The Epidemiology, Prevention and Control of Trauma

MJM
04.March.2013
Resources for your reference

2. Road Traffic Report March 2008
3. WHO. Global Status Report on Road Safety. Time for Action (accessible on www.who.int/publications)
4. WHO. Drinking and Driving. A road safety manual for decision makers and practitioners (accessible on www.who.int/publications)
Perspectives of the Impact of Trauma

1. Health Perspective
2. Social Perspective
3. Economic Perspective
4. Developmental Perspective
5. Human Rights Perspective
Dealing with the Effects of Trauma

Trauma has significant immediate & long term health effects

• Physical outcomes
  – Immediate intervention – decreased morbidity & mortality

• Emotional & Psychological outcomes
  – Require prolonged counseling & support

• Social outcomes
  – Require long lasting structural changes and support

Health care workers can only deal effectively with short term physical outcomes
Epidemiology - Worldwide

• Trauma - a major cause of mortality and morbidity worldwide
  – Affects all ages groups and both sexes
  – Occurs in both high- and low-income countries

• > 90% of global deaths from injury are from Low- and Middle-income countries

• Takes the three forms:
  – Accidents
  – Violence and
  – Natural disasters
# Global Violence-related Deaths in 2000

(Who Global Burden of Disease Project for 2000)

<table>
<thead>
<tr>
<th>Types of violence</th>
<th>Number</th>
<th>Rate per 100 000 population</th>
<th>Proportion of total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homicide</td>
<td>520 000</td>
<td>8.8</td>
<td>31.3</td>
</tr>
<tr>
<td>Suicide</td>
<td>815 000</td>
<td>14.5</td>
<td>49.1</td>
</tr>
<tr>
<td>War-related</td>
<td>310 000</td>
<td>5.2</td>
<td>18.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 659 000</strong></td>
<td><strong>28.8</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td>Low- &amp; Middle-income countries</td>
<td>1 510 000</td>
<td>32.1</td>
<td>91.1</td>
</tr>
<tr>
<td>High-income countries</td>
<td>149 000</td>
<td>14.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>
Geographic variation in Road Traffic Mortality rates/100 000 population among those<25yrs (2002)
How the Effects of Trauma are Measured

• Potential Years of Life Lost (PYLL):
  – a measure of premature mortality due to early deaths (before age of 65) caused by injuries

• Disability Adjusted Life Years (DALYs):
  – a measure of PYLL + Years of Health Life Lost (YHLL) due to being in a state of poor health caused by non-fatal injuries.
Classification of Trauma

- Based on whether or not there was intent
- Based on mechanism by which trauma was inflicted
- Based on the form/nature or injury sustained
Typology: Classification Based on Intent

• **Intentional**
  – Violence
    • Self directed violence
    • Interpersonal violence
      – Intimate partner violence
      – Youth violence
      – Child abuse
      – Neglect & abuse of the aged parents,
    • Collective violence

• **Unintentional injuries**
  – Accidents
    • Transport-related road traffic accidents (RTAs),
    • Burns, Drowning, Falls, Machinery, etc
  – Environmental & Natural phenomena
Typology: Classification based on Mechanism

- Transport-related
  - MVA
  - Other modes of transport
- Machinery
- Gunshot
- Stab wounds
- Burns (fire/heat, scalds and chemical burns)
- Drowning
- Falls
- Others
Major causes of Injuries in RSA

• Interpersonal Violence

• Road traffic Accidents

• Together these two categories account for over 75% of all the fatal injuries in RSA

