Injury is a major cause of child and adolescent death and disability throughout the world. More than a million children aged 14 years and under die each year from unintentional injuries globally. Ninety eight per cent of these deaths occur in low-income countries, where injury is inexorably closing its gap with disease to be the leading cause of death among children.

The South-East Asia and Western Pacific regions of the World Health Organization together share almost 55% of the global burden of injury mortality among children and young people under the age of 20 years. Interestingly, low- and middle-income countries in the South-East Asia Region alone bear more than a third of this burden. The major causes of injury among children in the Region are drowning, transport accidents, burns, falls, poisoning and intentional injuries.

The main objective of this document is to highlight the epidemiological aspect of childhood injuries in the WHO Member States of the Asia-Pacific Region. Though only six Member States of the both regions provided information for this report, this document Profile of Child Injuries: Selected Member States in the Asia-Pacific Region nevertheless gives us for the first time a detailed epidemiological profile of child injuries in the Asia-Pacific Region.
Profile of Child Injuries: Selected Member States in the Asia-Pacific Region
Profile of child injuries: selected Member States in the Asia-Pacific Region.


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Foreword

Child injuries are a global public health problem, especially in the Asia-Pacific Region, and require urgent action. Globally, around 950,000 children and young people less than 18 years die every year due to injury and violence. In addition to the deaths, tens of millions of children seek hospital care for unintentional injuries. Many of them are left with lifelong disabilities. More than 95% of all injury deaths in children occur in low- and middle-income countries. About 55% global cases of injury mortality among children and young people less than 20 years occur in the Asia-Pacific Region.

The causes of child mortality have changed over the last few decades. While deaths due to common childhood diseases such as diarrhoea, pneumonia, vaccine-preventable diseases and infectious diseases continue to decline, injuries and noncommunicable diseases are emerging as the leading causes of childhood death. However, injuries in children have been neglected for many years. This report depicts the magnitude of the problem in order to draw the attention of policy-makers, academics and developmental partners.

This report is a complement to the World report on child injury prevention launched in December 2008. Both reports urge the integration of child injury prevention programmes into the existing child survival strategies.

We thank all injury prevention experts in the Region who had presented their country situations on child injuries at the Bi-regional Workshop on Injury Surveillance, Chiang Mai, Thailand, in December 2006. We pledge our continued support to address the problem.
Executive summary

Introduction

Childhood injury is a major public health problem that requires urgent attention. Globally, around 950,000 children and young people under the age of 18 years die every year due to injury and violence. Unintentional injuries account for almost 90% of these cases. In addition to death, millions of children suffer different degrees of disability due to injury.

Data from low, middle- and high-income countries show an increasing number and proportion of deaths from injuries after the age of five years. However, strategies to improve survival in children less than five years of age may not include injury prevention. It is vital to focus on child injury prevention at all ages in order to prevent injury deaths in children who have been saved from other diseases earlier on in life.

There is an urgent need for the public health sector to anticipate problems of child injury and develop health information systems to identify and characterize the problem. Once injuries and their risk factors are identified, strategies for their prevention can be designed and implemented.

Objectives

The major objectives of this report are to:

1. illustrate the epidemiology of injuries among children less than 15 years old reported from national injury surveillance and other important sources (national surveys, researches/government reports);

2. describe national responses to child injuries; and

3. make recommendations for child injury surveillance and prevention.

Findings

It is evident that injury is the leading cause of death in children over one year of age. In Australia, injury is responsible for 37% and 16% deaths and
hospitalization among children, respectively. Transport injury is the leading cause of 60% of injury deaths in children in the age group of 1–14 years. In the Region, Bangladesh has the highest child injury deaths – causing 38% of all classifiable deaths in children aged 1–17 years. Drowning, road traffic injuries, falls and burns are the leading causes of injury deaths and disability in children over one year of age. Child injury accounts for 26.9% of all causes of hospitalization in Myanmar and falls (66%) is the leading cause of hospitalization due to injury. Among all Member States in the Region, the Republic of Korea has the lowest rate of child injuries and injury accounts for 18.8% of emergency room visits by children aged 0–14 years. Transport-related injury is the leading cause of emergency room visits (45.6%) and hospitalization (35.5%). Sri Lanka has the highest rate of suicides in the world (40 per 100,000). Landmine injuries and injuries due to conflict are major causes of child injuries in Sri Lanka. According to death certificates, drowning and transport injuries are the leading causes of injury deaths in Thai children under 15 years of age. However, Thailand’s national injury surveillance system reported transport injuries as the leading cause of severe injury in children (0–15 years), and reflected the nature of injury information according to the site of data collection. Motorcycle-related injuries are increasing significantly in several countries of the Region due to high proportion of motorcycles among registered vehicles and inadequate public education on the risk.

**Conclusion**

Only six countries in the Asia-Pacific Region are included in this report; thus it is difficult to draw conclusions and make recommendations for the South-East Asia (SEA) and Western Pacific (WP) regions on the basis of this information. However, this is the first report ever published outlining child injuries and the existing preventive efforts being made in the Asia-Pacific Region. It was concluded that: (i) injury is a major public health problem among children and needs urgent action; (ii) The Millennium Development Goals (MDGs) will not be met without addressing child injuries; (iii) only a few countries have injury information or surveillance systems on child injuries; (iv) motorcycle-related injury is a growing problem among children; and (v) research on child injuries is useful but limited. Other aspects that also need to be included are economic analyses, programme effectiveness studies, socio-cultural aspect of child injuries, pre-hospital and emergency trauma care and rehabilitation of trauma victims.
Recommendations

1. Injury surveillance should be improved to identify, characterize and monitor child injuries;
2. Member States should develop specific policy and action plans on child injury prevention;
3. Child injury prevention should be integrated into child health services;
4. Human resource development in the police, transport, law, education and health sectors should receive immediate attention;
5. A research agenda on child injuries should be set and appropriate funding allocated; and
6. National and international networks on injury prevention and safety promotion should be established and maintained.
Acknowledgements

The Regional Office for South-East Asia, World Health Organization would like to thank all participants of the Bi-regional Workshop on Injury Surveillance, Chiang Mai, Thailand, December 2006, for presenting the child injury profiles of their respective countries as the base-line information for this document.

The Report also benefited from contributions of a number of people, in particular, Ms Siriwan Santijiarakul who collected and collated information to develop this document.

Several WHO staff at both WHO/SEARO and WHO/HQ were involved in data management (compiling, cleaning, validating and analysing), in drafting the report and reviewing it. Their inputs are greatly appreciated.

Most of all, the World Health Organization, Regional Offices for the South-East Asia and the Western Pacific acknowledge with thanks contribution of all Member States of both regions for preparing and presenting national-level information, as well as of all contributors whose dedication, support and expertise made this document possible.
With the control of communicable diseases, rapid urbanization and socio-demographic changes, noncommunicable diseases and injuries constitute the major cause of global mortality and morbidity. In 2002, it was estimated that 5.2 million people die due to injuries globally. The figure is projected to increase to 8.4 million by 2020 comprising almost 9% of all deaths. Road traffic injuries are the 10th leading cause of death and the 9th leading cause of the burden of disease; self-inflicted injuries, falls, and interpersonal violence follow closely. Injury is a major cause of child and adolescent death and disability throughout the world. More than a million children aged 14 years and under, die each year from unintentional injuries. Ninety eight percent of these deaths occur in low-income countries, where injury is making significant gains over disease as the leading cause of death in young children. The rapidly rising number of motor vehicles and motorcycles in countries of both regions has seen an equally rapid increase in the number of injuries and deaths. And children may be suffering more than their fair share of this burden.

