Queensland Injury Surveillance Unit



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QISCI collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QIS() publications and data are available on request for research, prevention and education activities.

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Addressing Childhood Injury in Mackay: a Safe Communities Initiative

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Summary

- Injury is the leading cause of death in children, accounting for one-third of all deaths in those aged 1 to 14 years (compared with 3% of deaths in adults).
- In the Mackay and Moranbah Health Service Districts, childhood injury results in an average of 4 deaths, 1,260 hospitalisations and 3,343 Emergency Departments (EDs) presentations per year.
- There were 16,715 injury presentations to regional EDs involving children during the 5-year study period (1998 to 2002), 5,007 (30%) in children aged 0-4.
- Immersion incidents (drowning / near drowning) resulted in 4 deaths and 13 ED presentations.
- Transport incidents resulted in 14 deaths and 1,998 ED presentations in children. Three deaths and 231 ED presentations occurred in children aged 0-4. Leading causes of ED presentation in children of this age were bicycle (41%), motor vehicle passenger (34%), & pedestrian (13%) injuries.
- Falls resulted in one death and 5,550 ED presentations. 1,953 occurred in children aged 0-4. The most important causes of falls in children of this age were nursery equipment, playground equipment, stairs, balconies and windows, trampolines, and beds including bunk beds.
- Poisoning resulted in 398 ED presentations, 313 in children aged 0-4. Half were the result of poisoning by medications and half due to household chemicals.
- Burns resulted in 486 ED presentations, most commonly from hot object burns (214), scalds (174) and flame burns (53).
- Childhood development is rapid and dynamic. Accordingly, the type of injury children suffer is equally dynamic. Each type of injury has its own distinctive age demographic. Significant causes of injury in children aged 0-4 also involve children of primary school age. Interventions targeting young children may be more effective in the context of interventions simultaneously aimed at older children.

Introduction

Injury is the leading cause of death in children (persons under the age of 15)¹. It is responsible for one third of childhood deaths in Queensland, half of these occurring in children aged 0-4². Childhood injury death rates in Queensland are higher than all other Australian states with the exception of the Northern Territory¹.

Children aged 0-4 years are at greater risk of being hospitalised due to injury than any other age group³.

Three of the four priority injury prevention issues endorsed in the National Injury Prevention Plan⁴ are concerned with injury prevention in childhood:

- falls in children,
- drowning in children,
- poisoning in children.

The Queensland Government's Human Services CEO's Committee Child Injury Prevention Project (CHIPP) ³ jointly sponsored by the Department of Emergency Services and Queensland Health is establishing two demonstration child injury prevention projects in Mackay and Mt Isa using the WHO Safe Communities model. This project provides an excellent opportunity to reduce harm through injury to children living in the Mackay and Moranbah Health Service Districts (MMHSD).

The Mackay Whitsunday Safe Communities Project⁹ is a community based safety promotion project established in February 2000. The project aims to co-ordinate a systematic, inter-sectoral, sustained response to injury in the region. Queensland Injury Surveillance Unit (QISU) is assisting by profiling injury patterns in the MMHSD so that the community can identify priorities and develop solutions.

This report reviews the patterns of childhood injury in the MMHSD. It seeks to identify strategic opportunities to reduce childhood injury in the region, with a particular focus on injury affecting children aged 0-4.

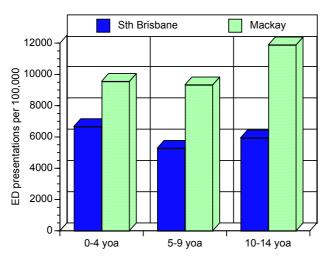


Figure 1: QISU ED injury presentation rates by region and age group (1998 - 2002)

Results

The MMHSD reported 26 childhood deaths due to injury during the period from 1994 to 2000, an average of 4 deaths per year. In children aged 0-4 the leading causes of death were drowning (4) followed by transport (3) and falls (1).

