The other feature is that 20.6% of the population is aged 65 years or older. This is unusual in that the 40-44 year group are underrepresented in other studies with the same definition of 'other rural areas' (Fragar, Gray, Franklin & Petrauskas 1997).

Figure 6.11 Display of Yorke Peninsula Division of General Practice



Prepared by Richard Franklin from Cdata96 on 16 September 1998.

Table 6.2 Industries in area served by the Yorke Peninsula Division of General Practice by workers (N=7620)

Industry	Number of Workers
Agriculture, Forestry & Fishing	1907
Retail Trade	1038
Health & Community Services	753
Education	558
Manufacturing	404
Wholesale Trade	396
Accommodation, Cafes and Restaurants	367
Construction	343
Not stated	319
Government Administration & Defence	247
Transport & Storage	240
Personal and Other Services	225
Property & Business Services	207
Communication Services	178
Finance & Insurance	175
Mining	93
Non-classifiable economic units	68
Electricity, Gas & Water Supply	52
Cultural & Recreational Services	50
Total	7620

Source: ABS 1998

Table 6.2 displays the industries for this area. *Agriculture, Forestry & Fishing* is the largest industry group 1,907 (25.0%) followed by *Retail Trade* 1,038 (13.6%) and *Health and Community Services* 753 (9.9%). When examining the number of people employed by the government (ie government, administration & defence; education; & health & community services) there are 1,558 (20.4%), making it the second largest industry in the area.

Table 6.3 Age groups of those who work in the Agriculture, Forestry & Fishing industry for 1996

Age	Males	Females	Total	%
15-19	46	9	55	2.9
20-24	111	7	118	6.2
25-34	294	67	361	18.9
35-54	655	274	929	48.7
55+	315	129	444	23.3
Total	1421	486	1907	100.0

Table 6.3 displays the age grouping for Agriculture, Forestry and Fishing industry. It is shown that 929 (48.7%) people working in this industry are in the age range 35-54 and 444 (23.3%) are aged 55 years and over.

Figure 6.12 Agricultural industries in the Yorke Peninsula Division of General Practice for 1994, (N=1017)

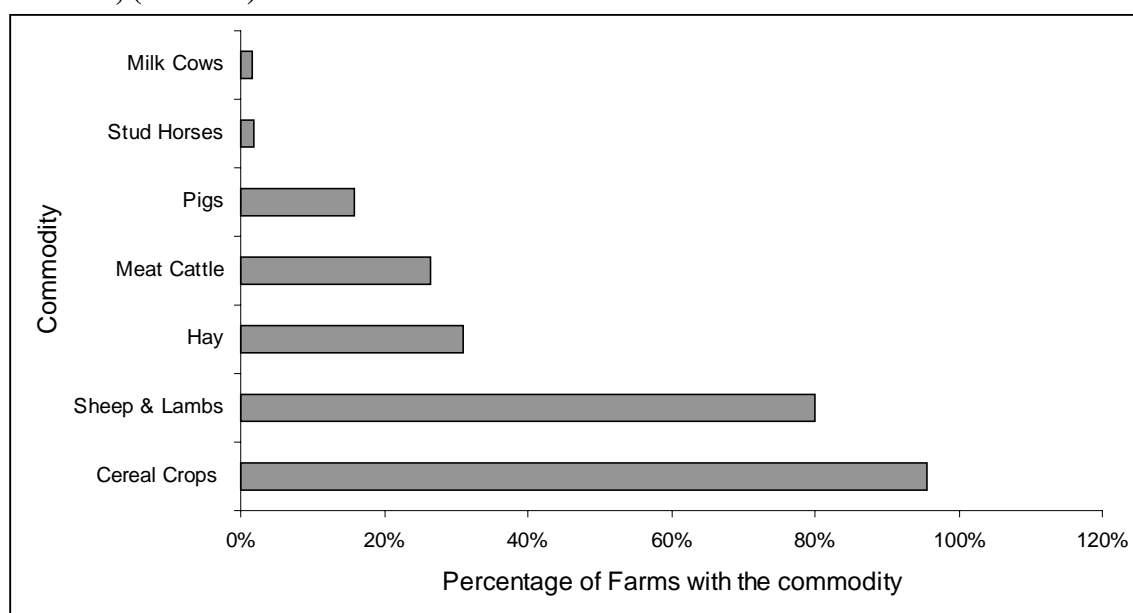


Figure 6.12 displays the agricultural industries in the Yorke Peninsula for 1994. There were 1,017 agricultural establishments in the Yorke Peninsula and of these *cereal crops* were present on 972 (95.6%) establishments, *sheep and lambs* were present on 814 (80.0%), *hay* 315 (30.0%), *meat cattle* 269 (26.5%) and *pigs* 161 (15.8%).

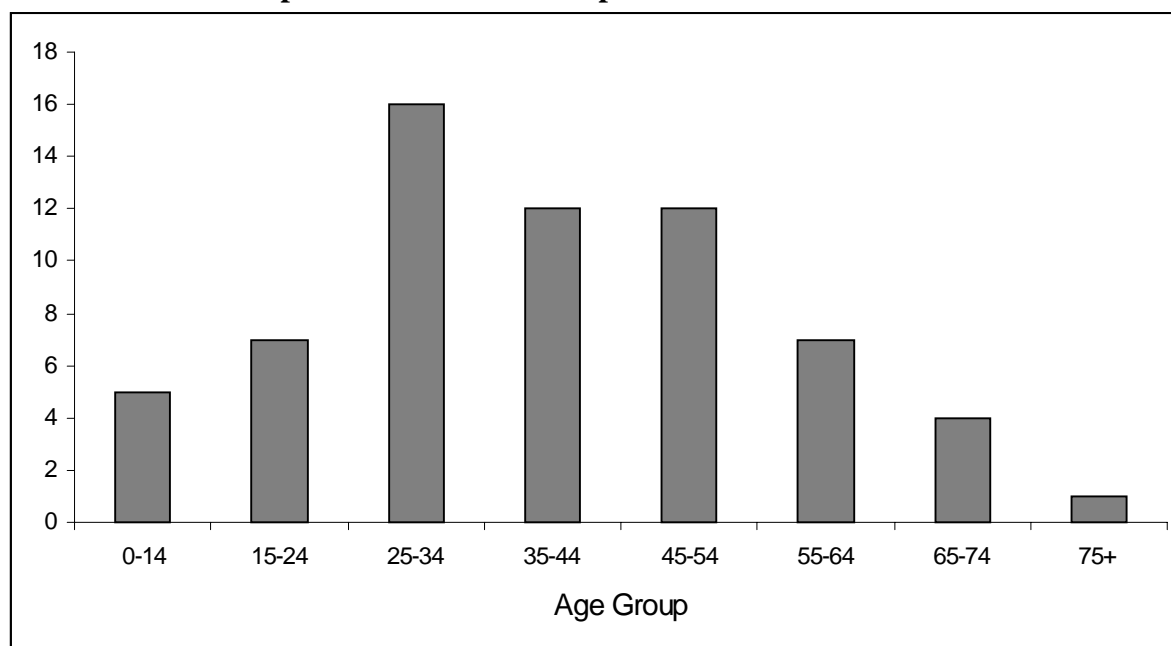
In the Yorke Peninsula Division of General Practice there are eight medical practices and of these, seven were involved in the collection of farm injury data. There were 75 people with agricultural injuries seen in the Yorke Peninsula between 1 September 1996 and 30 April 1998 by the seven Practices. This represents 4.4 injuries per 100 farms per annum. The Yorketown practice saw the most injured 23 (30.7%) followed closely by Maitland 21 (28.0%) and then Kadina with 15 (20.0%). The number injured by Practice can be seen in Table 6.4.

