

# CHILDHOOD INJURIES IN SINGAPORE – A REVIEW

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## INTRODUCTION

The aim of this paper is to present the results of a review on childhood accidental injuries in Singapore that have been published. Such information will give a composite picture of the pattern of accidental injuries in Singapore and point to areas where preventive measures may help to reduce the number of episodes. Healthcare providers can do much to reinforce safety from accidental childhood injuries.

Worldwide more than 2000 children die every day of unintentional childhood injury and at least half can be saved. Every year tens of millions more worldwide are taken to hospitals with injuries that often leave them with lifelong disabilities<sup>1</sup>.

In Singapore childhood injuries are the 2nd leading cause of death for children 5 to 18 years, and the fifth leading cause of death for children for children under 5 years<sup>2</sup>.

Singapore introduced the Childhood Injury Prevention Programme (CHIPP) in June 2004 to create awareness and educate parents and caregivers on common childhood accidental injuries, and how they can be prevented through vigilance and the taking appropriate safety precautions<sup>3,4,5</sup>. Available resources available on the web are also discussed, and the need for health care providers to disseminate the available information to the community.

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## METHODOLOGY

A PubMed search was conducted using the keywords of “childhood injury”, “childhood injuries” and limited by the keywords “accidental”, and “Singapore” for Editorial letter reviews, practice guideline, journal article published in published from 1999-2009. Out of the 17 papers from PubMed, 10 were relevant and the full text obtained. The information in these papers provided the information in this review.

Supplementary searches were also made on Google Scholar, and UpToDate.dot.com obtained 6 articles. Finally hand searching of the relevant referenced articles or the abstracts yielded another 10 articles. A total of 26 articles were obtained and reviewed for this review article.

The SORT evidence rating system and the key recommendations for prevention of unintentional childhood injuries (Table 1) was found to be useful and this has been included in the discussion<sup>6</sup>.

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**Table 1<sup>8</sup>. Injury prevalence rates in the Community (≤ 14 years)**

	Percentage
<b>Overall injury prevalence rates</b>	19.5
Mean age	7.7 years
Percentage of Injuries in Males	63.09
<b>Sex-specific injury prevalence rate</b>	
Boys	21.4
Girls	17.5
<b>Ethnic-specific injury prevalence rate</b>	
Chinese	18.6
Malay	20.5
Indian	24.3
Others	19.5
<b>Age-specific injury prevalence rate</b>	
Less than 9 months	4.9
9 months to 4 years	18.6
5 years to 9 years	21.6
10 years to 14 years	19.8

Source: Thein et al (2005)<sup>6</sup>

## RESULTS

The available papers were grouped into comprehensive papers, and papers on selected age group(s) and injury type. Two papers provided a comprehensive picture of the childhood accident scene in Singapore, namely one by Thein et al<sup>7</sup> on the community setting and one by Ong et al<sup>8</sup> on the case mix seen at an A&E Department in one of the general hospitals. A paper by Snodgrass<sup>9</sup> described the injuries in Singapore infants, and two papers one by Tan et al<sup>10</sup>, and one by Mahadev et al<sup>11</sup> focused on playground injuries in general, and the monkey bar injuries respectively. It is good to note that the monkey bar is now taken off from the playground. Tan RMK (2004) discussed about epidemiological data of drowning in Singapore<sup>12</sup>. Table 2 shows the contributions to the understanding of childhood injuries from the papers selected.

### I. Comprehensive studies

#### I.1 Community survey

A cross-sectional nationwide study on representative sample of the Singapore population of children under 15 years<sup>7</sup> that showed an overall incidence rate of injuries was 19.5%. Boys have higher injury rates than girls. Among the ethnic groups in Singapore, the Indians and the Malays had the highest injury rate while the Chinese had the lowest injury rate. (See Table 1).