In the 4 year period from July 1998 until June 2002 there were 5,040 hospitalisations in the MMHSD due to injury in children (an average of 1260 hospitalisations per year). 1,331 (26%) were in children less than 5 years of age.

The Mackay Injury Surveillance Network was established in September 1997 as part of the QISU's network⁵. This population based network collects surveillance data from all Emergency Departments (EDs) in the MMHSD. The network reported 57,532 injury presentations to the region in the five year study period (January 1998 to December 2002). 16,715 (29%) were in children less than 15 years old (an average of 3,343 presentations per year). Childhood ED injury presentation rates in the MMHSD are high compared with a similar surveillance network in South Brisbane (Figure 1).

In the MMHSD ED injury presentations initially peak in the toddler age group, and after a slight reduction in early primary school children, rise again in adolescence (Figure 2).

Drowning

Four deaths due to drowning were reported in the MMHSD in the 5 year period from 1994 to 2000; all were children aged 0-4 years. Three of these incidents occurred in domestic swimming pools while one occurred in the bath.

There have been 13 presentations to regional EDs due to near drowning between 1998 and 2002, 10 occurring in children less than 5 years of age (Table 1).

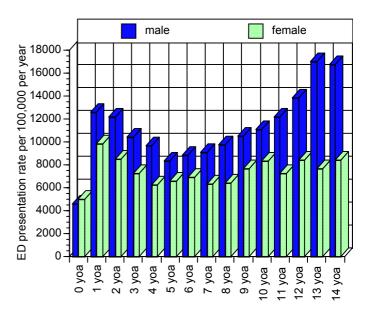


Figure 2: QISU ED injury presentation rates MMHSD by age (1998 - 2002)

	ED presentations				
	0-4 years	0-14 years			
Domestic swimming pool	5 (45.5%)	5 (38%)			
Public / resort pool	1 (9%)	3 (25%)			
Bath	4 (36.5%)	4 (31%)			
Garden Pond	1 (9%)	1 (8%)			

Table 1: QISU near drowning ED presentations for 0-4 years and 0-14 years by place (1998 - 2002)

A number of interventions have been shown to reduce pool drownings ^{3, 6}:

- 1 Review state legislation to improve standards for domestic swimming pool fencing and enforce these standards,
- 2 Obtain local government support for regular pool fence inspections,
- 3 Develop and distribute information regarding fencing requirements to pool builders and real estate associations,
- 4 Promote CPR training and the installation of CPR instruction charts around all domestic pools.

The occurrence of a drowning death and three ED presentations from near drowning in the bath is of concern. Awareness of the need for adequate supervision of any small child in the bath needs emphasis along with the dangers of baby bath seats.

Transport

The region reported 14 transport related deaths in children between 1994 and 2000. Three occurred in children aged 0-4 (2 motor vehicle passengers, 1 go-kart).

In this period there were 1,998 ED presentations of childhood transport injury (12% of childhood ED injury presentations). Of these 1,273 (7.6% of all childhood injury presentations) and 2 deaths were due to bicycle injuries. 655 (51%) occurred on a public road, of these 40 (3%) involved a collision with a motor vehicle.

231 ED presentations occurred in children aged 0-4 (5% of ED presentations in this age group). The leading causes of transport related injury in children in this age group were:

- Motor vehicle passengers 2 deaths and 77 (34%) ED presentations,
- Bicycles 94 (41%) ED presentations,
- Pedestrian 30 (13%) ED presentations, including 11 low speed driveway runovers.

While children aged 0-4 are more likely to experience a bicycle injury at home (56%) than on the road (32%), it is of concern that similar to older children 2% of injuries occur after a collision with a motor vehicle on a public road.

Strategies to reduce bicycle related injury include⁷:

- Bike Education programs (currently offered to primary school children in the region through the Police Citizens Youth Club),
- 2 Lobby for the provision of bike paths and safe riding areas.
- 3 Encourage parents to stop children under 5 years of age from riding bicycles on roads,
- 4 Promote the use of bike helmets.