Table 6.4 Number Injured by practice for the York Peninsula from 1 September 1996 and 30 April 1998

Practice	Number Injured
Yorketown	23
Maitland	21
Kadina	15
Minlaton	10
CYP Hospital	3
Moonta	3
Total	75

Of those injured on farms and seen by GP's there were 67 (89.3%) males and eight (10.7%) females. Figure 6.13 shows the age groups of those who were injured on farms. The group with the largest number of injuries was the 15-24 age group.

Figure 6.13 Age of those injured on farms in the Yorke Peninsula Division of General Practice between 1 September 1996 and 30 April 1998



In 37 (50.0%) of the injuries a *farm vehicle* was involved, *other machinery* was the next most commonly involved 'vehicle' with 28 (75.7%) of the cases involved, followed by the *motor bike* five (13.5%) and *motor car* and *tractor* with two (5.4%) injuries apiece.

Table 6.5 Primary cause of injury for farm injuries presenting in the Yorke Peninsula Division of General Practice, September 1996 to April 1998

Primary Injury	Number	%
Fall/struck	27	46.6
Animal	8	13.8
Foreign Body	8	13.8
Other	5	8.6
Chemical/Poison	4	6.9
Insect/venom	4	6.9
Burns/electric/fire	2	3.4
Total	58	100

Table 6.5 shows the cause of the primary injury. The most common type of injury was *fall/struck* 27 (46.6%) followed by *animal* and *foreign body*, which had eight (13.8%) injuries respectively.

Table 6.6 Body part injured for farm injuries presenting in the Yorke Peninsula Division of General Practice, September 1996 to April 1998

Area of Injury	Number	%
Hand	27	36.5
Eye	11	14.9
Head	9	12.2
Legs/Knee	7	9.5
Back	5	6.8
Ankle/Feet	5	6.8
Arms	3	4.1
Systemic	2	2.7
Skin	2	2.7
Face	2	2.7
Chest	1	1.4
Total	74	100

Table 6.6 displays the body location of injury. The hand was the body location most often injured 27 (36.5%), followed by the eye 11 (14.9%) and head nine (12.2%).

Table 6.7 Nature of injury for farm injuries presenting in the Yorke Peninsula Division of General Practice, September 1996 to April 1998

Nature of Injury	Number	%
Laceration	33	50.0
Sprains/Strains	10	15.2
Foreign Body	10	15.2
Haematoma	6	9.1
Fracture/Dislocation	4	6.1
Other	3	4.5
Total	66	100

Table 6.7 displays the nature of the farm injury in the Yorke Peninsula Division of General Practice. Laceration was the most frequent occurring in 33 (50.0%) of the cases followed by foreign body 10 (15.2%) and sprains/strains 10 (15.2%).

Table 6.8 Outcome for farm injuries presenting in the Yorke Division of General Practice, September 1996 to April 1998

Outcome	Number	%
No Admission	58	78.4
Admission to Local Hospital	9	12.2
Admission to Adelaide Hospital	7	9.5
Total	74	100

Table 6.8 displays the outcome from intervention for farm injuries. The majority of cases, 58 (78.4%) were not admitted to hospital, nine (12.2%) were admitted to hospital and seven (9.5%) had to be admitted to an Adelaide hospital.

Summary

- The rate of farm injuries reported is low compared to other studies. No information has been provided about the degree of under-reporting of farm injury.

- There were 75 recorded farm injuries in the Yorke Division of General Practice between 1 September 1996 and 30 April 1998. Of these 67 (89.3%) were males.
- The 25-34 age group had the highest crude rate of injury per 1,000 agricultural workers, which was 44.32.
- *Fall / Struck* was the most common mechanism of injury, with 27 (46.6%) injuries reported.
- The *hand* was the body area most often injured, with 27 (36.5%) injuries reported.
- *Laceration* was the most common nature of injury, with 33 (50.0%) injuries reported.
- For 58 (78.4%) of the farm injuries no hospitalisation was required.

Recommendations

1. The value of GP based farm injury studies would be greatly enhanced by incorporating the following into the study design:
 - Scheduling the study over 12 month periods to account for seasonal effects.
 - Use of the National Farm Injury Optimal Dataset for recording and analysis of data.
 - Quality control checks to report the capture rate, quality of recording and coding.
2. General practitioners in rural South Australia should be well trained in management of hand and eye injury.

Section 7: Other health issues

Pesticides and Human Health

Pesticides are defined as substances used to destroy, prevent, control, attract or repel pests or to regulate plant growth. They include insecticides, herbicides, fungicides, bactericides, plant growth regulators, defoliant, rodenticides and biological control agents.

Pesticides, by definition, exert adverse effects on living organisms, including humans.

The properties that determine the nature and degree of toxicity include:

- Chemical properties
- Physical properties
- Interaction with other chemicals
- Environmental transformation
- Specificity of the pesticide

Pesticides are usually grouped according to purpose and chemical characteristics.

The dose-response relationship is a fundamental principle in toxicology. It is the relationship between the degree of response of a biological system and the amount of a substance received by the system, and implies that a change in the dose results in a concurrent change in the response of the organism.

The **LD₅₀** (lethal dose 50) is the dose at which half the given test population (mostly rodents) will be killed.

LD₅₀ data are used to provide a comparison of relative acute toxicities of pesticides.

The **NOEL** (no-observable-effect-level) is the exposure level at which no adverse health effects occur, and is often used to establish acceptable contaminant or exposure levels of substances in the environment. These levels are determined by applying a safety factor to account for possible differences between test animals and humans, and to provide protection for sensitive human subgroups.

This relationship is used extensively to quantify the toxicity of substances and to determine the **ADI** (Acceptable Daily Intake) and the **MRL** (Maximum Residue Level).

Toxic effects of pesticides may be:

- Acute effects, having a rapid onset, and relatively rapid recovery. These include skin and respiratory tract irritation, gastrointestinal effects, neurological symptoms and death.
- Chronic and delayed effects may occur after a lapse of time or following multiple exposures. They may include:
 - Behavioural changes
 - Peripheral neuropathy
 - Cancer
 - Reproductive effects

- Subclinical effects may not be revealed as signs or symptoms, but may be detected by biological tests - eg cholinesterase inhibition due to chronic exposure to organophosphate exposure. Other effects may only be defined by behavioural and psychomotor testing.

Health effects which may not be so clearly dose-related are those where allergic type responses cause symptoms. In some cases symptoms become so severe that workers must avoid handling particular products.

Routes of human exposure are:

- Dermal - the common route associated with work related toxicity
- Inhalation - where pesticides are applied as mists, sprays or gases, and especially important in confined spaces
- Ingestion - through either contamination of hands, food, drinking water and, more commonly, through accidental or intentional poisoning.

Exposure to the odours associated with pesticides application may be a significant problem to some hypersensitive people. Some pesticides release a range of volatile mercaptans with strong, and sometimes offensive odours.