**Table 2. Information from key papers on childhood accidental injuries in Singapore (2001 to 2009)**

No	Authors and (year)	Number of subjects	Setting	Findings	Remarks
01	Ong et al (2003) [8]	2,517 12 years and below	Comprehensive NUH A&E -1999	Mean age 7.7; males 62.7% • Home injuries 56.4% • Road related 14.4% • Sports related 8.2% • Playground injuries 7.4%	1 year's findings of cases seen at A&E (37.1% total attendance 12 yrs and below) Advocated establishment of injury surveillance database
03	Thein MM et al (2005) [7]	2322 15 years and below	Fairly Comprehensive- participation rate of 60% of appropriate households with children	Annual prevalence rate of injuries was 19.5% (boys was 21.4%, Girls 17.5%) Falls 77% (45% at home, outside the building 32.2%, and school 22.8%)	Need for educational and intervention programmes to increase awareness and understanding of child safety and injury prevention.
04	Snodgrass (2006) [9]	405 1 yr and below	Comprehensive Data from A&E of 3 hospitals, 2 polyclinics and Forensic Medicine Department	Most infants aged between 9 months to one year (37%). Male 57.3% and first born 57.3%, lower income 49.9% • Falls 76.7% • Burns 3.7% • Foreign Bodies 2.2% • Others 12.3%	Age specific measures in injury prevention. Close care giver supervision. Emphasis on identifying potential injury hazards in the home, fall prevention, adopting safe infant care practices and safe use of infant care products.
	Thein MM (2005) [14]	2322 15 years and below	Fairly Comprehensive- participation rate of 60% of appropriate households with children	Caregivers in Singapore have good knowledge of road safety for children and poor knowledge on home safety and first aid. The higher the mother's education level, the more likely it is that she possesses the correct knowledge and practice on childhood injury prevention. Only 38.5% obtained information on child safety from doctors and other health professionals.	Doctors and nurses should be involved in providing injury prevention advice as part of the education of parents when they bring their children for immunisation or when they come for well baby examinations.
05	Tan NC et al [2007] [10]	19,094 16 years and below	Comprehensive Data from A&E of 3 hospitals 2 polyclinics and Forensic Medicine Department	Mean age 6.8 years, Males 63.1% • Falls 70.7 % (Playground climbing apparatus 52.1%, slide 21.2%, swing at 6.3%, see saw at 4.4%) • Contact with blunt objects 12.6%	Safety advice should be erected at the playgrounds in public and private estates. Information on cause, mechanism of injury should be documented, coded and electronically compiled for epidemiological studies. Information should be standardized based on international classifications and coding system.
07	Mahadev A (2004) [11]	Retrospective review of 390 15 years and below	Comprehensive study Patients visiting KKH orthopaedics from May 1997 to Dec 1998	Noted 66% of playground injuries involved monkey bars. Mean and Median age was 7 years. Male 66.7% Supracondylar fractures majority of supracondylar fractures at the playground were from monkey bars.	Studies to determine the actual dimensions of playground equipment will be carried to ascertain with greater certainty the safety of equipments in the playgrounds.
08	Tan RMK (2004) [12]	NA	Comprehensive Data of in the 10-year period from 1992-2001. Epidemiological analysis from annual dawning statistics reported in the annual reports of the Singapore Life Saving Society	Drowning rate per 100,000 population varied from a low of 0.88 to 1.72 for the period of 1992-2001. Male: female ratio of drowning varied from a low of 2.7 to high 11.3.	Swimming skills and water safety should be widely taught with special emphasis on males. Pool fencing legislation was advocated.

Of the children who had injuries in the community, the home was the most common place where injuries occurred (45%), followed by outside the building (32.2%) and school (22.8%). Falls constituted the most common type of injuries; occurring 77% in the home, 92% at school and 76% outside respectively<sup>7</sup>. This was followed by mechanical injuries (14.3%), including knocks, lacerations, pulled elbows and being hit by falling objects. Slamming door injuries (6.1%), foreign bodies (4.4%), burns/scalds (2%), accidental poisonings (0.85), and drowning/ near drowning (0.4%) were other important causes. The remainder (6%) consisted of a mixed group including choking, animal/insect bites etc. The causes of falls at home included slipping (26%), falls from bed(18.3%), chairs (7.7%),

stairs (5.1%), in the toilet (4.1%) and walker devices (0.5%) and 9.7% were unknown<sup>7</sup>. See Table 3 for the details. There were no breakdown figures on injury age by age group and injury type.

