Surgery in Global Health & OHSU

Resident Conference

6/2/14
Overview

• Intro
• Surgery in Global Health
  – Current barriers
• Global Surgery at OHSU
  – Haiti
  – Tanzania
  – South Africa
• Future Direction
Global Health

• Global Health – Public health on a global level

• Public health – Health on a population level

• Clinician – Health on an individual level
Example – Colon Cancer

• 55M with newly diagnosed sigmoid cancer

• Clinician – how do I maximize this patient’s outcome?

• Public Health – how can we maximize outcomes for colon cancer in our community?

• Global Health – how do we compare with the rest of the world?
Priorities in Global Health

• How does one decide what is important?
  
  *Disease burden*
  
  *Preventability*
  
  *Treatability*

• Disability-adjusted life years (DALYs)
  
  – Creating a common denominator for health conditions to facilitate comparison
Disability Adjusted Life Years (DALY) is a measure of overall disease burden, expressed as the cumulative number of years lost due to ill-health, disability or early death.

\[ \text{DALY} = \text{YLD} + \text{YLL} \]

- YLD: Years Lived with Disability
- YLL: Years of Life Lost

Healthy life

Disease or Disability

Early death

Expected life years
# Global DALYs 1990 & 2010

![Image of DALYs 1990 & 2010](http://www.healthdata.org/data-visualization/gbd-arrow-diagram)

## 1990

<table>
<thead>
<tr>
<th>Mean rank (95% UI)</th>
<th>Disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-0 (1 to 2)</td>
<td>Ischaemic heart disease</td>
</tr>
<tr>
<td>2-0 (1 to 2)</td>
<td>Stroke</td>
</tr>
<tr>
<td>3-0 (3 to 4)</td>
<td>Lower respiratory infections</td>
</tr>
<tr>
<td>4-0 (3 to 4)</td>
<td>COPD</td>
</tr>
<tr>
<td>5-0 (5 to 5)</td>
<td>Diarrhoea</td>
</tr>
<tr>
<td>6-1 (6 to 7)</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>7-3 (7 to 9)</td>
<td>Preterm birth complications</td>
</tr>
<tr>
<td>8-6 (7 to 12)</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>9-4 (7 to 13)</td>
<td>Malaria</td>
</tr>
<tr>
<td>10-4 (8 to 14)</td>
<td>Road injury</td>
</tr>
<tr>
<td>10-8 (8 to 14)</td>
<td>Protein-energy malnutrition</td>
</tr>
<tr>
<td>12-8 (11 to 16)</td>
<td>Cirrhosis</td>
</tr>
<tr>
<td>13-2 (9 to 18)</td>
<td>Stomach cancer</td>
</tr>
<tr>
<td>15-5 (12 to 20)</td>
<td>Self-harm</td>
</tr>
<tr>
<td>15-8 (13 to 19)</td>
<td>Diabetes</td>
</tr>
<tr>
<td>16-1 (12 to 20)</td>
<td>Congenital anomalies</td>
</tr>
<tr>
<td>16-9 (13 to 20)</td>
<td>Neonatal encephalopathy*</td>
</tr>
<tr>
<td>18-3 (14 to 22)</td>
<td>Hypertensive heart disease</td>
</tr>
<tr>
<td>21-1 (6 to 44)</td>
<td>Measles</td>
</tr>
<tr>
<td>21-1 (12 to 36)</td>
<td>Neonatal sepsis</td>
</tr>
<tr>
<td>21-3 (19 to 26)</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>21-6 (18 to 26)</td>
<td>Meningitis</td>
</tr>
<tr>
<td>23-2 (21 to 26)</td>
<td>Other cardiovascular and circulatory</td>
</tr>
<tr>
<td>23-7 (20 to 28)</td>
<td>Liver cancer</td>
</tr>
<tr>
<td>23-8 (20 to 27)</td>
<td>Rheumatic heart disease</td>
</tr>
<tr>
<td>27 Chronic kidney disease</td>
<td></td>
</tr>
<tr>
<td>30 Falls</td>
<td></td>
</tr>
<tr>
<td>35 HIV/AIDS</td>
<td></td>
</tr>
</tbody>
</table>