While all those who handle pesticides are at risk of exposure, South Australian agricultural industries that have been identified as exposing significant numbers of workers or others in the community to risk of pesticide exposure include (Faulkner, 1993):

Tree fruit production – insecticides, fungicides, herbicides
 Viticulture – insecticides, fungicides, herbicides
 Vegetable production - insecticides
 Sheep – insecticides in ectoparasite control
 Greenhouse crop production – fungicides, insecticides

In addition to these industries, operators in the broadacre cropping industries are using herbicides in increasing amounts as part of the conservation farming process.

The people at risk of exposure, in general decreasing order of degree of risk, include:

- Mixers, loaders and handlers of concentrated forms of pesticides
- Pesticide applicators
- In-field markers, for directing application (less commonly used)
- Workers who enter sprayed crops - eg bug checkers, cotton chippers
- Family of workers who handle pesticides - by pesticides residues on surfaces and clothes
- Families whose homes are adjacent to paddocks or crops being sprayed - by pesticides residues on outdoor surfaces, and spray drift
- Other bystanders who may be exposed by spray drift
- Communities may be exposed by occasional spray drift or drift of odours.
- Consumers of agricultural products may be exposed to pesticide residues in food or fibre.

The risk level of any pesticide will depend on the pesticide's toxicity, the concentration of the chemical, the duration of exposure and the route of entry or absorption into the body. The human toxicity of a chemical is generally extrapolated from test animal experiments and can be expressed dermally or orally. Toxicity tests evaluate the following health effects:

1. Acute effects - the immediate effects of single, short term exposure
2. Chronic effects - multiple or long-term exposure effects
3. Reproductive effects - potential impairment of reproductive function
4. Teratogenic effects - effects on foetal development
5. Mutagenic effects - structural or functional impairment to genetic material
6. Carcinogenic effects - potential to cause tumours and cancer

1. Acute poisoning from pesticides exposure in South Australia

Although there was only one on-farm death caused by farm chemicals in South Australia during the period 1991-1996 (Parker & Bandara, 1995), during 1996, there were nine people admitted to hospitals with poisoning by agricultural chemicals. This is in addition to six admissions due to poisoning by petroleum products, four by corrosives and caustics and four by gases and vapours.

Workers compensation claims for the period 1994/5 to 1996/7 are displayed in Table 7.1.1

Table 7.1.1 South Australian WorkCover claims for poisoning and toxic effects of substances 1994/5- 1996/7

	Number of claims	Cost of claims	Mean cost per claim
Males	28	\$973 973	\$34 785
Females	12	\$105 947	\$8 829
Total	40	\$1 079 920	\$26 998

2. Worker exposure

No specific data are available relating to exposure of workers or the wider community to pesticides in South Australia, although studies in other centres of similar agricultural activity are relevant. These include studies in the horticultural industries (McMullen et al, 1993; Yeung, et al 1996; Parker & Bandara, 1995), in vineyards (Galvin, 1995), and in the sheep industries (NOHSC, 1997).

2. Community exposure

Australian reports of community exposure to pesticides are associated with aerial application of pesticides in the cotton industry and the banana growing areas, not relevant to the South Australian agricultural profile.

A more comprehensive discussion of the health issues for pesticides and human health in Australia is found in Fragar (1998).

Summary

Workers in most agricultural industries in South Australia are potentially exposed to pesticides in the processes of mixing, handling, storing, and cleaning down pesticides. The extent of exposure is unknown, although the annual cost of workers compensation claims for pesticides exposure is of the order \$0.5 million. This is a conservative estimate, and does not take into account potential claims and litigation for possible long-term effects.

Recommendations

1. It is recommended that increased attention be given to defining the nature and extent of pesticides exposure to agricultural operators in South Australia.
2. Priority attention should be given to:
 - Workers in vineyards
 - Workers in tree crop industries
 - Sheep industry workers during sheep jetting and dipping
 - Workers in vegetable crop industries
 - Greenhouse workers

Organic dusts and respiratory disease

In the years 1990-1993, 165 farmers and farm managers died from respiratory disease in South Australia. This represented 8.3% of deaths in this occupational group, and is in line with the statistics Australia-wide (8.2% of deaths of farmers/farm managers were due to respiratory disease).

Table 7.2.1 Diagnoses for farmers/farm managers who died of respiratory disease in South Australia, 1990-1993

Diagnosis	Number
Chronic airways obstruction	67
Pneumonia	48
Bronchitis/emphysema	20
Other respiratory disease	16
Asthma	12
Influenza	1
Bronchiectasis, extrinsic allergic alveolitis	1
Total deaths from respiratory disease	165

Source: HealthWIZ 1996

In the same time period 78 farmers / farm managers died from cancer of the lung and trachea, representing 3.9% of all deaths in this occupational group.

Hospital admission data are not available for occupational groups, although Table 7.2.2 shows regional data for hospital admissions to South Australian hospitals during 1995/96. Around 8% of admissions to hospital of rural and remote residents of South Australia were due to respiratory disease.

Table 7.2.2 Principal diagnoses for respiratory disease admissions to South Australian hospitals 1995/1996

Diagnosis	Separations Remote areas		Separations Rural areas		Separations Adelaide		Separations Total South Australia	
	No	%	No	%	No	%	No	%
Chronic bronchitis, emphysema, asthma	107	1.9	2984	2.3	5540	1.6	8631	1.8
Pneumonia	87	1.6	1258	1.0	2536	0.8	3881	0.8
Influenza	1	0.02	100	0.08	34	0.01	135	0.03
Chronic airways obstruction - other	37	0.7	481	0.4	944	0.3	1462	0.3
Other respiratory disease	235	4.2	5323	4.1	11673	3.5	17231	3.7
All other diagnoses	5126	91.6	118746	92.1	316830	93.9	440702	93.4
Total admissions	5593	100	128892	100	337557	100	472042	100

Source: HealthWIZ 1996

Exposure to dusts associated with agricultural production can cause both short term and long term respiratory problems.

The following agricultural processes undertaken in South Australia are associated with respiratory problems caused by agricultural dusts:

- Grain harvesting, storage, crushing and handling
- Hay and silage handling
- Animal handling in confined spaces - piggeries, poultry, dairies

Dusts, which are associated with respiratory problems, include:

- Particles of hair
- Feathers
- Dander
- Pollens
- Grains dust
- Bacteria
- Fungi spores.

These dusts originate in the soil, animals and their breakdown products, animal feeds, plant materials and fungi, insects and decaying stored plant material.

Other substances on farms, including fumes and gases, can also cause respiratory problems.

Grain Dusts

Grain dusts are generated during sowing, harvesting, storing and handling of grains in South Australia. Dusts from grain consist of a complex mixture of organic and inorganic particles from sources as diverse as leaves, soil, and insect parts. The mixture varies with the type of grain, where it is grown, growing conditions and methods of harvest, storage and processing.

Most grain dust particles are biologically active vegetable dusts and significant amounts can be breathed into the lungs. Dusts of certain grains such as durum wheat and barley are reported to be more irritating than others. Adverse health effects also increase as moisture content and spoilage increase.

Most particles are from fruits of grasses such as wheat, legumes such as soybeans, or oil seeds such as rape seed. Bits of leaves and stems may also be present. There are many non-plant contaminants. Animal material (bits of insects, rodents, or birds or their excreta), mites, chemical residues (pesticides used to grow or later treat the grain), and inorganic matter (soil including silica particles) all may be intermixed in small quantities. A variety of fungi and bacteria, their spores and their by-products also pose a respiratory hazard. Species of microorganisms vary with regional climate and change from harvest through storage. Many of the components of grain dust are capable of affecting the respiratory tract individually; together, they produce a wide variety of biological effects.

