Injury and trauma research training program for Botswana

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Doug Wiebe, PhD
University of Pennsylvania

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Botswana
Botswana

- 1966 independence
- 2,021,000 population

- Tswana ethnic group, Setswana and English are official languages

- Rapidly developing economy, dominated by fast-growing service sector, diamond industry, tourism, and manufacturing

- 1967 diamonds discovered. Debswana, largest diamond mining company in Botswana, is 50% owned by the government and generates half of all government revenues

- Since independence, Botswana has been transformed into an upper middle-income country

- However, 30% of the population lives at an income below the international poverty level

- Road traffic, self-harm, and violence are among the 10 leading causes of years of lost life. Alcohol major risk factor
Year of life lost

Leading causes of years of potential life lost due to premature death in Botswana and percent change, 1990 and 2013.

YPLLs based on rates per 100,000

<table>
<thead>
<tr>
<th>1990 ranking</th>
<th>2013 ranking</th>
<th>% change 1990-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrheal diseases</td>
<td>HIV/AIDS</td>
<td>805%</td>
</tr>
<tr>
<td>Lower respiratory inf</td>
<td>Tuberculosis</td>
<td>6%</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Lower respiratory inf</td>
<td>-35%</td>
</tr>
<tr>
<td>Other neonatal</td>
<td>Diarrheal diseases</td>
<td>-67%</td>
</tr>
<tr>
<td>Neonatal preterm birth</td>
<td>Self-harm</td>
<td>55%</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Road injuries</td>
<td>39%</td>
</tr>
<tr>
<td>Neonatal encephalopathy</td>
<td>Other neonatal</td>
<td>-58%</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>Neonatal preterm birth</td>
<td>-57%</td>
</tr>
<tr>
<td>Protein-energy malnutrition</td>
<td>Neonatal encephalopathy</td>
<td>-44%</td>
</tr>
<tr>
<td>Road injuries</td>
<td>Interpersonal violence</td>
<td>1,072%</td>
</tr>
<tr>
<td>Self-harm</td>
<td>Congenital anomalies</td>
<td>-31%</td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>Protein-energy malnutrition</td>
<td>-71%</td>
</tr>
</tbody>
</table>

Source: Institute for Health Metrics and Evaluation
Drivers of the increasing road fatality rate

The rapidly increasing road fatality rate stemmed from multiple factors

• New high-speed roadway construction to accommodate expanded commerce without proportionately resourced traffic safety systems and programs

• Roadway engineering safety features are lacking, such as barriers to physically separate vehicle lanes and pedestrian walkway and collapsible barrels at bridge abutments

• Additional challenges: the increase in transport trucks moving trade through Botswana; lack of overtaking points on single lane highways; drinking while driving while travelling long distances between their city home, rural home, and cattle post (Mupimpila 2008)

• Added to this, Botswana and other neighboring nations have experienced an increase in less expensive, secondhand vehicles that are imported from Singapore, Japan and China and that often lack basic safety features such as seat belts, removed to reduce shipping costs, are likely one driving factor (Schatz 2008)
Botswana injury mechanisms

• The mechanisms of injury that account for deaths in Botswana vary by age group. The top three leading causes of death by age group are:
  • road injuries, adverse effects of medical maltreatment, and drowning in 0-4 year-olds;
  • road injuries, drowning, and blunt-force trauma (non-road and non-violence) in 5-14 year-olds;
  • road injuries, self-harm, and violence in 15-49 year-olds;
  • self-harm, road injuries, and adverse effects of medical treatment in 50-69 year-olds;
  • adverse effects of medical treatment, self-harm, and falls in those 70 years old and older.

• Mechanisms vary by sex also; among women in Botswana sexual violence is a priority for prevention.
  • 29% of women age 18+ years experienced at least one episode of sexual violence in their lifetime (UNAIDS 2014).
  • More than half of all homicides of women are committed by their intimate partners (UNDP 2008).

• Alcohol is leading risk factor for many injury mechanisms: contributes to 41% of road injuries, 24% of violence deaths, and 22% of self-harm deaths each year (IMHE 2016); alcohol levy research dollars.

• There is an intersection between the broad health domains of injury and infectious disease.
  • Eg, gender-based violence has been identified as a significant driver of HIV/AIDS infections in women in sub-Saharan Africa (Fustos 2011).
  • Approx 60% of people infected with HIV in the region are women.
  • The gender gap is even more pronounced in younger age groups, with approximately 21% of men but 30% of women age 15-49 years in Botswana living with HIV/AIDS.
  • International organizations are increasingly focusing on preventing violence against women a priority strategy to battle the spread of the epidemic (Ellsberg & Betron 2010).
Injury Research Training Program

Goal: build capacity for research on trauma care and injury prevention
Two Penn training program offers two pathways

Independent Investigator training to prepare fully-trained researchers who have interests in trauma and injury treatment and prevention for successful careers as independent, extramurally-funded academic investigators

- drawn from pools of physicians and other clinicians in Botswana hospitals and academic programs
- requires two years of full-time training
- first 12-15 months of training will be conducted at Penn; remaining months at UB or MOH
- require letter of support promising protected time

Two Independent Investigator trainees, one from UB and one from MOH, will enter the training program as pairs in years, two, four and five with one trainee entering in year one and one in year three; 8 total

Associate Investigator training provides research methods training sufficient for individuals interested in injury to serve in collaborative or research support roles

- drawn from pools of physicians, other clinicians, and staff in Botswana hospitals, academic programs, the MOH, Botswana Police, and other organizations
- enroll a cohort of 15-20 Associate Investigators
- participate in short course each July/August for 4 years
Priority Injury Research Topics for Botswana

- Value of telemedicine for trauma triage
- Preventing drinking/driving between home and cattle post; ignition interlocks on long-haul freight trucks
- Clinical evaluations of trauma developments using risk scoring (could compare TRISS with locally developed models) and outcomes from the trauma registry
- Long term outcomes of injury. Currently Princess Marina Hospital (PMH) has virtually no follow-up of injured patients
- Epidemiology of burns which could inform a burns prevention program
- Effectiveness of introducing a formal trauma service at PMH on trauma outcomes
- Country wide trauma epidemiology. We expect that patterns and thus prevention priorities are very different given the population and environmental differences across the country but this has not been investigated
- Effect of introducing child restraints in cars. Currently these are not mandatory in Botswana
- Preventing community violence and domestic violence spikes on payday
- The efficient use of injury surveillance systems in limited-information environments
A&E – Princess Marina Hospital

Patient log
Date, time, age, sex, chief complaint, severity

Patient log archive
A&E – Princess Marina Hospital

Megan Cox
Emergency Medicine
Mentor
Yohana Mashalla
Dean, Health Sciences
D43 Co-Director

Miriam Sebego
Nursing
Mentor

Titus Mswabi
Dept of Environmental Health
Mentor

Kagiso KG Ndlovu
Computer Science
Mentor
Botswana-UPenn Partnership

Doreen Ramogola-Masire
Director

Ari Ho-Foster
Head Administrator
Divider slide (if needed)