• Alcohol is the main risk factor for each of these

*Ref. Lancet 374:1011-1032*
Percent of injury-deaths by cause: RSA 2000
(Source NIMMS, MRC)

| Rank | Males n = 45 237 | | Females n = 14 698 | | Persons n = 59 935 |
|------|------------------|-------------------|-------------------|-------------------|
|      | Cause of injury death | % | Cause of injury death | % | Cause of injury death | % |
| 1    | Homicide/interpersonal violence | 50.9 | Road traffic injuries | 32.6 | Homicide/interpersonal violence | 46.0 |
| 2    | Road traffic injuries | 24.8 | Homicide/interpersonal violence | 30.8 | Road traffic injuries | 26.7 |
| 3    | Suicide/self-inflicted violence | 9.3 | Fire | 12.5 | Suicide/self-inflicted violence | 9.1 |
| 4    | Fire | 5.1 | Suicide/self-inflicted violence | 8.6 | Fire | 6.9 |
| 5    | Drowning | 2.4 | Surgical/medical misadventure | 4.3 | Drowning | 2.3 |
| 6    | Other transport injuries | 1.7 | Falls | 2.6 | Surgical/medical misadventure | 2.0 |
| 7    | Falls | 1.4 | Drowning | 2.2 | Falls | 1.7 |
| 8    | Other unintentional injuries | 1.3 | Other unintentional injuries | 1.7 | Other transport injuries | 1.7 |
| 9    | Surgical/medical misadventure | 1.2 | Poisoning | 1.7 | Other unintentional injuries | 1.4 |
| 10   | Poisoning | 0.8 | Other transport injuries | 1.5 | Poisoning | 1.1 |
| 11   | Mining injuries | 0.5 | Suffocation and foreign bodies | 0.9 | Suffocation and foreign bodies | 0.4 |
| 12   | Suffocation and foreign bodies | 0.3 | Natural and environmental factors | 0.4 | Mining injuries | 0.4 |
| 13   | Natural and environmental factors | 0.3 | Mining injuries | 0.0 | Natural and environmental factors | 0.3 |
| 14   | War | 0.0 | War | 0.0 | War | 0.0 |
| All injuries | 100.0 | All injuries | 100.0 | All injuries | 100.0 |
Rates/100 000 population of Injuries in RSA compared to Global rates

- RSA Interpersonal violence rates are 5-8 times those of the global rate – rates for males much more than that of females

- RSA suicide rates for males is slightly higher than the global rate

- Rate of Road Traffic Accidents in RSA is twice the global rate
<table>
<thead>
<tr>
<th>RANK</th>
<th>0-4 YRS</th>
<th>5-14 YRS</th>
<th>15-29 YRS</th>
<th>30-44 YRS</th>
<th>45-69 YRS</th>
<th>70+ YRS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perinatal causes</td>
<td>Lower respiratory infections</td>
<td>Road traffic injuries</td>
<td>HIV/AIDS</td>
<td>Ischaemic heart disease</td>
<td>Ischaemic heart disease</td>
<td>Ischaemic heart disease</td>
</tr>
<tr>
<td>2</td>
<td>Lower respiratory infections</td>
<td>Road traffic injuries</td>
<td>HIV/AIDS</td>
<td>Tuberculosis</td>
<td>Cerebrovascular disease</td>
<td>Cerebrovascular disease</td>
<td>Cerebrovascular disease</td>
</tr>
<tr>
<td>3</td>
<td>Diarrhoeal diseases</td>
<td>Malaria</td>
<td>Tuberculosis</td>
<td>Road traffic injuries</td>
<td>HIV/AIDS</td>
<td>Chronic obstructive pulmonary disease</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>4</td>
<td>Malaria</td>
<td>Drownings</td>
<td>Violence</td>
<td>Ischaemic heart disease</td>
<td>Tuberculosis</td>
<td>Lower respiratory infections</td>
<td>Perinatal causes</td>
</tr>
<tr>
<td>5</td>
<td>Measles</td>
<td>Meningitis</td>
<td>Self-inflicted injuries</td>
<td>Self-inflicted injuries</td>
<td>Chronic obstructive pulmonary disease</td>
<td>Trachea, bronchus, lung cancers</td>
<td>Chronic obstructive pulmonary disease</td>
</tr>
<tr>
<td>6</td>
<td>Congenital anomalies</td>
<td>Diarrhoeal diseases</td>
<td>Lower respiratory infections</td>
<td>Violence</td>
<td>Trachea, bronchus, lung cancers</td>
<td>Diabetes mellitus</td>
<td>Diarrhoeal diseases</td>
</tr>
<tr>
<td>7</td>
<td>HIV/AIDS</td>
<td>HIV/AIDS</td>
<td>Drownings</td>
<td>Lower respiratory infections</td>
<td>Cirrhosis of the liver</td>
<td>Hypertensive heart disease</td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>8</td>
<td>Whooping cough</td>
<td>Tuberculosis</td>
<td>Fires</td>
<td>Cerebrovascular disease</td>
<td>Road traffic injuries</td>
<td>Stomach cancer</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>9</td>
<td>Meningitis</td>
<td>Protein–energy malnutrition</td>
<td>War and conflict</td>
<td>Cirrhosis of the liver</td>
<td>Lower respiratory infections</td>
<td>Colon and rectum cancers</td>
<td>Trachea, bronchus, lung cancers</td>
</tr>
<tr>
<td>10</td>
<td>Tetanus</td>
<td>Fires</td>
<td>Maternal haemorrhage</td>
<td>Poisonings</td>
<td>Diabetes mellitus</td>
<td>Nephritis and nephrosis</td>
<td>Road traffic injuries</td>
</tr>
</tbody>
</table>
Causes of non-fatal trauma in hospitals