Anyone involved in production, storage, transportation, or processing of grain can suffer the effects of regular inhalation of grain dusts. Exposure starts with farmers and farm workers who grow, harvest, sometimes store and then transport grain to local storage facilities. These farmers are exposed to grain dust on occasion. Exposure extends far beyond the farm to workers in feed mills, grain elevators and grain transportation industries. These workers, who are routinely exposed to grain dust, suffer from respiratory responses more commonly and more severely than do farmers. Exposure to grain can occur at any stage of the production process. Clouds of grain dusts are most evident whenever grain is moved, and especially heavy exposures among any grain handlers occur during dumping and loading grain.

As with grain dusts, hay dusts and other organic dusts are a complex mixture of plant, fungi, bacteria and insect material.

Mouldy or spoiled hay and silage are known to increase the risk of all the different types of respiratory responses, including hypersensitivity pneumonitis.

Silos

The atmosphere in confined spaces on farms such as grain silos can be dangerous. Ventilated silos allow enough air flow through to prevent build up of toxic gases. Even after fumigating, toxic concentrations are generally reduced to a safe level after a week.

However, grain dusts in silos can result in all the conditions associated with grain dusts mentioned above. In particular, persons whose asthma is triggered by grain dusts have a high risk of suffering an attack in an enclosed silo. A number of life threatening asthma attacks have been associated with entry to grain silos.

Fully sealed silos present quite a different situation and are becoming more common because they allow efficient fumigation for the destruction of insects. These silos not only retain toxic concentrations of fumigants longer, but may also allow a build up of carbon dioxide generated by the natural respiration of grain.

In a silo with a dusty atmosphere; for example, one being filled from a feed mill, the atmosphere might become explosive, particularly if the humidity is low. A spark from metal striking metal, an electric switch or a match could cause a dust explosion.

Less common in Australia are silage silos that can contain a highly toxic gas, nitrogen dioxide. If sludges are present in old, disused silos, flammable methane might also be present

Farm workers who smoke cigarettes are at increased risk of respiratory disease. Those people who work with organic material, which is damp and subsequently contaminated by fungi, are at increased risk of respiratory disease.

In medical terms, respiratory responses to exposure to organic dusts are:

1. Airway inflammatory response to organic dust exposure

Rhinitis (inflammation of the lining of the nose)
Pharyngitis, laryngitis (inflammation of the throat)
Tracheitis, bronchitis (inflammation of the upper airways)
Asthma/ hyperactive airways
Bronchiolitis (inflammation of the lower airways)
Toxic organic dust syndrome (TODS)

2. Airway immunological responses to organic dust exposures

Allergic rhinitis (runny nose and eyes, itchy eyes, nose and throat)
Extrinsic asthma (asthma triggered by the environment)

3. Interstitial (tissue) immunological responses to certain fungi (moulds) and bacteria

Hypersensitivity pneumonitis (extrinsic allergic alveolitis; Farmer's Lung)

In South Australia, the dust-induced asthma assumes a higher relative importance, although there is probably a widespread lack of recognition of other conditions such as toxic organic dust syndrome (TODS) and hypersensitivity pneumonitis.

Asthma is a problem to many farmers because:

- Many farmers have asthma which is triggered by farm dusts (organic dusts) and pollens - grain dusts, especially wheat dust, hay, grasses and many other farm dusts
- Many farmers with severe asthma caused by farm dusts may not wish, or be able, to leave the industry
- Farm families are usually a long distance from medical help when a severe asthma attack occurs
- There is no one easy way of reducing exposure to organic dusts. Face masks may be of limited use
- Some farmers may have a cough or chest tightness and not be aware they have asthma

Summary

- Respiratory disease associated with organic dusts in agriculture is probably under-reported in South Australia, given the important place that grain production and grain handling plays in the state.
- Forty deaths of farmers and farm managers per annum due to respiratory disease occur in South Australia. This does not take into account deaths of grain handlers at grain handling and transport facilities in rural South Australia, and at ports.

Recommendations

1. It is recommended that farm health and safety promotions and education programs address the issues of respiratory disease due to farm dusts. Target groups should include rural doctors and farm workers, particularly those handling grain, hay and silage.

Hearing

Noise induced hearing loss affects over 60% of all farmers. Noise induced hearing loss is painless, progressive and preventable. As the number of years of farming increases so does the extent of noise induced hearing loss. Many commonly used items on the farm contribute to noise. The typical noise levels at operating distance and the maximum exposure time before damage occurs is displayed in table 7.3.1

Farmsafe Australia has identified hearing conservation on farms as a high priority and has set a goal of reducing the number of young people on farms (aged 15-24 years) with noise induced hearing loss by 15% (Fragar, 1996).

Table 7.3.1 Noise levels dB (A) at operating distance and maximum exposure time before damage occurs

Typical noise levels	dB (A) at operating distances	Maximum exposure time before damage occurs
Quite countryside	30-35	No limit
Conversation	60-70	No limit
Tractor - idling	75-80	No limit
Working (with cab) (no radio)	75-85	No limit
Chainsaw – idling	80-90	8 hours
Header	85-95	2.5 hours
Grain Auger	85-95	2.5 hours
Angle Grinder	85-95	2.5 hours
Motor Cycle	85-95	2.5 hours
Tractor – working (no cab)	95-100	2 hours
Pig shed at feeding time	95-105	48 minutes
Chainsaw – cutting	105-120	30 seconds
Shotgun	140+	Instantaneous

Noise induced hearing loss is the only type of hearing loss that is totally preventable.

In South Australia a farm noise-hearing project has evolved with many individuals and agencies contributing to its development. The project has drawn together audiologists, speech Pathologists, hearing advisors, farmers, nurses, researchers, engineers, safety officers and administrators.

The project started in the Yorke Peninsula at the Paskeville field day in 1991. It continues to be run on a regular basis at field days, fairs, gadget days and agricultural shows. Information on the hearing of those screened can be obtained from Lyn Forby-Atkinson.

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Recommendations

1. Data collected in association with hearing screening services should be collated and made available to Farmsafe South Australia and the National Farm Injury Data Centre, so that baseline measures can be set and state programs developed.

Zoonosis

Notifications of the four major Zoonotic diseases that farmers, farm workers and farm families are at risk of contracting are collected in Australia through the Communicable Diseases Network. These are Q Fever, Leptospirosis, Hydatid infection, and Brucellosis. It should be noted that there is no breakdown of the information into occupational groups.

Q Fever

Q Fever also known as Query Fever, is caused by *Coxiella burnetii*, which is common in nature and highly resistant to drying. Transmission of this disease to humans is possible through inhalation of aerosols or dust from animal birth products and unpasteurised milk. There is an incubation period of 7 to 14 days for Q Fever. (Edwards et al., 1995; Coleman et al., 1995).