Historically, child injury was largely associated with industrialized countries. However, the World Report on Child Injury Prevention 2008 shows that more than 95% of all injury deaths in children occur in low- and middle-income countries in the world. Other studies also reveal that childhood mortality due to injury is a major public health problem in low- and middle-income

countries and the rate is five times higher than that of high-income countries (UNICEF, Innocenti Declaration, 2001). The South-East Asia and Western Pacific regions of WHO together share almost 55% of the global burden of injury mortality among children and young people under the age of 20 years. Most interestingly, low and middle-income countries in the South-East Asia Region alone share more than one third of this burden. The major causes of injury are drowning, transport accidents, burns, falls, poisoning and intentional injuries. Although child injury is a major public health concern in the Asia-Pacific Region, it does not get its fair share of attention.

This document has been prepared from country reports presented at the Bi-regional Workshop on Injury Surveillance organized by the South-East Asia and Western Pacific Regional Offices of WHO in collaboration with the Nursing Faculty of Chiang Mai University, Thailand. Member States were requested to provide their reports on child injury surveillance and prevention. Only six of a total of 37 countries in both regions provided their reports. Information was obtained from internet sources to supplement the data provided by the Member States.
General objective

To review the situation of child injuries and existing preventive efforts in the Asia-Pacific Region.

Specific objectives

1. To describe the epidemiology and trends of mortality and morbidity from injuries among children under 15 years of age as reported from national injury surveillance and other important sources (national surveys, researches/government reports);

2. To describe national responses to important causes of child injuries; and

3. To provide recommendations for child injury information system and prevention in each country.
3.1 Australia

*Population structure*

There are about four million persons in Australia aged less than 15 years. This number has not changed much in recent decades. Since the total population has been growing, the proportion of children in the population has declined from 30% in 1960 to less than 20% now (Figure 1). In contrast, the number and proportion of older persons has increased.

**Fig 1: Number and proportion of children in the Australian population (1900–2000)**

Ages 0 to 14 years:
- 3,978,751 persons in 2004
- Little change in 30 years
- 19.8% of total population
- Proportion is declining

Source: AIHW "GRIM Books"
**Epidemiology of the most important causes of child injury**

The causes of death and hospitalization in the first year of life are very different from causes in late childhood (under 15 years old). In 2004, deaths and hospital admissions at ages less than one year on account of injuries (or external causes, in the case of deaths) were about 2% of all cases. The main causes of hospitalization and deaths were perinatal conditions (Figure 2). The childhood injury rate was 7.4/100,000 population; the injury rate among males being higher than in females. However, downward trends for both mortality and morbidity have been observed in recent years.

**Figure 2: Leading causes of infant mortality and morbidity in Australia, 2004**

![Diagram showing the make-up of deaths and hospital admissions at ages less than one year in 2004. Each band represents the proportion of all cases that were coded according to ICD-10. The narrow red band represents injuries (or external causes, in the case of deaths), making up about 2% of all cases. The main causes of both mortality and morbidity among infants are perinatal conditions.]

* includes cases at ages under one year and grouped by ICD-10 chapters
Figure 3: Leading causes of child mortality and morbidity in Australia, 2004

![Figure 3: Leading causes of child mortality and morbidity in Australia, 2004](image)

* includes cases at ages 1 to 14 years and grouped by ICD-10 chapters

Figure 3 describes the pattern of causes of death and hospitalization for children aged 1–14 years as grouped by ICD-10 chapters. Injury accounted for 37% and 16% of all causes of deaths and admissions, respectively in 2004. Although the causes of death and hospitalization are same, the proportion of deaths and hospitalization are different (Figure 4).

Figure 4: Child (less than 15 years) injury profile, Australia 2000–02

<table>
<thead>
<tr>
<th>Summary measures</th>
<th>Fatal</th>
<th>Hospitalized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Cases</td>
<td>185</td>
<td>110</td>
</tr>
<tr>
<td>Rates</td>
<td>9.1</td>
<td>5.7</td>
</tr>
<tr>
<td>As percentages of injury cases at all ages</td>
<td>3%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Case counts and rates are annual averages. Rates are per 100 000 population. Includes cases at ages less than 15 years

Injury was the leading cause of death in the 1–4 years and 10–14 years age groups and the second leading cause of death in the 5–9 years age group. In the case of hospitalization, injury was found to be the leading cause in the 10–14 years age group (Figure 5).
**Figure 5:** Injury mortality and hospitalization ranking by age group, Australia, 2004

<table>
<thead>
<tr>
<th></th>
<th>Fatal</th>
<th>Hospitalized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>Rank</td>
</tr>
<tr>
<td>Under 1 year</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>1 to 4 years</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5 to 9 years</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10 to 14 years</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ages 0 to 14 years</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

* ranking is by the number of cases coded to each ICD-10 chapter

A downward trend was observed for both injury mortality and hospitalization (Figure 6). However, a sharp downward trend in injury mortality was observed after 1999.

**Figure 6:** Injury mortality and hospitalization trend among children, Australia (1999–2003)

![Graph](image)

* includes cases at age less than 15 years

Figure 7 describes the pattern of injury mortality and hospitalization among children between 0–4 years. Drowning and transport injuries were the leading causes of injury mortality, while falls and poisoning were the leading causes of injury-related hospitalization among children of this age group.
Among 5–9 year-old children, drowning has declined and transportation has become the main cause of injury-related death. Falls continue to be the dominant cause of injury-related hospitalization (Figure 8).

Figure 8: Causes of injury mortality and hospitalization among children in the 5–9 years’ age group, Australia, 1995–2003
Figure 9 describes the pattern of injury mortality and hospitalization among 10–14 year-old children. Transport injuries were the leading cause of injury mortality and responsible for almost 60% of injury-related mortality. Falls and transport injuries were the leading causes of hospitalization due to injury among children of this age group.

**Figure 9: Causes of injury mortality and hospitalization among children in the 10–14 years’ age group, Australia, 1995–2003**

Transport injuries and drowning are the leading causes of injury mortality among children under 15 years. While transportation injury was one of the major causes of injury-related hospitalization, falls were the leading cause of hospitalization due to injury among children under 15 years (Figure 10).
Figure 10: Causes of injury mortality and hospitalization among children in the 1–14 years’ age group, Australia, 1995–2003

Figure 11 shows that the rate of child injury mortality and hospitalization increases with increasing remoteness of the place where the child lives.

Figure 11: Injury mortality and hospitalization among children (0–14 years) by remoteness of residence, Australia, 2000–02
Types of child injuries

Transport injuries: Transport injury is a major cause of childhood mortality and hospitalization in Australia and is responsible for about 40% injury deaths and 15% hospitalized cases. Older children are more vulnerable to transport injuries than younger children. Figure 12 shows that death rates have declined in recent years and the number of hospitalization cases due to injury has reduced. However, the high threat to life did not decline (note that these are a small proportion of all cases).