The best opportunity for reducing harm from motor vehicle crashes is to increase the effective use of child restraints^{3, 7}:

- Promote use of Queensland Ambulance Service program for the correct fitting of baby capsules and child restraints.
- 2 Encourage the disposal of old capsules and restraints and educate target groups of the dangers of using equipment that has been involved in an impact.

Strategies aimed at reducing pedestrian injury include⁷:

- Education programs teaching safe road use for pedestrians,
- 2 "Walking bus" programs, providing adult supervised walking from home to school,
- 3 Promotion of the new Department of Housing 'Smart House' design for all new dwellings which recommends driveways and garages be situated separately from child accessible areas,
- 4 Encourage installation of fencing between driveways and play and living areas in houses.

Falls

Falls are the leading cause of ED injury presentations in children. There were 5,550 ED presentations due to falls in the region over the study period which accounted for 33% of all ED injury presentations. 1,953 of these occurred in children aged 0-4 (39% of ED injury presentations in this age group).

High falls (> 1 metre) are more likely to result in hospitalisation and occur in younger children at a rate almost double that of older children (367.7 vs 688.3 per 100,000 per year). Examination of the causes of high falls provides a strategic focus for initial analysis and planning of interventions. Table 3 (page 4) lists the major injury factors associated with high falls by age group.

	ED Presentations	Hospitalisations
Low Falls	4496	425 (9.5%)
High Falls	1054	217 (20.6%)

Table 2: QISU ED presentations and hospitalisations, children (0-14 years) by type of fall (1998 - 2002)