Q Fever can be contracted from cattle, sheep, goats, bandicoots, kangaroos and wallabies. People at risk of Q Fever include: farmers, veterinarians, abattoir workers, meat inspectors, biological researchers working with pregnant animals and shearers. (Coleman et al, 1995)

Table 7.4.1 Notifications of Q Fever reported to State and Territory health authorities in the period of 1991 to 1997 and year-to-date notifications by year – month

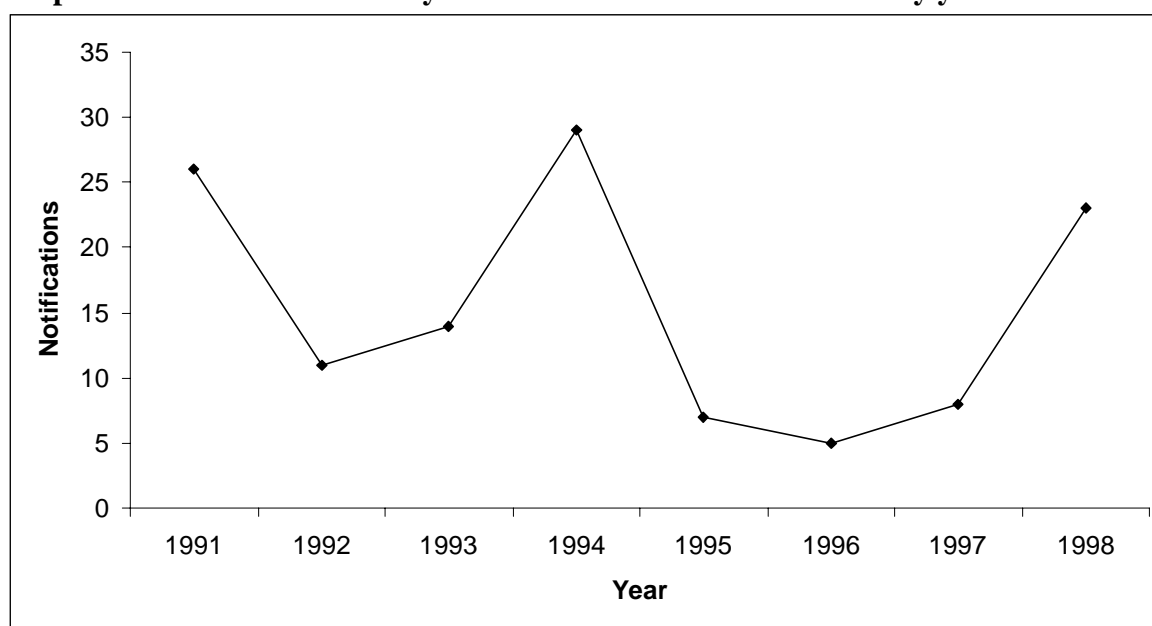
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	18	95	66	47	79	38	66	53	37	37	25	34	595
1992	16	44	55	37	33	47	58	38	52	54	61	48	543
1993	50	60	82	65	9	70	87	89	81	89	63	63	889
1994	47	68	60	38	68	69	64	61	31	47	66	44	663
1995	40	34	42	21	36	45	40	57	35	39	52	32	473
1996	40	40	41	31	47	54	60	77	22	41	48	54	555
1997	60	43	36	46	65	60	61	39	39	55	47	42	593
1998	45	42	40	56	43	47	46	44	71	56	50	8	548

Note: Table is for the reporting period to 8 December 1998.
1997 & 1998 data is provisional and may be reviewed.

Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication.

There has been 123 cases of Q Fever since 1991, this represent just over 15 cases per annum. As of the 8th of December 1998 there were 23 cases in South Australia for 1998. This represents a 3-fold increase from 1997 with notification returning to the 1994 level.

Figure 7.4.1 Notifications of Q Fever reported to South Australian health authorities in the period of 1991 to 1997 and year-to-date notifications for 1998 by year



Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication.

South Australia appears to have smaller number of zoonotic disease cases. Information about the occupation and industry of the infected person needs to be collected. This would then allow for effective counter measures to be implemented for specific populations.

Leptospirosis

There are over 100 serotypes of leptospirosis that have been shown to cause disease in humans. People can contract the disease through contaminated water, contact via skin, eyes or nose of urine from infected animals. Leptospirosis can be found in pigs, cattle, sheep, dogs and rats. People at risk include meat workers, dairy farmers, cattle farmers, veterinarians, piggery workers, cane farmers, banana growers and bush walkers. (Edwards et al. 1995; Coleman et al 1996.)

Table 7.4.2 Notifications of Leptospirosis reported to State and Territory health authorities in the period of 1991 to 1997 and year-to-date notifications for 1998 by year – month

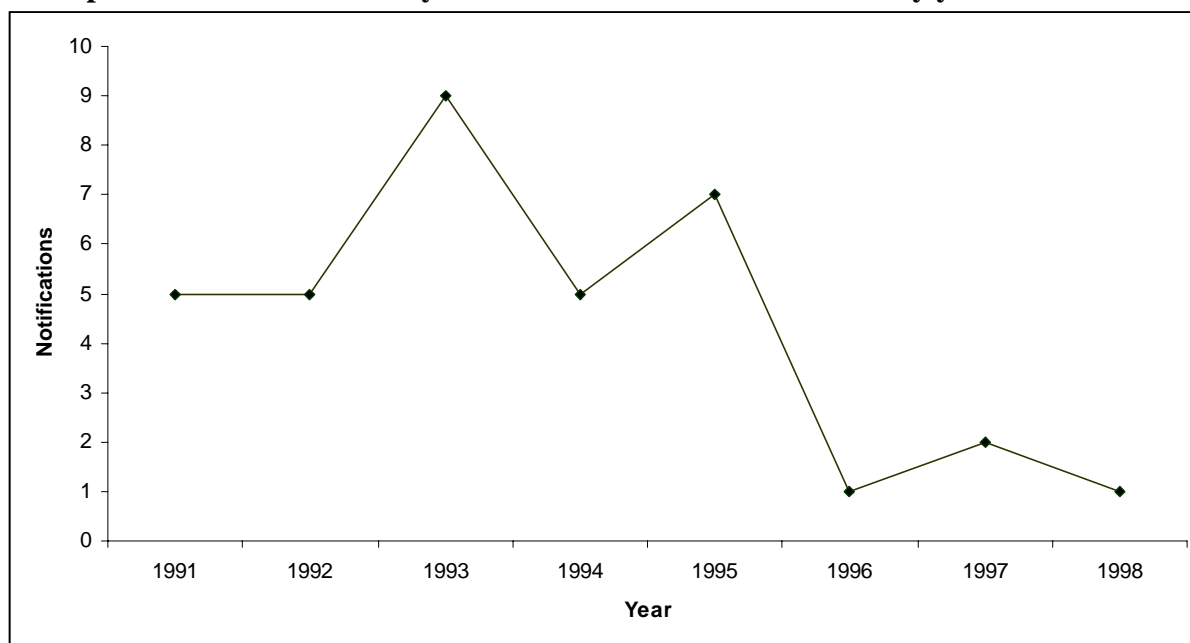
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	2	22	10	11	20	9	12	8	16	23	22	14	169
1992	8	11	11	8	7	9	11	14	7	18	35	20	159
1993	21	16	15	20	8	8	14	10	13	16	27	10	178
1994	15	17	18	11	11	5	8	4	2	17	5	10	123
1995	8	17	3	9	10	6	13	18	8	19	18	19	148
1996	25	19	19	21	21	23	25	10	8	28	16	12	227
1997	14	12	4	14	11	15	8	5	9	11	12	11	126
1998	15	11	14	15	18	8	20	11	12	17	29	9	179

Note: Table is for the reporting period to 8 December 1998.
1997 & 1998 data is provisional and may be reviewed.

Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication.

There have been 35 cases of leptospirosis in South Australia since 1991, this represents nearly 5 cases per annum. In recent years there has been a decline in the number of cases as can be seen in figure 7.4.2 below.

