
Farm Injury Related Deaths in Australia 2003-2006

Australian Centre for
Agricultural Health & Safety

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Contents

Summary	1
1. Introduction	2
2. Method	2
3. Results	3
3.1 On-farm deaths by year, work status and number of agricultural establishments.....	3
3.2 On-farm deaths by year, jurisdiction and number of agricultural establishments.....	3
3.3 On-farm work-related deaths by year and number of workers	4
3.4 Age and Gender	4
3.5 Agent of on-farm deaths - adults	5
3.6 Tractor-related injury deaths (adults).....	7
3.7 Quad bike injury deaths (adults).....	7
3.8 Agent of on-farm deaths - children (< 15yrs).....	7
3.9 Agent of on-farm deaths to children and residential status.....	8
3.10 Agent of on-farm deaths - young children (< 5yrs).....	9
4. Conclusion	9
References	10
Annex 1	11

Summary

Background

Agriculture remains a significant industry in Australia, however the potential for death and serious injury for those working, living or visiting farms is known to be high.

Method

This report draws on the available data from the National Coroners Information System for the period 2003-06. All closed coronial cases that have involved a non-intentional farm injury death are included in the assessment.

Results

There were a total of 326 non-intentional injury deaths on Australian farms from 2003-06. Major findings were:

- Continued reduction in the overall number of deaths (mean 82 per year)
- Continued reduction in the rates of death for farms (5.9 per 10,000 agricultural establishments)
- Continued reduction in the rates of death for individuals working in agriculture (10.9 deaths per 100,000)
- There was an even distribution between work related and non-work related deaths
- Males accounted for 87% of all deaths
- Tractors, quad bikes and farm utilities continue to be the leading cause of adult (≥ 15 years) deaths
- Those older than 55 years accounted for 40% of all deaths
- Children (< 15 years) accounted for 17% (n=55) of all deaths, with those under 5 years being involved in more than half the cases
- Farm dams and other water bodies (n=25) continue to be the single largest cause of child (< 15 years) deaths
- For children (<15 years), riding or being a passenger on a quad bike (n=7) is the second leading agent of injury death
- Overall, 34% (n=19) of all child fatalities involved farm visitors.

Conclusions

Although further cases for the years 2005 and 2006 will be added to this data once the coroners' have closed these cases, this is not expected to add dramatically to the case numbers. Hence, even with these additional cases, the steady improvements in industry performance in reducing death rates will be evident.

This review has identified common agents of non-intentional injury death for both adults and children. Significantly, for all of these agents there are already well known and highly effective solutions that can be used to further reduce the burden of non-intentional injury. To continue and fast-track improvement in agriculture's performance, there is a need to improve the adoption of health and safety systems and the evidence-based solutions that already exist. Future interventions should target these priority areas to allow for further significant reductions in farm related deaths.

1. Introduction

The high rates of death and serious injury in the agricultural sector for people who live, work and visit farms continues to be widely recognised as an area of concern.

This brief report aims to build on earlier data¹⁻³ outlining information on all non-intentional injury deaths known to have occurred on Australian farms for the period 2003 to 2006.

The report has been produced by the National Farm Injury Data Centre (NFIDC) within the Australian Centre for Agricultural Health and Safety (University of Sydney).

It is expected that this information will further improve the evidence base for agencies and individuals working to reduce the risks associated with working and living on farms in Australia.

2. Method

The data source for this review is the National Coroners Information System (NCIS). The NCIS is the central repository of information about every death reported to an Australian coroner since July 2000 (January 2001 for Queensland) and provides a valuable hazard identification and death prevention tool for coroners and research agencies.⁴

When deaths are referred to a coroner in one of the states or territories, preliminary information is automatically uploaded into the NCIS. These cases remain “open” until the coroner hands down a final determination on each case when it is then “closed”. For this review, only “closed” cases have been included as “open” cases generally have limited available detail particularly in relation to agent and mechanism of injury.

The NCIS is also able to provide detail on the proportion of cases “open” and “closed” in each state/territory by year. To avoid large underestimation of totals for this study it became necessary to apply inclusion criteria i.e. a case closure rate of $\geq 90\%$ nationally for the years to be included in the study period. At the time of assessment, this meant that data through to 2006 could be included in this study (Annex 1).