## 2010

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Mean rank (95% UI)</th>
<th>% change (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ischaemic heart disease</td>
<td>1-0 (1 to 1)</td>
<td>35 (29 to 39)</td>
</tr>
<tr>
<td>2 Stroke</td>
<td>2-0 (2 to 2)</td>
<td>26 (14 to 32)</td>
</tr>
<tr>
<td>3 COPD</td>
<td>3-4 (3 to 4)</td>
<td>-7 (-12 to 0)</td>
</tr>
<tr>
<td>4 Lower respiratory infections</td>
<td>3-6 (3 to 4)</td>
<td>-18 (-24 to -11)</td>
</tr>
<tr>
<td>5 Lung cancer</td>
<td>5-8 (5 to 10)</td>
<td>48 (24 to 61)</td>
</tr>
<tr>
<td>6 HIV/AIDS</td>
<td>6-4 (5 to 8)</td>
<td>396 (323 to 465)</td>
</tr>
<tr>
<td>7 Diarrhoea</td>
<td>6-7 (5 to 9)</td>
<td>-42 (-49 to -35)</td>
</tr>
<tr>
<td>8 Road injury</td>
<td>8-4 (5 to 11)</td>
<td>47 (18 to 86)</td>
</tr>
<tr>
<td>9 Diabetes</td>
<td>9-0 (7 to 11)</td>
<td>93 (68 to 102)</td>
</tr>
<tr>
<td>10 Tuberculosis</td>
<td>10-1 (8 to 13)</td>
<td>-18 (-35 to -3)</td>
</tr>
<tr>
<td>11 Malaria</td>
<td>10-3 (6 to 13)</td>
<td>21 (-9 to 56)</td>
</tr>
<tr>
<td>12 Cirrhosis</td>
<td>11-8 (10 to 14)</td>
<td>33 (25 to 41)</td>
</tr>
<tr>
<td>13 Self-harm</td>
<td>14-1 (11 to 14)</td>
<td>32 (8 to 49)</td>
</tr>
<tr>
<td>14 Hypertensive heart disease</td>
<td>14-2 (12 to 18)</td>
<td>48 (39 to 56)</td>
</tr>
<tr>
<td>15 Preterm birth complications</td>
<td>14-4 (12 to 18)</td>
<td>-28 (-39 to -17)</td>
</tr>
<tr>
<td>16 Liver cancer</td>
<td>16-9 (14 to 20)</td>
<td>63 (49 to 78)</td>
</tr>
<tr>
<td>17 Stomach cancer</td>
<td>17-0 (13 to 22)</td>
<td>-2 (-10 to 5)</td>
</tr>
<tr>
<td>18 Chronic kidney disease</td>
<td>17-4 (15 to 21)</td>
<td>82 (65 to 95)</td>
</tr>
<tr>
<td>19 Colorectal cancer</td>
<td>18-5 (15 to 21)</td>
<td>46 (36 to 63)</td>
</tr>
<tr>
<td>20 Other cardiovascular and circulatory</td>
<td>19-7 (18 to 21)</td>
<td>46 (40 to 55)</td>
</tr>
<tr>
<td>21 Protein-energy malnutrition</td>
<td>21-5 (19 to 25)</td>
<td>-32 (-42 to -21)</td>
</tr>
<tr>
<td>22 Falls</td>
<td>23-3 (21 to 29)</td>
<td>56 (20 to 84)</td>
</tr>
<tr>
<td>23 Congenital anomalies</td>
<td>23-4 (21 to 29)</td>
<td>-22 (-40 to -3)</td>
</tr>
<tr>
<td>24 Neonatal encephalopathy*</td>
<td>24-4 (21 to 30)</td>
<td>-20 (-33 to -2)</td>
</tr>
<tr>
<td>25 Neonatal sepsis</td>
<td>25-1 (15 to 35)</td>
<td>-3 (-25 to 27)</td>
</tr>
<tr>
<td>29 Meningitis</td>
<td>29-1 (20 to 30)</td>
<td>-1 (-14 to 1)</td>
</tr>
<tr>
<td>33 Rheumatic heart disease</td>
<td>33-8 (20 to 27)</td>
<td>-3 (-14 to 1)</td>
</tr>
</tbody>
</table>

### Conditions Not Accounted For:

- Abscesses
- Infected wounds
- Intestinal obstructions
- GI bleeding
- Appendicitis
- Hernias

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Disease Control Priorities in Developing Countries. 2nd edition.
Jamison DT, Breman JG, Measham AR, et al., editors.
# Surgical Burden of Disease