Figure 7.4.2 Notifications of Leptospirosis reported to South Australian health authorities in the period 1991 to 1997 and year-to-date notifications for 1998 by year



Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication

Hydatid Infection

Hydatid infection is passed to humans from handling an animal that has the disease (especially dogs) or ingestion. Infection is prevented with good personal hygiene, satisfactory disposal of carcasses, meat inspection and worming dogs (Edwards et al. 1995).

Table 7.4.3 Notifications of Hydatid Infection reported to State and Territory health authorities in the period 1991 to 1997 and year-to-date notifications for 1998 by year – month

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	8	1	2	6	7	2	1	8	2	5	2	44
1992	0	2	8	1	3	5	4	4	1	7	3	0	38
1993	2	1	6	2	2	2	1	3	2	4	5	2	32
1994	2	5	7	4	1	4	7	4	2	4	13	3	56
1995	1	3	3	1	3	6	7	1	9	2	5	5	46
1996	5	1	4	6	4	2	1	4	3	4	9	2	45
1997	2	1	3	4	6	5	3	8	11	5	7	7	61
1998	8	1	1	2	5	-	-	-	-	-	-	-	42

Note: Table is for the reporting period to 8 December 1998.
1997 & 1998 data is provisional and may be reviewed.
No longer notifiable in NSW by late 1996

Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication.

There have been eight notifications of Hydatid infection in South Australia since 1991, of these three have presented in 1998.

Brucellosis

Brucellosis also known as undulant fever, malta fever and abortus fever is caused by infection with *Brucella abortus* bacteria and is spread to man by ingestion of raw milk, inhalation of dusts and contact with infected materials such as mucous membrane or skin (Edwards et al. 1995).

Table 7.4.4 Clinical Feature of Brucellosis

Onset:	Acute with high continuous fever or insidious with fever undulating over 7-10 day periods
Symptoms	Fever, sweating, weakness, headache, anorexia, pain in limbs and back, rigors, joint pains
Signs	Fever and splenomegaly
Complications	Relapse within 2 years of recovery; Localised disease causing suppurative or granulomatous lesions including arthritis, spondylitis, bursitis, osteomyelitis, meningoencephalitis, endocarditis, epididymoorchitis, pneumonia, hepatitis; Chronis brucellosis: low-grade fever and neuropsychiatric symptoms.

Source: Edwards et al 1995 p. 4

Table 7.4.5 Notification of Brucellosis reported to State and Territory health authorities in the period of 1991 to 1997 and year-to-date notifications for 1998 by year – month

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	0	4	3	1	1	2	2	3	4	2	3	3	28
1992	0	2	1	2	0	2	6	3	0	5	5	3	29
1993	4	1	4	1	1	2	0	2	2	2	1	0	20
1994	2	0	0	1	2	2	1	3	4	6	4	9	34
1995	7	2	0	2	3	3	1	1	3	3	2	2	29
1996	2	2	4	0	4	5	3	2	3	6	3	4	38
1997	6	3	2	2	3	0	3	2	7	3	6	4	41
1998	11	2	2	2	3	2	5	3	2	6	6	-	44

Note: Table is for the reporting period to 8 December 1998.
1997 & 1998 data is provisional and may be reviewed.

Source: *Communicable Disease Network – Australia New Zealand – National Notifiable Diseases Surveillance System*, personal communication.

There has only been one notification of brucellosis in South Australia since 1991.

Summary

- Zoonotic disease remains a significant biological hazard for the South Australian workforce.
- There were 108 notifications of Q-fever since 1991 and 23 notifications in 1998.
- There have been 35 notifications of leptospirosis in South Australia since 1991, but only four notifications in the last three years.
- There have been eight notifications of hydatid infection in South Australia since 1991.
- There has been one notification of brucellosis in South Australia since 1991.

Recommendations

1. Zoonotic programs should be maintained to protect South Australian families and workers.
2. Occupation and industry information should be reported with the notification.

In Summary

The profile of injury deaths on farms in South Australia is not dissimilar to that of Australia as whole. There were 55 deaths between 1991 and 1996 on South Australian farms, this is an average 9 deaths per annum. Of the 55 deaths 11 (20.0%) were children. Of the 11 child deaths five (45.5%) were caused by *machinery in operation*.

The largest number of farm fatalities between 1991 and 1996 were caused by *mobile farm machinery / plant* 17 (32.1%), of these nine (52.9%) were *tractors*. Of the tractor fatalities four were *run-overs*, two were *roll-overs*, two were *entanglements* and one was *hit by a falling object*. Thirty of the fifty deaths occurred while people were engaged in work activities, either paid (23) or other (7). *Machinery in operation* was the largest external cause of death 13 (24.5%).

There were 962 workers compensation claims between July 1995 and June 1998, of these 772 (80.2%) were males and 190 (19.8%) were females. This is an average of 320 claims per annum.

The largest number of workers compensation claims for nature of injury was *sprains and strains* with an average cost per injury of \$14,013 for males and \$12,485 for females. *Farm hands and assistants* represent the largest occupational group seeking workers compensation from agricultural related injury. This group represented 140 (73.7%) of female claims and 413 (53.5%) of male claims. *Sheep shearers* represent 151 (19.6%) of injuries sustained by males and had an average cost per claim of \$16,386.

The majority of workers compensation claims are for people aged between 20-49 years with a decline after this age bracket. The *upper extremity* was the most common body region involved in an injury resulting in a workers compensation claim.

There were 349 identified Ambulance cases between 1 July 1995 and 30 June 1998 where scene location was *agriculture, forestry, or mining*. The average age of those transported by South Australian ambulance was 43.6 years. The largest number of transportations was due to *limb injuries* followed by *head injuries*.

The primary trauma cause from Ambulance cases was due to *blunt trauma*, followed by *fall* and *other*. The majority of transportations 89 (65.4%) were *industrial or work related*. The majority of cases occur between 7am and 10pm.

There were a total of 2118 patients admitted to South Australian hospitals during 1996 where the location of place where injury occurred was coded as 'farm'. There were 447 hospital separations using Farmsafe Australia defined E-codes during 1996 where farm was the location. Of the 447 cases 352 (78.7%) were males. More injuries occurred on Saturday than any other day of the week.

The largest numbers of injuries to people admitted to South Australian Hospitals 115 (25.7%) were due to *cutting and piercing* cases. *Farm machinery, farm vehicles* including *ag-bikes* and *animals* are important causes of admission to South Australian hospitals.

There were 118 (26.4%) children admitted to hospital for selected farm injuries. The largest numbers of these injuries were from *cutting and piercing* with 25 (21.2%) injuries and *motorcycle* with 24 (20.3%) injuries.

In a General Practice study in the Eyre Peninsula, during the period 1 February 1997 to 31 January 1998, there were 145 farm injuries reported, which is a rate of 8.96 injuries per 100 farms. The majority of cases were collected from hospitals 120 (82.8%).

The largest number of injuries for any one month in the Eyre Peninsula occurred in April with 18 (12.4%) injuries reported. There was on average 12 farm injuries per month. Males represented 139 (95.9%) of the injuries reported. The average age of those injured was 37.4 years.

The main occupation for people reporting a farm injury in the Eyre Peninsula was *farmer* with 95 (65.5%) injuries reported. The *owner* was the person most often involved in a farm injury with 85 (58.6%) injuries recorded. Mixed *sheep and grain* farms had the most farm injuries with 87 (60.1%) injuries recorded. The area on the farm where the largest number of injuries occurred was *sheds* with 48 (33.1%) recorded injuries.

