

The incidence of race-day jockey falls in Australia, 2002–2006

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Working as a licensed jockey in horse racing is a high-risk occupation. Studies in the United States found that jockeys had a higher risk of fatality than pilots and flight engineers, logging workers, structural metal workers, farm workers, roofers and truck drivers,¹ or participants in sports such as skydiving, motorcycling and boxing.² Only fishers and related fishing workers had a higher fatality rate.¹

Jockey injuries and fatalities have been investigated in overseas studies.^{3–10} However, although there has been a review of injuries to jockeys in Victoria,¹¹ no national study of jockey falls has been undertaken.

We aimed to determine the incidence of falls, injuries and fatalities occurring at race meetings in Australia, and to compare them with overseas rates.

METHODS

Data sources

Incidence data on falls of licensed jockeys riding registered racehorses at race meetings throughout Australia were collated from stewards' reports provided by the Principal Racing Authority of each state and territory of Australia. Each report was scanned electronically, and a keyword search was conducted for any report of a rider being dislodged from a horse. Once a fall was identified, details of the incident were extracted and recorded in a database.

Racing Information Services Australia, the official repository for all thoroughbred race results across Australia, provided comprehensive data on every race conducted at race meetings run by a Principal Racing Authority from 1 August 2002 to 31 July 2006. These data were merged with the incidence falls data by one-to-one matching on race date, racecourse, race number, jockey name and horse name.

Data on falls from flat racing and jumps racing (over steeplechase fences or hurdles) were analysed separately to consider the different risks of jumps racing.

An injury was considered to have occurred if the jockey was declared unfit to ride or was transported to hospital after a fall. Information from clinical assessments by the attending medical officer was not available. Where the outcome of a fall was

ABSTRACT

Objectives: To describe rates of occurrence of falls, injuries and fatalities to horse-racing jockeys in Australia.

Design and setting: Retrospective analysis of data on race-day falls from stewards' reports provided by the Principal Racing Authority of each state and territory of Australia, August 2002 – July 2006.

Main outcome measures: Fall, injury and fatality incidence rates; comparison with overseas rates.

Results: There were 3360 jockey falls from 748 367 rides. Falls occurred at a rate of 0.42 per 100 rides in flat races and 5.26 per 100 rides in jumps races. In flat racing, 54.6% (1694/3101) of falls occurred before the start of the race and 11.1% (344/3101) of falls occurred post-race. The 34.3% (1063/3101) of falls that occurred during flat races resulted in 61.7% (516/836) of the injuries sustained. In jumps racing, most falls occurred at a jump and 9.7% (25/259) of jockeys who fell were transported to hospital and/or declared unfit to ride. There were five fatalities resulting from falls during the study period, all in flat racing. Fall and injury rates were comparable with those found in the United Kingdom, Ireland, France and Japan.

Conclusions: Being a jockey carries a substantial risk of injury and death. Although rates of injury in Australia are not exceptional by international standards, there can be improvement to safety standards in the Australian racing industry.

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not reported in the stewards' report, we assumed that the injury severity was minor.

Mortality data were obtained from the Australian Jockeys' Association National Jockeys' Trust online memorial (1847–2007).¹²

The Human Research Ethics Committee (Tasmania) waived the need for ethics approval of these analyses of publicly available information.

Statistical analysis

To enable comparisons with the results of overseas studies, the incidence of falls was expressed as the number of falls per 100 rides:

$$\text{incidence} = (\text{number of falls during period} / \text{number of rides during period}) \times 100$$

Poisson regression was used to estimate rate ratios with 95% confidence intervals. Multiple observations of the same jockey were condensed into a single observation per year. To estimate the trend in rates over race seasons, a linear term for year was used. A Poisson model was used to compare rates between countries.

To assess possible bias due to stewards' reports being missing or unavailable, we re-estimated the event rates with the missing data on rides, falls and injuries replaced by

means for each category of relevant stratifying factors.

Data were statistically analysed using Stata, version 10.0 (StataCorp, College Station, Tex, USA).

RESULTS

Stewards' reports were available for 92.8% (10 373/11 180) of the race meetings held during the study period (Box 1).

There were 861 injuries and 3360 jockey falls from 748 367 rides in 75 434 races and 10 373 race meetings. Jockeys had a mean of one fall every 240 rides in flat racing, and a mean of one fall every 19 rides in jumps racing (Box 2).

