Introduction

- Drowning is an unrecognised national problem
- Injuries are 3rd commonest cause of death in children (0-18 years)
- No standardised database on childhood drowning in Malaysia exists
- Drowning preventive measures are limited/uncertain in Malaysia
### Table 4

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (000s)</td>
<td>23,270</td>
</tr>
<tr>
<td>Population Census Year</td>
<td>2000</td>
</tr>
<tr>
<td>Total Unintentional Drowning Deaths</td>
<td>127</td>
</tr>
<tr>
<td>Drowning Rate (per 100,000 population)</td>
<td>0.5</td>
</tr>
<tr>
<td>Male %</td>
<td>N/A</td>
</tr>
<tr>
<td>Female %</td>
<td>N/A</td>
</tr>
<tr>
<td>Unknown %</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AGE</th>
<th></th>
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<tbody>
<tr>
<td>0-4</td>
<td>20 (&lt;10)</td>
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<td>5-12</td>
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</tr>
<tr>
<td>13-17</td>
<td>33 (19-30)</td>
</tr>
<tr>
<td>18-34</td>
<td>45 (30+)</td>
</tr>
<tr>
<td>35-49</td>
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</tr>
<tr>
<td>50-64</td>
<td></td>
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<tr>
<td>65+</td>
<td></td>
</tr>
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</tr>
</tbody>
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**Boy falls in pool and drowns**

A 2-year-old boy drowned after he and a friend fell into a swimming pool at a recreational club in Malaysia. The boy, named Tan Wei Xuan, was playing with his friend when they fell into the pool. The boy's family, along with the club staff, immediately rushed to help him. The boy was taken to the hospital, where he was pronounced dead. The club has since implemented additional safety measures to prevent similar incidents in the future.
Objectives

General objective
• To collaborate data on childhood drowning in Malaysia and review existing drowning prevention measures in place.

Specific objective(s)*
• To obtain data on drowning from all sources/agencies to assess burden, risk factors and swimming skills among children
• To review sources of drowning data with respect to their quality
• To undertake an inventory of drowning prevention activities by all relevant sectors, including non-governmental agencies
• To prepare a summary report with recommendations

* As commissioned by WHO

Methodology

• A retrospective study using secondary data obtained from government and non-governmental organizations (NGOs) on drowning events from 2000-2007
• Drowning rates per 100,000 total population
• Childhood drowning rates were studied for differences by region, month, gender, age and ethnicity to identify a risk profile
• Formal enquiries were made to government and NGOs about existing water safety measures already in place
Methodology

Sampling
• **Universal** sampling but focus on children under 18 years

**Inclusion criteria**
• All drowning outcomes, including mortality, morbidity and non-morbidity.
• Drowning cases admitted and not admitted to hospitals, reported to police and unreported to police.
• All drowning cases, including natural disasters, water transport incidents.

**Exclusion criteria** - None
Definitions

• Drowning
  – “the process of experiencing respiratory impairment from submersion/immersion in liquid

• Drowning outcome
  – Death, Morbidity, No morbidity (Beeck et al. WHO 2005)
  – No longer use “drowning” and “near drowning”

• Drowning death
  – Certified (medical personnel) & Uncertified

• Child (UNCRC & Child Act 2000)
  – any individual aged below 18 years old

Results
Sources and Availability of Data

• Primary source: Department of Statistics
  (All other agencies submit data to Dept of Statistics - National Registration Department, Ministry of Health (MOH), the Royal Malaysian Police)

• Statistics Department
  – Accounts of drowning fatalities from 2000-2007
  – Data from 2008-2009 is available but not finalized

• Health Informatics Centre (HIC), MOH
  – Drowning morbidity data 2000-2008 (admission)

Sources and Availability of Data

• Newspaper sources reviewed using electronic archive search for period available (2006-2009)

• Data on laws/regulations, strategies and initiatives was obtained from:
  – Life-Saving Society Malaysia
  – Other government ministries (e.g. Ministry of Transport, Ministry of Education, Ministry of Sport, Fire & Rescue Volunteers Malaysia)
# Childhood vs Adult Drowning Deaths
## Malaysia 2000-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Deaths</td>
<td>708</td>
<td>615</td>
<td>609</td>
<td>716</td>
<td>657</td>
<td>590</td>
<td>627</td>
<td>625</td>
</tr>
<tr>
<td>Children</td>
<td>312</td>
<td>286</td>
<td>279</td>
<td>344</td>
<td>277</td>
<td>266</td>
<td>248</td>
<td>279</td>
</tr>
<tr>
<td>% of total</td>
<td>44.1</td>
<td>46.5</td>
<td>45.8</td>
<td>48.0</td>
<td>42.2</td>
<td>45.1</td>
<td>39.6</td>
<td>44.6</td>
</tr>
</tbody>
</table>

