GLOBAL SURGERY 2030

EVIDENCE AND SOLUTIONS FOR ACHIEVING HEALTH, WELFARE, AND ECONOMIC DEVELOPMENT

John G Meara MD, DMD, MBA
Kletjian Professor of Global Surgery
Harvard Medical School

The Lancet Commission on Global Surgery
Global surgery 2030: evidence and solutions for achieving health, welfare, and economic development
The Lancet Commission on Global Surgery

“Universal access to safe, affordable surgical and anaesthesia care when needed.”

@JohnMeara

The Lancet Commission on Global Surgery
The Lancet Commissions

Inform and drive policy change
Generate broad sustainable improvement in global health
The Lancet
Richard Horton
Editor-in-Chief

Status Quo
Key Messages
Recommendations
Indicators/metrics

Inform and drive policy change
Address the gross inequities – improve global health
**Process**

Vision: Universal access to safe, affordable surgical and anesthesia care when needed

<table>
<thead>
<tr>
<th>Region</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston</td>
<td>January</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>June</td>
</tr>
<tr>
<td>Dubai</td>
<td>November</td>
</tr>
<tr>
<td>Bellagio</td>
<td>Feb 2015</td>
</tr>
</tbody>
</table>

Regional meetings:
- South/Central America
- Asia/Pacific
- Australia
- India
- Middle East/Gulf
- Sub-Saharan Africa
- Europe
Improved health & health equity for all

Global Surgery

Underserved Populations

Populations in Crisis

LMICs

HICs

Conflict & Displacement

Disaster
Collaborators in over 110 countries
Over 100 publications/abstracts
Address from
World Bank President Jim Kim
Healthcare Delivery & Management

Workforce Training & Education

Key Messages

Recommendations

Indicators

Information Management

Finance & Economics

Research

National Surgical Plan
5 Billion cannot access safe surgery when needed
Interpretation: Probability

$\text{Probability of access is the joint probability of timely care, surgical capacity, safe surgery, and affordability}$
Surgical Workforce & Health Outcomes
(SAO providers/100,000)

FIGURE 1. The relation between MMR and density of surgical providers in 143 countries with available data. Logarithmic trendline used to show the gradient of improvement in MMR as providers increase.
Surgical Workforce - Shortage

44% of people in the world live in countries with SAO density < 20/100k

72% of people in the world live in countries with SAO density < 40/100k

+1.27 million providers needed by 2030 to reach 20/100k

+2.28 million providers needed by 2030 to reach 40/100k
143 million more procedures needed annually at minimum

Poorest $\frac{1}{3}$rd of the world’s population receives 6.3% of worldwide procedures
Surgical Volume & Health Outcomes
(Surgical procedures/100,000)
THE SURGICAL SYSTEM AND THE THREE DELAYS

The 1st Delay
Delay in Seeking Care

The 2nd Delay
Delay in Reaching Care

The 3rd Delay
Delay in Receiving Care
Hospitals that can consistently provide the Bellwether Procedures are likely staffed and equipped, and function at a level of complexity that enables the delivery of other, related surgical care.
B General surgical procedure provision

- Provides laparotomy (n=577)
- Does not provide laparotomy (n=432)
33 million Individuals face catastrophic expenditures paying for surgery & anaesthesia annually

+ 48 million = 81 million
MORE THAN 3 BILLION PEOPLE LIVE ON LESS THAN $2.50 PER DAY
Financial Risk Protection
Risk pooling - Prepayment preferable to user fees

- Time-critical and life- or limb-threatening
- Unpredictable, cannot plan or save for financial consequences
- User fees are often high and can be catastrophic
Investing in surgery is affordable, saves lives, & promotes economic growth.
Cost of Surgical Expansion (2015-2030)

$350,000,000,000,000
Total GDP Losses (2015-2030)

$12,300,000,000,000
Economic Impact

Annual value of lost economic output due to surgical conditions

The economic burden of malaria.

Gallup JL¹, Sachs JD.

