Benchmarking surgical systems 2015-30: application of indicators from The Lancet Commission on Global Surgery for an Indicator-based, near real-time capacity building index

Jonathan Meadows, MS, MPH, CPH
Osteopathic Medical Student, 2nd Year
Touro College of Osteopathic Medicine New York

Kelly K.A. McQueen, MD, MPH
Professor, Department of Anesthesiology & Surgery
Director, Vanderbilt Anesthesia Global Health & Development
Director, Vanderbilt Global Anesthesia Fellowship
Department of Anesthesiology
Vanderbilt University Medical Center
President, Global Surgical Consortium
Introduction

SIXTY-EIGHTH WORLD HEALTH ASSEMBLY
Agenda item 17.1

Strengthening emergency and essential surgical care and anaesthesia as a component of universal health coverage

WHA68.15
26 May 2015
Introduction

• **Purpose**
  – Developed an country-level index
    • Incorporate Lancet Commission Indicators
    • Incorporate useful traditional global health indicators
    • Establish indicators thresholds/goals
  – Generate database (available data)
  – Generate hypothetical index score using points
Methods

• Indicators
  – Lancet Commission on Global Surgery’s *Global Surgery 2030: Indicators* Policy Brief
  – Traditional high-impact global health indicators

• Recorded → Excel for Mac 2011 (Microsoft, Redmond, WA).

• Available Public Data Importation
  – Low income country: World Bank classification
  – Global data repositories
    • World Bank data
    • WHO Global Health Observatory
    • WHO Global Health Expenditure Database
  – Academic Literature for missing values; manual entry
Methods

• Point assignment
  – Quintiles; 1 point per division
  – Max 5 points upon meeting threshold/goal target
  – Ideal target (threshold): most indicators
    • Lancet Commission
    • WHO Recommendations
    • Academic Literature
  – Excel function equations

• Basic descriptive statistics
  – Range
  – Mean

Development of a Surgical Capacity Index: Opportunities for Assessment and Improvement

Steve Kwon · T. Peter Kingham · Thaim B. Kamara · Lawrence Sherman · Eileen Natuzzi · Charles Mock · Adam Kushner

DOI 10.1007/s00266-011-1385-z
### Threshold Values

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP Ratio</td>
<td>No set threshold</td>
</tr>
<tr>
<td>Health expenditure, total (% of GPD)</td>
<td>5–6%</td>
</tr>
<tr>
<td>General government expenditure on health (GGHE,%)</td>
<td>100%</td>
</tr>
<tr>
<td>Out of Pocket Expense (OOPE %)</td>
<td>&lt;20%</td>
</tr>
<tr>
<td>Surgeons, Anesthesiologists, Obstetricians/100,000 persons</td>
<td>20 Surgeons, Anesthesiologists, Obstetricians/100,000 persons</td>
</tr>
<tr>
<td>Total &quot;Bellweather&quot; District Hospitals</td>
<td>80%</td>
</tr>
<tr>
<td>Population 2.0 hours from health-care facility with surgeon (%)</td>
<td>80%</td>
</tr>
<tr>
<td>Surgical procedures/100,000 persons</td>
<td>5,000 procedures/100,000 persons</td>
</tr>
<tr>
<td>POMR: [Intraoperative death + 30d Post-operative death]/100,000 surgical procedures</td>
<td>0.5-1.5%</td>
</tr>
<tr>
<td>Births by caesarean section (%)</td>
<td>10%</td>
</tr>
<tr>
<td>Maternal Death/100,000 live births</td>
<td>&lt;70 deaths/100,000 live births</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Country Classification</th>
<th>Afghanistan</th>
<th>Benin</th>
<th>Burkina Faso</th>
<th>Burundi</th>
<th>Cambodia</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Bank Classification</td>
<td>LIC</td>
<td>LIC</td>
<td>LIC</td>
<td>LIC</td>
<td>LIC</td>
</tr>
<tr>
<td>Country Code</td>
<td>AFG</td>
<td>BEN</td>
<td>BFA</td>
<td>BDI</td>
<td>KHM</td>
</tr>
<tr>
<td>GDP (current US$) [YR2014]</td>
<td>2.08E+10</td>
<td>8.747E+09</td>
<td>1.254E+10</td>
<td>3.094E+09</td>
<td>1.671E+10</td>
</tr>
<tr>
<td>GDP Ratio</td>
<td>25.010341</td>
<td>10.496391</td>
<td>15.051563</td>
<td>3.7123768</td>
<td>20.051319</td>
</tr>
<tr>
<td>Health expenditure, total (% of GPD) [YR2013]</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Surgical Workforce: Physician Density/100,000 persons</td>
<td>21</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Number of Hospitals [2015]</td>
<td>43</td>
<td>33</td>
<td>3</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Number of “Bellweather” Hospitals</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Population 2.0 hours driving distance from a health-care facility staffed by a surgeon (%)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Births by caesarean section (%)</td>
<td>3.6</td>
<td>5.4</td>
<td>1.9</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Births by caesarean section (%) Year Collected</td>
<td>2010-2011</td>
<td>2011-2012</td>
<td>2010</td>
<td>2010</td>
<td>2010</td>
</tr>
<tr>
<td>Maternal mortality ratio (per 100 000 live births) - Interagency estimates, 2013</td>
<td>400</td>
<td>340</td>
<td>1</td>
<td>740</td>
<td>170</td>
</tr>
<tr>
<td>Perioperative Mortality Rate (intraoperative + 30 days)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Surgical Volume (procedures per 100,000 persons)</td>
<td>N/A</td>
<td>N/A</td>
<td>152</td>
<td>N/A</td>
<td>419</td>
</tr>
<tr>
<td>GGGH (%)</td>
<td>21.196658</td>
<td>54.199369</td>
<td>58.457641</td>
<td>54.70006</td>
<td>20.499129</td>
</tr>
<tr>
<td>OOPE (%)</td>
<td>73.79183</td>
<td>40.863651</td>
<td>13.234376</td>
<td>20.233347</td>
<td>59.739799</td>
</tr>
<tr>
<td>Total Points</td>
<td>16</td>
<td>15</td>
<td>12</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Total Possible Points for Categories with Available Data</td>
<td>35</td>
<td>35</td>
<td>40</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Index of Categories with Available Data (%)</td>
<td>45.714286</td>
<td>42.857143</td>
<td>30</td>
<td>37.142857</td>
<td>47.5</td>
</tr>
<tr>
<td>Total Possible Points for All Categories</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Index of All Categories (%)</td>
<td>29.090909</td>
<td>27.272727</td>
<td>21.818182</td>
<td>23.636364</td>
<td>34.545455</td>
</tr>
</tbody>
</table>
Analysis: Descriptive Stats

