# Surgical Care for the Underserved: Focus Globally

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# Outline

- Overview
- Data
- Specialties
  - Trauma
  - Obstetrics and gynecology
  - Oncology
  - Plastics
- Future and sustainability
- Advice

# Surgery and Global Health: A View from Beyond the OR

Paul E. Farmer · Jim Y. Kim

- In Africa, surgery may be thought of as the neglected stepchild of global public health

World J Surg (2008) 32:533–536

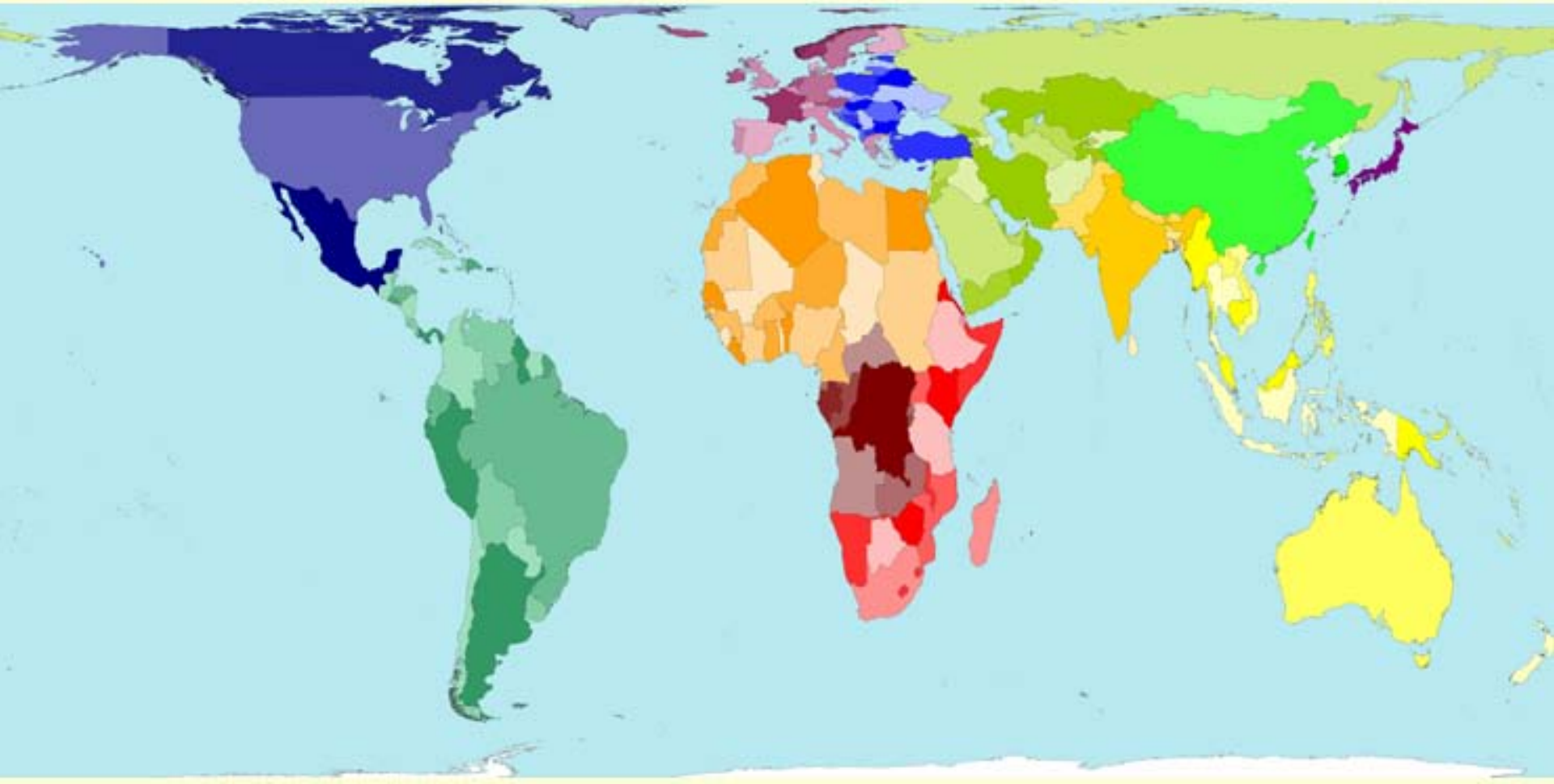
