CHIRPP INJURY REPORT

Canadian Hospitals Injury Reporting and Prevention Program

Injuries associated with ... Slips and Falls From Diving Boards, Towers and Platforms (outside of pool) in Public Pools

CHIRPP database cumulative to May 2006, All ages

SOURCE OF THE STATISTICS

Injury data were obtained from the database of the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP). CHIRPP is an injury surveillance system operating in the emergency departments of 10 pediatric and 4 general hospitals in Canada. Data collection began in April 1990 at the pediatric hospitals and between 1991 and 1995 in the general hospitals. CHIRPP is a program of the Injury and Child Maltreatment Section of the Health Surveillance and Epidemiology Division, Public Health Agency of Canada.

Briefs and reports are updated when there is reason to believe the injuries or circumstances surrounding the injuries have changed. For example, the report of injuries associated with a specific product would be updated if the manufacturing regulations for the product are changed to include a new safety element. There is no need to update reports on a regular basis because the data collection sites are not a representative sample of all Canadian hospitals. Frequent updates would simply increase the number of records included in the report but not necessarily result in any change in the patterns and distributions found.

LIMITATIONS

It is important to note that the injuries described do not represent all injuries in Canada, but only those seen at the emergency departments of the 15 hospitals in the CHIRPP network. Since most of the data comes from the pediatric hospitals, which are in major cities, injuries suffered by the following people are under-represented in the CHIRPP database: older teenagers and adults, who are seen at general hospitals; native people; and people who live in rural areas. Fatal injuries are also under-represented in the CHIRPP database because the emergency department data do not capture people who died before they could be taken to hospital or those who died after being admitted.

INCLUSION AND EXCLUSION CRITERIA

A May 2006 search of the entire CHIRPP database, all ages (1,556,733 records total) for injuries due to slips and falls involving diving boards, towers and platforms not related to the performance of a dive was conducted. The search was restricted to public pools (indoor and outdoor) involving falls where the direct cause of injury was the pool deck (concrete or ceramic tiles) or the diving structure itself (board, platform, stairs, ladder). Specifically, the CHIRPP factor codes for diving (1157) and swimming (1177) were combined with the following text strings: 'DIVING', 'DIVE', 'PLONG', 'BOARD', 'PLATFORM',' TOWER', 'LADDER','ECHELLE' and 'ETAGE', to identify potential cases. Records were reviewed individually for appropriateness and the following types were excluded: *i)* cases where the patient was injured by the diving structure or pool edge in the process of performing the dive, *ii)* overexertion injuries, *iii)* injuries related to water, pool floor or wall impact, *iv)* incidents occurring in lakes, rivers, ponds, quarries and private residence pools.

RECOMMENDED CITATION

Injury briefs and reports and data from them may be copied and circulated freely provided that the source is acknowledged. The following citation is recommended:

Health Surveillance and Epidemiology Division (Public Health Agency of Canada). *Injuries Associated with Slips and Falls From Diving Boards, Towers and Platforms (outside of pool) in Public Pools*: Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) database, Cumulative to May 2006, All ages, 97 records.

FOR MORE INFORMATION

Please contact the Injury and Child Maltreatment Section, Health Surveillance and Epidemiology Division, by PHONE at (613) 957-4689, by FAX at (613) 941-9927 or visit our website at http://www.phac-aspc.gc.ca/inj-bles/

Overview

Overall, 97 cases were identified, which represents 10.6% of all diving-related incidents and 38% of all diving structure-related injuries in public pools over the same time period. Only seven cases (7.2%) involved organized diving or swimming (lessons or competition). In 86.6% of the 97 cases, the pool deck (concrete or ceramic tile) was the direct cause of the injury. In the remaining 13 (13.4%) cases the direct cause was some component of the diving structure (stairs, railing, platform, etc.).

Proportion of cases by year

Table 1 shows the proportion of cases (both relative to all CHIRPP cases and all diving-related cases) by year for the period 1999-2005. There was a significant increase in the proportion of cases between 1997 -2003 and 1990-1996 ($p<0.05$, $\chi^2 = 4.46$). During the time period from 1990-1996 there were 4.87/100,000 CHIRPP cases of all types and 8.4% of all diving-related cases in public pools; in the time frame from 1997-2003 these proportions increased to 7.84/100,000 and 12.4%, respectively.