<table>
<thead>
<tr>
<th>Condition</th>
<th>Surgical DALYs estimated millions</th>
<th>Estimated surgical DALYs as a % of total DALYs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injuries</td>
<td>63</td>
<td>4.3</td>
</tr>
<tr>
<td>Malignancies</td>
<td>31</td>
<td>2.1</td>
</tr>
<tr>
<td>Congenital Anomalies</td>
<td>14</td>
<td>1.0</td>
</tr>
<tr>
<td>Obstetrical Complications</td>
<td>10</td>
<td>0.7</td>
</tr>
<tr>
<td>Cataracts and Glaucoma</td>
<td>8</td>
<td>0.5</td>
</tr>
<tr>
<td>Perinatal Conditions</td>
<td>7</td>
<td>0.5</td>
</tr>
<tr>
<td>Other</td>
<td>31</td>
<td>2.1</td>
</tr>
</tbody>
</table>
Road traffic injuries an emerging priority internationally

- Contribution to global BoD rising to 5.1% by 2020
- Esp in LMICs: rapid motorization, decrease in other causes

*Source: Peden et al. 2002. The injury chart book*
Road traffic injury mortality rates (per 100 000 population) in WHO regions, 2002

• By 2030 – Road Traffic Crashes will be the 5th leading cause of death in developing world – Ahead of Malaria, TB and HIV

• By 2015 – Road Traffic Crashes will be the biggest killer of African children 5-15
• Surgical diseases contribute significantly to the overall global burden of disease
• Much of surgical disease is preventable or treatable
• Further research needed to better understand the scope of surgical conditions
What are barriers in improving surgical global health?
A Complex Answer

- Surgeon Inattention
- Conversation focused on Infectious Diseases
- Perception that surgery is too expensive
- Lack of providers and resources**
- Lack of high-quality epidemiologic data
“Neglected Stepchild of Global Health”

Medical and Surgical care are complementary

Medical Clinics are de facto Surgical Clinics
This Costs a LOT of Money

Direct costs of road traffic crashes

1% of GNP in low income countries

1.5% of GNP in middle income countries

2% of GNP in high income countries

Globally = $518 billion a year!
### Estimated global research and development funding for selected topics

<table>
<thead>
<tr>
<th>Disease or injury</th>
<th>US$ millions</th>
<th>1990 DALYs ranking</th>
<th>2020 DALYs ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS</td>
<td><strong>919–985</strong></td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Malaria</td>
<td>60</td>
<td>8</td>
<td>—</td>
</tr>
<tr>
<td>Diarrhoeal diseases</td>
<td>32</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Road traffic crashes</td>
<td><strong>24–33</strong></td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>19–33</td>
<td>—</td>
<td>7</td>
</tr>
</tbody>
</table>
This is Going to Get Worse

Projections of Global Mortality and Burden of Disease from 2002 to 2030

Colin D. Mathers*, Dejan Loncar
Evidence and Information for Policy Cluster, World Health Organization, Geneva, Switzerland

[Graph showing projections for group III deaths with categories for other, falls, violence and war, self-inflicted, and road traffic accidents over the years 2002 to 2030.]
This is Going to Get Worse

Figure 9. Projected Growth in Road Traffic Fatalities, 2002–2020: A Comparison of World Bank Projections with GBD Projections
doi: 10.1371/journal.pmed.0030442.g009
Is it too Expensive?
In the reference article "The “Other” Neglected Diseases in Global Public Health: Surgical Conditions in Sub-Saharan Africa" by Doruk Ozgediz, Robert Rivielo, Surgery is NOT too expensive. The table includes the minimum necessary infrastructure, human resources and supplies at the DISTRICT HOSPITAL level.
Cost Effectiveness

Direct Cost
- Physician services
- Hospital services
  - Overhead
  - Capital
- Supplies
- Drugs
- Transportation

Indirect Costs
- Productivity losses
  - Absenteeism from work
  - Impaired productivity
  - Cost of premature mortality
Cost Effectiveness

HIV/AIDS
• Incurable disease
• Frequent visits
• Long term resource allocation
• Long periods of incapacitation and no productivity

Surgical Services
• Often “curable”
• Often an acute problem
• Often recovery care done by family
• Short periods of incapacitation and no productivity
Surgery is NOT too Expensive
Theme (Revisited)

• Basic surgical care is a right

• Surgical disease is a major public health problem

• We can and should take steps to address this issue
Global Surgery at OHSU
Global Health Advocacy Program in Surgery (GHAPS)

To promote and advance sustainable surgical care initiatives by providing a unique educational foundation in surgery and global health to the OHSU community, and to engage in collaborative efforts both domestically and abroad emphasizing clinical, educational, and research opportunities.
Initiatives & Goals

• Clinical
  – Short-term: Haiti, Tanzania, East London

• Education
  – Medical Student Seminar

• Research
  – Masters in Public Health
  – Clinical Research in Cape Town
Short-term Clinical Rotation
Haiti
Background