World Journal of Surgery

# Statistics

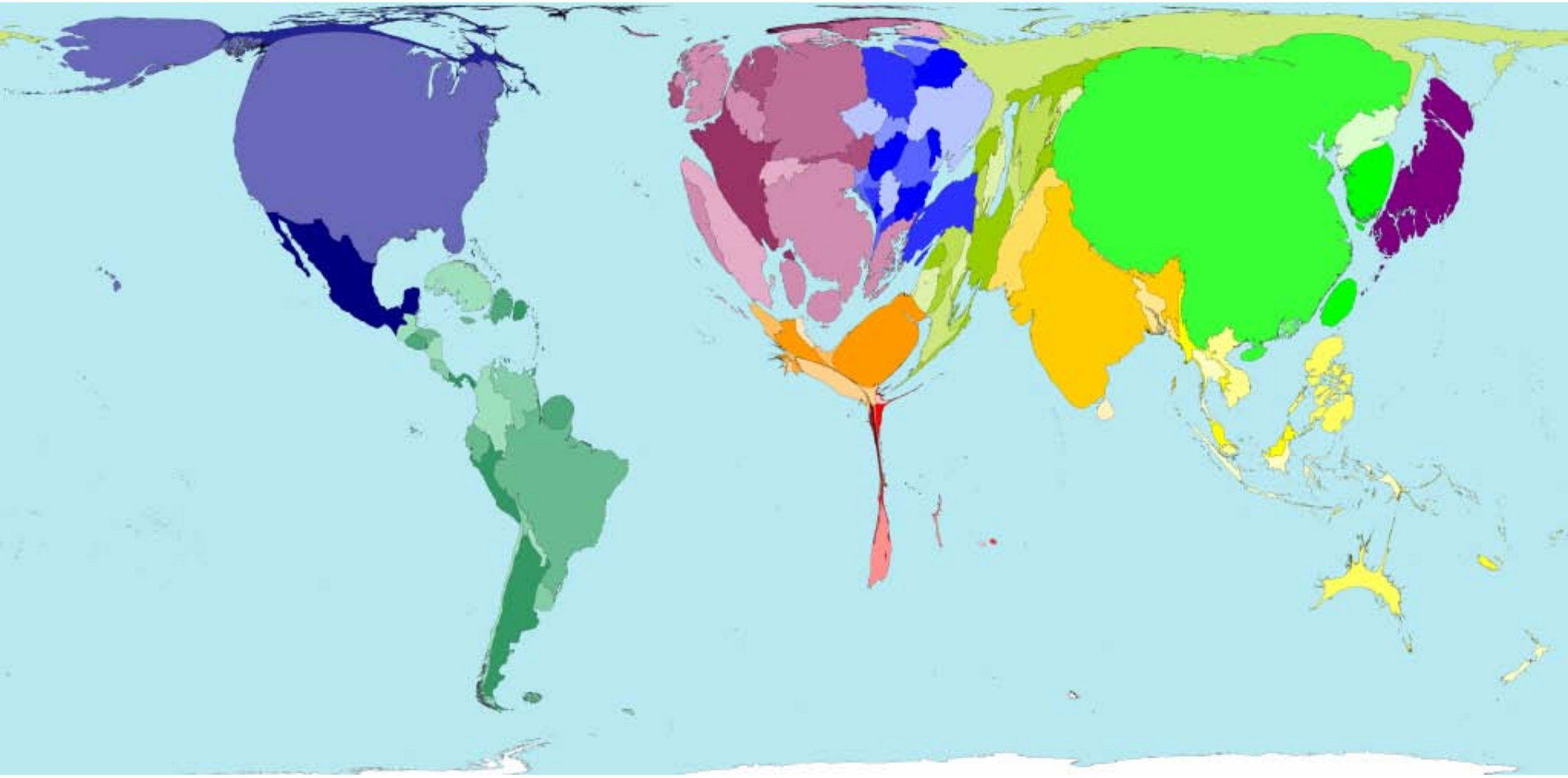
- America = 500 surgeons /million
- In Africa - 1 surgeon (any type) / million
  - Rural = WORSE
  - Malawi – 1 OB/GYN and 2 GS / 2.5 million
  - Mozambique - 12 OB/GYNs / 15 million people
  - Burundi 8 GS / 9 million people
  - 1 neurosurgeon > 9 million people in most areas
    - Eleven countries (46 million) = no neurosurgeons
- 2-3 billion people lack essential surgical care

  (7 billion people in the world)