Figure 12: Mortality and hospitalization due to transport injury among children (<15 years), Australia, 1995–2003

Overall, in the case of injuries, there is a strong relationship with location, especially of deaths (Figure 13). People living in remote areas have to travel long distances for their normal daily activities (e.g. for shopping and services). In Australia, people travelling long distances have a high risk of being injured while driving at high speed, sometimes on un-surfaced roads and often on non-divided roads.
Pedestrians and occupants of cars are the main victims of fatal road traffic injury. Among boys, pedal cyclists and motorcyclists constitute the major share of hospitalization cases on account of road traffic injury. Among girls, pedal cyclists and horse-riders constitute the major share of hospitalization cases on account of road traffic injury (Figure 14)
**Road traffic injury prevention efforts**

In Australia, there was a sharp rise in the number of road deaths during the 1950s and the 1960s. Since the late 1960s, road traffic injuries have received serious attention in Australia. As a consequence, Australia has large, diverse and long-standing programmes for addressing road traffic injuries. During the last few decades, death rates have dropped significantly in relation to population, and even more in relation to distance travelled. The main themes in addressing road traffic injuries are:

- Vehicles: design rules, roadworthiness checks, etc.
- Roads: design rules, ‘black spot’ programme, etc.
- Drivers: laws, enforcement, education, focusing on:
  - Use of seatbelt (and helmets for motor cyclists)
  - Drunken driving (recently, attention was focused on other drugs)
  - Speeding
  - Fatigue
- Community education
  - Tradition of “hard-hitting” messages and intense programmes

In Australia, there are road safety agencies in national and state governments. The government promotes road safety activities and ministers are responsible for formulating the required policies; sometimes they take “brave” action in addressing road traffic injuries. Police and courts strictly enforce the existing traffic laws. Besides, there are countrywide awareness-raising programmes on particular aspects (school crossings, pedestrians etc.). There are several international standard road traffic injury research centres in Australia. Child protection activities are conducted largely at the state level. However, there are national-level polices and forums to address road traffic injuries. These are:

- National Road Safety Strategy
  - National Road Safety Advisory Committee (responsible to transport ministers)
- National Injury Prevention and Safety Promotion Plan
  - National Injury Prevention Working Group (responsible to health ministers)
Road safety strategies for children

In Australia, there is no specific strategy on prevention of road traffic injury that is specifically for children. Child transport safety is a part of broader policies and programmes such as:

- Transport safety
- Injury prevention
- Child protection

However, there are different programmes to address child-related issues. These are:

- Infant capsules and child seats
- Pedestrian safety
- Cyclist safety
- Toddler run-over, especially in driveways (a current issue)
- Programmes for particular population groups (special child restraint programmes for Aboriginal communities)

Child and road safety: A current issue

Toddler run-over in home driveways

Toddler run-over, especially in driveways, is the third largest cause of death among Australian toddlers. The common SUV-type of vehicle is mainly responsible for this problem since the driver has a poor view of the area behind while reversing the vehicle. The problem has already been recognized by child death reviews, high-profile cases and surveillance. Parents are also recognizing the problem and ensuring safety for their children.

Australian Transport Safety Bureau reviews the problem

Since road traffic injuries among children is a major public health problem, the Australian Transport Bureau is reviewing the problem for developing an appropriate strategy.

Vehicle manufacturers provide reversing cameras

Currently, vehicle manufacturers are providing reversing cameras to reduce accidents, especially toddler run-overs.
Community education

To reduce road traffic injuries among children, celebrities are being used in campaigns. Moreover, insurance companies are collaborating with SafeKids, Australia.

Information on child transport safety

General transport injury surveillance is providing child transport safety information and the sources of data are:

- Death data
- Hospital data
- Police crash reports

There are other sources for child transport safety-related data, which are:

- Child death review teams
- Child safety and welfare government agencies
- Child safety NGOs (e.g. SafeKids, Australia)

The road safety programme in Australia is a successful event and the success factors underlying road safety in Australia are:

- Political commitment
- Funding
- Critical mass of expertise
- Long-term view
- Past success (gives credibility to new plans)
- Strong publicity
- Ensuring community support

These success factors are the same for injury prevention in general. Although the main focus of road safety programmes is on road safety and motor vehicles, the following have not been included in the programmes:

- Recreational off-road motor-cycling (young men)
- Horse-riding (especially girls)
- Off-road bicycling (children)
- Crashes on private property (toddler run-over)
In Australia, data (including injury surveillance data) are an essential part of the original efforts in acknowledging road safety seriously and an essential tool of road safety programmes. Although there is a risk of “blind-spots”, the general systems are largely adequate for detecting or confirming new or changing problems. Hence, the injury surveillance system is considered an important component of child injury prevention efforts in Australia.

**Falls:** Falls are the leading cause of injury-related morbidity among children in Australia. They are responsible for about 40% hospitalization cases. The incidence of falls peaks at ages 5–14 years (active children). Fracture of bones and brain injury are the major complications arising out of falls.

**Drowning:** Drowning is the leading cause of injury mortality in early childhood. It is responsible for about 25% injury deaths at ages 0–4 years, and for 50% at 1–3 years. Toddlers are the high-risk group for drowning.

**Poisoning:** Poisoning is one of the major causes of hospitalization due to injury in early childhood (0–4 years) and responsible for about 20% cases of hospitalization due to injury at ages 0–4 years. Fortunately, only a small proportion has serious consequences.

**Child abuse:** Although child abuse is not a major public health problem in Australia, some special studies have identified child abuse as an emerging problem. The problem is not prominent in routine hospital data, which may be due to under-reporting.
3.2 Bangladesh

Population structure

In Bangladesh, there are about 64,194,000 persons aged less than 18 years of whom 18,951,000 are less than five years. During 1990–2006, the annual population growth rate was 2%.

Epidemiology of child injury

Since Bangladesh is passing through an epidemiological transition like other low- and middle-income countries, the pattern of morbidity and mortality is changing from infectious diseases to noncommunicable diseases and injuries.

Figure 15 shows that child survival in Bangladesh has improved significantly over the last two decades. Under-five mortality, in particular, has fallen by half – from 146 to 76 deaths per 1000 live births during the last decade.

Figure 15: Child, infant and neonatal mortality trends, Bangladesh, 1982–2003

![Graph showing child, infant and neonatal mortality trends](image-url)
Although there are a few studies where the causes of deaths are directly comparable, most public health experts have noted a gradual shift in the cause of child deaths in Bangladesh from infectious diseases to noncommunicable diseases and injury. In 1983, 9% of all deaths were due to injury; by 2000 the figure had risen to 53%. This shift indicates a sharp reduction in child mortality from infectious diseases, with accidents and injuries now being the major concern for child health in Bangladesh.

**Bangladesh Health and Injury Survey**

This collaborative study on injury pooled the resources and expertise of Institute of Child and Maternal Health (ICMH), the Director-General of Health Services (DGHS), UNICEF Bangladesh, The Alliance for Safe Children (TASC) and the Centers for Disease Control (CDC-USA). The population-based survey was conducted in 2003 to:

- Determine the causes of mortality and morbidity in children
- Establish the risk factors, vulnerable groups and risk environment for drowning among children
- Gain understanding of the cultural, behavioural and other factors related to the perception of risk, hazard and prevention of injuries

**Methodology of the survey**

The survey, conducted in 2003, has four components: (i) a cross-sectional national survey to examine the incidence of injury; (ii) a case-control study to determine the risk factors of drowning; (iii) a behavioural survey examining knowledge, attitude and practices related to injury; and (iv) a risk survey to examine the prevalence of certain risk factors in child injury in the home environment.