Major injury factor	I	All ages			< 1 yoa			1-4 yoa		5-	11 yoa		12-	14 yoa	
Nursery Product	No		Rates*	No	%	Rates*	No	%	Rates*	No	%	Rates*	No	%	Rates*
Pram	3	0.3	1.7	1	1.5	8.9	2	0.6	4.3	0	0	0.0	0	0	0.0
Baby walker	18	1.7	10.0	18	27.7	160.7	0	0	0.0	0	0	0.0	0	0	0.0
High Chair	8	8.0	4.4	4	6.2	35.7	4	1.2	8.6	0	0	0.0	0	0	0.0
Cot	5	0.5	2.8	0	0	0.0	5	1.5	10.7	0	0	0.0	0	0	0.0
Change Table	11	1	6.1	8	12.3	71.4	2	0.6	4.3	1	0.2	1.1	0	0	0.0
Other			0.0			0.0			0.0			0.0			0.0
Total	45	4.3	25.0	31	47.7	276.8	13	3.9	27.9	1	0.2	1.1	0	0	0.0
Toy / Playground Equip															
Tree House	20	1.9	11.1	0	0	0.0	5	1.5	10.7	15	2.7	17.2	0	0	0.0
Tricycle	3	0.3	1.7	0	0	0.0	3	0.9	6.4	0	0	0.0	0	0	0.0
Other Toy	1	0.1	0.6	0	0	0.0	0	0	0.0	1	0.2	1.1	0	0	0.0
Flying Fox	15	1.4	8.3	0	0	0.0	1	0.3	2.1	14	2.5	16.0	0	0	0.0
Monkey Bars	89	8.4	49.4	0	0	0.0	16	4.8	34.3	69	12.3	79.0	4	4.1	11.4
Slide	36	3.4	20.0	0	0	0.0	19	5.7	40.8	17	3	19.5	0	0	0.0
Swing	34	3.2	18.9	0	0	0.0	9	2.7	19.3	22	3.9	25.2	3	3.1	8.6
Other Playground Equip	24	2.3	13.3	0	0	0.0	9	2.7	19.3	15	2.7	17.2	0	0	0.0
total	222	21	123	0	0	0.0	62	18.6	133.0	153	27.3	175.1	7	7.2	20.0
Furnishing Bed	17	1.6	9.4	2	3.1	17.9	9	2.7	19.3	6	1.1	6.9	0	0	0.0
Bunk Bed	60	5.7	33.3	0	0	0.0	23	6.9	49.3	36	6.4	41.2	1	1	2.9
Cabinet	5	0.5	2.8	0	0	0.0	3	0.9	6.4	2	0.4	2.3	0	0	0.0
Chair	15	1.4	8.3	0	0	0.0	10	3	21.5	5	0.9	5.7	0	0	0.0
Sofa	9	0.9	5.0	1	1.5	8.9	4	1.2	8.6	4	0.7	4.6	0	0	0.0
Table	20	1.9	11.1	5	7.7	44.6	12	3.6	25.7	3	0.5	3.4	0	0	0.0
Other Furniture	4	0.4	2.2	0	0	0.0	3	0.9	6.4	1	0.2	1.1	0	0	0.0
Total	130	12.3	72	8	12.3	71.4	64	19.2	137.3	57	10.2	65.2	1	1	2.9
Appliance															
Total	2	0.2	1.1	1	1.5	8.9	1	0.3	2.1	0	0	0.0	0	0	0.0
Utensil or container															
Clothes line	3	0.3	1.7	0	0	0.0	2	0.6	4.3	1	0.2	1.1	0	0	0.0
Shopping Trolley	15	1.4	8.3	1	1.5	8.9	14	4.2	30.0	0	0	0.0	0	0	0.0
Other	3	0.3	1.7		0	0.0	1	0.3	2.1	1	0.2	1.1	1	1	2.9
Total	21	2	11.7	1	1.5	8.9	17	5.1	36.5	2	0.4	2.3	1	1	2.9
Transport related falls															
Car	6	0.6	3.3	0	0	0.0	3	0.9	6.4	2	0.4	2.3	1	1	2.9
Truck	5	0.5	2.8	0	0	0.0	0	0	0.0	3	0.5	3.4	2	2.1	5.7
Utility	6	0.6	3.3	0	0	0.0	2	0.6	4.3	4	0.7	4.6	0	0	0.0
Trailer	4	0.4	2.2	0	0	0.0	2	0.6	4.3	2	0.4	2.3	0	0	0.0
Pushbike	6	0.6	3.3	0	0	0.0	0	0	0.0	5	0.9	5.7	1	1	2.9
Other	2	0.2	1.1	0	0	0.0	0	0	0.0	1	0.2	1.1	0	0	0.0
Total Sport	29	2.7	16.1	0	0	0.0	7	2.1	15.0	17	3	19.5	4	4.1	11.4
Trampoline	125	11.8	69	0	0	0.0	36	10.8	77.2	77	13.8	88.1	12	12.4	34.3
Sport - other	26	2.5	14.4	0	0	0.0	2	0.6	4.3	17	3	19.5	8	8.2	22.9
Total	151	14.3	84	0	0	0.0	38	11.4	81.5	94	16.8	107.6	20	20.6	57.2
Tool	101	11.0	01	Ů		0.0	00		01.0	01	10.0	101.0	20	20.0	01.2
Ladder	13	1.2	7.2	0	0	0.0	4	1.2	8.6	8	1.4	9.2	1	1	2.9
Scaffolding	2	0.2	1.1	0	0	0.0	0	0	0.0	0	0	0.0	2	2.1	5.7
Total	15	1.4	8.3	0	0	0.0	4	1.2	8.6	8	1.4	9.2	3	3.1	8.6
Natural Object / animal															
Tree / plant	156	14.8	87	0	0	0.0	18	5.4	38.6	113	20.2	129.3	25	25.8	71.4
Dropped by human	13	1.2	7.2	4	6.2	35.7	4	1.2	8.6	3	0.5	3.4	2	2.1	5.7
Other natural object	15	1.5	8.3	1	1.5	8.9	2	0.6	4.3	7	1.3	8.0	5	5.2	14.3
Total	184	17.4	102	5	7.7	44.6	24	7.2	51.5	123	22	140.8	32	33	91.4
Structure	16	1.5	8.9	1	1 5	0.0	10	2	21.5	5	0.0	5.7	0	0	0.0
Window Stairs	16 98	9.3	54.4	16	1.5 24.6	8.9 142.9	10 53	3 15.9	21.5 113.7	5 23	0.9 4.1	5.7 26.3	0 6	0 6.2	0.0 17.1
Fence / wall	39	3.7	21.6	0	0	0.0	7	2.1	15.0	24	4.1	27.5	8	8.2	22.9
Balcony	37	3.5	20.5	1	1.5	8.9	20	6	42.9	14	2.5	16.0	2	2.1	5.7
Roof	20	1.9	11.1	0	0	0.0	3	0.9	6.4	12	2.1	13.7	5	5.2	14.3
Other structure	21	2	11.7	1	1.5	8.9	6	1.8	12.8	12	2.4	13.7	3	3.1	8.6
Total	231	21.9	128	19	29.2	169.6	99	29.8	212.3	90	16.1	103.0	24	24.7	68.6
Material															
Total	8	0.8	4.4	0	0	0.0	1	0.3	2.1	4	0.7	4.6	2	2.1	5.7
Miscellaneous	,_											10.0			0.0
Total	17	1.6	9.4	0	0	0.0	2	0.6	4.3	11	2	12.6	3	3.1	8.6
Grand Total	1054			65			332			560			97		