- Interpersonal violence
- Traffic
- Other "accidents"
- Attempted suicide
Violence
IPV

Self-directed
- Suicide
- Self abuse

Interpersonal
- Child
- Partner
- Elder

Collective
- Social
- Political
- Economic
<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>South African rate (per 100 000)</td>
<td>Global rate (per 100 000)</td>
</tr>
<tr>
<td>Homicide/interpersonal violence&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>14.0</td>
<td>5.9</td>
</tr>
<tr>
<td>5–14</td>
<td>5.6</td>
<td>2.3</td>
</tr>
<tr>
<td>15–29</td>
<td>184.0</td>
<td>19.8</td>
</tr>
<tr>
<td>30–44</td>
<td>180.2</td>
<td>19.1</td>
</tr>
<tr>
<td>45–59</td>
<td>107.7</td>
<td>15.2</td>
</tr>
<tr>
<td>≥ 60</td>
<td>85.2</td>
<td>13.3</td>
</tr>
<tr>
<td>All ages&lt;sup&gt;c&lt;/sup&gt;</td>
<td>113.4</td>
<td>13.9</td>
</tr>
<tr>
<td>Suicide/self-inflicted violence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>5–14</td>
<td>2.1</td>
<td>1.7</td>
</tr>
<tr>
<td>15–29</td>
<td>26.3</td>
<td>15.6</td>
</tr>
<tr>
<td>30–44</td>
<td>29.4</td>
<td>21.5</td>
</tr>
<tr>
<td>45–59</td>
<td>35.0</td>
<td>28.4</td>
</tr>
<tr>
<td>≥ 60</td>
<td>38.1</td>
<td>44.9</td>
</tr>
<tr>
<td>All ages&lt;sup&gt;c&lt;/sup&gt;</td>
<td>23.3</td>
<td>18.6</td>
</tr>
<tr>
<td>Road traffic injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>26.7</td>
<td>13.4</td>
</tr>
<tr>
<td>5–14</td>
<td>21.4</td>
<td>11.2</td>
</tr>
<tr>
<td>15–29</td>
<td>51.9</td>
<td>35.7</td>
</tr>
<tr>
<td>30–44</td>
<td>84.2</td>
<td>37.6</td>
</tr>
<tr>
<td>45–59</td>
<td>79.9</td>
<td>39.6</td>
</tr>
<tr>
<td>≥ 60</td>
<td>81.9</td>
<td>49.0</td>
</tr>
<tr>
<td>All ages&lt;sup&gt;c&lt;/sup&gt;</td>
<td>59.4</td>
<td>32.1</td>
</tr>
</tbody>
</table>
## Injuries in Tshwane/Pretoria: 2001-2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (in thousands)</th>
<th>Total deaths</th>
<th>Rate/100,000 pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>2,893,247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>2,939,810</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>2,981,898</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>3,024,589</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table I. Age standardised* injury mortality rates for Tshwane/Pretoria, 2001-2004