### How Many Children Die?

#### Overview of Childhood Drowning Deaths, Malaysia 2000-2007

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>312</td>
<td>286</td>
<td>279</td>
<td>344</td>
<td>277</td>
<td>266</td>
<td>248</td>
<td>279</td>
</tr>
<tr>
<td>Drowning Rates</td>
<td>3.31</td>
<td>3.06</td>
<td>2.97</td>
<td>3.66</td>
<td>2.94</td>
<td>2.83</td>
<td>2.64</td>
<td>2.98</td>
</tr>
</tbody>
</table>

**Mean:** 3.05

### Graphs

- **Drowning Death Incidents**
- **Drowning Death Rates**

- **13.9 - WP LMIC**
- **1.2 - WP HIC**
Overview of Childhood Drowning Deaths
Malaysia 2000-2007
Certification

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>312</td>
<td>286</td>
<td>279</td>
<td>344</td>
<td>277</td>
<td>266</td>
<td>248</td>
<td>279</td>
<td>286.4</td>
</tr>
<tr>
<td>Uncertified Deaths (%)</td>
<td>88 (28.2)</td>
<td>91 (31.8)</td>
<td>78 (28.0)</td>
<td>80 (23.2)</td>
<td>76 (27.4)</td>
<td>76 (28.6)</td>
<td>58 (23.4)</td>
<td>56 (20.1)</td>
<td>75.4 (26.3%)</td>
</tr>
</tbody>
</table>

Where do Children Die?

Childhood Drowning Deaths by Region 2000-2007
Which Child Dies? – Age Group
Overview of Childhood Drowning Deaths, Malaysia 2000-2007

Average Drowning Rate

WHO: Age 1-4 yrs (10-11 per 100,000 children)

Which Child Dies? - Gender
Overview of Childhood Drowning Deaths, Malaysia 2000-2007

<table>
<thead>
<tr>
<th>Gender</th>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td></td>
<td>233</td>
<td>225</td>
<td>220</td>
<td>265</td>
<td>228</td>
<td>217</td>
<td>195</td>
<td>221</td>
</tr>
<tr>
<td>Rate</td>
<td>4.81</td>
<td>4.69</td>
<td>4.57</td>
<td>5.49</td>
<td>4.72</td>
<td>4.49</td>
<td>4.04</td>
<td>4.59</td>
<td>4.68</td>
</tr>
<tr>
<td>Girls</td>
<td></td>
<td>79</td>
<td>61</td>
<td>59</td>
<td>79</td>
<td>49</td>
<td>49</td>
<td>53</td>
<td>58</td>
</tr>
<tr>
<td>Rate</td>
<td>1.72</td>
<td>1.34</td>
<td>1.29</td>
<td>1.73</td>
<td>1.07</td>
<td>1.07</td>
<td>1.16</td>
<td>1.27</td>
<td>1.33</td>
</tr>
</tbody>
</table>

3.5 boys die for every 1.0 girl
WHO: 1.7 boys for 1.0 girl
### Location of all-age drowning incidents in Malaysia Reported in the Press, 2006-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Location of Drowning</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sea</td>
<td>River</td>
</tr>
<tr>
<td>2006</td>
<td>36  (23.8%)</td>
<td>64   (42.4%)</td>
</tr>
<tr>
<td>2007</td>
<td>40  (27.8%)</td>
<td>64   (44.4%)</td>
</tr>
<tr>
<td>2008</td>
<td>59  (40.7%)</td>
<td>67   (46.2%)</td>
</tr>
<tr>
<td>2009</td>
<td>72  (51.8%)</td>
<td>45   (32.4%)</td>
</tr>
</tbody>
</table>

Primary source: New Straits Times newspaper archives
This accounted for only 23% of drowning deaths

### When Drowning Happens?

**All-age Drowning Deaths** in different Months of Year in 2006 and 2007
Childhood Drowning Death Risk Profile

- Boys
- Aged 5 to 14 years
- East coast regions (Terengganu and Kelantan)
- End of the year (Nov, Dec, Jan)
- Malay ethnicity

Drowning Morbidity
Childhood Drowning Admissions
2003-2008 HIC, MOH

50% of admissions aged 0-4 years
Childhood Drowning Risk Profile

Story Telling Information

- NST - Jan 13, 2005 Ulu Tiram
  - HK 11 yrs was walking along the narrow bank of the stream when he slipped and fell in
  - In a bid to save his cousin, MJ 10 yrs, dived into the stream but also got into difficulties
- NST - Mar 7, 2010 Segamat
  - 2 youths drowned as they were helping a friend from being swept away by strong current at a river
- NST - Mar 10, 2010, Kulim
  - Two siblings, aged 9 and 10, drowned in a monsoon drain while playing near their home