Twelve out of 64 districts were randomly selected for the survey. Multi-stage cluster sampling was used to select 171,366 households—88,380 from rural areas; 45,183 from district towns (urban areas) and 37,803 from Dhaka Metropolitan City. The sample included 467,778 adults and 351,651 children. Figure 16 explains the method of the survey.

---

**Morbidity criteria**

The Bangladesh Health and Injury Survey did not include minor bruises, cuts or bumps that did not incur any medical or social cost. The following definitions were used to classify morbidity:

- **Moderate**: Sought medical care but not admitted in hospital; or had at least three days' work loss or absence from school or inability to do normal daily activities.
- **Major**: Hospitalized for a period of less than 10 days but no permanent disability.
- **Serious**: Hospitalized for 10 days or more/requird surgery but no permanent disability.
- **Severe**: Permanently disabled (loss of vision, hearing, handling, ambulating, etc.) regardless of whether hospitalized or not.

**Findings**

**Mortality overview**

In the survey, 1452 deaths among children of age 0–17 years were identified in the preceding one year. Injury accounted for 38% of all classifiable deaths in children aged 1–17 years. Injury caused 2% infant deaths, 29% deaths
in children aged 1–4 years, 48% deaths in the age group 5–9 years, 52% deaths among children aged 10–14 years and 64% deaths among 15–17 year-old children (Figure 17).

**Figure 17:** Proportional mortality among children (0–17 years) by age, Bangladesh, 2003

![Proportional mortality among children (0–17 years) by age, Bangladesh, 2003](image)


In children aged 1–17 years, drowning was the leading cause (23%) of deaths, followed by pneumonia, malnutrition, diarrhoea, meningitis and transport injury (Figure 18).

**Figure 18:** Leading causes of death in children aged 1–17 years, Bangladesh, 2003

![Leading causes of death in children aged 1–17 years, Bangladesh, 2003](image)

**Morbidity overview**

A total of 19,304 morbidities were identified among all children (0–17 years) in the six months preceding the survey. About a third of total morbidities were due to injury; about 5% of morbidities did not have enough information to be classifiable by cause; 6% of infant morbidity was caused by injury. Proportional morbidity due to injury was much higher in the older age groups—26% among 1–4 year old, 40% among 5–9 year old, 37% among 10–14 year old and 38% among 15–17 year-old children (Figure 19).

**Figure 19:** Cause-specific proportional morbidity, all children 0–17 years, Bangladesh, 2003


In children aged 1–17 years, acute respiratory infection (ARI)/pneumonia was the leading cause of morbidity, followed by diarrhoea, fever, falls, burns, measles, cut injury and transport injury (Figure 20).

The survey documented an overall child injury rate of 1592/100,000 children. Every year, 30,000 children die due to injuries, 13,000 children become permanently disabled each year and 1,000,000 children suffer from moderate to severe injury morbidities. Besides, 38,000 children become orphaned every year.
Figure 20: Leading causes of deaths in children aged 1–17 years, Bangladesh, 2003


Efforts to prevent child injury

In Bangladesh, the Centre for Injury Prevention and Research, Bangladesh (CIPRB), UNICEF, Bangladesh, the Director-General of Health Services and The Alliance for Safe Children is piloting a comprehensive child injury prevention programme. The major components of this programme are home safety, school safety and community safety. The aim of the programme is to develop a cost-effective child injury prevention programme for low-income countries.
3.3 Myanmar

Population structure

In Myanmar, children in the age group of 0–14 years comprise 28.1% (males 6 091 220; females 5 840 968) of the total population (Figure 21). The annual population growth rate is 0.52% (2003 est.).

![Figure 21: Population pyramid, Myanmar](image)

**Epidemiology of child injury**

The total number of injured children less than 15 years of age reported in injury surveys was 976. The percentage of admitted injured children to total admission was 26.9%.

Childhood injuries: Pilot study in Yangon General Hospital, 2003

According to the pilot study on child injuries in Yangon General Hospital in 2003, 30.8% of total injured patients reported were children under 15 years of age. Various types of falls (66%) were identified as the major cause of child injury followed by road traffic accidents (22%). Myanmar is also piloting an injury surveillance system to develop an injury information system. Injuries sustained in the home environment were responsible for 5% of total child injuries.
**Efforts to prevent child injury**

The Ministry of Health and Accident Prevention Committee is mainly responsible for addressing child injuries. The following activities are being conducted by different ministries in Myanmar:

- Life skills training curriculum at the basic education level
- First-aid care facilities at the school level
- Road safety advocacy and training to schoolchildren by the Traffic Police Department
- Public awareness through media campaign by the Ministry of Information

Although child injury is a major child health problem in Myanmar, the problem is still neglected due to lack of convincing information. Hence, implementation of national-level surveillance on childhood injury is very important. Besides, there is an urgent need to conduct an in-depth study on the epidemiology of childhood injury in Myanmar.
3.4 Republic of Korea

Population structure

There are 6,606,510 children in the country, accounting for 14% of the total population (47,041,434). The proportion of total population under 15 years of age has risen and fallen with the growth rate. In 1955, approximately 41.2% of the population was under 15 years of age, which rose to 43.5% in 1966 before falling to 38.3% in 1975, 34.2% in 1980 and 29.9% in 1985.

Background information

In the Asia-Pacific Region, the Republic of Korea has a well-structured injury information system. The Injury Incidence Rate in the Republic of Korea is available from:

- Death statistics
- Health insurance payment system
- Traffic injury insurance system
- Industrial injury compensation system

However, unintentional injury and its characteristics are available from:

- Death statistics
- Hospital discharge surveillance
- Emergency Department (ED)-based injury surveillance

Table 1 shows the child injury statistics of the Republic of Korea.

Table 1: Average injury incidence rate per 100,000 population in children < 14 years, 2001–2003

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>801 (16.1)</td>
<td>514 (11.4)</td>
<td>1315 (13.9)</td>
</tr>
<tr>
<td>Admission</td>
<td>61,155 (1230.0)</td>
<td>31,850 (716.5)</td>
<td>93,006 (987.6)</td>
</tr>
<tr>
<td>Outpatients</td>
<td>1,320,774 (26,563.1)</td>
<td>804,389 (18,095.8)</td>
<td>2,125,163 (22,566.4)</td>
</tr>
</tbody>
</table>

Epidemiology of the most important causes of child injury

The total number of injury cases among children ≤ 14 years was 19,235 during 2005–2006 (Table 2). The incidence of injury among males was more than twice that of females. Injury comprised about 18.8% of the total cases of emergency room visits.
Table 2: Number of emergency room (ER) visits with unintentional injuries in children > 14 years, 2005–2006

<table>
<thead>
<tr>
<th></th>
<th>Injury cases</th>
<th>Injury /ER visit*</th>
<th>Admission /ER visit**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12,205</td>
<td>20.0%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Female</td>
<td>7,030</td>
<td>17.0%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Total</td>
<td>19,235</td>
<td>18.8%</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

* Proportion of injury cases per total ER visit cases
** Proportion of admission/injury cases per injury/ER visit case

During the year 2004, a total of 843 deaths due to injury were recorded and 76,536 injury cases were admitted in hospitals (Table 3).