The process for extracting the relevant data for the 2003-06 period was laborious and involved several data sweeps. All deaths for each year due to external causes were downloaded using query design searches. The identification of deaths of relevance involved a number of coded and keyword searches of the NCIS based on the Farm Injury Optimal Dataset,⁵ with cases that were not farm-related being withdrawn from the dataset. Cases that were confirmed as intentional by the coroner, were also withdrawn from the file. A final verification process assessing farm-related deaths identified in the Media Monitors data base, was undertaken to match any reported cases with relevant detail in the NCIS.

Following the identification of the non-intentional farm-related deaths, exploration of attached documents such as police, toxicology and coroners’ findings reports was completed. Data from this analysis is presented with reference to the appropriate denominator data. It is important to note that changes adopted by the Australian Bureau of Statistics in 2006 using the Australian and New Zealand Standard Industrial Classification (ANZSIC),⁶ have resulted in an increase in the number of agricultural establishments identified from 2006 onwards. Consequently, this impacts on some of the data presented relating to rates of death where agricultural establishments are used as a denominator.

3. Results

3.1 On-farm deaths by year, work status and number of agricultural establishments

For the period 2003-06 there were a total of 326 non-intentional farm injury deaths (mean 82 per year). Of these, 303 cases could be defined as either work related (52%) or non-work related (48%), with work status being unknown in a further 23 cases. Notwithstanding the further addition of “closed” cases for these data, a continued downward trend in the overall number and rates of deaths per 10,000 agricultural establishments is apparent.

Table 1: Non-intentional on-farm injury deaths by year and work status, Australia 2003-2006

Year	No. work-related deaths	No. non-work related deaths	Total deaths incl. other or unknown work status	No. agricultural establishments ^{a7}	Deaths per 10,000 agricultural establishments
2003	47	53	104	132,983	7.8
2004	51	36	98	130,526	7.5
2005	35	25	62	129,934	4.8 ^b
2006	25	31	62	154,472 ^c	4.0 ^b
	158	145	326	136,978^d	5.9^b

Source: NFIDC On-farm fatality database

a Agricultural establishments producing an EVAO >\$5000 pa

b Most likely under-enumerated, with further cases to be added as more cases are “closed”

c Change in Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

d Mean 2003-06

3.2 On-farm deaths by year, jurisdiction and number of agricultural establishments

There is significant variation in the rates of deaths per 10,000 agricultural establishments over the study period, with Western Australia having the lowest rate and the Northern Territory the highest.

Table 2: Non-intentional on-farm injury deaths by jurisdiction, Australia 2003-2006

Jurisdiction	2003	2004	2005	2006	TOTAL	Mean No. agricultural establishments ^{a7}	Deaths per 10,000 establishments per annum
New South Wales	33	18	20	17	88	42,692	5.5
Northern Territory	3	3	1	1	8	453	52.6
Queensland	31	26	22	13	92	28,442	8.5
South Australia	6	6	6	9	27	14,764	4.8
Tasmania	8	6	5	5	24	4,112	15.5
Victoria	17	26	5	17	65	33,786	5.0
Western Australia	6	13	3	0	22	12,636	4.6
ACT						91	-
TOTAL	104	98	62^b	62^{b c}	326	136,978^d	5.9^b

Source: NFIDC On-farm fatality database

a Agricultural establishments producing an EVAO >\$5000 pa

b Most likely under-enumerated, with further cases to be added as more cases are “closed”

c Change in Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006

d Mean 2003-06

3.3 On-farm work-related deaths by year and number of workers

When work-related cases are assessed in relation to deaths per 100,000 partaking in agricultural work, a downward trend in rates of death is also illustrated.