The largest cause of farm injury in the Eyre Peninsula was *struck* 31 (21.4%). *Tractors* were the cause of nine (6.2%) injuries. *Cut / laceration* 67 (38.1%) was the largest type of farm injury. The *arm* 74 (51.0%) was the most common body location of a farm injury.

The rate of farm injuries reported in the Eyre Peninsula is low compared to other Australian studies. No information is provided about the proportion of people injured on farms participating in the study.

In a General Practice study in the Yorke Division of General Practice, there were 75 recorded farm injuries in the between 1 September 1996 and 30 April 1998. Of these 67 (89.3%) were males. The 25-34 age group had the highest crude rate of injury per 1,000 agricultural workers with a rate of 44.32.

Fall / Struck was the most common mechanism of injury in the York Peninsula study with 27 (46.6%) injuries. The *hand* was the body area most often injured with 27 (36.5%) injuries. *Laceration* was the most common nature of injury with 33 (50.0%) injuries. For 58 (78.4%) of the farm injuries no hospitalisation was required. The rate of farm injuries reported is low compared to other studies. No information has been provided about the degree of under-reporting of farm injury.

Workers in most agricultural industries in South Australia are potentially exposed to pesticides in the processes of mixing, handling, storing, and cleaning down pesticides. The extent of exposure is unknown, although the annual cost of workers compensation claims for pesticides exposure is of the order \$0.5 million. This is a conservative estimate, and does not take into account potential claims and litigation for possible long-term effects.

Respiratory disease associated with organic dusts in agriculture is probably under-reported in South Australia, given the important place that grain production and grain handling plays in the state. Forty deaths of farmers and farm managers per annum due to respiratory disease occur in South Australia. This does not take into account deaths of grain handlers at grain handling and transport facilities in rural South Australia, and at ports.

Zoonotic disease remains a significant biological hazard for the South Australian workforce. There were 108 notifications of Q-fever since 1991 and 23 notifications in 1998. There have been 35 notifications of leptospirosis in South Australia since 1991, but only four notifications

in the last three years. There has been eight notifications of hydatid infection in South Australia since 1991. There has been one notification of brucellosis in South Australia since 1991.

Recommendations

1. Recommendations regarding farm injury/illness data collection and management

1. Mechanisms for South Australia to contribute to the National Tractor Death Register and the National Child Deaths on Farms Register should be established.
2. Workers compensation information should be made available on a yearly basis in an electronic form to allow annual agricultural statistics to be published, in a form that allows for adjustment to data as claims are finalised.
3. Within the ambulance service special coding should be established to define 'farm' as a location separate from 'forestry' and 'mining' for farm injury.
4. Improvements in ambulance service coding and definitions would allow better compilation of injury information.
5. Collection of ambulance information should be collected annually and made available to Farmsafe South Australia and The National Farm Injury Data Centre.
6. Regular collection of hospital admissions and separations information should be obtained and reported each year both through Farmsafe South Australia and Farmsafe Australia.
7. The value of General Practice based farm injury studies would be greatly enhanced by incorporating the following study design:
 - Scheduling each study to cover at least 12 month periods to account for seasonal effects.
 - Use of the National Farm Injury Optimal Dataset for recording and analysis of data.
 - Quality control checks to report the capture rate, quality of recording and coding.
8. Data collected in association with hearing screening services should be collated and made available to Farmsafe Australia and The National Farm Injury Data Centre, so that baseline measures can be set and state programs developed.
9. Occupational and industry information should be reported with the notifications of zoonotic disease.

1. Recommendations regarding farm injury prevention programs

1. Programs aimed at preventing deaths on South Australian farms should focus on:
 - Tractors
 - Other mobile machinery
 - Child safety on farms
2. Prevention programs aimed at reducing workers compensation claims should include:
 - Key agricultural industries, including shearing, plant nurseries, poultry farming, fruit growing and pig farming.
 - Animal handling, with particular emphasis on sheep and cattle.
 - Falls
 - Body stressing / strains - ergonomic and manual handling.
 - Agents:
 - Motorcycles
 - Bags / buckets / bins / pallets
 - Hand tools
 - Shearing handpiece
 - Tractors
 - Harvesters
 - Trucks
 - Ladders
 - In-depth investigation of industry related injuries should occur on a regular basis.
3. Programs aimed at reducing the number of hospital admissions due to on-farm injury in South Australia should include farm machinery safety, motorcycle safety, safe horse handling, safe animal handling and child safety on farms.
4. General practitioners in rural South Australia should be well trained in management of hand and eye injury.
5. Farm health and safety promotions and education programs address the issues of respiratory disease due to farm dusts. Target groups should include rural doctors and farm workers, particularly those handling grain, hay and silage.
6. Zoonotic programs should be maintained to protect South Australian families and workers.

Glossary

AAHU	Australian Agricultural Health Unit
ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ANZIC	Australia New Zealand Industry Classification
EVAO	Estimate value of agricultural output
FSA	Farmsafe Australia
ha	hectare
ICD	International Classification of Disease
Incl.	Including
LD₅₀	Lethal Dose 50
NEC	Not Elsewhere Classified
No.	Number
NOHSC	National Occupational Health & Safety Commission
Other rural areas	Are the remaining SLA's in the rural zone that are not 'Large Rural Centres' (ie population resides in urban centre of population of 25,000 or more) or 'Small Rural Centres' (ie rural zone containing urban centre population of 10,000 to 24,999)
RIRDC	Rural Industries Research & Development Corporation
SA	South Australia
SLA	Statistical Local Area
*	This is included in tables where numbers are 2 or under to protect individuals from identification.

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Appendix 1. South Australian Ambulance collection form.



S.A. AMBULANCE SERVICE INC.
AMBULANCE OFFICER REPORT N^o 098664 MEDICAL IN CONFIDENCE

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OFFICE COPY

Surname _____ Date / / Case Number - -
 Given Names _____ Initials _____
 Title _____ Sex Age _____ Date of Birth / / Guardian (if under 16) _____
 Home Address (Number and Street) _____
 Suburb/Town _____ Postcode _____
 Telephone (H) or (W) _____ Subscriber _____ Pension Number _____
 Hosp. Order No. _____ Charge to Insurance/Govt? V/A W/C IND Cover

C R E W	Officer A _____	Observer _____	T _____	Start (at Desp.) _____	A <input type="checkbox"/>	X <input type="checkbox"/>
	Officer D _____	Fleet _____	R _____	Arrived Scene _____	C <input type="checkbox"/>	Y <input type="checkbox"/>
	Call Sign _____	Station _____	I _____	Arrive Dest. _____	D <input type="checkbox"/>	Z <input type="checkbox"/>
			P _____	End _____	E <input type="checkbox"/>	F <input type="checkbox"/>

T Priority - To Priority - From Hospital Triage Code _____
 I Onset of Condition (if known) _____ Call Received _____ Depart Scene _____ At Station _____
 M _____ Despatched _____ Arrive Dest. _____
 E PICK UP TIME _____ Arrived Scene _____ Cleared _____

SUBURB VEHICLE AT DESPATCH TIME - Metro Only

F Address (Number and Street) _____
 R Suburb/Town _____
 O _____
 M Address (Number and Street) _____ RAPID NO. _____
 T Suburb/Town _____
 O _____