Table 3: Unintentional injury rate in children < 14 years, 2004

<table>
<thead>
<tr>
<th></th>
<th>Deaths</th>
<th>Admissions</th>
<th>ER Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Rate (100 000)</td>
<td>Number</td>
</tr>
<tr>
<td>Males</td>
<td>550</td>
<td>11.1</td>
<td>48,688</td>
</tr>
<tr>
<td>Females</td>
<td>293</td>
<td>6.6</td>
<td>27,848</td>
</tr>
<tr>
<td>Total</td>
<td>843</td>
<td>9.0</td>
<td>76,536</td>
</tr>
</tbody>
</table>

It was also observed that for every child death due to unintentional injury, 80 children were hospitalized and 600 children visited emergency rooms/centres (Figure 22).

Figure 22: Unintentional injury pyramid (children < 14 years)
Table 4 shows the male–female ratio of unintentional injury rates among children less than 14 years of age. The number of emergency room visits, hospitalization and rate of death among males were almost twice that of females.

Table 4: Male–female ratio of unintentional injury among children < 14 years

<table>
<thead>
<tr>
<th>Year</th>
<th>ER visit</th>
<th>Admission</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1</td>
<td>1.15</td>
<td>1.25</td>
<td>1.28</td>
</tr>
<tr>
<td>1-3</td>
<td>1.50</td>
<td>1.47</td>
<td>1.17</td>
</tr>
<tr>
<td>4-6</td>
<td>1.76</td>
<td>1.78</td>
<td>2.29</td>
</tr>
<tr>
<td>7-12</td>
<td>2.08</td>
<td>1.89</td>
<td>1.81</td>
</tr>
<tr>
<td>13-14</td>
<td>2.63</td>
<td>2.94</td>
<td>3.55</td>
</tr>
<tr>
<td>Total children</td>
<td>1.74</td>
<td>1.56**</td>
<td>1.68</td>
</tr>
</tbody>
</table>

The highest death rate due to unintentional injury was observed during infancy for both male and female children (Figure 23). Although the death rate due to unintentional injury decreases as age increases, an upward trend was observed at the age of seven years.

Figure 23: Rate of fatal unintentional injury among children < 14 years

Note: The highest rank in the less than one-year age group might have come from the number of deaths of children of unknown age adding to the known age of those less than one-year old.

The number of deaths due to unintentional injuries among children less than 14 years was proportionately higher than emergency room visits and hospital admission (Figure 24) during infancy. The highest proportion of emergency room visits due to unintentional injuries was found to be just after infancy.
Transport injuries, drowning, falls and suffocation are the leading causes of death due to unintentional injuries among children (0–14 years). However, injury from falls was the leading cause of both emergency room visits and hospitalization (Figure 25).

Figure 25: External causes of injury among children (0–14 years)
Figure 26 shows the distribution of unintentional injuries among children (0–14 years) by place of occurrence. Roads, homes and schools were the places where most injuries occurred. However, during infancy, almost two-thirds of all injuries happened in the home environment.

**Figure 26:** Distribution of unintentional injuries among children (0–14 years) by place of occurrence

Gross seasonal variations for the occurrence of different types of injuries were also observed. The highest proportion of deaths due to collision and burns were found to occur during the January–March period. The proportion of deaths due to cuts/piercing suddenly peaked every two months. Figure 27 shows the body parts affected by unintentional injuries among children (0–14 years). Head injury was the leading cause of death as well as hospitalization.
Prevention and control activities by responsible organization

In the Republic of Korea, the “Year for children safety” and policy for children’s safety was established in 2003. The objective of the policy is to decrease 10% of injury mortality per 100,000 population every year for five years. Accordingly, a national strategy has been developed. The government has reformed laws and regulations associated with children’s safety and also systematically analysed and disseminated data on accidents on-line. Examination of safety in nurseries, kindergartens, schools and playgrounds has also been initiated in the country.

In Korea, child injury has already drawn the attention of policy-makers and academics. Many initiatives have been taken to address the problem at national and regional levels and the main thrust of these initiatives is to increase awareness regarding child safety on priority.
3.5 Sri Lanka

Population structure

In 2003, there were 4,494,806 children under 15 years of age, accounting for 26.6% of the total population (16,867,681) of the country and the annual population growth rate was 1.12% (1998 est.). The major health-related statistics are:

- Maternal mortality (2004): 45 per 100,000 live births
- Infant mortality (2003): 13 per 1000 live births
- Over 97% births are attended by skilled providers

Background information

In Sri Lanka, injury, especially road traffic injury, has drawn the attention of policy-makers in recent years. There are several sources for information on child injuries; these are:

- Hospital admission records
- Death certificates
- Police reports
- Studies from individual hospitals
- Independent research

Epidemiology of the most important causes of child injury

In 2003, injury was identified as the fourth leading cause of death among children less than five years of age. Injury was the third leading cause of death in children in the age group 1–5 years during 1996, and second leading cause of death in children of 5–14 years during 1999.

Survey of childhood trauma at Lady Ridgeway Children’s Hospital, Colombo

The Lady Ridgeway Children’s Hospital (LRH), Colombo, is a teaching hospital with tertiary care paediatric facilities. There are over 1100 in-patient beds and over 3000 outpatient visits per day, of which about 200 cases are hospitalized. A study on the epidemiology of child injury conducted at LRH was published in *Sri Lankan Journal of Child Health* in 2002. A structured interview questionnaire was administered to collect data. Data of 171 children
less than 13 years seeking treatment at LRH accident services in 2001 were collected.

The study revealed that unintentional injuries within the home and on the road comprised 56% and 8%, respectively of all causes of injury. Among all children injured on the road, half the victims were pedestrians (50%) followed by passengers on bicycles (29%) and passengers on motorcycles (14%). Besides, unintentional injuries related to bicycles (43%) were followed by motorcycles (36%) and three-wheelers (7%). Males were twice as likely to sustain injury from animals than females.

Another study was conducted to explore the epidemiologic findings of burns among children. Data for the study were collected from hospitals in the Eastern Province. The study revealed that children in the age group of 1–4 years were at high risk of unintentional burns, and that burns were the leading cause of death in surgical wards. Kerosene lamps and scalding water were the major causes of burns. Although almost all burn cases were unintentional, there were some intentional burn cases as well.

In Sri Lanka, 500 000–900 000 children of age 5–17 years work for monetary reasons and 10% of them are exposed to health and safety hazards. The most common occupational injury among children is agricultural accidents.

There is no national data on child abuse. However, physical abuse of children was first reported in medical case studies published in the 1980s and after that several case reports were published. Sri Lanka has one of the highest suicide rates in the world (40 per 100 000 population). A study of suicides by organophosphate ingestion revealed that the rate of such suicides was 5 per 100 000 population and 17 per 100 000 population among children in the 5–14 years and 14–19 years age groups, respectively.

During the time that country data were presented at the Bi-regional Workshop on Injury Surveillance at Chiang Mai, Thailand (2006), there was a huge number of child soldiers in Sri Lanka, with around 20% to 40% rebel casualties being under 18 years. Voluntary and forced enrolment of children in rebel military was continuing. Media reported over 50 deaths of children from conflict in 2006. Although landmine injuries were decreasing, they still were a great concern.
Prevention and control activities by responsible organization

In Sri Lanka, injury has recently been recognized as a major public health problem and accordingly the government has taken several initiatives to improve injury information systems and injury prevention activities (establishment of trauma secretariat and piloting of an injury surveillance system).