## 1.2 Childhood injuries seen in A&E Department

In the retrospective study by Ong et al in 19998 of all children 12 and below presenting to the Emergency Department with trauma, 2,517 were seen for childhood accidental injury<sup>8</sup>. This accounted for 37.1% of all presentations to the National University Hospital Emergency Department for this age group. The injury prevalence rates are shown in Table 4.

**Table 3<sup>7</sup>. Injury profiles and injury type in the Community survey**

Location	Type	No	%	Place	No	%
1. Home - 327 (45%)	Falls	252	77	Living Room	179	54.7
	Injuries caused by sharp objects	43	13.2	Kitchen	58	17.7
	Burns & scalds	16	4.9	Bedroom	45	13.8
	Blunt & crush injuries	7	2.1	Bathroom	31	9.5
	Choking	4	0.2	Do not know where it happened	14	4.8
	Drowning	1	0.3			
	Suffocation	1	0.3			
	Others	3	0.9			
2. School - 166 (22.8%)	Falls	153	92.2	School field	131	78.9
	Injuries caused by sharp objects	6	3.6	Classroom	20	12.1
	Poisoning	1	0.6	Canteen	3	3.6
	Others	6	3.6	Others	9	5.4
3. Outside of Building - 234 (32.2%)	Falls	178	76.1	Playground & Parks	105	44.9
	Child cyclist	30	12.8	Road (non traffic related)	39	16.7
	Cuts	13	5.6	Corridors	31	13.3
	Child pedestrian	3	1.3	Stairs	19	8.1
	Child passenger in cars	1	0.4	Void deck	12	5.1
	Others	7	3.0	Road (traffic related)	8	3.4

Source: *Thein et al (2005)*<sup>7</sup>

**Table 4<sup>8</sup>. Injury prevalence rates of childhood accidents seen at the Accident and Emergency**

Mean age	6.8 years
Percentages of Injuries in Males	62.07 years
Ethnic specific injury (%)	
Chinese	62.8
Malays	19
Indians	11.3
Other Races	7

Source: *Ong et al (2003)*<sup>8</sup>

Table 5 show that by injury type, home injuries accounted for 56.4% of the cases. This was followed by road traffic injuries (7.4%), non traffic road injuries (7%). Sports and recreational injuries contributed 8.2% and playground injuries 7.4%. Injuries occurring in schools contributed 6.6% with the remainder (5.4%) occurring in various public areas. The occurrence of Non-Accidental Injuries was 1.6%. Pre-school children (age<5) were more likely to sustain home injuries ( $p<0.001$ ), compared to school going children (age 6-12). They also have higher proportion of head injuries.

Home injuries profile at the A&E is similar to that in the community where falls is the predominant mechanism of injury.

Car collisions (42.5%) caused the highest number of road traffic injuries, followed by pedestrians (34.4), bus (5.9), bicycles (5.9%), taxi, motorcycles both each 1.6% and others 3.8%.

These injuries tended to be on the head and face ((55%), followed by limbs (27.4%) and trunk (16.7%). Those in passenger vehicles were often seated in the rear (66%). Only 6.1% were seated in a child restraint, 9.3% of patients have been in adult seat-belts, and 84.5% not restrained at all<sup>8</sup>.

**Table 5<sup>8</sup>. Injury profile and injury type in childhood accidents seen in A&E Department**

Type	Age <5 years (%)	Age 6-12 years (%)	Total (%)
Home	802 (79.41)	618 (41.01)	1420 (56.42)
RTA	51 (5.05)	135 (8.96)	186 (7.39)
Non-traffic road	49 (4.85)	128 (8.49)	177 (7.03)
Sports	13 (1.29)	193 (12.81)	206 (8.18)
Playground	35 (3.47)	151 (10.02)	186 (7.39)
Schools	21 (2.08)	145 (9.62)	166 (6.60)
Abuse	11 (1.09)	30 (1.99)	41 (1.63)
Others	28 (2.77)	107 (7.10)	135 (5.36)

Source: Ong et al (2003)<sup>8</sup>

## 2. Studies of selected groups and injury type

### 2.1 Infants

This was a study by Snodgrass et al (2006)<sup>9</sup> which analysed the demographical, socio-economic data, data on the circumstances of injuries, nature, and severity of injury and clinical outcome of all infants less than one year old who sought medical attention at the A&E of three Singhealth hospitals, two Singhealth primary care polyclinics and the Forensic Medicine Department from February to July 2002.