Unconscious Prior to Ambulance Arrival Unknown <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	Allergies Known <input type="checkbox"/> Unknown <input type="checkbox"/>	Communicable Disease Unknown <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>	Estimated Weight _____ kgs
Details: _____			

Chief Complaint (C/C) Relevant Past History (PHx) Medication (Med^o) History (Hx) On Arrival (O/A) On Examination (O/E) Provisional Diagnosis (PD)

TIME: [] [] [] [] [] []

Pulse []/min

R.P. 15-14 [] [] [] [] [] []
 131-150 [] [] [] [] [] []
 111-130 [] [] [] [] [] []
 91-110 [] [] [] [] [] []
 71-90 [] [] [] [] [] []
 51-68 [] [] [] [] [] []
 <50 [] [] [] [] [] []
 0 [] [] [] [] [] []

Capillary Filling Under 2 sec. [] [] [] [] [] []
 Over 2 sec. [] [] [] [] [] []
 Nil [] [] [] [] [] []

Respiratory rate/min 10-24 [] [] [] [] [] []
 25-35 [] [] [] [] [] []
 Over 35 [] [] [] [] [] []
 Under 10 [] [] [] [] [] []
 0 [] [] [] [] [] []

Respiratory Effort Satisfactory [] [] [] [] [] []
 Unsatisfactory [] [] [] [] [] []

Cardiorespiratory Score (max=11) [] [] [] [] [] []

SAO2 [] [] [] [] [] []

Pupil Size Size [] [] [] [] [] []
 Reaction [] [] [] [] [] []
 Unstable [] [] [] [] [] []

Eye Opening Spontaneous [] [] [] [] [] []
 To voice [] [] [] [] [] []
 To pain [] [] [] [] [] []
 Nil [] [] [] [] [] []

Verbal Response Oriented [] [] [] [] [] []
 Confused [] [] [] [] [] []
 Inapp. words [] [] [] [] [] []
 Incomprehensible [] [] [] [] [] []
 Nil [] [] [] [] [] []

Best Motor Response Obeys commands [] [] [] [] [] []
 Purposeful movement [] [] [] [] [] []
 Withdrawal to pain [] [] [] [] [] []
 Flexion to pain [] [] [] [] [] []
 Extension to pain [] [] [] [] [] []
 Nil [] [] [] [] [] []

Coma Score (max=15) [] [] [] [] [] []

- Pupil Sizes:
- 8
 - 7
 - 6
 - 5
 - 4
 - 3
 - 2
 - 1

▶ ATTACH ECG STRIPS

TREATMENT

Airway:
 Oral
 Suction
 Laryngeal Mask
 E.T.T.

Breathing:
 Bag/Mask - 1.P.P.V.

Circulation:
 Cardiac Compression
 Defib.
 Monitor
Posture/Trendelenburg:
 Supine
 Sitting
 Semi-Reclumbent
 Lateral

O₂ Therapy:
 Prone
 Bag/Mask:
 Mask: 100%
 Mask: 8 lpm
 Cannula: I.P.M.

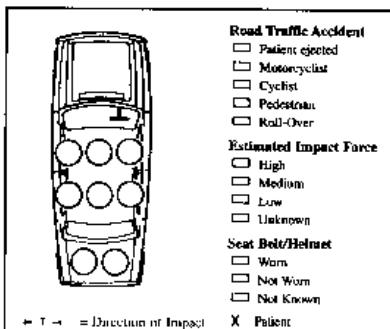
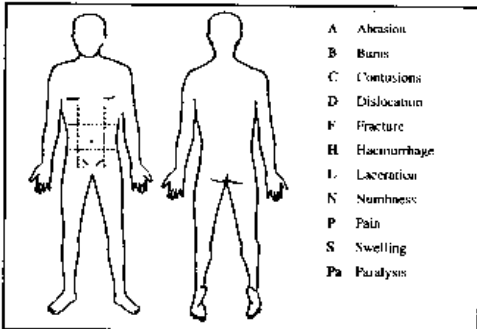
Haemorrhage Control:
 Controlled

I/V Cannulation:
 Successful
 Unsuccessful
 In situ

Analgesia:
 Entonox
 Penthoex
 Morphine
 Effective
 Part Effective
 Not Effective

Splints:
 Air
 Cardboard
 Cervical
 Jordan
 Scoop
 Spinal Board
 Traction
 RED
 Improvised

Drugs:
 Hartmann's
 Normal Saline
 Haemaccel
 Adrenaline
 GTN
 Glucagon
 Glucose
 Salbutamol
 Naloxone
 Atropine
 Lignocaine
 Maxalou



Time	ECG	Treatment	Dose	Route	Result	Auth.

Attendant: Surname: Signature:

Care at Scene

First Aid C.P.R.

No Need
 Need not Done
 Ineffective
 Inappropriate Rx

Condition At Destination

Improved
 Unchanged
 Deteriorated

Appendix 2. South Australian Ambulance information

Type of station	Training	Station location
1. Country Volunteer station	These officers are volunteers. They provide an ambulance service to their community. Volunteer Ambulance Officers receive a minimum of 80 hours training	Ardrossan, Balaklava, Booleroo Centre, Bordertown, Burra, Ceduna, Clare, Cleve, Coober Pedy, Coonalpyn, Cowell, Crystal Brook, Cummins, Elliston, Eudunda, Gladstone, Goolwa, Hamley Bridge, Hawker, Jamestown, Kadina, Kangaroo Island, Kapunda, Karoonda, Keith, Kimba, Kingston, Lameroo, Leigh Creek, 'Lock, Lucindale, Maitland, Mallala, Mannum, Marla, Meningie, Moonta, Mount Pleasant, Nangwarry, Orroroo, Padthaway, Penola, Peterborough, Pinnaroo, Port Broughton, Quorn, Riverton, Robe, Roxby Downs, Snowtown, Strathalbyn, Streaky Bay, Swan Reach, Taillem Bend, Tintinara, Tumby Bay, Wallaroo, Wudinna, Yalata, Yankalilla, Yorketown, Yunta.
2. Country Professional stations	Officers at these stations work full time as Ambulance Officers, they work a variety of shifts, some on station and some on call. Officers at professional country stations have a minimum skill level of Advanced Life Support with some officers being qualified as Paramedics.	Angaston, Barmera, Berri, Loxton, Millicent, Mount Gambier, Murray Bridge, Naracoorte, Port Augusta, Port Lincoln, Port Pirie, Renmark, Victor Harbour, Waikerie, Whyalla, Woodside.
3. Level 4 Response.	In some areas, the services of a level 4 response ambulance are used by SUMS. These stations have a role of primary response to incidents. Level 4 Officers have the same training as other volunteer officers, except they don't have the capacity to transport patients. When a level 4 crew is tasked to a case, the nearest available transporting ambulance is also despatched.	Coomandook, Meadows, Penneshaw, Gosse, American River, Port Wakefield, Morgan and Coffin Bay. Of these stations only Coffinn Bay and Morgan have a Heartstart machine available for use
4. Metropolitan Stations	Metropolitan Officers have a minimum qualification of Advanced Life Support. There are several Paramedics in the metropolitan area, and SA Ambulance Service aims to have one Paramedic on each emergency metropolitan ambulance by the year 2000	Aldinga, Brooklyn Park, Campbelltown, City, Elizabeth, Fulham Gardens, Gawler, Marion, Modbury, Mt Barker, Noarlunga, O'Halloran Hill, Port Adelaide, Prospect, Salisbury, Unley, West Torrens.