• Interest in international surgery
  – 6% (1984) → 31% (2011)
• Clinical rotations in foreign teaching hospitals
• Less studied
  – Establishing rotations in areas without academic centers
  – Increased demand for surgeons in rural settings
• Challenge: provide an ethical, sustainable and educational experience

Requirements for an International General Surgery Rotation

• Establish site

• Program accreditation status and cycle length

• Supervised faculty

• Competency based goals and objectives

• Evaluation of residents performance

• Educational rationale

• In-/outpatient experience

• Operative experience

• Expenses verification

• Description of educational resources
Surgical Residents

Resident responsibilities

– Insurance
– Vacation
– ACGME
– Safety
– Continuity of care
– Developing skills

Challenges

– Instruments and supplies
– Technology
– Staff
– Language
Curriculum

• Take on an active role in logistical planning and resource gathering for your trip
  – Clinical duties
  – Medical
  – Surgical

• Develop and/or help implement Public Health education
Goals

• Understand the pathophysiology and clinical presentation of surgical problems

• Learn management of diseases in a resource limited environment

• Understand social and cultural influences impacting surgical decisions
Clinics
Patient Care

• Awareness operative decision making on lives of patients and their role in society
  – Build sustainable surgical capacity of research and local staff
  – Understand religious cultural and family structure and how it affects care

• Develop
  – Interpersonal and communication skills
  – Professionalism and compassion
Haitian Experience

October 2013

• 4 days
  – Medical clinics ~1600 patients
  – 30 operations

April 2014

• 3 days
  – Medical clinics ~1200 patients
  – 25 operations

Board certified US surgeon was present for every resident case
Typical Day

**Timing**
- 6am-7am: round on inpatient ward
- Breakfast
- Clinic (medical or surgical) or Operating Room
- 5pm-8pm: dinner
- Evening activity if time permits

**Resources**
- History and physical
- 1 X-ray
  - No CT scanner or U/S
- Minimal access to labs
- HIV tests
- Pregnancy tests
- Mainly access to medications we bring
Pathology/Cases

- Bowel obstruction- volvulus
- Inguinal hernias
- Hydrocele
- Uterine cancer/fibroids
- Abdominal typhoid
- Tonsillectomy
- Excision of mass
  - Neurofibroma
  - Cysts
  - Breast fibroadenoma
  - Scalp lesions
Free Time
Conclusion

- Educationally valuable rotation
- Residents successfully integrated into a sustainable partnership at an international community hospital
- Opportunity to advance local knowledge (Public Health, OR training, etc)
Short-term Clinical Rotation
Tanzania
MUHAS & AGCT

“FOCUS ON TEACHING”
Alliance for Global Clinical Training & Muhimbili University for Health and Allied Sciences
Dar es Salaam, Tanzania
MUHAS & AGCT

- FOCUS ON TEACHING
  - Medical students
  - Residents
  - Specialty care
Wards at MUHAS
Advanced Technology at MUHAS
(not so) Advanced Technology at MUHAS
Trauma & EGS at MUHAS
Cancer at MUHAS
Pediatrics at MUHAS
Living at MUHAS
Opportunities

Research
• Partner with residents
• Trauma
• Cancer

Teaching
• Residents
• Students
• Curriculum development (US)
Why go to Tanzania?

• Foundations for a career in global surgery
• Wide variety of cases
• Huge opportunity to teach
• Friendship
MPH, Research & Clinical Rotation
South Africa
South Africa

- Fourth worst income inequality in the world
- Longstanding apartheid legacy
- Ethnically & culturally diverse – 11 official languages
- Unique public and privatized health system
GHAPS Initiatives

• Research & Education
  – Masters in Public Health at the University of Cape Town
  – Independent research

• Clinical
  – Potential for clinical experiences in Cape Town or East London
MPH @ UCT

• 2 year program condensed into 1.5
• Study and work in a developing nation
• Unique perspectives from instructors and colleagues from around the world
• Research skills and multidisciplinary experience in epidemiology, health systems research, policy, biostatistics
Groote Schuur Hospital

- Academic tertiary hospital in Cape Town
- First heart transplant in the world
- Referral center for the Western Cape Province
Research

• Preventable deaths at a level 1 trauma center
• Pediatric surgical burden of disease in Cape Town
• Acute appendicitis in the private and public sectors of Cape Town
East London
East London

- Frere Hospital – referral hospital for poorly resourced Eastern Cape, adult & peds
- Indigent township community
Life in Cape Town
Life in Cape Town
Future Direction: The Way Forward
The Way Forward

• Increase Surgical Interest
• Academic Twinning
• Support Local Surgeons
Questions