Welcome to ES718
A new workshop on innovation in global health
Anjali Sastry
Plan for today

• First 70 minutes: Global Health briefing
• Next 50 minutes: in-class exercise to review useful data sources
  – you may step out for up to 10 minutes for a mini-break
• last hour: share your review with classmates, form teams, and plan for tomorrow
what is global health?
Global health takes on health problems that cross national boundaries, traditionally focusing on those that impose the greatest burden in resource-limited settings. To address the challenges, the field now encompasses a broad range of disciplines. Proponents have argued that it should account for “cultural identities, political organizations, transnational corporations, civil society movements and academic institutions” (Frenk 2010), along with populations.

Recent reframings of global health place interdependence at the center. If the origins and effects of many of today’s biggest health problems cross national borders, then global health should be less concerned with geographical location or stage of development, and more concerned with the ways in which health issues are interconnected. This new definition of global health thus aligns with calls for multilateral collaboration and learning that flow both ways across state, sector, and socioeconomic boundaries, and for recognizing “the many contributions of both resource-rich and resource-scarce nations” (Fried et al, 10). In fact, some argue that global health is (or should be) “collaborative trans-national research and action for promoting health for all” (Beaglehole & Bonita, 10). Others note that acknowledging interrelationships requires equity to factor into solutions (Frenk, 10; Piot & Garnett, 10).

Source: Sastry 2011
How long will you live?

Life expectancy at birth 2008 estimates. CIA - The World Factbook, 2008 via Wikimedia Commons. License: CC-BY-SA. This content is excluded from our Creative Commons license. For more information, see http://ocw.mit.edu/help/faq-fair-use/.

Article and interactive map: http://www.dailymail.co.uk/news/article-2240855/How-does-nation-rank-world-map-life-expectancy.html#ixzz2dy9R5IDx
maternal death

Chance of dying in childbirth

- in Boston
  - 1 in 4,800
- In Burundi
  - 1 in 16
- in Austria
  - 1 in 21,500
- world
  - 1 in 92

A women’s lifetime risk of dying from pregnancy-related complications:
Niger: 1 in 7
Ireland: 1 in 48,000

http://www.who.int/making_pregnancy_safer/topics/maternal_mortality/en/
What’s the response?
Alma Ata Declaration 1978

Health for All in the 21st Century 1998

People’s Health Charter 2000

Millennium Development Goals 2000

Universal Declaration of Human Rights 1948
UN Millennium Goals

- **Goal 1**: Eradicate extreme hunger and poverty
- **Goal 2**: Achieve universal primary education
- **Goal 3**: Promote gender equality and empower women
- **Goal 4**: Reduce child mortality
- **Goal 5**: Improve maternal health
- **Goal 6**: Combat HIV/AIDS, Malaria and other diseases
- **Goal 7**: Ensure environmental sustainability
- **Goal 8**: Develop a global partnership for development

IMPLEMENTATION GAP
Global health delivery failures

<table>
<thead>
<tr>
<th><strong>Intervention</strong></th>
<th><strong>Implementation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARVs for PMTCT</td>
<td>9% coverage of women overall and 50% of women who test positive in a clinic are given ARVs for PMTCT</td>
</tr>
<tr>
<td>Reduce HIV transmission by 40%</td>
<td></td>
</tr>
<tr>
<td>ITNs for Malaria Prevention</td>
<td>Only 24% of children in endemic areas sleep under nets</td>
</tr>
<tr>
<td>Reduce infant mortality by 23%</td>
<td></td>
</tr>
</tbody>
</table>
Critical health interventions have historically faced slow uptake and low coverage. Gaps in coverage fall disproportionately on the poor, and amplify inequity.

2008 data, courtesy of the Bill & Melinda Gates Foundation. Used with permission.

http://csis.org/event/rajeev-venkayya-global-health-delivery-systems
HOW DO YOU CHOOSE WHERE TO FOCUS?
START WITH BURDEN OF DISEASE
Years of life lost by cause


Child death rates by region and cause in 2013
A: younger than 1 month
B: aged 1–59 months

Top 50 causes of global years of life lost in 1990 and 2013

Figure removed due to copyright restrictions. See Figure 10: "Global, Regional, and National Age-sex Specific All-cause and Cause-specific Mortality for 240 Causes of Death, 1990–2013." The Lancet 385, no. 9963 (2015): 117–71.