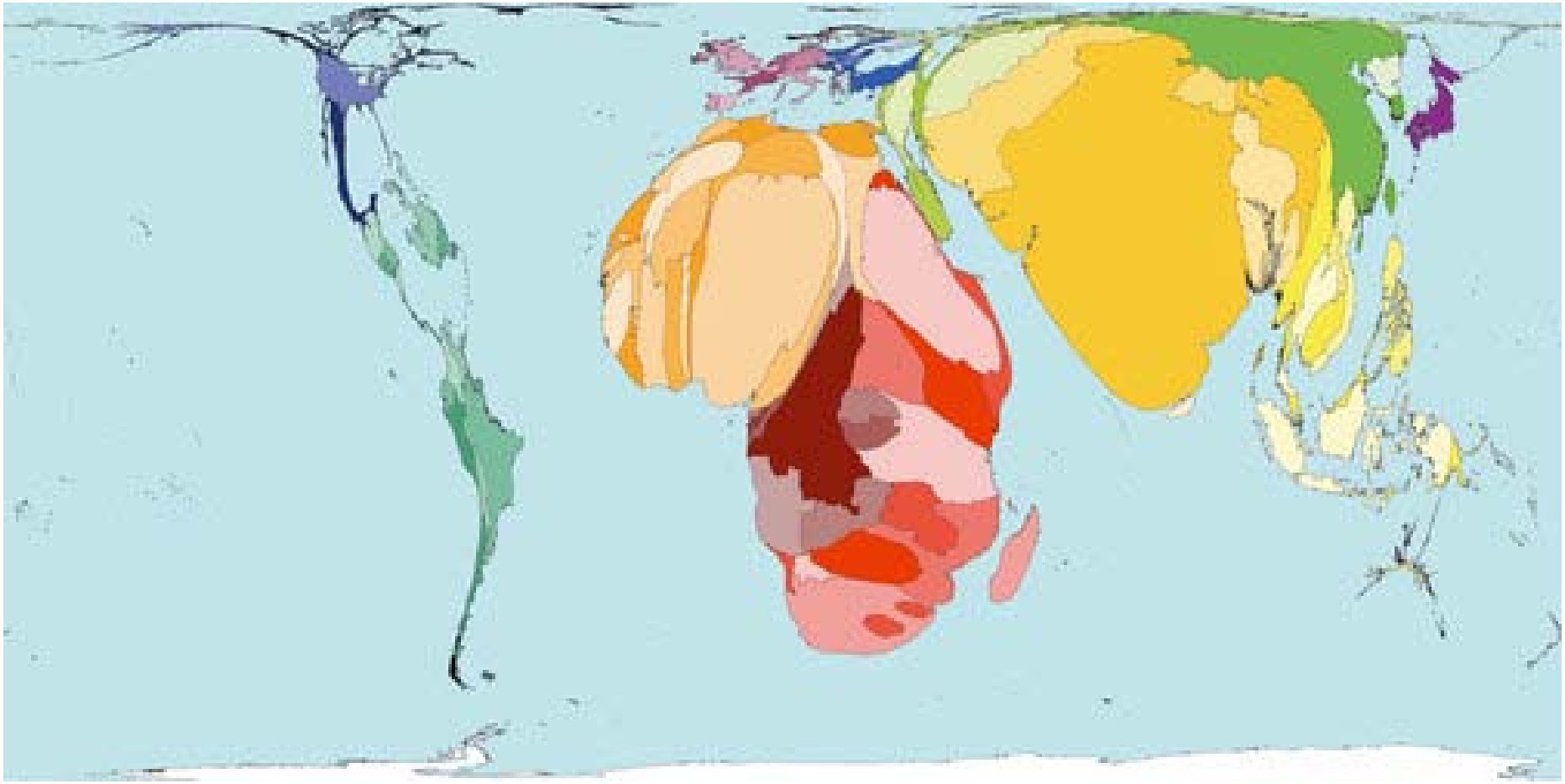
# World Map



# Physicians Working



# Global Burden of Disease

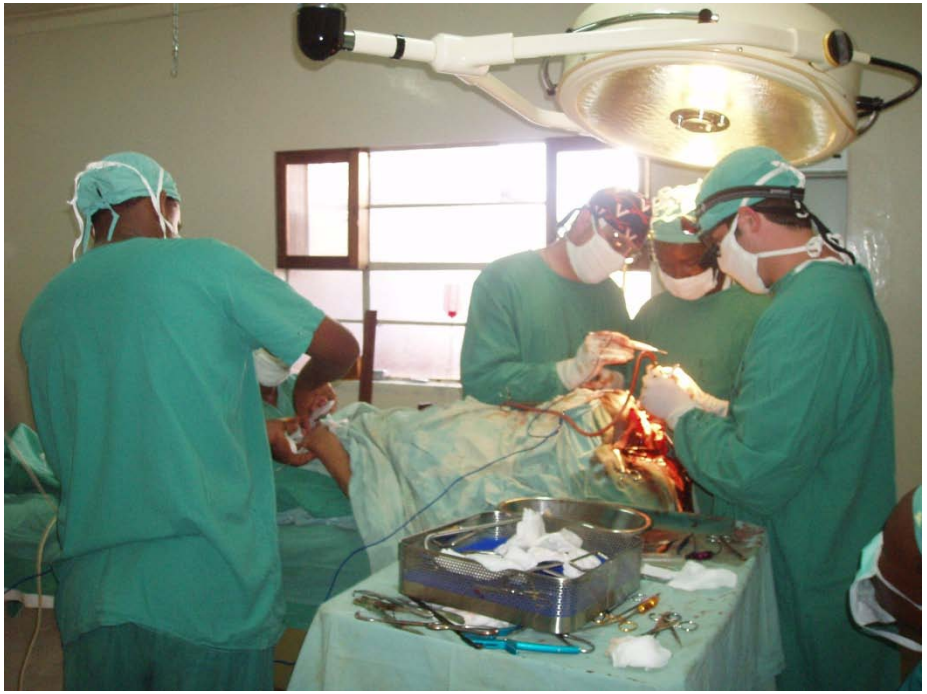


# Statistics

- Diseases amenable to surgical treatment
  - 10-15% of admissions to hospital in developing world
- Untreated surgical condition primary cause of death
  - 20% of young adults
- Estimates are conservative