When fall incidence rates were re-analysed to estimate the effect of missing data, the re-estimated incidence rates were almost unchanged.

Flat racing

The median number of rides per jockey in flat races was 160.5 (range, 1–4019). The median number of falls per jockey was 1.0 (range, 0–20). The number of falls increased over the study period at a rate of 5.83% (95% CI, 5.67%–5.99%) per year, or around 44 falls per year, but around one-fifth of this increase can be attributed to an increase in

1 Comparison of stewards' reports obtained and not obtained, by race type

Race type	Reports obtained	Reports not obtained
Flat	74 873/80 439 (93.1%)	5566/80 439 (6.9%)
Jumps	561/604 (92.9%)	43/604 (7.1%)
Total	75 434/81 043 (93.1%)	5609/81 043 (6.9%)

the number of races each season. In flat racing, falls per 100 rides increased at the rate of 4.50% (95% CI, 3.83%–5.19%) per year. This increase was mainly confined to falls pre- and post-race, which increased at the rate of 6.69% (95% CI, 4.37%–9.07%) per year.

Information on the location and causes of falls in flat racing is shown in Box 3. Of 3101 falls that occurred during flat racing, 1694 (54.6%) occurred before the horses jumped out of the barriers. Another 1063 (34.3%) occurred during the race (including during the jump out from the barriers) and 344 (11.1%) occurred after the race. Reporting of cause of fall was incomplete in 1398 (45.1%) cases. These cases were recorded as “dislodged” or similar without an underlying reason specified. Most (1057; 75.6%) of these falls occurred before the race.

Information on the severity of falls in flat racing is summarised in Box 4. Falls during the race (including during the jump out from the barriers) accounted for 61.7% of injuries. Assuming that falls with outcomes not reported in the stewards' report were

2 Fall and injury rates for flat and jumps racing, 2002–2006

Race type	Rides	Falls	Falls per 100 rides	Injuries	Injuries per 100 rides	Injury incidence per fall
Flat	743 445	3101	0.42	836	0.11	27.0%
Jumps	4 922	259	5.26	25	0.51	9.7%
Steeplechase	1 578	144	9.13	12	0.76	8.3%
Hurdle	3 344	115	3.44	13	0.39	11.3%
Total	748 367	3360	0.45	861	0.12	25.6%

minor in injury severity, about 30% of falls occurring during a race required admission to hospital, compared with less than 10% of falls occurring pre- or post-race.

Jumps racing

During the study period, jumps racing was conducted in three states — Victoria, South Australia and Tasmania. The median number of rides per jockey in jumps races was 18 (range, 1–385). The median number of falls per jockey was 1.0 (range, 0–19). The fall rate changed little for the first three race seasons, but decreased by 28.23% (95% CI, 20.71%–35.04%), or by around 20 falls, in the 2005–2006 race season.

Of 259 falls that occurred during jumps racing, 228 were at a jump (88.0%) and a further 27 (10.4%) occurred during the race. The main causes of falls in jumps racing were reported as horse having fallen (136; 52.5%), stumbled or blundered (57; 22.0%), or dislodged the jockey with no underlying reason specified (39; 15.1%). The outcome of 196 (75.7%) falls in jumps racing was not reported. Of jockeys who fell, 25 (9.7%) were transported to hospital or declared unfit to ride.

Fatalities

There were five fatalities during the study period, equivalent to a mortality rate of 673 per 100 million rides (0.0007%), or 161 238 per 100 million falls (0.16%). All occurred in flat racing; four occurred during the race and the other occurred in the mounting yard. Occupational fatalities to jockeys occurred at a rate of 2.31 (95% CI, 2.06–2.58) deaths per year between 1878 and 2007, but jockey mortality in the past 25 years has stabilised at 1.27 (95% CI, 0.98–1.64) deaths per year. Before 1963, the mortality rate was 2.86 (95% CI, 2.52–3.24) deaths per year.