Table 3: Non-intentional work related on-farm injury deaths by year, Australia 2003-2006

Year	No. work-related deaths	No. persons working in agriculture ^{a,8}	Annual deaths per 100,000 workers
2003	47	370,500	12.7
2004	51	366,800	13.9
2005	35	357,500	9.8 ^b
2006	25	348,000	7.2 ^b
	158	360,700^c	10.9^{b,c}

Source: NFIDC On-farm fatality database

a Agricultural establishments producing an EVAO >\$5000 pa

b Most likely under-enumerated, with further cases to be added as more cases are "closed"

c Mean 2003-06

3.4 Age and Gender

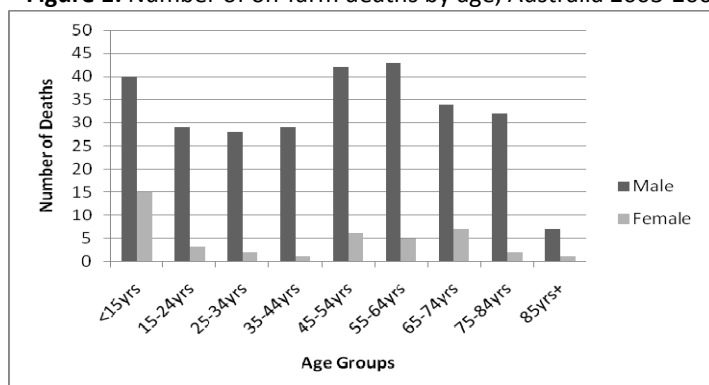
Of the total 326 on-farm deaths recorded, 87% occurred to males and 13% to females. Overall, 17% of all deaths occurred in those under 15 years of age and 40% occurred to people aged over 55 years.

Table 4: Number of on-farm deaths by age and gender, Australia 2003-2006

	Male (No.)	Male %	Female (No.)	Female %	TOTAL	Percent
<15yrs	40	14.1	15	35.7	55	16.9
15-24yrs	29	10.2	3	7.1	32	9.8
25-34yrs	28	9.9	2	4.8	30	9.2
35-44yrs	29	10.2	1	2.4	30	9.2
45-54yrs	42	14.8	6	14.3	48	14.7
55-64yrs	43	15.1	5	11.9	48	14.7
65-74yrs	34	12.0	7	16.7	41	12.6
75-84yrs	32	11.3	2	4.8	34	10.4
85yrs+	7	2.5	1	2.4	8	2.5
TOTAL	284	87.1	42	12.8	326	100

Source: NFIDC On-farm fatality database

Figure 1: Number of on-farm deaths by age, Australia 2003-2006



Source: NFIDC On-farm fatality database

3.5 Agent of on-farm deaths - adults

The agents associated with on-farm non-intentional injury deaths for persons aged 15 years and over are shown in Table 5. The leading cause of deaths for this group from 2003-06 are:

- Tractors 57
- Quad Bikes 23
- Farm Utilities 23
- 2 Wheel Motorcycles 14

Table 5: Agent of on-farm non-intentional injury death of persons aged 15 years and over, Australia 2003-2006

Category	Agent	No.	%
Farm Vehicle	Aircraft	4	1.5
	Car	5	1.8
	Farm Vehicle other NEC	4	1.5
	Gyrocopter	3	1.1
	Helicopter	7	2.6
	Motorcycle 2 Wheel	14	5.2
	Motorcycle 4 Wheel	23	8.5
	Truck	7	2.6
	Utility	23	8.5
		Subtotal	90
Mobile Farm Machinery / Plant	Cherry Picker	1	0.4
	Earth Moving Equipment	4	1.5
	Fertiliser Spreader	3	1.1
	Fire Truck/ Tanker	1	0.4
	Forklift	3	1.1
	Grader	2	0.7
	Grain Auger	2	0.7
	Harvesting machine	1	0.4
	Mobile Farm Machinery/ Plant NEC.	4	1.5
	Power Take Off (PTO)	2	0.7
	Seeder/ planter	1	0.4
	Slasher	2	0.7
	Tractor	57	21.0
		Subtotal	83
Fixed Plant / Equipment	Fixed Plant/ Equipment NEC	3	1.1
	Pump	3	1.1
	Shearing Plant	1	0.4
		Subtotal	7
Workshop Equipment	Angle Grinder	2	0.7
	Power saw incl. circular saw	1	0.4
		Subtotal	3