Table 1. Slips and falls from diving structures, proportion of cases by year, CHIRPP, all ages, 1990-2005

Year	# Cases	#/100,000 CHIRPP [1]	% of Diving Cases [2]
1990	1	2.3	3.7
1991	1	1.3	2.2
1992	4	5.6	7.6
1993	10	9.9	17.9
1994	8	6.5	12.7
1995	4	3.3	5.8
1996	4	3.3	5.8
1997	13	11.1	19.1
1998	8	7.2	9.4
1999	6	5.4	8.2
2000	12	10.4	15.8
2001	6	5.2	8.5
2002	13	11.1	14.9
2003	5	4.3	10.0
2004	0	- *	0.00
2005	2	- *	15.4
Total	**97**	**6.2**	**10.6**

[1] Number of cases per 100,000 CHIRPP records of all types for the given year.
[2] Proportion of all diving-related cases in public pools for the given year.
***** 2004 and 2005 are incomplete and since there is a seasonality to diving injuries, the proportion per 100,000 will be inaccurate.

Age and sex distribution

Table 2 details the age and sex distribution. Two-thirds of the cases involved children between the ages of 5 and 9 years old. The median age was 8.3 years (range: 2.6 to 66.7 years). The interquartile range (25th to 75th percentiles) was 6.2 to 9.8 years. Males represented about 60% of incidents.

Table 2. Slips and falls from diving structures, age and sex distribution, CHIRPP, all ages, 1990-2005

Age Group (years)	# Cases (%)	#/100,000 CHIRPP [1]	M:F Ratio [2]	M:F Ratio CHIRPP [3]
2-4	9 (9.3)	3.5	0.8	1.4
5-9	64 (66.0)	19.8	2.2	1.4
10-14	22 (22.7)	5.6	0.7	1.6
15+	2 (2.0)	0.5	1.0	1.6
Total	**97 (100.0)**	**7.0**	**1.5**	**1.5**

[1] Because CHIRRP collects information from ten children's hospitals and only four of the general hospitals, there is a high number of young children in the database. Using cases per 100,000 within an age group (instead of percentage by age group) adjusts for this uneven distribution.
[2] M:F = Male to female ratio (#males/#females).
[3] The M:F ratio in the entire CHIRPP database for the given age group.

Circumstances

Table 3 details how the slip/fall occurred. In the records where detailed information was known (*i.e.* more than "FELL FROM DIVING PLATFORM TO POOL DECK"), 79% involved slipping due to a wet surface while 18.9% occurred because the patient lost their balance (not related to a slippery surface).

Table 3. Circumstances of slips and falls from diving structures, CHIRPP, all ages, 1990-2005

Circumstance	# Cases (%)
Fell, NFS	44 (45.4)
Slipped (due to wet surface)	42 (43.3)
Lost balance/footing [1]	10 (10.3)
Other person fell causing patient to lose balance	1 (1.0)
Total	**97 (100.0)**

[1] Excluding losing balance due to wet surface. Includes catching feet in the ladder, stepping back and missing stair, etc.
NFS - Not Further Specified

Month and day of the week

Table 4 shows the distribution by day of the week and table 5 details the monthly pattern. Almost one-quarter of the cases occurred on Monday and one-third happened in August.

Table 4. Slips and falls from diving structures, day of the week, CHIRPP, all ages, 1990-2005

Day of the Week	# Cases (%)	% CHIRPP [1]
Sunday	14 (14.4)	14.4
Monday	22 (22.7)	14.0
Tuesday	7 (7.2)	13.8
Wednesday	16 (16.5)	14.1
Thursday	10 (10.3)	14.2
Friday	13 (13.4)	14.5
Saturday	15 (15.5)	15.0
Total	**97 (100.0)**	**100.0**

[1] The proportion of cases in the entire CHIRPP database for the given day, over the same time period.

Table 5. Slips and falls from diving structures, month of the year, CHIRPP, all ages, 1990-2005

Month	# Cases (%)	% CHIRPP [1]
January	2 (2.1)	7.9
February	4 (4.1)	7.6
March	7 (7.2)	7.9
April	5 (5.1)	8.3
May	3 (3.1)	10.3
June	12 (12.4)	9.7
July	19 (19.6)	8.7
August	32 (33.0)	8.5
September	3 (3.1)	8.7
October	3 (3.1)	8.3
November	5 (5.1)	7.4
December	2 (2.1)	6.6
Total	**97 (100.0)**	**100.0**

[1] The proportion of cases in the entire CHIRPP database for the given month, over the same time period.

Time of day

Table 6 shows the distribution by time of day. Of the cases where the time of day was known (n=90), just over half (52.2%) occurred between 2:00 pm and 4:59 pm.