Comparison with overseas studies

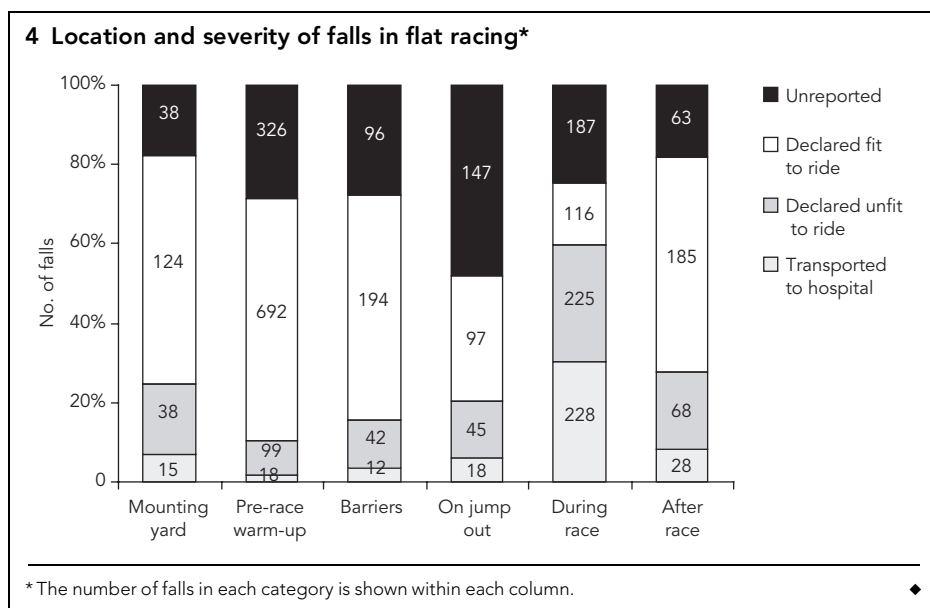
Rates of falls in Australia compared with other countries are shown in Box 5.

The occurrence of falls per 100 rides in Australia during the study period was similar to the rate in the United Kingdom and Ireland,⁵ but 1.35 (95% CI, 1.27–1.44) times greater than the rate in France⁷ during the previous decade.

When the risk window was restricted to the period from leaving the barriers to crossing the finishing line (to enable a compari-

3 Location and cause of fall outcome in flat racing (% of total falls by location), 2002–2006

Cause of fall	Mounting yard	Pre-race warm-up	Barriers	On jump out	During race	After race	Total
Dislodged	85 (40%)	866 (76%)	106 (31%)	24 (8%)	121 (16%)	196 (57%)	1398 (45%)
Fractious	125 (58%)	220 (19%)	238 (69%)	133 (43%)	39 (5%)	48 (14%)	803 (26%)
Clipped heels	0	0	0	3 (1%)	113 (15%)	5 (1%)	121 (4%)
Stumbled	1	5	0	105 (34%)	34 (4%)	12 (3%)	157 (5%)
Equipment failure	0	9 (1%)	0	2 (1%)	20 (3%)	26 (8%)	57 (2%)
Horse fell	4 (2%)	7 (1%)	0	1	251 (33%)	13 (4%)	276 (9%)
Shifted ground	0	6 (1%)	0	27 (9%)	25 (3%)	25 (7%)	83 (3%)
Struck rail	0	22 (2%)	0	1	25 (3%)	8 (2%)	56 (2%)
Careless riding	0	0	0	0	46 (6%)	1	47 (2%)
Broke down	0	0	0	0	52 (7%)	7 (2%)	59 (2%)
Hampered	0	0	0	0	23 (3%)	0	23 (1%)
Rider unbalanced or lost stirrup	0	0	0	11 (4%)	7 (1%)	3 (1%)	21 (1%)
Total	215 (100%)	1135 (100%)	344 (100%)	307 (100%)	756 (100%)	344 (100%)	3101 (100%)



son with data from Japan¹⁰), the Australian rate was similar to the Japanese rate. The injury incidence rate in Australia was similar to France, but lower than the rates in the UK and Ireland.

In jumps racing, the incidence of falls in Australia was 1.10 (95% CI, 0.97–1.25) times the rate in Ireland, but 0.58 (95% CI, 0.51–0.65) times the rate in France, 0.77 (95% CI, 0.68–0.87) times the rate in the UK and 0.78 (95% CI, 0.66–0.92) times the rate in Japan (Box 5).