Category	Agent	No.	%
Materials	Drums	1	0.4
	Hay Bale	2	0.7
	Laden carton	1	0.4
	Materials other NEC	2	0.7
	Pole	1	0.4
	Tyres	2	0.7
	Wall	1	0.4
	Subtotal	10	3.7
Farm Structure	Channel/ water crossing	2	0.7
	Creek/ River	3	1.1
	Dam	5	1.8
	Farm Structure NEC	2	0.7
	Fence	1	0.4
	Other Shed	1	0.4
	Powerlines	6	2.2
	Tank	3	1.1
	Windmill	1	0.4
	Subtotal	24	8.9
Animal	Cattle	6	2.2
	Horse	10	3.7
	Insect	2	0.7
	Pig	1	0.4
	Sheep	1	0.4
	Snake	1	0.4
	Subtotal	21	7.7
Farm Chemicals	Pesticides -- herbicide	1	0.4
	Subtotal	1	0.4
Working Environment	Fire / Smoke / Flame	5	1.8
	Solar radiation	1	0.4
	Tree, Stick branch	9	3.3
	Trees being felled	5	1.8
	Subtotal	20	7.4
Other	Firearms	7	2.6
	Knife	1	0.4
	Other Hand tools, NEC	1	0.4
	Chainsaw	1	0.4
	Unknown	2	0.7
	Subtotal	12	4.4
TOTAL		271	100

Source: NFIDC On-farm fatality database

3.6 Tractor-related injury deaths (adults)

A total of 21% (n=57) of all non-intentional farm injury deaths of adults for the period involved tractors. The mechanism of injury was identifiable for 45 of these cases, with tractor run-overs 49% (n=22), being the main cause of tractor related death.

Table 6: Mechanism of injury for tractor-related injury deaths, Australia 2003-2006

Mechanism of injury	No.	%
Run over by tractor	22	48.9
Tractor rollover	15	33.3
Fall from tractor	4	8.9
Other tractor related mechanism of injury	4	8.9
TOTAL	45	100

3.7 Quad bike injury deaths (adults)

There were 23 adult deaths resulting from the use of quad bikes in the study period, accounting for 8.5% of all adult cases. The mechanism of injury was identifiable for 17 of these cases, with 65% of these related to rollover incidents where the rider was crushed by the machine and asphyxiated.

Table 7: Mechanism of injury for quad bike injury deaths in adults, Australia 2003-2006

Mechanism of injury	No.	%
Rollover	11	47.8
Non-rollover	6	26.1
Unknown	6	26.1
TOTAL	23	100

3.8 Agent of on-farm deaths - children (< 15yrs)

Table 8 illustrates the number of injury deaths of children under 15 years of age on Australian farms according to the agent of injury. The leading causes of unintentional deaths on-farm for children are:

- Dam drowning 13
- Other drowning sites (tanks etc) 12
- Quad bikes (four wheel motorcycles) 7
- Animals (dogs, cattle, horses) 5
- Farm Utilities 4

Drowning in dams and other water bodies are by a large margin the leading agents of child deaths on farms.

Despite manufacturer recommendations that children under 16 years should not use quad bikes and that passengers (of any age) should not be carried, seven children died as a result of these machines in the study period (four rollovers / three non-rollover incidents).

Table 8: On-farm injury non-intentional injury deaths of children by agent of injury, Australia 2003-2006

Category	Agent	No.	%
Farm Vehicle	Car	2	3.6
	Farm Vehicle other NEC	2	3.6
	Motorcycle 2 Wheel	2	3.6
	Motorcycle 4 Wheel	7	12.7
	Utility	4	7.3
	Subtotal	17	30.9
Mobile Farm Machinery / Plant	Forklift	1	1.8
	Trailer	1	1.8
	Subtotal	2	3.6
Farm Structure	Channel/ water crossing	2	3.6
	Creek/ River	2	3.6
	Dam	13	23.6
	Sheep/Cattle Dip	1	1.8
	Swimming Pool	3	5.5
	Tank	3	5.5
	Water Trough	1	1.8
	Subtotal	25	45.5
Animal	Cattle	1	1.8
	Dog	1	1.8
	Horse	3	5.5
	Subtotal	5	9.1
Other	Firearms	2	3.6
	Other Hand tools, NEC	1	1.8
	Materials other NEC	2	3.6
	Pesticides -- insecticide	1	1.8
	Subtotal	6	10.9
TOTAL		55	100

Source: NFIDC On-farm Fatality Database

3.9 Agent of on-farm deaths to children and residential status

Of the 55 deaths occurring to children, 34% (n=19) occurred to children who were farm visitors. The prime agent associated with deaths of children both living on (n=13) and visiting farms (n=10), were bodies of water (dams, tanks, swimming pools, creeks/ivers etc).