<table>
<thead>
<tr>
<th>Category</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Violence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>653</td>
<td>629</td>
<td>549</td>
<td>596</td>
</tr>
<tr>
<td>Rate</td>
<td>29.6</td>
<td>28.5</td>
<td>24.2</td>
<td>26.4</td>
</tr>
<tr>
<td>- Firearm</td>
<td>398</td>
<td>384</td>
<td>320</td>
<td>329</td>
</tr>
<tr>
<td>Suicide</td>
<td>308</td>
<td>278</td>
<td>293</td>
<td>341</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>118</td>
<td>122</td>
<td>121</td>
</tr>
<tr>
<td>- Hanging</td>
<td>84</td>
<td>76</td>
<td>89</td>
<td>110</td>
</tr>
<tr>
<td>Transport</td>
<td>716</td>
<td>677</td>
<td>694</td>
<td>779</td>
</tr>
<tr>
<td>Road Traffic</td>
<td>684</td>
<td>646</td>
<td>657</td>
<td>738</td>
</tr>
<tr>
<td>- Pedestrian</td>
<td>238</td>
<td>237</td>
<td>231</td>
<td>250</td>
</tr>
<tr>
<td>- Driver</td>
<td>95</td>
<td>106</td>
<td>118</td>
<td>135</td>
</tr>
<tr>
<td>- Railway</td>
<td>31</td>
<td>27</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>Unintentional</td>
<td>240</td>
<td>183</td>
<td>213</td>
<td>237</td>
</tr>
<tr>
<td>Total</td>
<td>2235</td>
<td>2035</td>
<td>2028</td>
<td>2266</td>
</tr>
<tr>
<td>Rate</td>
<td>110.4</td>
<td>99.9</td>
<td>97.7</td>
<td>107.6</td>
</tr>
</tbody>
</table>
Forms of Interpersonal Violence (IPV)

- Physical
- Sexual
- Deprivation or Neglect
Fig. 1. Age-standardized DALY rates for persons by cause for South Africa and WHO regions in 2000.

- **South Africa**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **Africa**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **Americas**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **Eastern Mediterranean**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **Europe**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **South-East Asia**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **Western Pacific**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War

- **World**:
  - Road traffic injuries
  - Self-inflicted injuries
  - Other unintentional injuries
  - Fires
  - Falls
  - War
(Report for the 5 year period April 2004 - March 2009)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Cape</td>
<td>49.5</td>
<td>48.4</td>
<td>47.3</td>
<td>48.0</td>
<td>-3.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Free State</td>
<td>31.6</td>
<td>31.4</td>
<td>34.1</td>
<td>34.9</td>
<td>10.4%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Gauteng</td>
<td>37.9</td>
<td>32.7</td>
<td>29.1</td>
<td>26.6</td>
<td>-29.8%</td>
<td>-8.6%</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>47.0</td>
<td>40.4</td>
<td>35.2</td>
<td>31.6</td>
<td>-32.8%</td>
<td>-10.2%</td>
</tr>
<tr>
<td>Limpopo</td>
<td>14.2</td>
<td>14.6</td>
<td>12.2</td>
<td>13.2</td>
<td>-7.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>25.1</td>
<td>24.3</td>
<td>20.0</td>
<td>19.9</td>
<td>-20.7%</td>
<td>-0.5%</td>
</tr>
<tr>
<td>North West</td>
<td>25.1</td>
<td>21.5</td>
<td>23.2</td>
<td>24.7</td>
<td>-1.6%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>36.5</td>
<td>33.2</td>
<td>31.0</td>
<td>33.6</td>
<td>-7.9%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Western Cape</td>
<td>44.6</td>
<td>42.4</td>
<td>44.2</td>
<td>43.5</td>
<td>-2.5%</td>
<td>-1.6%</td>
</tr>
<tr>
<td>RSA</td>
<td>37.3</td>
<td>34.1</td>
<td>31.9</td>
<td>30.9</td>
<td>-17.2%</td>
<td>-3.1%</td>
</tr>
</tbody>
</table>

GBH = Grievous Bodily Harm;  
Source: SAPS 2008/09 Report
Ecological model for Understanding Violence