Drowning Prevention Efforts in Malaysia

Laws/regulations, strategies, initiatives

- No water safety regulations or legislation are currently available in the country

- Search with relevant authorities, no formal regulations or acts pertaining to drowning or water safety were identified for:
  - Compulsory lifeguard in public pools/beaches/water recreational parks
  - Pool fencing
  - Wearing of flotation devices in children when engaging in water activities
  - To have an authorized personnel certified/competent in swimming and life-saving for school excursions involving water activities
  - Local institutions/recreational facilities e.g. hotels, theme parks may often have individually develop water safety rules
Drowning Prevention Efforts in Malaysia

Laws/regulations, strategies, initiatives

Life Saving Society Malaysia
• Organise water safety courses for public
• Community messages via the radio stations & media

Malaysian Maritime Enforcement Agency (MMEA)
• Search and Rescue (SAR) Preventive Program
• Monitor Local Fishermen & Local Ferry Services

Civil Defense Department
• Trained volunteer lifeguards to guard public beaches in Malaysia

Summary of Childhood Drowning:
• 200-300 die yearly
• 200-250 drowned but survive
• Total burden ≈ 500 yearly

• National fatal rate = 3 per 100,000
• National non-fatal rate = 2 per 100,000
• National drowning rate = 5 per 100,000
MDG 4: Mortality Rates
PNM, IMR, U5MR, Malaysia 1965-2007

Source: Ministry of Health

Drowning 2nd commonest cause of death
(after RTA in 1-18 age group)

Discussion
Comparison with Regions

Childhood Drowning Malaysia/Amar, Pui-San, Lina
Discussion
Comparison with other studies

Comparison of Malaysian Drowning Data with WHO World Drowning Data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood Fatal Drowning Rate</td>
<td>3.0 per 100,000 children</td>
<td>7.2 per 100,000 children (Global rate) 13.9 per 100,000 children (Western Pacific LMIC) 1.2 per 100,000 children (Western Pacific HIC)</td>
</tr>
<tr>
<td>Boys: Girls</td>
<td>3.6:1.0</td>
<td>1.7:1.0</td>
</tr>
<tr>
<td>Most Prevalent Age Group</td>
<td>Age 10-14 (3.4 per 100,000 children)</td>
<td>Age 1-4 (10-11 per 100,000 children)</td>
</tr>
<tr>
<td>Most prevalent site of drowning</td>
<td>Seas and rivers (all ages)</td>
<td>LMIC: open bodies of water ie, seas, rivers, lakes etc. HIC: swimming pools</td>
</tr>
</tbody>
</table>

Issues

• Based on reported sources, hence may underestimate overall drowning rates
• Very limited data available on the mechanisms of events
• First comprehensive national study in Malaysia on drowning in children and serves to highlight the magnitude of the problem
Actions Taken

1. Finding **presented to senior manager** (inter-agency meeting)
   Dec 2010
   Fire & Rescue, Marine, Civil Defense, Town Services, Maritime, Transport Ministry,
   Education Ministry, Health Ministry, WHO (WPRO region)

2. Decision to establish a **national drowning registry**
   - pilot in 3 regions with high rates
   - facilitate accuracy of rates
   - monitoring the effect of any interventions

3. Form a national task force to look at prevention measures

4. Communicate findings to sensitise general public

References

- Maritime Search And Rescue (MSAR), Malaysian Maritime Enforcement Agency,
  - Search and Rescue (SAR) Preventive Program, Malaysian Maritime Enforcement Agency,
  - Global Maritime Distress and Safety System (GMDSS), Malaysian Maritime Enforcement Agency,
Acknowledgement

• This study was initiated and funded by the Violence and Injury Prevention Unit, Western Pacific Regional Office, WHO

• Department of Statistics, Malaysia that made available to us data that formed the core of the study

• Health Informatics Centre (HIC) Ministry of Health

• National newspapers - electronic archives

• Life Saving Society Malaysia for support

• World Health Organization for helping fund this study

• Clinical Research Center Perak, Hospital RPB Ipoh & Perak State Health Department that supported the study via routine operational funds
Table 4

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</table>

| Male % | N/A | N/A |
| Female % | N/A | N/A |

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<tr>
<td>Unknown</td>
<td></td>
<td></td>
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</tbody>
</table>

Appendix 1: Data capture form

Subject Information

1. Name of patient
2. Date of birth
3. Sex
4. Race
5. Place of residence
6. Marital status
7. Highest education level

Sudden death

Table 5
Standard Information

1. Date of event
2. Time of event
3. Place of event
4. Body of water
5. Other persons present
6. Witnessed
7. Perpetrating agent
8. Other factors associated
9. Cause of death
10. Presence of injury
11. Supervision
12. Other factors associated
13. Other factors associated

Childhood Drowning Malaysia/Amar, Pui-San, Lina