Table 9: On-farm deaths of children by agent of injury and residential status, Australia 2003-2006

Agent of Injury	Resident	Visitor	Unknown	Total
Water body	13	10	2	25
Quad Bike	3	3	1	7
Vehicle	4	3	1	8
Motorcycle 2 wheel	2	-	-	2
Machinery	1	-	-	1
Animal	3	-	2	5
Other	4	3	-	7
TOTAL	30	19	6	55

Source: NFIDC On-farm fatality database

3.10 Agent of on-farm deaths - young children (< 5yrs)

Overall, 56% (n=31) of unintentional on-farm child deaths were of children aged less than 5 years of age. The leading cause of death was drowning in a water body (61%):

Farm Dam	7
Farm Structure (tank/dip/ trough)	5
Swimming Pool	3
Creek/River	2
Channel/ Water Crossing	2

4. Conclusion

These data reinforce previous assessments^{2,3} indicating that the agricultural sector is reducing:

- The overall mean number of non-intentional injury related deaths per year
- The rate of non-intentional injury related deaths per 10,000 agricultural enterprises
- The rate of non-intentional injury related deaths per 100,000 persons working in the sector

Males dominate the data profile, with approximately 40% of all cases being to individuals over the age of 55 years. Such findings are in keeping with the demographics of the industry as 40% of farmers are over 55, with a further 18% over 65 years.⁹

While tractors remain the single leading agent of non-intentional injury death for adults, these data suggest an increasing prominence of runover incidents, now accounting for almost 50% of tractor-related deaths. Quad bikes, farm utilities and motorcycles also remain significant agents of non-intentional injury death.

For children, drowning in dams and a range of other water bodies is far and away the leading cause of non-intentional injury death on farms. The issue of quad bike use, either as a rider or passenger, also needs to be addressed in light of the recommended prohibitions against both practices for children under 16 years.

Although further cases for 2005 and 2006 remain to be “closed” by the NCIS, based on previous experience of the National Farm Injury Data Centre, it is estimated that approximately 5-20 cases in total may be added to this data set. Even with these additional cases, the steady improvements in industry performance will be evident.

Notwithstanding changes in the ANZSIC classifications for agricultural establishments that impact at least partially on some data presented, the decline in the rates of death per 10,000 farms, rates per 100,000 persons employed and in raw numbers, are all continuing to demonstrate a downward trend.⁶

Whilst any decline in the number and rates of on-farm injury deaths is welcome, agriculture remains among the most dangerous industries in Australia.¹⁰ As identified in this review there are common agents of non-intentional injury death identified for both adults and children. Significantly, for all of these agents there are already well known and highly effective solutions that can be used to further reduce the burden of non-intentional injury deaths. To continue and fast-track improvement in agriculture’s performance, there is a need to improve the adoption of health and safety systems and the evidence-based solutions that already exist. Future interventions should target these priority areas to allow for further significant reductions in farm related deaths.

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Annex 1

Year	Closed Cases	Open Cases	Total Cases	% Closed
2000	8191	123	8314	99%
2001	17973	819	18792	96%
2002	17452	935	18387	95%
2003	17085	1423	18508	92%
2004	17697	1713	19410	91%
2005	17512	1068	18580	94%
2006	16139	1616	17755	91%
2007	15329	3068	18397	83%
2008	12219	7171	19390	63%
2009	5833	14797	20630	28%
2010	14	1824	178163	0%
Grand Total	145444	34557	356326	41%

Source: NCIS Operational Statistics Feb 2010¹¹