Injuries comprise an important proportion of the burden of disease in children in Sri Lanka who are most often injured at home or on roads. Transport accidents, falls and burns are the major causes of injury. To improve injury prevention efforts, national statistics on child injuries are urgently needed.
3.6 Thailand

**Population structure**

In the past five years, the number and proportion of children under 15 years of age has reduced from 15 874,957 persons (25.7% of all age populations) in 2000 to 13 511 643 persons in 2005, which was 21.7% of the total population (Table 5).

<table>
<thead>
<tr>
<th>Table 5: Number and percentage of children under 15 years of age, mid-year population, 2000–2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mid-year population</strong></td>
</tr>
<tr>
<td>All ages</td>
</tr>
<tr>
<td>&gt;15 years</td>
</tr>
<tr>
<td>Column %</td>
</tr>
</tbody>
</table>


**Epidemiology of the most important causes of child injury**

**Mortality notification system**

Drowning is the leading cause of deaths in children under 15 years of age. In 2004, the number of deaths due to drowning was 1471 (10.7 per 100 000 children per year) among children under 15 years of age. The second leading cause was transport accidents with a death rate of 5.5 per 100 000 children per year (death certificates, Mortality Notification System 2004–2005, Tables 6 and 7) in 2004. In 2004, 3747 children died from all injuries; 1471 from drowning and 765 from transport injuries. Besides, a study of the causes of mortality in Thailand in 2000 using verbal autopsy reported drowning as the major cause of death among children aged 1–4 years.

<table>
<thead>
<tr>
<th>Table 6: Injury mortality rate in children (&lt;15 years), Thailand, 2004–2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cause of death</strong></td>
</tr>
<tr>
<td>Drowning</td>
</tr>
<tr>
<td>Transport injuries</td>
</tr>
</tbody>
</table>

Source: Bureau of Health Policy and Strategy, Ministry of Public Health
Table 7: Top five leading causes of death due to injury, Thailand, 2004

<table>
<thead>
<tr>
<th>Rank</th>
<th>0-4</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Trans. Acc. 154</td>
<td>Trans. Acc. 184</td>
<td>Drowning 286</td>
<td>Assault 321</td>
<td>Suicide 425</td>
</tr>
<tr>
<td>3</td>
<td>Forces of nature 118</td>
<td>Forces of nature 70</td>
<td>Electric/radiation 44</td>
<td>Drowning 243</td>
<td>Assault 412</td>
</tr>
<tr>
<td>4</td>
<td>Threats to breathing 48</td>
<td>Electric/radiation 23</td>
<td>Forces of nature 38</td>
<td>Suicide 38</td>
<td>Drowning 176</td>
</tr>
<tr>
<td>5</td>
<td>Electric/radiation 32</td>
<td>Threats to breathing 18</td>
<td>Suicide 28</td>
<td>Suicide 223</td>
<td>Forces of nature 164</td>
</tr>
</tbody>
</table>

In 2004, 3747 children died from all injuries, 1471 died from drowning and 765 from transport injuries.

Source: Death certificates, Bureau of Health Policy and Strategy, Ministry of Public Health, Thailand, 2004

The study of burden of diseases and injuries in Thailand in 1999

K. Bundhamcharoen, et al. demonstrated that drowning and traffic accidents were among the top ten leading causes of disease burden (Disability Adjusted Life Years [DALYS]), accounting for 5% of the total loss, 3% in males and 4% in females (Table 8).
Table 8: Ten leading causes of DALYS in children under 15 years of age (the study on Burden of Diseases and Injuries in Thailand, 1999)

<table>
<thead>
<tr>
<th>Rank of disease (Males)</th>
<th>%</th>
<th>Rank of disease (Females)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Low birth weight</td>
<td>12</td>
<td>1. Low birth weight</td>
<td>13</td>
</tr>
<tr>
<td>2. Birth trauma and asphyxia</td>
<td>8</td>
<td>2. Birth trauma and asphyxia</td>
<td>9</td>
</tr>
<tr>
<td>3. HIV/AIDS</td>
<td>6</td>
<td>3. Lower Respiratory Tract infections</td>
<td>7</td>
</tr>
<tr>
<td>5. Lower Respiratory Tract infections</td>
<td>5</td>
<td>5. HIV/AIDS</td>
<td>6</td>
</tr>
<tr>
<td>7. Asthma</td>
<td>4</td>
<td>7. Asthma</td>
<td>4</td>
</tr>
<tr>
<td>8. Congenital heart disease</td>
<td>4</td>
<td>8. Drowning</td>
<td>4</td>
</tr>
<tr>
<td>10. Deafness</td>
<td>2</td>
<td>10. Traffic accidents</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Bureau of Health Policy and Strategy, Ministry of Public Health

National injury surveillance system

The Bureau of Epidemiology, Ministry of Public Health, has a national injury surveillance system in place in Thailand since 1995. The system has expanded gradually. Reports from sentinel hospitals during 2001–2004 revealed that transport was the most common cause of severe injury in children. In 2004, the Bureau estimated that approximately 24 183 Thai children suffered severe injury (were injured not more than seven days before coming to seek care in emergency rooms and were kept in the hospital for observation or were admitted to wards, or died due to the event) from transport crashes. In 2004, the estimated severe injury cases in Thai children were reported to be as high as 63 276 and the death rate was 13 per 100 000 population less than 15 years of age. Transport accidents ranked first in 2004 and 2005, accounting for 38% of total reported severe injuries and 52% of the total reported deaths from injuries in 2005. The estimated rate of severe injury from transport accidents was 175.6 and death rate was 6.9 per 100 000 population less than 15 years of age.
Table 9: Causes of severe injury among children (<15 years), Thailand, 2003–2004

<table>
<thead>
<tr>
<th>Causes of severe injury (ICD-10 Chapter 20 Code Group)</th>
<th>2003</th>
<th>2004</th>
<th>Whole country each year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Transport</td>
<td>8123</td>
<td>38.6</td>
<td>8273</td>
</tr>
<tr>
<td>Falls</td>
<td>5856</td>
<td>27.8</td>
<td>6047</td>
</tr>
<tr>
<td>Inanimate Mechanical forces</td>
<td>3529</td>
<td>16.8</td>
<td>3642</td>
</tr>
<tr>
<td>Animated Mechanical forces</td>
<td>743</td>
<td>3.5</td>
<td>780</td>
</tr>
<tr>
<td>Drowning and submersion*</td>
<td>325</td>
<td>1.5</td>
<td>352</td>
</tr>
<tr>
<td>Other accidental threats to breathing</td>
<td>53</td>
<td>0.3</td>
<td>36</td>
</tr>
<tr>
<td>Exposure to electric current, radiation and extreme ambient air temperature and pressure</td>
<td>114</td>
<td>0.5</td>
<td>129</td>
</tr>
<tr>
<td>Smoke, fire and flames</td>
<td>100</td>
<td>0.5</td>
<td>115</td>
</tr>
<tr>
<td>Heat and hot substances</td>
<td>355</td>
<td>1.7</td>
<td>386</td>
</tr>
<tr>
<td>Venomous animals and plants</td>
<td>711</td>
<td>3.4</td>
<td>736</td>
</tr>
<tr>
<td>Forces of nature</td>
<td>4</td>
<td>0.0</td>
<td>19</td>
</tr>
<tr>
<td>Poisoning by exposure to noxious substances</td>
<td>380</td>
<td>1.8</td>
<td>383</td>
</tr>
<tr>
<td>Overexertion, travel and privation</td>
<td>29</td>
<td>0.1</td>
<td>27</td>
</tr>
<tr>
<td>Other and unspecified factors</td>
<td>16</td>
<td>0.1</td>
<td>24</td>
</tr>
<tr>
<td>Intentional self-harm</td>
<td>151</td>
<td>0.7</td>
<td>200</td>
</tr>
<tr>
<td>Assaults</td>
<td>421</td>
<td>2.0</td>
<td>392</td>
</tr>
<tr>
<td>Event of undetermined intent</td>
<td>52</td>
<td>0.2</td>
<td>53</td>
</tr>
<tr>
<td>Legal intervention and operations of war</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Unspecified event and unspecified intent</td>
<td>89</td>
<td>0.4</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>21 051</td>
<td>100.0</td>
<td>21 647</td>
</tr>
</tbody>
</table>