In this study, infants comprised 7.7% of total attendances who sought medical attention or died<sup>9</sup>. Falls were the majority mechanism of injury (77%). 63% were head injuries of which 93.1% were stable head injuries. The majority of injuries were related to furnishing, with 40% of cases involving beds or

bedding. Most of the injuries involve falls from furniture. Infant and child products, such as cots, sarong cradles, infant and child products were more frequently cited as causes of injury, the three most common items being cots, sarongs cradles and infant walkers. Of the falls involving heights, only 3.9% cited the presence of safety features such as non-slip mats, safety barriers, cot rails and seat belts. While falls from height remained the primary cause of injury for all age groups, an increase in the number of falls on level ground, walker related injuries and injuries caused by burns and foreign bodies were seen with increasing age during the first year of life<sup>9</sup>. (Table 6)

**Table 6. Mechanism of Injury by Age Groups (Snodgrass 2006)**

Age range	Falls	Poisoning	Burns	FBs	RTAs	Others	Unknown
0-< 3 mths	21	1	0	0	1	3	2
3-< 6 mths	99	0	3	1	0	17	3
6-< 9 mths	89	1	5	4	0	7	2
9 mths-1 yr	107	2	7	4	2	23	5

**Table 7. Data from the Life Saving Society 2009**

Year	No of rescues	Deaths by drowning	Rate per 100,000
2000	53	60	1.83
2001	115	41	1.23
2002	169	39	1.15
2003	143	36	1.07
2004	298	45	1.32
2005	300	38	1.10
2006	281	28	0.79
2007	255	45	1.26
2008	315	35	0.96
2009	271	17	0.46

**Table 8<sup>8,10</sup>. Incidence rates of childhood of playground injuries (children 12 years and below) in study conducted in 1999**

Playground injuries as proportion of all injuries	7.4-8.5%
<b>Injury type (%)</b>	
Falls	70.7%
Contact with blunt objects	12.6%
Application of bodily force	4.1%
Crushing injuries	0.8%
Penetrating injuries	0.5%
<b>Equipment involved in playground injuries</b>	
Monkey bars or other playground climbing apparatus	53%
Slide	21.2%
Swing	6.3%
See Saw	4.4%

Source: Ong et al<sup>8</sup> and Oh et al<sup>10</sup>

## 2.2 Playground Injuries

An analysis of the prevalence of playground injuries in Singapore by Ong et al<sup>8</sup> and Tan et al<sup>10</sup> of childhood injuries in Feb 2002 to Dec 2003 showed a prevalence of 8.8-14.7% of total injuries<sup>9,12</sup>. This community study analysed a cross-sectional questionnaire of children ≤ 16 years old who sought treatment in the A&E, two SingHealth Polyclinics and the Forensic department of Singapore. The larger figure of 14.7% is probably due to the fact that the community study may have included a percentage of children with self limiting injuries treated at home with TCM doctors, chiropractors or private family physicians.

Based on classification of injuries in the playground in the community<sup>10</sup>, 18.2% involved upper limb fractures, 3.0% had lower limb fractures, 4.3% sustained head injuries and 0.2% had intrathoracic and abdominal injuries. 77% had insignificant injuries based on the ICD 9 classification. According to the Abbreviated Injury Scale, a head injury comprises 17.2%, and face injuries (34%) in preschool children aged 1-4 years. Children aged between >6 to 10 were more susceptible to upper limb injuries (71.1%) which is in concordance with the local study on monkey bars which showed that primary school children were more susceptible to upper limb injuries especially the non dominant hand<sup>11</sup>. Falls again comprises the predominant injuries from 70.7 to 76.1% from the playground. Common causes of falls were from the monkey bars, swings and slides and see-saw. Monkey bars form the majority of cases 9.3% of the cases of fractures presenting to the children's A&E and 66% of the fractures sustained while in the playground<sup>11</sup>.