Nadine B. Semer [a,*], Stephen R. Sullivan [b], John G. Meara [c]
Journal of Plastic, Reconstructive & Aesthetic Surgery (2010) 63, 1244–1248

# Data



# An estimation of the global volume of surgery: a modelling strategy based on available data

Thomas G Weiser, Scott E Regenbogen, Katherine D Thompson, Alex B Haynes, Stuart R Lipsitz, William R Berry, Atul A Gawande

- 234 million major surgical procedures worldwide
- 1 for every 25 people
- 2x yearly births (136 million)
- 7x 33.2 million infected HIV

# An estimation of the global volume of surgery: a modelling strategy based on available data

Thomas G Weiser, Scott E Regenbogen, Katherine D Thompson, Alex B Haynes, Stuart R Lipsitz, William R Berry, Atul A Gawande

- Demographic, health, economic data World Health Organization states (n = 192)

- Data on rate of surgery
  - Intervention in hospital operating theatre
  - Incision, excision, manipulation, or suturing
  - Regional, general anesthesia or sedation

- 4 groups of countries defined by per-head yearly expenditure
  - High >$1000 (US dollars)
  - Middle $401-$1000
  - Low $101-$400
  - Poor $≤100

# An estimation of the global volume of surgery: a modelling strategy based on available data

*Thomas G Weiser, Scott E Regenbogen, Katherine D Thompson, Alex B Haynes, Stuart R Lipsitz, William R Berry, Atul A Gawande*

| | Mean estimated surgical rate per 100 000 population (SE) | Estimated volume of surgery in millions (%; 95% CI) | Share of global population |
|---|---|---|---|
| **Expenditure** | | | |
| Poor-expenditure countries (N=47) | 295 (53) | 8·1 (3·5%; 3·4–12·8) | 34·8% |
| Low-expenditure countries (N=60) | 2255 (342) | 53·8 (23·0%; 9·8–97·4) | 35·0% |
| Middle-expenditure countries (N=47) | 4248 (524) | 34·3 (14·6%; 23·6–43·3) | 14·6% |
| High-expenditure countries (N=38) | 11 110 (1300) | 138·0 (58·9%; 132·5–143·9) | 15·6% |
| **Overall** | | | |
| Total global volume of surgery | .. | 234·2 (187·2–281·2) | .. |
| Average surgical rate | 4016 (431) | .. | .. |

Expenditures are adjusted to 2004 US$. Poor-expenditure countries defined as per-head total expenditure on health $100 or less, low-expenditure countries as $101–400, middle-expenditure countries as $401–1000, and high-expenditure countries as >$1000. p<0·0001 for difference between expenditure groups.

*Table 2:* Average national rate of surgery for countries in each category of health expenditure, with total volume of surgery contributed by each category

# The "Other" Neglected Diseases in Global Public Health: Surgical Conditions in Sub-Saharan Africa

Doruk Ozgediz*, Robert Riviello

- Initiatives for "neglected tropical disease" (NTD) last 10 years

- NTD, primarily parasitic (exclude TB, HIV, malaria), affect world's rural poor, treated cheaply

- Shouldn't surgical conditions also be considered "neglected"?

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PLoS Medicine | www.plosmedicine.org

# The "Other" Neglected Diseases in Global Public Health: Surgical Conditions in Sub-Saharan Africa

- Surgical conditions account for 11% of total global burden of disease

- 25 million disability-adjusted life years (DALYS) in Africa
  - measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death

- NTD account for 1.3% of global burden of disease

**Doruk Ozgediz*, Robert Riviello**
June 2008 | Volume 5 | Issue 6 | e121
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# The "Other" Neglected Diseases in Global Public Health: Surgical Conditions in Sub-Saharan Africa

Doruk Ozgediz*, Robert Riviello

**Table 1.** Estimated Cost-Effectiveness of Health Interventions

| Intervention | Cost-Effectiveness |
|---|---|
| Rapid-impact package for NTDs | US$2–US$9/DALY averted [1] |
| Measles vaccination | US$5/DALY averted [6] |
| Basic surgical services | US$11–US$33/DALY averted [5,7] |
| Antiretroviral therapy for HIV | US$300–US$500/DALY averted [6] |

# The Political Economy of Emergency and Essential Surgery in Global Health

Jeremy P. Hedges · Charles N. Mock · Meena N. Cherian

- Emergency and essential surgery (EES)  low priority
  - Cost effective
  - Save lives
  - Prevent disabilities
- Political problem
- Expand narrow focus on communicable disease