An interactive version of this figure is available at http://vizhub.healthdata.org/gbd-compare/.
Change in life expectancy at birth by GBD region and cause group from 1990 to 2013

An interactive figure with these data is available at http://vizhub.healthdata.org/le. Changes in life expectancy as a result of specific causes were decomposed from the difference between all-cause lifetables and cause-deleted lifetables (mortality set to zero for a specific cause). Because all changes in life expectancy are based on cross-sectional lifetables, the cause-specific changes add up to the total change in life-expectancy. NTDs=neglected tropical diseases
Quantifying the Burden of Disease from mortality and morbidity

Disability-Adjusted Life Year (DALY)

Definition

- One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.
- DALYs for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for incident cases of the health condition:

Calculation

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

- The YLL basically correspond to the number of deaths multiplied by the standard life expectancy at the age at which death occurs. The basic formula for YLL (without yet including other social preferences discussed below), is the following for a given cause, age and sex:

\[
\text{YLL} = N \times L
\]

where:

- \( N \) = number of deaths
- \( L \) = standard life expectancy at age of death in years

- Because YLL measure the incident stream of lost years of life due to deaths, an incidence perspective is also taken for the calculation of YLD. To estimate YLD for a particular cause in a particular time period, the number of incident cases in that period is multiplied by the average duration of the disease and a weight factor that reflects the severity of the disease on a scale from 0 (perfect health) to 1 (dead). The basic formula for YLD is the following (again, without applying social preferences):

\[
\text{YLD} = I \times DW \times L
\]

where:

- \( I \) = number of incident cases
- \( DW \) = disability weight
- \( L \) = average duration of the case until remission or death (years)

http://www.who.int/healthinfo/global_burden_disease/en/
Figure showing Disability-adjusted Life Years (DALYs) by region removed due to copyright restrictions. See: [DALYs by region, 2012](http://www.who.int/gho/mortality_burden_disease/daly_rates/en/). World Health Organization.
Global Burden of Disease (GBD) Visualizations

Not sure which visualization will provide you with the results you are looking for? Click here for a guide that will help you determine which tool will best address your data needs.

GBD Compare is new to IHME’s lineup of visualizations and has countless options for exploring health data. To help you navigate this new tool, we have a video tutorial that will orient you to its controls and show you how to interact with the data. You can also watch the video of IHME Director Christopher Murray presenting the tools for the first time at the public launch on March 5, 2013.
Age distribution of burden of disease by country income group, 2004

High-income Countries
- 60 years and over: 35%
- 5-14 years: 5%
- 15-59 years: 56%
- 0-4 years: 4%

Low-and Middle-income Countries
- 60 years and over: 13%
- 5-14 years: 31%
- 15-59 years: 48%
- 0-4 years: 8%


Urban-rural differences, 2000-2008

Births attended by skilled health personnel

<table>
<thead>
<tr>
<th>Low income</th>
<th>Middle income</th>
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<tbody>
<tr>
<td>Rural</td>
<td>Urban</td>
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<tr>
<td>35</td>
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<tr>
<td>40</td>
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<td>45</td>
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<td>100</td>
<td>100</td>
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<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

Measles immunization coverage among 1-year olds

<table>
<thead>
<tr>
<th>Low income</th>
<th>Middle income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
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<td>81</td>
<td>81</td>
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<td>82</td>
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<td>85</td>
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</tbody>
</table>

SO, WHAT IS MOST NEEDED?
WE DEFINITELY NEED BETTER DATA
Map removed due to copyright restrictions. See "Civil Registration Coverage of Cause of Death (%), 2005-2011."
Proportions of deaths covered by vital registration (by GBD-2010 regions)

NEEDED INPUTS ARE MISSING
Doctors per person

• In Massachusetts? 4.69 (nonfederal) per 1,000
• In Malawi? 0.02
Infographic removed due to copyright restrictions.
MAYBE IT COMES DOWN TO MONEY: NEED MORE ECONOMIC INPUTS
Public Health Spending

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www.worldmapper.org
Health Expenditure Per Capita (PPP; International $, 2010)

World map depicting health expenditure per capita removed due to copyright restrictions.
Source: Kaiser Family Foundation. "Health Expenditure Per Capita (PPP; International $, 2010)."

http://kff.org/global-indicator/health-expenditure-per-capita/
## Comparing the US and Malawi

<table>
<thead>
<tr>
<th></th>
<th>Malawi</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>% GDP on health</td>
<td>9.1</td>
<td>15.2</td>
</tr>
<tr>
<td>Percapita health spending (PPP $)</td>
<td>49</td>
<td>7,164</td>
</tr>
<tr>
<td>Pvt spend as % of total</td>
<td>39.4</td>
<td>52.2</td>
</tr>
<tr>
<td>Children/woman</td>
<td>5.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Gross nat’l income per capita (PPP $)</td>
<td><strong>760</strong></td>
<td>45,640</td>
</tr>
<tr>
<td>% population living on under PPP$1/day</td>
<td>73.9</td>
<td>-</td>
</tr>
</tbody>
</table>