A local study done on Heelys™ - a type of shoes with stealth wheels, resulted in predominantly upper limb injuries i.e. distal radial fractures and elbow injuries<sup>13</sup>.

## 2.3 Drowning

Four children aged 19 and below (all males) drowned in 2009, based on the Singapore Life Saving Society Annual Report. That year there was 17 deaths of all ages. 217 rescues were made in that year. There is no data on near drowning available. Presumably more deaths could have taken place if not for these rescues<sup>14</sup>.

## 3. Prevention Strategies

### 3.1 Parents and caregivers' knowledge and practice

The study on knowledge and practice of parents and caregivers by Thein et al<sup>15</sup> showed that caregivers had good knowledge of road safety but poor knowledge on home safety and first aid. The higher the education of the mother, the more likely it is that she would possess the correct knowledge and practice

on childhood injuries and its prevention. The media played an important role on information on child safety of the caregivers. Notable was only 38 percent of caregivers said they obtained information from doctors and other health personnel.

### 3.2 CHIPP Programme

The Childhood Injury Prevention Programme was an important local initiative that was launched on 19/6/2004 to create awareness and educate parents and caregivers on childhood accidental injuries and how it can be prevented. The programme aims to educate parents and caregivers about common childhood injuries and how these can be prevented through vigilance and taking appropriate safety precautions<sup>3,4,5</sup>.

Strategies included to achieve these goals are:

1. Talks and public seminars for parents and caregivers to gain practical knowledge on how to make their homes safer for their children. These talks will not only be in English but also in Tagalog and Bahasa Indonesia for domestic helpers.
2. Roadshows targeted at caregivers at various shopping malls and other public venues to bring the child safety messages to the heartlands.
3. Collaboration with community partners to reach out and educate families at the grassroots level. We will also be collaborating with hospitals in their educational programmes and activities.
4. Pre-school competitions and other activities at pre-schools to educate young children on home safety issues.
5. Training of educators from pre-school centres to update them on child safety and encourage them to use educational resources developed for them.
6. Dissemination of relevant educational materials such as booklets, pamphlets and teachers' guides, to help drive the child safety messages across. Exhibition panels and a child safety jingle for pre-schools and primary schools have also been produced.

## DISCUSSION

Two eminent doctors of Singapore Emergency Medicine in their editorial on childhood injuries in 2005 have stated<sup>16</sup> "*Many begin their plans to prevent injuries to children and adolescents by considering only education aimed at changing individual behaviour. Such an approach often fails to achieve maximum success. It reinforces the commonly held misconception that individual behaviour is solely responsible for health outcomes, and that individual health education is an adequate solution. Effective prevention is not that simple...Evaluated strategies are found in the literature, perhaps it is time for a unified system approach.*"

## General pointers

Appreciating the profile of both the parent and the child is very important in getting to understand what types of accidents and injuries occur most commonly amongst children in the first place. For example, injury in childhood is strongly associated with poverty. Death rates from unintentional injury in the UK are around three times higher in children from the poorest families than in those from the least poor families<sup>17,18,19</sup>.

In our review, boys have a higher incidence of injuries presumably because of their high risk behavior<sup>10</sup>. Interestingly; educational attainment of the mother is a predictor of the mother's correct knowledge and practice on childhood injury prevention. This thus reduces the rate of injuries in children<sup>14</sup>. Thus, by tactfully finding out the socioeconomic status of our patients, we can channel these families to appropriate social welfare organizations e.g. for financial assistance at the Community Development Council. It has been shown that physician counseling can positively impact behavior, and the American Academy of Pediatrics recommends that physicians provide anticipatory guidance for minimizing injury risk<sup>20,21,22</sup>.

## Education and advice by Health Care Providers

It has been shown that office based or outpatient injury prevention is an integral part of the medical care for infants, children and adolescents<sup>21,23</sup>. The health care providers should also be familiar with the epidemiology of the accidental injuries in Singapore Table 1-8 and the various proven evidence based strategies. By familiarizing ourselves with this data we can provide target specific interventions to the target pediatric age group.