Societal

Community

Relationships

Individual
Risk Factors for Interpersonal violence: Multi-factorial

Interaction of:

1. Individual level factors
2. Relationship level factors
3. Community level factors .......... (environmental factors)
4. Societal level factors .......... (environmental factors)
# Risk factors for Interpersonal Violence

## 1. Individual level
- Personal factors: Age, education, income
- Substance abuse
- History of experiencing or observing abuse
- Psychological/personality disorder

## 2. Relationship level
- Nature of the relationship with family, peers & intimate partner
- Harsh physical punishment of children
- Lack of affection & bonding
- Association with delinquent peers
- Marital or parental conflict

## 3. Community level
- Characteristics of neighbourhood, school or workplace which increase risk:
  - Poverty, high density,
  - High level of residential mobility,
  - Existence of local drug trade

## 4. Societal level
- Prevailing societal norms
- Economic, educational & social policies that increase and maintain high levels of inequalities between groups
Road Traffic Accidents
## Comparison of RSA & France 2007

RSA: Population = 48.8m  
France: Population = 61.6m

<table>
<thead>
<tr>
<th>DATA</th>
<th>RSA</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported road traffic fatalities (2007)</td>
<td>14,920(^\dagger) (76% males, 24% females)</td>
<td>4,620(^\dagger) (76% males, 24% females)</td>
</tr>
<tr>
<td>Reported non-fatal road traffic injuries (2007)</td>
<td>219,978(^\dagger)</td>
<td>77,007(^\dagger)</td>
</tr>
<tr>
<td>Costing study available</td>
<td>Yes (deaths and injuries)</td>
<td>Yes (deaths and injuries)</td>
</tr>
</tbody>
</table>

\(^\dagger\) Road Traffic Management Corporation data, defined as died within 7 days of the crash.  
\(^\dagger\) Road Traffic Management Corporation and Medical Research Council data.  
\(^\dagger\) Observatoire national interministériel de sécurité routière (ONISR) data, defined as died within 30 days of the crash.  
\(^\dagger\) Observatoire national interministériel de sécurité routière (ONISR) data.
## Comparison of RSA & Uganda 2007

**RSA:** Population = 48.8m

**Uganda:** Population = 30.9m

<table>
<thead>
<tr>
<th>DATA</th>
<th>RSA</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported road traffic fatalities (2007)</td>
<td>14,920 (76% males, 24% females)</td>
<td>2,838 (78% males, 22% females)</td>
</tr>
<tr>
<td>Reported non-fatal road traffic injuries (2007)</td>
<td>219,978</td>
<td>12,058</td>
</tr>
<tr>
<td>Costing study available</td>
<td>Yes (deaths and injuries)</td>
<td>Yes (deaths and injuries)</td>
</tr>
</tbody>
</table>

---

1 Road Traffic Management Corporation data, defined as died within 7 days of the crash.

2 Road Traffic Management Corporation and Medical Research Council data.

b Police data, defined as died within 30 days of the crash. Data collected by financial year.

c Police data, collected by financial year.
Major Determinants of RTAs in RSA

Person-related factors

• Use of alcohol:
  – by drivers and pedestrians alike

• Lack of knowledge of roads safety
  – especially among young children
  – also among recent arrivals from rural backgrounds

• Disregard of road safety behaviour
  – high speed driving
  – lack of courtesy for other road users
  – un-licensed or poorly trained drivers
  – driver’s lack of attention (due to various factors e.g. tiredness, preoccupation with other activities like cell phone use, etc)
  – Close following distance
Major Determinants of RTAs in RSA (continued)

External Factors

• Poor state of roads
  – lack of traffic control road signs, non-visible road signs/markings and poorly maintained roads
  – lack of safe pedestrian crossings
  – unrestricted animal crossing

• Poor condition of vehicle
  – tyres threads, brakes, steering mechanism
  – non-functioning brake or indicator lights