## US-based NGOs with highest cumulative overseas health expenditure, 2007-2010

<table>
<thead>
<tr>
<th>Rank</th>
<th>Organization</th>
<th>Overseas health expenditure, adjusted</th>
<th>Overseas health expenditure, unadjusted</th>
<th>Overseas expenditure, unadjusted</th>
<th>Percent of revenue from private sources</th>
<th>Percent of revenue from in-kind contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Population Services International</td>
<td>1392.35</td>
<td>1392.36</td>
<td>1784.37</td>
<td>17.72</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>Catholic Relief Services</td>
<td>910.90</td>
<td>916.74</td>
<td>2750.85</td>
<td>32.11</td>
<td>0.85</td>
</tr>
<tr>
<td>3</td>
<td>Food for the Poor</td>
<td>793.18</td>
<td>3009.92</td>
<td>4709.03</td>
<td>98.55</td>
<td>90.08</td>
</tr>
<tr>
<td>4</td>
<td>PATH</td>
<td>667.75</td>
<td>683.20</td>
<td>799.46</td>
<td>78.67</td>
<td>2.91</td>
</tr>
<tr>
<td>5</td>
<td>Clinton Health Access Initiative</td>
<td>626.77</td>
<td>631.74</td>
<td>709.96</td>
<td>55.57</td>
<td>1.11</td>
</tr>
<tr>
<td>6</td>
<td>Management Sciences for Health, Inc.</td>
<td>577.22</td>
<td>577.22</td>
<td>609.58</td>
<td>0.77</td>
<td>0.00</td>
</tr>
<tr>
<td>7</td>
<td>Elizabeth Glaser Pediatric AIDS Foundation</td>
<td>411.98</td>
<td>413.23</td>
<td>434.94</td>
<td>15.60</td>
<td>0.37</td>
</tr>
<tr>
<td>8</td>
<td>CARE</td>
<td>355.95</td>
<td>358.28</td>
<td>2418.42</td>
<td>29.20</td>
<td>0.79</td>
</tr>
<tr>
<td>9</td>
<td>Save the Children</td>
<td>319.19</td>
<td>334.16</td>
<td>1701.05</td>
<td>50.34</td>
<td>5.70</td>
</tr>
<tr>
<td>10</td>
<td>World Vision</td>
<td>312.68</td>
<td>418.08</td>
<td>3440.61</td>
<td>78.01</td>
<td>30.81</td>
</tr>
<tr>
<td>11</td>
<td>Pathfinder International</td>
<td>307.76</td>
<td>310.04</td>
<td>354.37</td>
<td>22.83</td>
<td>0.85</td>
</tr>
<tr>
<td>12</td>
<td>MAP International</td>
<td>292.88</td>
<td>1384.72</td>
<td>1509.19</td>
<td>99.51</td>
<td>96.67</td>
</tr>
<tr>
<td>13</td>
<td>International Medical Corps</td>
<td>276.74</td>
<td>397.24</td>
<td>414.48</td>
<td>49.65</td>
<td>37.05</td>
</tr>
<tr>
<td>14</td>
<td>Rotary Foundation of Rotary International</td>
<td>271.83</td>
<td>271.83</td>
<td>587.14</td>
<td>99.99</td>
<td>0.00</td>
</tr>
<tr>
<td>15</td>
<td>Brother's Brother Foundation</td>
<td>239.60</td>
<td>1277.34</td>
<td>1919.16</td>
<td>99.96</td>
<td>99.36</td>
</tr>
<tr>
<td>16</td>
<td>Academy for Educational Development</td>
<td>232.72</td>
<td>233.93</td>
<td>943.28</td>
<td>11.21</td>
<td>0.62</td>
</tr>
<tr>
<td>17</td>
<td>Project HOPE</td>
<td>230.00</td>
<td>593.09</td>
<td>643.90</td>
<td>94.00</td>
<td>75.02</td>
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<tr>
<td>18</td>
<td>United Nations Foundation</td>
<td>219.47</td>
<td>230.85</td>
<td>342.12</td>
<td>88.30</td>
<td>8.63</td>
</tr>
<tr>
<td>19</td>
<td>Catholic Medical Mission Board</td>
<td>217.70</td>
<td>877.54</td>
<td>928.34</td>
<td>99.37</td>
<td>91.99</td>
</tr>
<tr>
<td>20</td>
<td>Feed the Children</td>
<td>212.60</td>
<td>738.36</td>
<td>2114.31</td>
<td>99.64</td>
<td>87.13</td>
</tr>
</tbody>
</table>

Source: IHME DAH Database 2013

Notes: Expenditures shown in millions of 2011 US dollars. Overseas health expenditure for 2011-2013 is not included because of data limitations. Data reflect NGOs registered with USAID. Adjusted overseas health expenditure reflects deflated private in-kind donations plus unadjusted financial assistance.