Null categories excluded/
Reported data only

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Points</th>
<th>Total Possible Points for Categories with Available Data</th>
<th>Percentage of Categories with Reported Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea, Dem. Rep.</td>
<td>2</td>
<td>55</td>
<td>9.09090909</td>
</tr>
<tr>
<td>Ethiopia Points</td>
<td>13</td>
<td>55</td>
<td>81.8181818</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>16</td>
<td>55</td>
<td>81.8181818</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>1872.72727</td>
</tr>
<tr>
<td>Number of LICs</td>
<td></td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td>60.4105572</td>
</tr>
</tbody>
</table>

Null categories included/
All indicators

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Points</th>
<th>Total Possible Points for Categories with Available Data</th>
<th>Index of Categories with Available Data (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somalia Points</td>
<td>1</td>
<td>15</td>
<td>6.66666666667</td>
</tr>
<tr>
<td>Zimbabwe Points</td>
<td>15</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>1214.68254</td>
</tr>
<tr>
<td>Number of LICs</td>
<td></td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td></td>
<td>39.18330773</td>
</tr>
</tbody>
</table>
Analysis

Country-Level Index of Surgical Capacity Indicators
(Only Reported Data)

Low Income Countries (LICs)
Analysis

Data Reported per Indicator & Data Reporting Gap

Country-level Indicator

- Data Reported Percentage
- Data Collection Gap Percentage
Discussion

• Uses

• Resource allocation

SIXTY-EIGHTH WORLD HEALTH ASSEMBLY

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26 May 2015

Strengthening emergency and essential surgical care 
and anaesthesia as a component of universal 
health coverage

WHA68.15

(12) to set aside adequate resources for the Secretariat, in line with the approved Programme 
emergency and essential surgical care and anaesthesia as a component of universal health 
coverage;

Ninth plenary meeting, 26 May 2015
A68/VR/9
Discussion

• Uses
  • Policy, planning
  • Monitoring and evaluation
  • *Perioperative mortality rate (POMR)*

• Important of data collection

WHO's Surveillance Officer collecting disease data from the field hospital
Discussion

• Limitations
  – Assumption variables are equal: capacity, safety, affordability, and timeliness
  – County-to-country differences
  – Indicator biases: GGE percentage of THE
  – Overestimations: OOP expenses

• Future research
  – Triangulating data sources (Field work)
  – Expenditure data solely based on household surveys
  – Weight/importance/influence of each index variable
  – Tool validation: Cape Verde Pilot Program, Summer-Fall 2016
Conclusion

References: provided upon request
• Utmost thanks and gratitude
  – Dr. Kelly McQueen, MD, MPH
    • Primary Investigator & ASIP Internship Mentor
    • Associate Professor of Anesthesiology & Surgery
    • Division of Ambulatory Anesthesiology
    • Director, Vanderbilt Anesthesia Global Health & Development

• Thank you
  – CUGH Abstract Review, Selection Committees & Staff
  – All attendees
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Jonathan Meadows, MS, MPH, CPH
jonathan.w.meadows@vanderbilt.edu
jwmeadow@gmail.com
C: 813-842-4832