In Singapore, caregivers of children in a nationwide study in Singapore have a good knowledge of road safety in children but poor knowledge on home safety and first aid. Thus emphasis should be placed for educational programmes on home safety and first aid. (Thein 2005)<sup>7</sup>. Doctors and nurses can play again an active role in giving advice in child safety by creating awareness of resources e.g. The Childhood Injury Prevention Programme (CHIPP) available on the internet<sup>3,4,5</sup>. Health care workers and parents are encouraged to use this available resource.

Discussing child safety with parents need not be restricted to education in the narrow sense but can include offering practical advice about legislation (e.g. car seat restraints) and environmental modifications (e.g. the installation of a thermostatic mixing valve). One should adopt an evidence based approach as far as possible and avoid appealing to parental "common sense" as this can be misleading e.g. that baby walkers are safe<sup>24</sup>.

## Home Injuries

Pre-schoolers (age<5) were more likely to sustain home injuries in children presenting to both the community and A&E study when compared to school going children (age 6-12 years), probably because they spend more time at home<sup>7,8</sup>. We know

that young children stay long hours indoors and they usually play in the living rooms and bedrooms. As such, injuries occurring in these places are more common.

Many people may think that their living rooms and bedrooms are safe, but they are not aware of many hidden dangers like sharp edges or sharp corners on furniture, glass coffee tables, glass panels, slippery floors, breakable ornaments and vases<sup>7</sup>. These children less than five years also have a higher proportion of head injuries due to relatively larger head to body ratio. They are more prone to foreign bodies, burns and poisonings due to lower awareness.

In contrast, school-going children (age 6-12), were more likely to sustain injuries in road accidents, sports, at playgrounds or schools, as this where they spend more time, with more limb, trunk and multi-trauma.

As Singapore is an urbanized country with many high rise buildings. Advocation to have suitable grilles and windows for all windows and balconies in order to avoid accidental fall from windows and ledges as suggested by Ong et al<sup>8</sup>.

## Playground Injuries

With regards to playground injuries, monkey bars should be replaced with safer equipment<sup>8,11</sup>. Safety advice should be erected at playgrounds in public and private housing estates to educate both the children and their caregivers on the proper use of the playground facilities.

## Bicycling Injuries, Heeley™ and Roller-blade accidents

Recently the LTA (Land Transport of Authority of Singapore) has introduced pilot projects for cyclists in Pasis Ris, Tampines, Yishun, Sembawang and Taman Jurong. The traffic police have ongoing public education talks to reinforce cycle safety<sup>25</sup>. Besides having bicycle lanes, health care providers should be advocates for cycle helmets to be introduced as local data supports universal use<sup>26</sup>. A local study done in 2006 showed that wearing a helmet is associated with fewer head and facial injuries and lower Injury Severity Score after a bicycle crash<sup>26</sup>. Use of proper shoes for cycling should be encouraged as our cyclist tend to wear slippers and shoes which predisposes them to cyclist getting their foot entangled in bicycle spokes resulting in lacerations<sup>34</sup>. Use of helmets and wrist and elbow, knee guards should also be advised for children using rollerblades or Heeleys™<sup>13</sup>.

## Road accidents

Car collisions caused the highest number of road traffic injuries received at the A&E. It is believed that use of appropriate child restraints is still low despite legislation. Some way to change attitude and behaviour is needed, as for example, the use of civilian volunteer reporting scheme where a violation of seat belt laws are notified possibly to a hotline, which will then send educational material to the offenders<sup>8</sup>.

## Drowning

As for drowning prevention, this may be broadly divided into supervision, environmental design changes, legislation, swimming lessons and aquatic safety education. Adequate supervision by lifeguards, better architectural design to promote safety should be encouraged. Swimming skills and water safety should be taught and pool fencing legislation ought to be seriously considered by the government, to reduce morbidity and mortality due to near drowning or drowning respectively<sup>12</sup>.