Table 6. Slips and falls from diving structures, time of day, CHIRPP, all ages, 1990-2005

Time	# Cases (%)	% CHIRPP [1]
Midnight to 9:59 am	1 (1.0)	7.7
10:00 am to 1:59 pm	16 (16.5)	20.7
2:00 pm to 4:59 pm	47 (48.5)	18.9
5:00 pm to 11:59 pm	26 (26.8)	33.4
Unknown	7 (7.2)	19.3
Total	**97 (100.0)**	**100.0**

Fall height

Table 7 details the fall height. The fall height is distinct from the structure height. In some cases the fall height was equal to the structure height, in others it was less (*e.g.* "PATIENT WAS CLIMBING 3 M DIVING TOWER, GOT ½ WAY UP, SLIPPED AND FELL"). Of the 56 cases where quantitative information was known, 30.3% involved a fall height of 3 metres.

Table 7. Slips and falls from diving structures, fall height, CHIRPP, all ages, 1990-2005

Fall Height (m)	# Cases (%)
< 1	7 (7.2)
1	11 (11.3)
1.5	4 (4.1)
2	7 (7.2)
2.5	5 (5.2)
3	17 (17.5)
3.5	3 (3.1)
7	1 (1.0)
12	1 (1.0)
High board, NFS	1 (1.0)
Low board, NFS	1 (1.0)
Platform, NFS	1 (1.0)
Unspecified	38 (39.2)
Total	**97 (99.8*)**

* Does not add to 100.0 due to rounding.
NFS - Not Further Specified

Injuries

Table 8 shows the distribution of injuries. CHIRRP allows the reporting of up to three injuries, this table shows all reported injuries. Almost one-third (28.9%) of patients had more than one injury - 97 patients suffered 131 injuries. There were 11 (8.4%) concussions, 9 (6.9%) skull fractures, 3 (2.3%) facial fractures, and 1 (0.8%) intracranial injury. Compared to all other diving injuries (*i.e.* excluding these 97 cases), skull and brain injuries were 2.6 times more frequent.

Table 8. Injuries (all reported) resulting from slips and falls from diving structures, CHIRPP, all ages, 1990-2005

Body Part **nature of injury**	**# Cases (%)**	**% Other Diving** [1]
Skull and Brain minor closed head injury (MCHI) concussion skull fracture scalp bruise, abrasion, laceration, soft tissue intracranial	**59 (45.0)** 29 11 9 9 1	**17.1**
Face and Neck bruise, abrasion, laceration, soft tissue facial fracture neck sprain/strain dental	**26 (19.8)** 20 3 2 1	**31.6**
Lower Extremity bruise, abrasion, laceration, soft tissue sprain/strain fracture	**17 (13.0)** 13 3 1	**18.0**
Upper Extremity bruise, abrasion, laceration fracture	**16 (12.2)** 9 7	**9.9**
Trunk bruise, abrasion pelvic fracture	**11 (8.4)** 10 1	**19.1**
Other	**2 (1.5)**	**4.3**
Total	**131 (100.0)**	**100.0**

[1] The proportion of cases of the given body part/region for all other diving related injuries, over the same time period.

Treatment in emergency

Table 9 shows the treatment received by the patients in the emergency room. Twenty-one patients (21.7%) were admitted to hospital. All admitted patients were under 10 years old. One-third of 2-4 year-olds and 28.1% of 5-9 year-olds were admitted. Compared to all other diving injuries (*i.e.* excluding these 97 cases) and all other CHIRPP cases, the proportion of admitted patients was 3-4 times more frequent.

Table 9. Treatment received in the emergency department for injuries resulting from slips and falls from diving structures, CHIRPP, all ages, 1990-2005

Disposition	# Cases (%)	% Cases CHIRPP [1]	% Other Diving [2]
Left without being seen	0 (0.0)	1.2	0.6
Advice only	33 (34.0)	18.2	26.2
Treated, medical follow-up if necessary	25 (25.8)	39.1	40.8
Treated, medical follow-up required	15 (15.5)	33.6	25.1
Short stay, observed in ED	3 (3.1)	1.6	2.0
Admitted to hospital	21 (21.6)	6.4	5.3
Fatal	0 (0.0)	<0.1	0.0
Total	**97 (100.0)**	**100.0**	**100.0**

[1] The proportion of cases in the entire CHIRPP database for the given disposition, over the same time period.
[2] The proportion of cases of the given disposition for all other diving related injuries, over the same time period.