• Other conditions
  – poor visibility
  – slippery roads
<table>
<thead>
<tr>
<th>BAC (g/100ml)</th>
<th>Effects of different Blood Alcohol Levels on the Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01–0.05</td>
<td>➢ Increase in heart and respiration rates</td>
</tr>
<tr>
<td></td>
<td>➢ Decrease in various brain centre functions</td>
</tr>
<tr>
<td></td>
<td>➢ Inconsistent effects on behavioural task performances</td>
</tr>
<tr>
<td></td>
<td>➢ Decrease in judgment and inhibitions</td>
</tr>
<tr>
<td></td>
<td>➢ Mild sense of elation, relaxation and pleasure</td>
</tr>
<tr>
<td>0.06–0.10</td>
<td>➢ Physiological sedation of nearly all systems</td>
</tr>
<tr>
<td></td>
<td>➢ Decreased attention and alertness, slowed reactions, impaired coordination, and reduced muscle strength</td>
</tr>
<tr>
<td></td>
<td>➢ Reduced ability to make rational decisions or exercise good judgment</td>
</tr>
<tr>
<td></td>
<td>➢ Increase in anxiety and depression</td>
</tr>
<tr>
<td></td>
<td>➢ Decrease in patience</td>
</tr>
<tr>
<td>0.10–0.15</td>
<td>➢ Dramatic slowing of reactions</td>
</tr>
<tr>
<td></td>
<td>➢ Impairment of balance and movement</td>
</tr>
<tr>
<td></td>
<td>➢ Impairment of some visual functions</td>
</tr>
<tr>
<td></td>
<td>➢ Slurred speech</td>
</tr>
<tr>
<td></td>
<td>➢ Vomiting, especially if this BAC is reached rapidly</td>
</tr>
<tr>
<td>0.16–0.29</td>
<td>➢ Severe sensory impairment, including reduced awareness of external stimulation</td>
</tr>
<tr>
<td></td>
<td>➢ Severe motor impairment, e.g. frequently staggering or falling</td>
</tr>
<tr>
<td>0.30–0.39</td>
<td>➢ Non-responsive stupor</td>
</tr>
<tr>
<td></td>
<td>➢ Loss of consciousness</td>
</tr>
<tr>
<td></td>
<td>➢ Anaesthesia comparable to that for surgery</td>
</tr>
<tr>
<td></td>
<td>➢ Death (for many)</td>
</tr>
<tr>
<td>0.40 &amp; greater</td>
<td>➢ Unconsciousness</td>
</tr>
<tr>
<td></td>
<td>➢ Cessation of breathing</td>
</tr>
<tr>
<td></td>
<td>➢ Death, usually due to respiratory failure</td>
</tr>
</tbody>
</table>

Source: WHO: Drinking and Driving. A Road safety manual for decision makers & practitioners
Catching up with a friend?
Is it worth risking lives?
Levels of Intervention for Trauma

- Before the injury ➢ $1^0$ prevention
- During the "golden hour" ➢ $2^0$ prevention
- In the aftermath ➢ $3^0$ prevention
1. Primary Prevention
Prevention (i.e. RTA)

RTA = Road Traffic Accidents
Application of Haddons Model for the control of Injuries
Public Health Approach to the Prevention of Trauma

Surveillance Monitoring & Evaluation

Gather information

Implement Interventions (Multiple role players)
Prevention & Control of RTA: The Public Health Approach

The PH approach entails:

- Using data to identify nature & magnitude of the problem
- Identifying causes of the problem (risk factors)
- Developing & testing interventions
- Implementing the appropriate interventions
- Surveillance, Monitoring & Evaluating the effectiveness
- Adapting the interventions according to information derived from the Monitoring & Evaluation
RTA Prevention – 1.1 Host Factors

- Social marketing and public education on behaviour change regarding Alcohol or Drug use and RTAs
- Promotion of the use of Seat Belts and Child Restraints
- Avoidance of Speeding
- Promote the correct use of the road and responsiveness to road signs
- Avoid driving while fatigued
- Use of Helmets - cyclists
- Attention to Medical conditions – vision, stress, epilepsy, CHD etc.
Use a Restraint Consistently & Correctly
Responsible parents do this at all times all before getting the car to move
Teach children road safety behaviour: Children learn from Examples
Source: WHO. Youth Road Safety
1.2. Environmental Factors