World J Surg (2010) 34:2003–2006

# The Political Economy of Emergency and Essential Surgery in Global Health

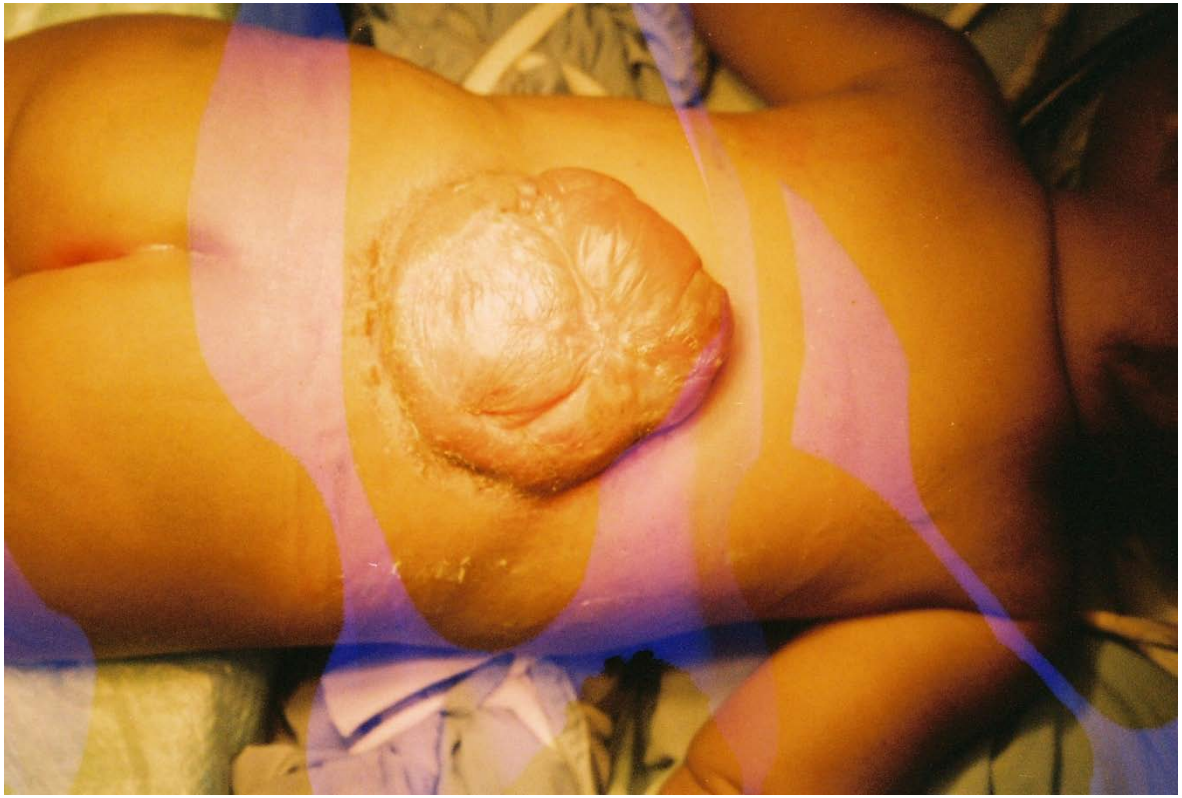
Jeremy P. Hedges · Charles N. Mock · Meena N. Cherian

**Table 1** Priority actions to increase the political priority of Emergency and Essential Surgery (EES)

| |
|---|
| 1. Organizational |
| • Coordinate EES stakeholders into a unified effort. |
| • Create opportunities for surgeons and anesthetists to gain expertise in policy and global public health (e.g., global health tracks during/after residency). |
| 2. Symbolic |
| • Reframe EES as an essential component of primary health care via publications, policy, and media. |
| • Capture attention and resources through media campaigns using high-profile EES issues such as maternal health and the injury epidemic. |
| 3. Economic |
| • Promote national health insurance schemes and novel mechanisms of sustainable funding. |
| 4. Research |
| • Advocate for increased resources for research relevant to EES. |
| • Expand collaborative research partnerships. |
| 5. Political |
| • Apply the sum product of the above actions to influence policy-makers to promote the EES agenda. |

World J Surg (2010) 34:2003–2006

# Specialties: Trauma, OB-GYN, Oncology, Plastics



# Trauma

- Injuries account for greatest burden of surgical disease worldwide (63million DALYs) (10 million DALYs, Africa)
- Burden disproportionately borne in low income countries, 90% of injury deaths
- Road traffic injuries are among leading cause of death 5-44 age group
- By 2020, trauma estimated to become third leading cause of global disease burden

Nadine B. Semer [a,*], Stephen R. Sullivan [b], John G. Meara [c]
Journal of Plastic, Reconstructive & Aesthetic Surgery (2010) 63, 1244–1248

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# Trauma

- 1.7 deaths/10,000 vehicles in high income countries
- 50 deaths/10,000 vehicles in Africa
- African children > 5 years, injuries claim more lives than HIV, TB, and malaria combined
- Only 1/3 of injured patients in Africa reach a health facility
- For each trauma, 3 to 8 persons become permanently disabled