Abstract
Malaria and poverty are intimately connected. Countries with intensive malaria had income levels in 1997 that were about 20% below the levels of malaria in poor countries are not much higher. The more efficient malaria mosquito vectors are found in the most severely affected tropical countries and in either subtropical or islands. These countries are expected to grow in the neighboring countries. Cross-country analysis shows that growth is related to initial poverty, economic growth, and a 1.3% less per person per year.
Financial Transparency
Spending on Surgery

958 National Health Accounts from 1996-2010

Only Georgia & Kyrgyzstan reported surgical spending
Surgery is an indivisible, indispensable part of health care
28-32% of the global burden of disease is from surgical conditions
Data - Surgical indicators are lacking
LANCET INDICATORS

2h Access
Access to timely essential surgery

Surgical Volume
Procedures done in an operating room per 100,000

Impoverishing Expenditure
Protection against impoverishing expenditure

SAO/100,000
Specialist surgical workforce density

POMR
All-cause death prior to discharge patients

Catastrophic Expenditure
Protection against catastrophic expenditure

The Lancet Commission on Global Surgery
# NATIONAL SURGICAL PLAN

## Infrastructure

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Assessment methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical facilities, blood supply, and blood products</td>
<td>Track number and distribution of surgical facilities</td>
</tr>
<tr>
<td>- Negotiate unified framework for purchase agreements with decentralized ordering</td>
<td></td>
</tr>
<tr>
<td>- Equip most surgical units to be able to do laparotomy, cesarean delivery, and treatment of obstetric fistulae (The Delphi Protocol)</td>
<td></td>
</tr>
<tr>
<td>- Develop national helplines</td>
<td></td>
</tr>
<tr>
<td>- Reduce barriers to access through enhanced connectivity across entire care delivery system to tertiary care</td>
<td></td>
</tr>
<tr>
<td>- Establish regional networks with community integration, transfer criteria, minimal logistics, and feedback from first responders and health managers of the public</td>
<td></td>
</tr>
</tbody>
</table>

## Workforce

| Surgical anesthesia, and obstetric providers, allied health providers (nursing, occupational therapists, biomedical engineers, and laboratory technicians) |
|---------------------|--------------------------------|
| - Establish training and education strategies based on population need and needs of country |
| - Require minimum competency of surgical and anesthetic training programmes |
| - Develop a context-appropriate learning and credentialing requirement for all surgical workforce |
| - Training and education strategy of ancillary staff based on population need and needs of country |
| - Invest in professional healthcare manager training |
| - Establish regional requirements training programmes |

## Service delivery

| Surgical care, system coordination, quality, and safety |
|------------------|----------------|
| All-level hospitals should provide transparent, customer delivery, and responsive treatment (Delphi Protocol) |
| - Integrate public and private NHIs providers into common national delivery framework, promote determination partnerships with NHIs to build surgical capacity |
| - Prioritize quality improvement processes and outcomes monitoring |
| - Prometheus initiatives to build systems-wide connectivity |
| - Promote systems-oriented context to drive innovation applications, clinical support, and education |

## Financing

| Financial health financing and accounting system |
|------------------|----------------|
| Evaluate surgical costs and financial health coverage strategies at grassroots level |
| - Risk pooling and extended care (out-of-pocket costs) |
| - Track financial flow for surgery through national health accounts |
| - Use risk-sharing purchasing with high quality providers |
| - Surgical expenditure as proportion of gross domestic product |
| - Surgical expenditure as proportion of overall health-care budget |
| - Surgical product expenditures on surgery |
| - Uptake and implementation expectations on surgery |

## Information management

| Information systems, research agenda |
|------------------|----------------|
| Establish robust information systems to monitor clinical processes, cost, outcomes, and safety defects |
| - Identity, privacy, and fund surgical research priorities of local relevance |
| - Properties of data systems that promote monitoring and accountability |
| - Adapt to surgical innovations |
| - Properties of surgical facilities with high speed internet connection |

These components addressing surgical care should be incorporated in a broader strategy of improvement of national health systems. NGS—non-governmental organizations.