Note: * Rank of drowning death is usually found to be lower than in death certificate system because some drowning death cases were taken straight to temples for funeral.

**Severely injured cases reporting criteria – “persons who were injured not more than seven days before coming to hospital, attending emergency rooms and kept under hospital observation, were admitted into wards, or died due to the event”.

*** Hospital of provincial or regional level (26 hospitals – 2 from Bangkok and 1 each from other provinces)
Objectives of the study

The study was conducted in order to:

- Describe the situation of child (< 15 years) injury
- Identify the children at risk of transport injuries
- Make suggestions for injury prevention and control

Methodology

Data from the Thailand National Injury Surveillance System (Non-communication Section, Bureau of Epidemiology, Ministry of Public Health) were analysed. The database comprises reported cases of severe injury (admitted, observed or dead before/after arrival in hospital) from 28 sentinel hospitals (large regional hospitals which are centres of referral with 500 to 1000 or more beds) across the country covering 26 provinces (out of a total of 76 provinces) during 1 January–31 December 2005. The patients under surveillance were all in the acutely injured category with or without death from external causes (ICD-10 code V01–Y36), and presented at emergency rooms within seven days of the occurrence. This report was analysed specifically in transport-related injury cases among children less than 15 years only. According to the data collection system design, dead cases are a subset of injured cases.

Findings

In 2005, 157 341 injured cases were reported from 28 sentinel hospitals to the Bureau of Epidemiology. Of these, 24 051 were severe and fatal injuries (15.9% of all severe injuries). Transport accidents were the leading cause of severe and fatal injuries in children (39.2% of all severe injuries and 57.8% of all fatal injuries). The second most common cause of severe injuries was accidental falls, accounting for 27.6% of all severe injuries (Table 10).
Table 10: Ten leading causes of severe injuries in children (<15 years), 2005

<table>
<thead>
<tr>
<th>Rank</th>
<th>Causes of injury</th>
<th>Number</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transport accident</td>
<td>9424</td>
<td>39.2</td>
</tr>
<tr>
<td>2</td>
<td>Accidental falls</td>
<td>6727</td>
<td>27.6</td>
</tr>
<tr>
<td>3</td>
<td>Exposure to inanimate forces</td>
<td>3951</td>
<td>16.4</td>
</tr>
<tr>
<td>4</td>
<td>Others</td>
<td>1306</td>
<td>5.4</td>
</tr>
<tr>
<td>5</td>
<td>Exposure to animate forces</td>
<td>825</td>
<td>3.4</td>
</tr>
<tr>
<td>6</td>
<td>Contact with venomous animals and plants</td>
<td>788</td>
<td>3.3</td>
</tr>
<tr>
<td>7</td>
<td>Contact with heat and hot substances</td>
<td>385</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>Drowning</td>
<td>367</td>
<td>1.5</td>
</tr>
<tr>
<td>9</td>
<td>Exposure to electric current</td>
<td>166</td>
<td>0.7</td>
</tr>
<tr>
<td>10</td>
<td>Exposure to smoke and fire</td>
<td>112</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*ICD 10, Chapter 20 includes striking against or struck by other objects, contact with sharp glass, knife, powered/non-powered hand tools etc.

Transport-related injuries (9 424 cases) were the leading cause of severe injury in children. Gender difference is obvious from the age of two years and older, and incidence of such injuries among males (66%) is more than in females. Most children injured in transport accidents were passengers (44.6%), drivers (42.2%) and pedestrians (13%) (Figures 28 and 29).

Figure 28: Age–sex distribution of transport injuries in children (<15 years), 2005

Source: National injury surveillance system, Non communication Section, Bureau of Epidemiology, Ministry of Public Health, Thailand, 2005
Among victims of transport injuries who used vehicles, motorcycles were most frequently used (68.8%), followed by bicycles (19.3%) and pick-up vehicles (6.5%) (Figure 30).

The motorcycle is the vehicle most often involved in transport injuries among children. It comprises more than two thirds (68.6% for both drivers and passengers) of transport injuries by all types of vehicles, 68.9% of child passengers and 69.7% of child drivers. The most important fact is that 58.7% of pedestrians were hit by motorcycles.
The youngest motorcycle driver who had severe injuries was seven years old and 95% injured children (motorcycles) did not wear helmets. Among child motorcycle drivers (7–14 years old), 6.7% were found to have consumed alcohol before the crashes.

**Prevention and control activities by responsible organization**

In Thailand, child injury has drawn the attention of the government, academics and media. Several government and private institutes are working on child injury prevention:

- Ministry of Public Health
  - Bureau of Epidemiology (child injury data)
  - Bureau of Noncommunicable Diseases (child motorcycle helmet, control of alcohol drinking, prevention of drowning)
  - Bureau of Health Policy and Strategy (domestic violence)
  - Department of Health (safe schools)
- Bureau of Royal Thai Police
- Ministry of Education
- Ministry of Interior
- Ministry of Transport
Universities
- Mahidol University and Child Safety Promotion and Injury Prevention Research Center, Ramathibodi Hospital
- Chulalongkorn University, Thammasat University, etc.
- Thai Health Promotion Foundation (funding agency)

Mr Jaturon Chaisang, Deputy Prime Minister, was assigned by the Prime Minister to Chair the Road Safety Directing Centre, which was established to be a lead agency. Four Deputy Ministers (Interior, Transport, Health and Education) were the Deputy Chairs and collaborated on injury prevention in Thailand, including Policy Department. The Deputy Prime Minister has supported various policies to protect children from road traffic injury. These include the policy on motorcycle helmets for children, strict enforcement of driving before legal age, banning alcohol advertisements on TV from 5 a.m. to 10 p.m. and no advertisement cut-outs of alcohol within a 500m radius of schools. However, enforcement is the problem in Thailand. There is also the need to promote knowledge and concern for safety among parents.