DAH per all-cause DALY, 2009-2011

Source: IHME DAH Database 2013

Notes: Countries that were ineligible for DAH based on their World Bank income classification are shown in white. DAH received is shown in real 2011 US dollars.

Top 20 countries by 2010 all-cause burden of disease versus cumulative 2009–2011 DAH

humongous CAVEAT: Spending does not equal health outcomes
Infographic removed due to copyright restrictions.
Source: Kane, Jason. "Health Costs: How the U.S. Compares With Other Countries."
Infographic removed due to copyright restrictions.
Infographic removed due to copyright restrictions.
Source: Kane, Jason. "Health Costs: How the U.S. Compares With Other Countries."
October 22, 2012. PBS Newshour The Rundown (blog).
Table 1: Health Status of the United States and Rank among the 29 Other OECD Member Countries removed due to copyright restrictions.

Now go watch this!

Reducing child mortality – a moral and environmental imperative
[15 minutes run time] September 27, 2010

Alternate link to the video

Many countries are making good progress towards MDG4 and it’s time to stop talking about Sub-Saharan Africa as one place.
So, it’s not all bad news—and Rosling makes stats and data compelling!
For more Rosling, see http://www.gapminder.org/videos

MENTAL HEALTH
Mental health workforce shortages in 58 low- and middle-income countries

Figure removed due to copyright restrictions. See Figure 1: Bruckner, Tim A., et al. "The Mental Health Workforce Gap in Low- and Middle-income Countries: A Needs-based Approach." Bulletin of the World Health Organization 89 (2011): 184-94.
Map removed due to copyright restrictions. See: "Age-standardized Suicide Rates (per 100,000 population), both Sexes, 2011." Mental Health. World Health Organization, 2014.

http://gamapserver.who.int/mapLibrary/app/searchResults.aspx
Map removed due to copyright restrictions. See: "Psychiatrists Working in Mental Health (per 100 000 population), 2011." Mental Health. World Health Organization, 2014.
Graph removed due to copyright restrictions. See: "Rate of Mental Health Outpatient Facilities per 100 000 population, 2011: By WHO Region." Mental Health. World Health Organization, 2014.
Key background knowledge you’ll need

1. India health outcomes; budget and government
2. technology, mHealth
3. innovations in mental health care; mental health in India
4. India healthcare delivery (esp mental hlth), service quality, HR, task shift
5. India health system
6. India social factors, poverty, equity
Next 40 minutes

Peruse your assigned materials, working in pairs
• Skim all articles
• Read several of them carefully

For your favorite readings, prepare a three-point briefing
• What’s the particular resource about, in a nutshell?
• What is really great/interesting/valuable?
• What is missing? (what do you wish you knew more about?)

feel free to note pages or figures you think are most useful
Form groups

• Please mingle and form teams of 4; there may be one team of 5.
• Look for diverse backgrounds in your team
• You will work together tomorrow and Wednesday.
• I will assign your topics shortly.
Aging
Alcohol use disorders, addiction
Child development and disability
Maternal mental health

OUR FOUR FOCAL AREAS ARE
GLOBAL NEEDS
Sustaining Healthy Behavior Change

**Personalized Health Technology**
wirelessly and simultaneously tracks behavior change and delivers tailored recommendations to advance individual health.

**Behavioral Economics**
incentivizes and nudges individuals to make healthy decisions.

**Smart Data Analytics**
Analyses using health data provides new insights to drive healthy behaviors.

Healthy Behavior Change
Tonight’s assignment

Read the following:

• Patel on SUNDAR (2.5 pp)
• Sangath for MIT intro, biosketches, key concepts (10 pp)
• Sangath Biennial report (review map to p. 30; p. 34-43; p. 47-60; p. 64-65; total 50 pages)
• Optional readings are also included in the folder numbered 0.

Come to class with at least one question for Sangath mapped out in writing. We kick off at 8 am with a joint call to all seven experts assigned to work with us.