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**The Lancet Commission on Global Surgery**
Lancet Commission on Global Surgery Indicators

Republic of Zambia

@emakasa
75% of the Zambian population lives within 2-hr driving distance of a first-level hospital or higher
Zambia places fairly well in 2-h access
Zambia has low surgical workforce density

Surgeons: 97
Anesthesiologists: 13
Obstetricians: 46
Total: 156
Zambian Population: 14,100,000

1.1 SAO/100,000

LCoGS Target: 20-40 SAOs/100,000

Workforce Indicator
There is large unmet need for surgery

Met and Unmet Need for Surgery

<table>
<thead>
<tr>
<th></th>
<th>Total minimum need</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute volume</td>
<td>864,900</td>
</tr>
<tr>
<td></td>
<td>Volume per 100,000</td>
<td>6,145</td>
</tr>
<tr>
<td>Met Need</td>
<td>Absolute volume</td>
<td>227,594</td>
</tr>
<tr>
<td></td>
<td>Volume per 100,000</td>
<td>1,617</td>
</tr>
<tr>
<td>Unmet need</td>
<td>Absolute volume</td>
<td>637,306</td>
</tr>
<tr>
<td></td>
<td>Volume per 100,000</td>
<td>4,528</td>
</tr>
</tbody>
</table>

Volume Indicator
**Most surgical procedures** can be “catastrophic” *(even without inclusion of non-medical costs)*

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumcision</td>
<td>$2.69</td>
</tr>
<tr>
<td>“Simple small surgery”</td>
<td>$20.19</td>
</tr>
<tr>
<td>Delivery</td>
<td>$80.75</td>
</tr>
<tr>
<td>Complicated delivery</td>
<td>$269.18</td>
</tr>
<tr>
<td>“Minor procedure”</td>
<td>$336.48</td>
</tr>
<tr>
<td>ENT procedure</td>
<td>$403.77</td>
</tr>
<tr>
<td><strong>Bellwether Procedure</strong></td>
<td>$1,413.20</td>
</tr>
<tr>
<td><em>(C-delivery)</em></td>
<td></td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>$6,729.50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household ‘Capacity to Pay’</th>
<th>Catastrophic Expenditure Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rural</strong></td>
<td>$303</td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td>$1652</td>
</tr>
<tr>
<td><strong>$121</strong></td>
<td><strong>$660</strong></td>
</tr>
</tbody>
</table>
56% chance of catastrophic expense from surgery

94% chance of impoverishment from C-delivery

If you include non medical costs – both figures approach 100%
1.8% loss in GDP per annum
The LCoGS Core Indicators for Zambia

**INDICATOR 1**
2h Access*
Up to 75%

**INDICATOR 2**
SAO Density
1.1

**INDICATOR 3**
Surgical Vol.
1617 (6145)

**INDICATOR 4**
POMR
?

**INDICATOR 5**
Impov. Exp. C-delivery
94%

**INDICATOR 6**
Catastrophic Exp. Surgery
56%
GLOBAL SURGERY 2030
EVIDENCE AND SOLUTIONS FOR ACHIEVING HEALTH, WELFARE, AND ECONOMIC DEVELOPMENT
DRIVING FORWARD THE LANCET COMMISSION ON GLOBAL SURGERY

GLOBAL INDICATOR INITIATIVE  SINGLE COUNTRY STUDIES  NATIONAL SURGICAL FORUMS  OUTREACH AND ADVOCACY

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GLOBAL INDICATOR INITIATIVE

LANCET COMMISSION INDICATORS
SURGICAL SYSTEM STRENGTH

- Two Hour Access
- Surgeon, Anaesthetist, & Obstetrician Density
- Surgical Volume
- Perioperative Mortality
- Impoverishing Expenditures
- Catastrophic Expenditures

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Data collection can be burdensome
Data asks must be responsible
THE WHO GLOBAL REFERENCE LIST OF 100 CORE HEALTH INDICATORS
# THE WORLD DEVELOPMENT INDICATORS