About 560 children die in motorcycle accidents every year, which means 1.5 children die per day from riding motorcycles. This is about seven times the number of deaths from dengue haemorrhagic fever in the same year (2005). All child motorcycle drivers are less than 15 years of age and do not have driving licences. The legal age for driving a motorcycle in Thailand is 18 years and 15 years for driving a moped. Hence it is very important to strengthen child injury prevention programmes targeting child motorcycle drivers and pillion riders in Thailand.
Data source and utilization for child injury in the Asia-Pacific Region

Child injury information on a national level is available mainly in high-income countries. For low- and middle-income countries, information on a national scale is often derived from population-based surveys. While these surveys provide information for designing intervention, they cannot be used for monitoring changes in risk groups and trends. Neither do they provide rapid assessment of the problem. However, such population surveys do play an important role in providing basic information on child injuries when no such data exist.

Death registry and hospital admission systems are an important source of information on the causes of deaths and admissions. Several countries have established sentinel injury surveillance (hospital-based) in order to obtain the detailed information required for injury prevention and control and monitoring of trends.

For injury surveillance, a combination of data sources is recommended because each type of data source has its own set of advantages and disadvantages. Existing data sources and systems should be used whenever possible. If the existing systems are inadequate, appropriate changes need to be made to provide the necessary information.

The most common sources of data for countries are: (i) death registry; (ii) hospital admissions; (iii) emergency departments; (iv) national health survey; (v) police; (vi) insurance; and (vii) research. Review of research studies is also useful for providing information when there is no surveillance system.

Improper classification of the causes of injuries is still an issue in the preparation of national injury reports. This reflects the need to build capacity...
injury classification for appropriate planning and intervention. The use of
the International Classification of Diseases 10 Chapter 20 (ICD-10 Chapter
20) for injury classification is an important issue to be discussed with technical
counterparts in Member States.

**Major child injury problems in the Asia-Pacific Region**

The proportion and severity of injuries in children increase after one year of
age. By the time the children have completed the requirement of vaccination
for communicable diseases, they have already been exposed to the greater
but silent risk of injuries. Data presented at the “Bi-regional Workshop on
Injury Surveillance, Chiang Mai, Thailand, 2006” revealed that child injury
is a major public health problem in the Asia-Pacific Region. However, only
few countries in the Region have specific programmes to reduce childhood
mortality and morbidity from injury.

It is evident from this report that injury is the leading cause of death in
children over one year of age. In Australia, injury is responsible for 37% and
16% deaths and hospitalization among children, respectively. Transport
injury is the leading cause of injury death in 1–14 year-old children (60%).
Bangladesh has the highest number of child injury deaths in the Region, and
injury is responsible for 38% of all classifiable deaths in children aged 1–17
years. Drowning, road traffic injuries, falls and burns are the leading cause
of injury deaths and disability in children more than one year of age. Child
injury accounts for 26.9% of all causes of hospitalization in Myanmar and falls
(66%) is the leading cause of hospitalization due to injury. Among all Member
States of the Region, the Republic of Korea has the lowest rate of child
injuries and injury accounts for 18.8% of emergency room visits by children
aged 0–14 years. Transport injury is the leading cause of emergency room
visits (45.6%) and hospitalization (35.5%). Sri Lanka has the highest rates of
suicide in the world (40 per 100 000 population). Landmines and conflict are
major causes of child injury in Sri Lanka. According to data collected from
death certificates, drowning and transport injuries are the leading categories
of injury deaths in Thai children under 15 years of age. However, Thailand’s
national injury surveillance system reported transport injuries as the leading
and most severe type of injury in children (0–15 years). It also presents
the information according to the site of data collection. Motorcycle-related
injuries are increasing significantly in several Member States of the Region
due to the high proportion of motorcycles among registered vehicles and
inadequate public education on the risk.
Conclusions and recommendations

Conclusions

1. **Injury is a major public health problem among children and needs urgent action.**

   It is evident that injuries constitute a major proportion of childhood deaths and hospitalization in the Asia-Pacific Region. Since injury is the leading cause of childhood mortality after the first birthday, it is evident that the Millennium Development Goals (Goal 4 – reduce under-five mortality rate) cannot be met without addressing the issue of child injuries. Special efforts to improve existing injury information systems by segregating them by age and sex, and generating reports of child injuries will complement the efforts to achieve MDG4.

2. **Few countries have injury information or surveillance systems on child injuries**

   Although a few countries in the Asia-Pacific Region have injury surveillance systems in place, some of these systems do not classify injuries appropriately. Improving injury information and classification systems and supporting the use of ICD-10, Chapter 20 – “External causes of morbidity and mortality”, in countries of the Region is crucial. Review of literature on research projects in these countries can provide information for prevention, and for injury surveillance systems to be set up.

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3. The information from Thailand is an early warning sign for developing countries in the Region that motorcycles can be a serious injury problem among children.

Riding a motorcycle is extremely dangerous for young children; driving it is even more so – both for themselves and others. Child pedestrians being hit by motorcycles is an important finding. Chronic exposure to riding motorcycles will desensitize the community despite awareness of the high risk associated with motorcycles. Parents allow children to drive motorcycles, injuring themselves and other road users.

4. Research on child injuries is useful but limited

Reductions in child injuries have been achieved in many high-income countries as a result of the application of evidence-based programmes on rigorous research and priority-setting.

Research on the epidemiological aspect is crucial. Other aspects that also need to be considered are:

- Economic analyses
- Programme effectiveness studies
- Socio-cultural aspect of child injuries
- Pre-hospital and emergency trauma care
- Rehabilitation of trauma victims

Recommendations

Recommendation 1: Improvement of injury surveillance and information systems that can identify important child injury problems is urgently needed.

Training on and monitoring the use of ICD 10 Chapter 20 in recording the causes of injury is important for appropriate classification and in making cross-country comparisons. Developing surveillance and strengthening injury information systems what segregate the data and generate reports by age would greatly facilitate child injury prevention.
Recommendation 2: Developing and implementing a child injury prevention policy and action plan, including establishing a national coordinating unit.

Since injury is a multifaceted and multidimensional event, a multidisciplinary body led by an appropriate ministry needs to be established to guide, supervise, develop, coordinate and monitor child injury prevention activities. Ministries of Health (MoH) can play an important role in health information, epidemiology, research and prevention. There is an immediate need to develop a roadmap on national policy on prevention of child injury and also an action plan. The plan should outline short-, medium- and long-term programmes with clearly achievable targets. It should also outline the effort required from different sectors and coordination mechanisms with resource allocation at various levels. National action plans should also be prepared laying down specific actions to be taken with time-bound targets and allocating resources for these actions. Injury units need to be established in MoHs to coordinate between sectors and implement child safety projects.

Recommendation 3: Integrating child injury into a comprehensive approach to child health and development

Child injury prevention needs to be integrated into the programmatic infrastructure of child survival as a basic package of child health services so that investments in immunization, nutrition and maternal and child health care do not go waste. A comprehensive programme to make homes, schools, roads and local communities safer for children would have a dramatic impact on child injury.

Recommendation 4: Human resource development and resource allocation

Human resource development and capacity building across sectors such as police, transport, law, education and health should receive immediate attention.

Recommendation 5: Defining priorities for research and supporting research on child injuries

It is important to set a research agenda on child injuries at national and regional levels. This agenda should be based on evidence from a broad range of sectors.
Recommendation 6: Support the development of a national and international network

It is very important to develop a national as well as international network that will facilitate access to scientific findings, prevention measures and public health initiatives, and promote exchange of information and sharing of experience among people working in the field of injury prevention and safety promotion.
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