Six strategic areas for intervention are evident. In order of priority, they are:

- 1 Falls involving nursery equipment 45% of high falls in children under 1 year old. Of particular importance were falls from baby walkers (28%), change tables (12%) and high chairs (6%). Falls from prams and strollers account for 11% of low falls in children under 1 year old.
- 2 Falls from stairs 25% of high falls in children less than 1 year old, 16% of high falls in children aged 0-4
- 3 Falls from playground equipment 15% of high falls in children aged 0-4. Leading causes include slides (6%), monkey bars (5%) and swings (3%).
- 4. Falls from trampolines 14% of high falls in children aged 0-4.
- 5. Falls from balconies and windows 1 death, 9% of high falls in children aged 0-4.
- 6. Falls from beds bunk beds account for 7% of high falls in children 0-4. Falls from beds account for 22% of low falls in children less than 1 year old and 7% of low falls in children aged 0-4.

Effective interventions to prevent falls include:

- 1 Nursery furniture³
 - Promote the removal of baby walkers and unsafe nursery equipment
 - Educate and motivate local retailers and second-hand dealers to supply goods which are compliant with current Australian Standards
 - Devise checklists for consumers to assist in the identification of unsafe nursery products.
- 2 Playground equipment 3, 6
 - Obtain support from Local Government and State and Private Schools for the installation and maintenance of 'safer playgrounds'
 - Conduct an audit of playgrounds situated in public parks, schools, preschool and childcare centres.
 - Devise a playground safety checklist to be distributed to all child care centres and home carers.
- 3 Stairs 3
 - Promote the use of stair guards.
- 4 Trampolines⁸
 - Encourage supervision of children aged 0-4
 - Clarify and promote rules for using trampolines
 - Promote the use of protective padding
 - Provide advice on appropriate positioning of trampolines including safe fall zone.

(Facing page - p4)

Table 3: QISU child (0-14 years) ED presentations for high falls (> 1 metre) by major injury factor (1998 - 2002)
*Rates per 100,000 per year

- 5 Balconies & windows 3, 6
 - Encourage builders and property owners to comply with Australian standards for balcony rails and window guards.
- 6 Bunk Beds 3
 - Encourage retailers and second hand dealers to comply with Australian standards and provide point of sale advice,
 - Discourage use by children aged less than 6 years.

Poisonings

There were 398 ED presentations due to poisoning over the 5 year study period. 313 occurred in children aged 0-4 (6.3% of all ED injury presentations in this age group). Half were the result of poisoning by medications and half due to household chemicals. Fifty four percent of ED poisoning presentations were admitted to hospital. Poisoning accounted for 11.9% of all ED injury admissions in children.