**Health**
- Adolescent fertility rate (births per 1,000 women ages 15-19)
- Birth rate, crude (per 1,000 people)
- Births attended by skilled health staff (% of total)
- Contraceptive prevalence (% of women ages 15-49)
- Death rate, crude (per 1,000 people)
- Fertility rate, total (births per woman)
- Health expenditure per capita (current US$)
- Health expenditure, public (% of total health expenditure)
- Health expenditure, total (% of GDP)
- Immunization, DPT (% of children ages 12-23 months)
- Immunization, measles (% of children ages 12-23 months)
- Improved sanitation facilities (% of population with access)
- Improved sanitation facilities, urban (% of urban population with access)
- Incidence of tuberculosis (per 100,000 people)
- Life expectancy at birth, female (years)
- Life expectancy at birth, male (years)
- Life expectancy at birth, total (years)
- Maternal mortality ratio (modeled estimate, per 100,000 live births)
- Mortality rate, infant (per 1,000 live births)
- Mortality rate, under-5 (per 1,000 live births)
- Out-of-pocket health expenditure (% of private expenditure on health)
- Population ages 0-14 (% of total)
- Population ages 15-64 (% of total)
- Population ages 65 and above (% of total)
- Population growth (annual %)
- Population, female (% of total)
- Population, total
- Pregnant women receiving prenatal care (%)
- Prevalence of HIV, female (% ages 15-24)
- Prevalence of HIV, male (% ages 15-24)
- Prevalence of HIV, total (% of population ages 15-49)
- Prevalence of stunting, height for age (% of children under 5)
- Prevalence of stunting, height for age (% of children under 5)
- Prevalence of stunting, height for age (% of children under 5)
- Prevalence of stunting, height for age (% of children under 5)
- Unmet need for contraception (% of married women ages 15-49)

**Infrastructure**
- Air transport, registered carrier departures worldwide
- Internet users (per 100 people)
GLOBAL INDICATOR INITIATIVE

• CONTACTED (ALMOST) every country in the world
• ENGAGED over half ~120
• OBTAINED data ~70
• SUBMITTED all data November 2015
• PUBLICATION 2016 on World Bank WDI site

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SINGLE COUNTRY STUDIES

• COLLECTING INDICATORS
• INTERPRETING INFORMATION
• LOCAL CONTEXT
UGANDA

FACILITY-LEVEL DATA POINTS

- Surgical Facility Name
- City
- Can perform laparotomy?
- Can perform caesarean delivery?
- Can treat open fracture?
- Specialist surgical providers
- Specialist anaesthetists
- Specialist obstetricians
- Procedures performed in operating room
- All-cause death rate prior to discharge among patients undergone surgical procedure
- Price of caesarean delivery
- Price of laparotomy
- Price of open fracture treatment
- Proportion out-of-pocket expense

LCG05 INDICATORS

- 2h Access
- SAO
- Volume
- POMR
- IE/CE

UGANDA BRAZIL

SINGLE COUNTRY STUDIES

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NATIONAL SURGICAL FORUMS

- CONTEXT SPECIFIC
- STAKEHOLDER DRIVEN
- PRACTICAL SOLUTIONS

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Global surgery 2030: evidence and solutions for achieving health, welfare, and economic development

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Proportion of population without access to surgery

0% 100%

NATIONAL SURGICAL FORUMS
A FRAMEWORK FOR A NATIONAL SURGICAL PLAN

INFRASTRUCTURE
WORKFORCE
SERVICE DELIVERY
FINANCING
INFORMATION MANAGEMENT

The Lancet Commission on Global Surgery
Outreach & Advocacy

- Governments
- Funders
- Bilateral/Multilateral Organizations

The Lancet Commission on Global Surgery
• WHO endorsement
• Several countries underway

National Surgical Plan

• WHO endorsement
• World Bank WDIs

LCoGS Indicators

• Govt leaders
• MOH & MOF

Financial Risk Protection

• National Health Accounts
• Grants
• NGOs

Financial Transparency

Strategic Priorities
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A Commission by The Lancet

www.lancetglobalsurgery.org

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