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# Trauma: Burns

- Sub-Saharan Africa
  - Children <15 years of age
  - Lose 7x number of productive years from fires than from war
- Physicians trained in resuscitation
- Subtle issues relating to function often overlooked
- Disabled

Nadine B. Semer [a,*], Stephen R. Sullivan [b], John G. Meara [c]
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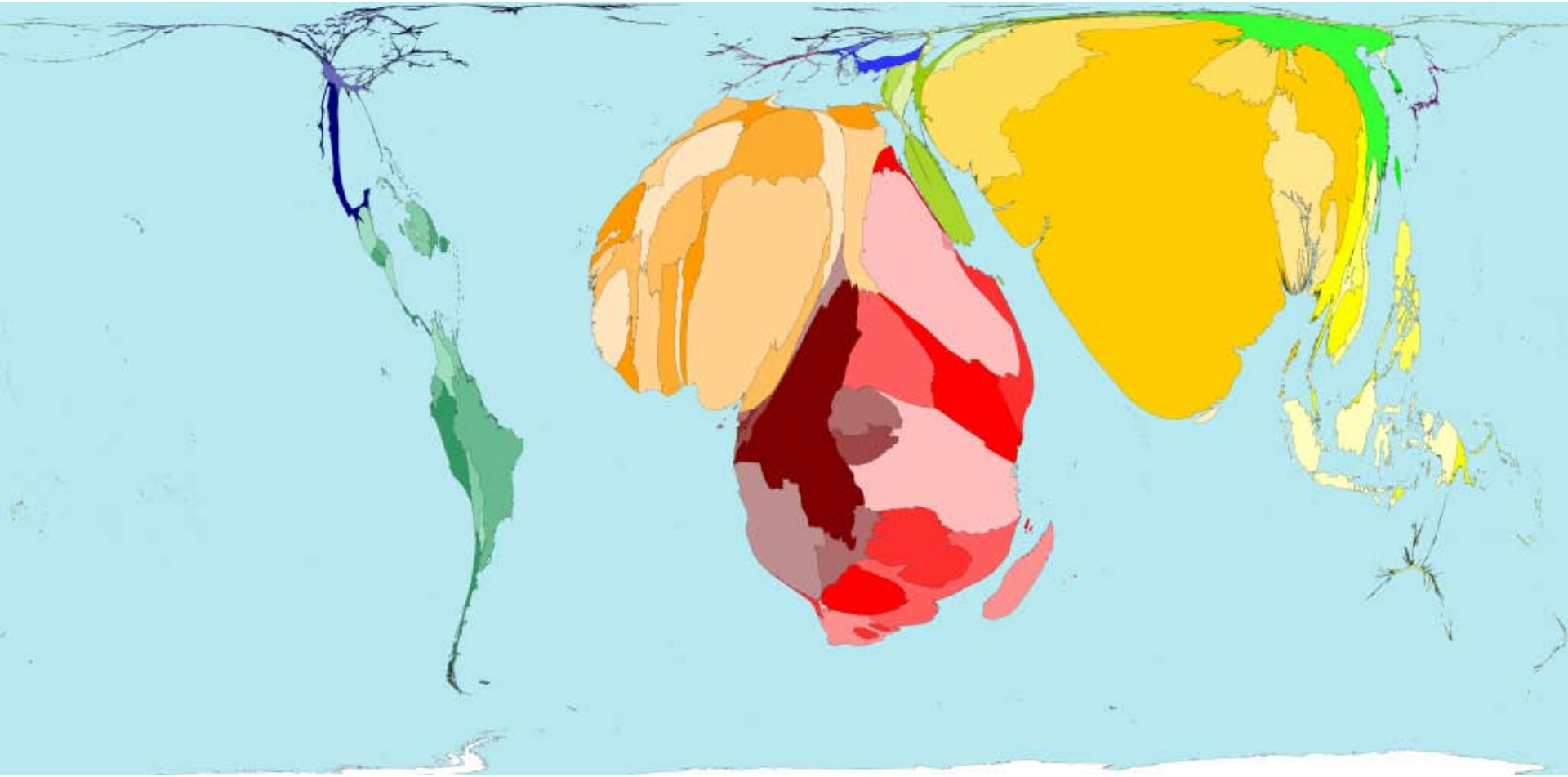
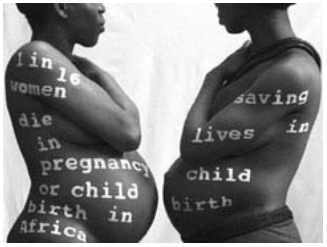
# OB-GYN: Maternal Mortality



# OB-GYN

- 11% global burden of disease is surgical

- 6% due to complications of pregnancy
  - Obstructed labor
  - Postpartum hemorrhage
  - Unsafe abortions




| | Developed World | Developing World |
|---|---|---|
| Life Expectancy | 79 in the US | 54 in Africa |
| Maternal Mortality Ratio | 20 / 100,000 | 440 / 100,000 |