Interventions useful in reducing unintentional poisonings include³:

- 1 Extend the use of child resistant closures to include essential oils and all household chemicals.
- 2 Promote the installation of and use of child resistant poisons cabinets in all homes.
- 3 Promote use of non toxic household chemicals for cleaning, pest control and personal hygiene,
- 4 Encourage the effective disposal of unwanted household chemicals and medications,
- 5 Provide poisons centre information and contact numbers to households.

Burns

There were 486 ED presentations due to burns (Table 4). Of the 441 thermal burns, 219 were in children aged 0-4 (4.3% of injury presentations in that age group). 8.1% of ED thermal burn presentations required admission to hospital.

A disproportionate number of hot object burns (eg irons, vehicle exhausts) presented to the non-urban hospitals in the MMHSD (Table 5).

	ED presentations
Hot object burns	214 (44.0%)
Scalds	174 (35.8%)
Flame burns	53 (10.9%)
Chemical burns	19 (3.9%)
Sunburn	17 (3.5%)
Friction burns	9 (1.9%)

Table 4: QISU child (0-14 years) ED presentations by type of burn (1998-2002)

Hospitals	ED presentations	ED presentation rate (per 100,000 per year)
Mackay city	94	290.4
Non-urban	119	702.9

Table 5: QISU child (0-14 years) ED presentations for hot object burns, Mackay city and non-urban hospitals (1998 - 2002)

Effective interventions to reduce the occurrence of burns include^{3, 6}:

- 1 Promote installation of smoke alarms and safety switches in rental properties and older dwellings,
- 2 Increase number of homes with hot water temperature regulation (thermostat reduction / tempering valves),
- 3 Educate and engage support of local plumbers and electricians to promote safety devices,
- 4 Encourage local retailers/suppliers to stock and promote safety products (eg. stove guards),
- 5 Encourage installation of stove top rail guards,
- 6 Promote and provide samples of spill proof mugs for use around young children.

Discussion

In the MMHSD injury resulted in an average of 4 deaths, 1260 hospitalisations and 3343 ED presentations per year.

This paper identifies strategic opportunities to reduce harm from injury to children living in the MMHSD, particularly injury affecting children aged 0-4.

While the predominate focus of this analysis has been on children aged 0-4, it is clear that many significant causes of injury in children in this age group also effect children of primary school age. Childhood development is rapid and dynamic; the patterns of injury observed in this study reflect this dynamism. Each injury type has a unique demographic footprint. It is unhelpful to analyse injury causation and plan interventions based on 5 year age groups in a phase of human development that is so rapidly evolving.

Some interventions targeting children aged 0-4 may be more effective in the context of interventions simultaneously aimed at older children.

Mass media campaigns and targeted education programs work best in the context of a broad integrated approach. Effective interventions seek to develop and strengthen community self-sufficiency while at the same time producing social and environmental changes that reduce the risk of injury.

The Mackay Whitsunday Safe Communities Project⁹ is a community based safety promotion project established in February 2000. The project aims to co-ordinate a systematic, inter-sectoral, sustained response to injury in the region. By involving the community in finding their own solutions, it hopes to be a catalyst for structural, sociological and political change that empowers the community, to change their environment and their behaviour to reduce the risk of injury.

In Mackay a unique combination of: QISU population based local surveillance system to inform strategic planning, the expertise of two tertiary universities (James Cook University and University of Queensland), an established credible community based action group, state government commitment and a full time local project co-ordinator, provide our community with its best opportunity to work together to reduce the incidence of chidhood injury in our community.

Conclusion

Injury is an important cause of morbidity for children living in the Mackay and Moranbah Health Service District. The Human Services CEO's Committee Child Injury Prevention Project³ provides an excellent opportunity to reduce harm through injury to children in the Mackay community.

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