A SCIENTIST, AN ENGINEER, AND A BANKER WALK INTO A PUB….

The Not-so-funny Truth about Innovation in Global Health

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EVERY PERSON DESERVES A CHANCE TO LIVE A HEALTHY, PRODUCTIVE LIFE
OUR GLOBAL REACH AND PRESENCE

- Seattle
- Washington DC
- London
- Beijing
- New Delhi
- Nigeria
- Ethiopia
- South Africa

- 1,200 active grantees
- $3.4B grant payments
- 1,116 employees worldwide
WHAT WE DO

GLOBAL HEALTH

GLOBAL DEVELOPMENT

UNITED STATES PROGRAM
FOCUS AREAS IN GLOBAL HEALTH
MALARIA

One Step, Rapid, Immunochromatographic test for the qualitative detection of Histidine-rich protein II (HRP-II) antigen of Malaria Plasmodium falciparum in human whole blood.

MALARIA
NEGLECTED INFECTIOUS DISEASES
POLIO
WHAT IS INNOVATION IN GLOBAL HEALTH?
>50% of GAVI’s vaccine suppliers are DCVMs
ADDITIONAL CHILDREN IMMUNIZED with GAVI support: 370M
36% DROP IN COST to fully immunize a child with pentavalent, pneumococcal, and rotavirus vaccines.
In 2009 rotavirus vaccines were $7.50 per dose.
In 2012 rotavirus vaccines dropped to $2.50 per dose.
In 2015 rotavirus vaccines will drop to $1.00 per dose.
DO WE NEED INNOVATION IN GLOBAL HEALTH

…beyond better delivery of existing simple solutions?
MAJOR PREVENTABLE CAUSES of under-five (U5) child deaths from infectious diseases

- **Pneumonia**: ~1.1M, 17% of all U5 child deaths
- **Diarrhea**: ~594,000, 9% of all U5 child deaths
- **Malaria**: ~462,000, 7% of all U5 child deaths

2012

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PROGRESS IN REDUCTION of under-five, infant and neonatal mortality rates

- Under-five mortality: 90 deaths/1,000 live births in 1990, 48 in 2012, 21 in 2015
- Infant mortality: 63 deaths/1,000 live births in 1990, 35 in 2012, target: 30 in 2015
- Neonatal mortality: 33 deaths/1,000 live births in 1990, 21 in 2015

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TECHNICAL HURDLES TO IMPACT ARE HIGHER IN GLOBAL HEALTH

...due to environmental factors and broken delivery systems.
Innovating for the developing world poses a unique set of difficulties, including developing:

- Solutions for weakened immune systems
- Novel ways to boost vaccine responses
- Single-shot vaccines and long-lasting antiretroviral drugs
- Combination vaccines to target multiple diseases
- Novel interventions for diseases like HIV, TB, and malaria
THE FUNDAMENTAL R&D PROBLEM

A strong shift to the left for maximal impact

INCREASED INVESTMENT

REduced INVESTMENT AT RISK

NEW PARADIGM

CURRENT PARADIGM

Probability of Success (PTRS)

Cost

Target Antigen  Pre-clinical  Proof of Concept  Phase IIB/III  PQ

$1M  $10M  $300M

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Discovery and development of fully human monoclonal antibody therapeutics using transgenic mouse platform, specifically for use in development of:

- Therapeutic monoclonal antibody generation
- Vaccine antigen discovery
- Immunogen iteration

Source: http://www.kymab.com/kymouse.php
MODEL ESTABLISHED AT SEVERAL LOCATIONS AROUND THE GLOBE, INCLUDING OXFORD UNIVERSITY

- Subjects vaccinated with a test article and exposed to mosquitos infected with *P. falciparum* and monitored for seroconversion and treated if necessary
- Yields huge benefits for malaria vaccine development in the form of rapid evaluation of efficacy of pre-erythrocytic vaccine candidates
Limited cold chain storage and weak health systems intensify the need for:

- Heat-resistant vaccines
- Innovative packaging/multi-dose vials to reduce volume in cold chain
- Reducing wastage - preservatives for multi-dose vials
- Battery-operated, rapid diagnostic tools
- Tracking mechanisms and efficient supply chains to avoid stock-outs
Results of VillageReach’s work to overcome infrastructure limitations in Mozambique include:

- Reduction in incidence of vaccine stockouts in rural health centers from 80% to 1%
- Increase in the amount of time the cold chain is working from 40% to 96%
- Increase in the percentage of children receiving basic vaccines from 69% to 95%
ACCESS AND AFFORDABILITY

- An effective and appropriate global health solution must also be made available at an affordable price point.
- We also provide financial support to industry through a variety of financial instruments to de-risk investments in global health products, including:
  - Advanced market commitments
  - Volume guarantees
  - Product-related investments
  - Equity investments
2012 agreement between Global Alliance for Vaccines and Immunizations (GAVI) to make GSK’s Rotarix product available to GAVI-eligible countries at just $2.50 per dose

- This represented a reduction in price of two thirds for GAVI markets
UK FUNDING TO GAVI

- The UK contributed ~$2.3 billion to GAVI in total as of December 2013
- For the period of 2000-2030, the UK has pledged over $5 billion in GAVI support
- The UK supports GAVI through all three funding channels:
  - Direct contributions
  - International Finance Facility for Immunization (IFFIm)
  - Advanced Market Commitment (AMC)

Source: http://www.gavialliance.org/country/
IMPORTANCE OF DATA ANALYTICS AND MEASUREMENT
The aim of this work is to develop an open-source, cartographic information suite to inform malaria control and elimination globally. This includes:

- *P. falciparum* global endemicity and limits maps to estimate population at risk
- *P. vivax* endemicity and limits maps to estimate population at risk

There are over 500 contributors of data from 85 malaria endemic countries covering over 4.5 million individuals.
GLOBAL BURDEN OF DISEASE

GBD 2010 was the first standardized, comprehensive platform to quantify global health data by geography, age, and sex

- Greater accessibility and improved access to data
- We are investing heavily in Global Burden of Disease 2.0
  - The goal is to inform decision-making and maximize health system impact
- However, we still have a fundamental issue with primary data quality

In terms of the number of years of life lost (YLLs) due to premature death in the United Kingdom, ischemic heart disease, trachea, bronchus, and lung cancers, and cerebrovascular disease were the highest ranking causes in 2010.

Of the 25 most important causes of burden, as measured by disability-adjusted life years (DALYs), ischemic heart disease showed the largest decrease, falling by 50% from 1990 to 2010.

The leading risk factor in the United Kingdom is dietary risks.
COMMUNICABLE, MATERNAL, NEONATAL AND NUTRITIONAL DISORDERS

Latin America and Caribbean, DALYs - both sexes, all ages

Sub-Saharan Africa, DALYs - both sexes, all ages
SOME OF OUR PARTNERS
A coalition of partners from the public and private sector came together two years ago and committed to controlling or eliminating 10 NTDs by 2020.

The pharmaceutical industry has donated the medicines needed to accomplish these goals.

Endemic countries have produced national plans outlining how they will map diseases, deliver treatment, and monitor progress toward control and elimination.
NEW FUNDING TO FIGHT SOIL-TRANSMITTED HELMINTHS

- We are delighted to announce $122 million in new commitments toward three soil-transmitted diseases that affect nearly one in four people worldwide - hookworm, roundworm, and whipworm
- This includes $50 million from CIFF to support school-based soil-transmitted helminth (STH) treatment programs
Our Grand Challenges work encompasses:

- **Grand Challenges Explorations**
  - Twice-annual $100,000 grant program

- **Grand Challenges in Global Health**
  - More structured RFPs to tackle specific problems

- **In-country partnerships**
  - USAID’s Grand Challenges for Development program, programs run by the organization Grand Challenges Canada, and programs run through the Grand Challenges India, Brazil, and Israel partnership frameworks
GRAND CHALLENGES EXPLORATIONS

Past topics:

- Develop the Next Generation of Condom
- Create Low-Cost Cell Phone-Based Applications for Priority Global Health Conditions
- Reinvent the Toilet Challenge

Current topic:

- Explore New Ways to Measure Fetal and Infant Brain Development
  (Running March 4th – May 6th)
GATES FELLOWS AND INTERNS

The objectives of the Gates Fellows Program are to:

- Create talent within strategic partners and the field that aligns with the foundation’s mission
- Access fresh talent and perspectives to advance our thinking and contribute in a substantive way to our work
- Develop fellows’ capabilities, skills, and understanding of the foundation
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