- 99% of maternal deaths occur in low income countries- Africa and South Asia

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# OB-GYN: Cervical Cancer

- Low income countries, cervical cancer kills more women than AIDS
- 2nd leading cause of cancer death in African women
- Screening coverage—abysmal <5%
- Late presentation (Stage 3 or 4)
- Infrequent access to therapy—surgery/radiation

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# OB-GYN: Obstetric Fistula

- 2 million African women living with untreated fistula
- Poor access to basic emergency surgery during childbirth
- Stigmatized

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# Oncology

- 1970-15% of new cancers diagnosed in developing world
  - 2008-56%
  - 2030-70%

- 2/3 of the 7.6 million deaths are in low and middle-income countries

- 80% of  DALYs lost to cancer developing world

www.thelancet.com **Published online August 16, 2010**

*Paul Farmer, Julio Frenk, Felicia M Knaul, Lawrence N Shulman, George Alleyne, Lance Armstrong, Rifat Atun, Douglas Blayney, Lincoln Chen, Richard Feachem, Mary Gospodarowicz, Julie Gralow, Sanjay Gupta, Ana Langer, Julian Lob-Levyt, Claire Neal, Anthony Mbewu, Dina Mired, Peter Piot, K Srinath Reddy, Jeffrey D Sachs, Mahmoud Sarhan, John R Seffrin*

# Oncology

*Panel 3*: Cancers amenable to prevention, early detection, and treatment in countries of low and middle income

**Preventable cancers by risk factor**

- Tobacco: lung cancer, head and neck cancer, bladder cancer
- Human papillomavirus infection: cervical cancer, head and neck cancer
- Hepatitis infection: hepatocellular cancer

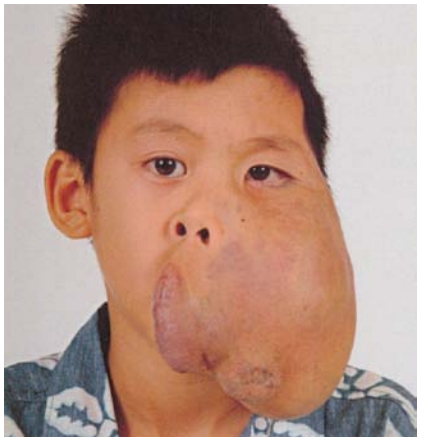
**Cancers that are potentially curable with early detection and treatment, including surgery**

- Cervical cancer
- Breast cancer
- Colorectal cancer

www.thelancet.com **Published online August 16, 2010**

# Plastic Surgery

- Reports mostly anecdotal
  - Rural hospital in Pakistan, 62% of operations
    - 38% burn scar contracture
    - 24% traumatic/injuries and wounds
    - 65% < 18 years of age



- Congenital anomalies (9% of global burden)
- Cleft lip/palate
- 2.8 million people worldwide untreated
- Speech, hearing, social well-being

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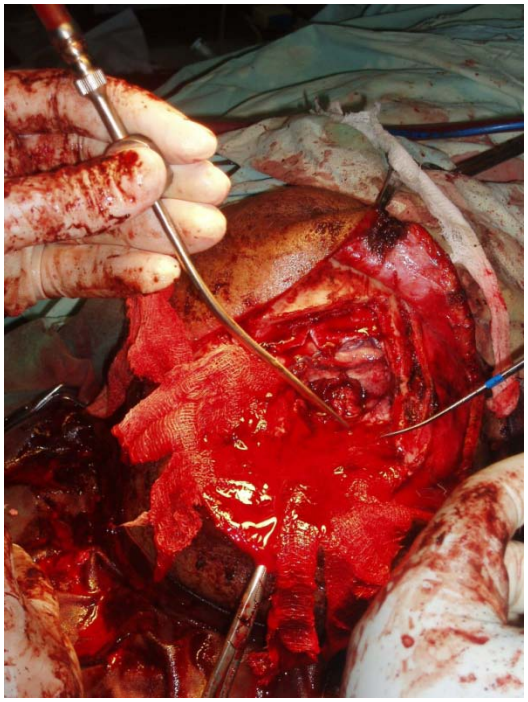
# The Future and Sustainability



# Is it Possible to Train Surgeons for Rural Africa? A Report of a Successful International Program

Jonathan D. Pollock · Timothy P. Love · Bruce C. Steffes · David C. Thompson · John Mellinger · Carl Haisch

- Rural Africa 1 surgeon: 2,500,000
- Pan-African Academy of Christian Surgeons
- 5 year American-competency based model

- 6 training programs, 4 countries
- 2009-2010, 35 residents
- 18 general surgeons, 1 pediatric surgeon

World Journal of Surgery

World J Surg (2011) 35:493–499

## Role of Collaborative Academic Partnerships in Surgical Training, Education, and Provision

Robert Riviello · Doruk Ozgediz · Renee Y. Hsia · Georges Azzie · Mark Newton · John Tarpley

- ½ general surgery residents seeking exposure in resource-limited settings as part of training