- **Condition of roads**
  - Road surface
  - Clearly marked & convenient Pedestrian crossings
- Pedestrian bridges for very busy roads
- Clear visibility
- Road signage
- Adequate lighting
- Control of animals
- Enforcement of traffic regulations in all areas & at all times (not only speed traps)
1.3. Agent Factors

- Road-worthy condition of the vehicles
- Road-worthy cycles
2. Secondary Prevention
Trimodal distribution of Death from RTAs

1. **Immediately**
   Unavoidable Fatal injury

2. **Within hours:**
   Usually treatable condition

3. **Delayed stage death**
   Infection, Multi system failure or complications
2.1 Pre-hospital Trauma Care

• Basic First Aid
  – Aim:
    • To plan and implement measures to reduce mortality soon after the trauma
      (i.e reduce the peak 2 of mortality shown in the previous slide)

  – Should be the competence and attitude of all persons
    • Stop to help
    • Call for help
    • Asses the scene and the victim
    • Start the breathing
    • Stop the Bleeding
2.2 Advanced pre-hospital care:

Access to services of Trained paramedics – within an hour of sustaining an injury
4. Health Services

- Adequate coverage by Emergency services with short response times ($\leq 30$ minutes)
- Appropriate qualified staff manning EMS
- Adequate staffing of and resource allocation for EMS
- Clear referral policies
- Adequately resourced hospitals District Hospital & Regional hospitals
Impact of Fatal & Non-fatal Injuries in RSA

- Fatal injuries from Interpersonal Violence and Road Traffic Accidents are 2\textsuperscript{nd} to HIV as the major causes of Years of Potential Life Lost (YPLL) and contribute to the high Disability Adjusted Life Years (DALYs)

- Approx 3.5 million people seek medical assistance for non-fatal injuries annually
  - 50% of these due to interpersonal violence
Cost of Trauma

• Proportion of the health budget
  – Ambulance service
  – Hospital services
  – Rehabilitation services

• Cost to society
  – Individual if they survive (loss of income, emotional and psychological)
  – The family and community who have to take care of survivor
Summary

RSA has the highest rates per 100,000 population of injuries (especially IPV & RTA) in the world

IPV in RSA:
• Violence & injuries are the 2nd leading causes of death (after AIDS) and lost disability-adjusted life years (DALYs)

• Interpersonal violence > traffic > other

• Young men aged 15-29 are predominantly perpetrators of violence and disproportionately affected as victims of violent crimes

• Alcohol a major risk factor for IPV > traffic > other

• The social factors driving the problem are poverty, unemployment, extremely wide disparity in wealth, childhood experience of violence, widespread access to firearms, alcohol and drug use and weak law enforcement mechanism
Summary (continued)

RTA

• Social marketing & Education of all categories of road users on alcohol & RTA and on safe use of the road
• Rigorous punitive sanctions for drinking-and-driving offences
• Expansion and rigorous enforcement of road-side alcohol & drug monitoring for drivers and pedestrians by law enforcement agents
• Laws against drinking-and-walking on public roads and their enforcement
• Use of safety belts & child restraints at all times
• Enforcement of Road Traffic Laws & Regulations
• Improving and maintaining condition of roads, road markings and visible signage
• Providing safe pedestrian crossings – scholar patrols, demarcated pedestrian crossings in the streets, pedestrian bridges etc
• Fencing-off the roads to prevent stray animals on the roads
• Corporate responsibility in ensuring safe public transport and commercial vehicles on roads & safe practices by the drivers of these
• Application of the public health approach in the control of RTAs and other forms of injuries
Summary (continued)

The Health Care Services:

- Strengthening the capacity of the PHC services, the District and Regional Hospitals
- Shortening of the response times for the Emergencies
- Adequate training of and resource allocation for the EMS
- Effective patient care in the 1st “golden” hour following an injury
- Building capacity within communities to handle emergencies while awaiting trained EMS staff
- Applying the Public Health Approach in monitoring and evaluating the effectiveness of the emergency health care system
THE END