DISCUSSION

Our study, the first to examine falls and injuries to jockeys in Australia, adds to previous Australian studies of injuries from equestrian and recreational horse riding¹³⁻¹⁷ and a study of injuries to jockeys in Victoria.¹¹ We found a rate of 0.42 falls per 100 rides in flat races and 5.26 falls per 100 rides in jumps races. A fall can be career-ending, and a small proportion of falls result in death. Most falls in Australia occur pre- or post-race, but falls occurring during the race result in the most severe injuries.

The incidence of falls in flat racing in Australia during 2002–2006 was at the high end of the range found in the UK and Ireland⁵ and France⁷ during the previous decade, but at the low end of that range if adjusted for the trend increase in Australian rates between 2002 and 2006.

Despite this, the proportion of injuries per fall in flat racing (27%) was lower in Australia than in the UK, Ireland and France, where it was around 40%.^{5,7} This may be because most falls in Australia

occurred before or after the race, when falls are generally less severe. In contrast, falls that occurred during races resulted in 48.5% (516/1063) of injuries. This result is similar to Japan, where about half of falls occurring during races resulted in injury.¹⁰

In jumps racing, the rate of falls in Australia was at the lower end of the range found in the European studies. Most jumps races in Australia were conducted in Victoria, and the introduction of a new type of jump during the 2005–2006 racing season coincided with a decrease in the rate of falls.

The injury rate for jumps racing in Australia was similar to that for Ireland and less than half that of the other countries, with a similar pattern in the ratio of falls in jumps races to falls in flat races. In our study, 34.3% of falls in flat racing occurred during the race, and resulted in 61.7% of the injuries sustained. This is slightly lower than that found in the UK and Ireland (approximately 70%).⁵

A strength of our study is that we had very high ascertainment, with 92.8% of stewards' reports for the period being obtained. As far as we can tell, missing data from stewards' reports did not materially influence our results. Although nearly half of the reports did not provide an underlying reason for the fall, there is no reason to suspect they were due to a cause other than fractious behaviour of the horse, because 90% occurred pre- or post-race, and falls from other causes are uncommon at those stages. If so, nearly all (96.8%; 1640/1694) falls before the race were due to fractious behaviour.

We were also able to provide information on the locations and causes of falls; the studies from the UK, Ireland and France did not provide this information.^{5,7} The study from Japan provided information on the causes of the falls, but during races only, so no meaningful comparisons were possible.¹⁰

Although stewards' reports provide a complete record of observed incidents occurring during a race meeting, they are not medical records and do not capture the

5 Fall and injury incidence rate comparisons between the current Australian study and Japan, the United Kingdom, Ireland and France

	Australia	Japan ¹⁰	UK ⁵	Ireland ⁵	France ⁷
Study period	2002–2006	1998–2000	1992–2001	1992–2001	1991–2001
Information source	Stewards' reports	—	Medical officer	Medical officer	Medical officer
Flat racing*					
Falls	0.42	—	0.42	0.37	0.31
Falls (during race)	0.14	0.16	—	—	—
Injuries	0.11	—	0.17	0.15	0.12
Fatalities [†]	672.54	—	419.40 [‡]	—	338.00 [‡]
Jumps racing*					
Falls	5.26	—	6.82	4.77	9.10
Falls (during race)	5.20	6.68	—	—	—
Injuries	0.51	—	1.21	0.59	1.19
Fatalities [†]	0	—	646.40 [‡]	—	2245.90 [‡]
Ratio jumps : flat	12.52	41.75	16.24	12.89	29.35

* Fall and injury incidence rates are per 100 rides unless otherwise stated.
[†] Fatality incidence rates are per 100 million rides. [‡] French fatality incidence rates were recorded for 1980–2001; UK rates were recorded for 1975–2000.

subsequent sequelae of those incidents. As a source of data on injuries, they may lead to underestimation of minor injuries, but should provide a reliable record of the occurrence of substantive injuries. A further limitation of our study is that we did not have coverage of falls or injuries during track work, which accounted for 31% of fall-related injuries in the Victorian study.¹¹ Compared with the European studies, we had a limited period of observation, but a higher number of rides and fall events. Jumps racing was limited to three states, providing fewer observations than included in the overseas studies. Despite this, we were able to observe a decline in falls following the safety changes to jumps in Victoria.

Being a jockey is a hazardous occupation. Our results support the need to improve occupational health and safety standards in the thoroughbred racing industry in Australia, and suggest that intervention strategies will need to address falls pre- and post-race as well as during the race.

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COMPETING INTERESTS

None identified.

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