- Reviewed 6 academic medical centers c partnerships
  - UCSF with Bellagio Essential Surgery Group
  - UCSF with Makerere University, Uganda
  - Vanderbilt with Baptist Medical Center, Ogbomoso, Nigeria
  - Vanderbilt with Kijabe Hospital, Kenya
  - University of Toronto, Hospital for Sick Children with Ministry of Health Botswana
  - Harvard/BWH/CHB with Partners in Health Haiti and Rwanda

World J Surg (2010) 34:459–465

## Role of Collaborative Academic Partnerships in Surgical Training, Education, and Provision

Robert Riviello · Doruk Ozgediz · Renee Y. Hsia · Georges Azzie · Mark Newton · John Tarpley

- **Lessons learned, challenges recognized, and values gained**
- Importance of relationships
  - Trust and respect
- Mutual learning
  - Technical expertise, contextual expertise
- Need an advocate
  - Both sides, communicator, help guide teams, permanent surgical faculty
- Local training needs supersede expatriate training needs
  - Doesn't work if visiting trainees are "doing all the good cases"

World J Surg (2010) 34:459–465

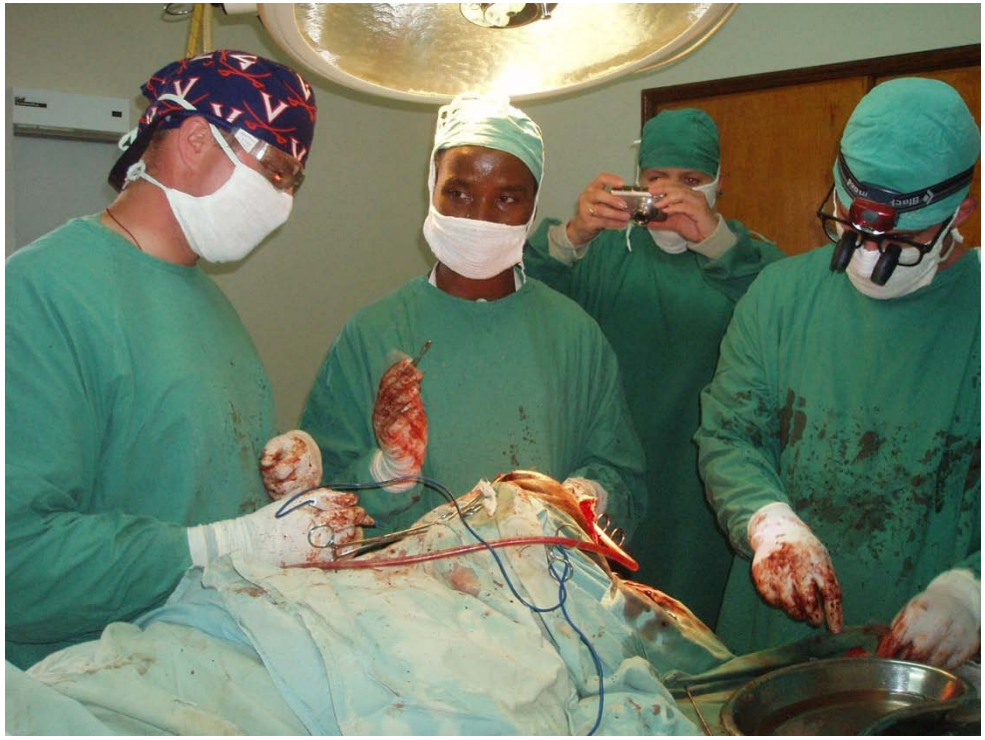
# Role of Collaborative Academic Partnerships in Surgical Training, Education, and Provision

Robert Riviello · Doruk Ozgediz · Renee Y. Hsia · Georges Azzie · Mark Newton · John Tarpley

- Research coalitions
  - Legitimate academic experiences improve the success of the programs
- Adapting the mission to the locally expressed needs
  - Botswana → laparoscopic training program
  - Haiti → short-term visiting subspecialist trips
- Multidisciplinary approach
  - Rokotomalala, Madagascan surgeon "Anesthetists and surgeons are like rice and water: together in the rice-field, together in the pot, and always complementary for a common goal."
- Is this *Academic*?
  - Physicians in global health → triple commitments of service, education, and research

World J Surg (2010) 34:459–465

# Advice



# Opportunities and Improvisations: A Pediatric Surgeon's Suggestions for Successful Short-Term Surgical Volunteer Work in Resource-Poor Areas

Donald Meier

- *Dos* and *don't*
- *Do* remember you are a guest
- *Do* understand that everything "they" do is not wrong
- *Don't* make sweeping reforms as a volunteer
- *Don't* discuss your expenses with your host
- *Do* plan return trips to the same locale
- *Do* treat your hosts as your equal
- *Do* relax and have sense of humor and patience

World J Surg (2010) 34:941–946

# Remember this…Dr. Marshall

***(even in an isolated county in the United States…)***

- 4 billion people
- 97% of all surgical procedures
- Poorest 2 billion
- 3% of all surgical procedures