## Strategies we can employ

Sweden has the lowest rate of unintentional childhood injuries in the world and the causes were championed mostly by health sector. The health sector played an important and leading role in the initiation and follow-up on a wide range of actions which included the following<sup>27</sup>.

- the idea of Safe Communities long before it was taken up by others;
- measures against drowning: much of the early reduction in child injury was attributed to water safety interventions; rates among children aged 0–14 years fell from 8 per 100 000 in 1951 to 1 per 100 000 children in 1985;
- safety measures in the home;

- home visits by health professionals;
- traffic safety measures – such as helmets and child-restraints – taking into account the limited capacity of small children to adopt safe practices in traffic ;
- improved product safety and standards;
- improved health care services for children;
- safety measures at school.

Health care workers and policy makers should study the Swedish model as a template to introduce policy change in reducing unintentional childhood injuries in Singapore. We should also develop a multisectoral plan of action for child injury prevention, including the setting of targets and goals, working with various stakeholders like the traffic police, HDB etc.

Health Care workers can serve as advocates of child safety in the family and community should help coordinate activities and collaborate across sectors for the implementation and evaluation of various child injury prevention programmes. We should also help and be child safety advocates to help enact, implement and enforce laws and standards that have been proven to reduce injuries in the community.

For a start, the clinical recommendations in Table 9 could be a talking point between healthcare providers and child providers on how to reduce childhood accidental injuries.

**Table 9<sup>6</sup>. Clinical Recommendations based on SORT rating system**

Clinical Recommendations	Evidence Rating
<b>Bicycle crashes in school age children</b>	
1) Approved bicycle helmet to reduce the risk of head injury after crashing	B
2) Educational programs to increase helmet use	B
<b>Drowning in toddlers and school age children</b>	
3) To prevent drowning, swimming pools should be surrounded completely by fencing that is difficult to climb and that does not allow direct access from the house. Gates should have self-closing latches.	A
4) Vigilant adult supervision to reduce risk of drowning.	B
5) Cardiopulmonary resuscitation training after drowning incident.	B
<b>Falls in infants and toddlers</b>	
6) Avoiding the use of infant walkers.	B
7) Releasable window guards or window stops above first floor.	
<b>Fire and burns in toddlers and school age children</b>	
8) Properly installed and maintained smoke detectors.	A
9) Clinical counseling to increase smoke detector use.	B
10) Water heater temperature preset to less than 54.4° C	A
<b>Motor vehicle crashes in all children</b>	
11) To prevent injury in motor vehicle crashes, all children should be placed in age-appropriate child restraint seats.	A
<b>Poisoning in toddlers</b>	
12) Child-resistant packaging.	A
<b>Recommended Safe Sleeping Practices in infants</b>	
13) To prevent sudden infant death syndrome, newborns should be placed on their backs to sleep.	B
14) Use a firm mattress that meets currently mandated safety standards.	B
15) Remove quilts, loose bedding, stuffed toys, and other soft objects from crib.	B
16) Keep infant's head uncovered.	B
17) Do not allow infant to share a bed with adults or other children.	B
18) Do not allow infant to sleep with adults on a sofa or recliner.	B

A= consistent, good quality patient-oriented evidence;

B= inconsistent or limited –quality patient oriented evidence;

C=consensus disease-oriented evidence usual practice, expert opinion, or case series.

For more information about the SORT evidence rating system see <http://www.aafp.org/afpsort.xml>

## CONCLUSIONS

The existing information on childhood accidental injuries as have been reviewed and put together in this review highlights the importance of falls in the home, school, road, and outside of buildings. Greater knowledge of home safety amongst care-providers is needed. We have made the childhood environment safer in the playground. We need to continue to remind care-providers and ourselves as healthcare providers of the gaps to be filled.

## RECOMMENDATIONS

The following are recommendations that could be considered in relation to childhood accident prevention:

- Continued information reminders on childhood safety at the playground, school, road, outside of buildings.
- Mass media programmes to create greater knowledge of home safety amongst care-providers.
- Reminders to healthcare providers that uncovering of gaps of knowledge and practice of childhood accident prevention, continuing reinforcement and opportunistic dialogue with parents and carers will help to further reduce childhood accidental injuries.

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