

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

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

Academy of Medical Sciences, United Kingdom
April 7, 2014

DR. TREVOR MUNDEL
PRESIDENT, GLOBAL HEALTH

OUR GLOBAL REACH AND PRESENCE



1,200

2012 active grantees

\$3.4B

2012 grant payments

1,116

2012 employees worldwide

WHAT WE DO

GLOBAL HEALTH



GLOBAL DEVELOPMENT



UNITED STATES PROGRAM





FOCUS AREAS IN GLOBAL HEALTH



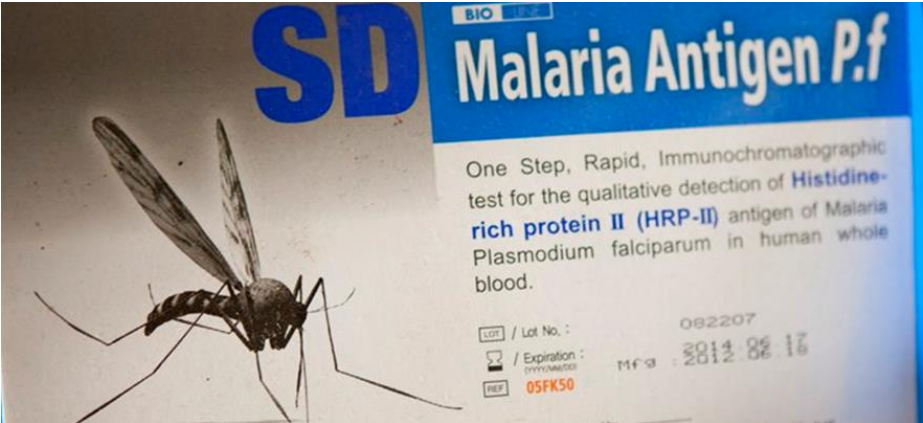
HIV





TUBERCULOSIS





MALARIA





NEGLECTED INFECTIOUS DISEASES





ENTERIC AND DIARRHEAL DISEASES





PNEUMONIA

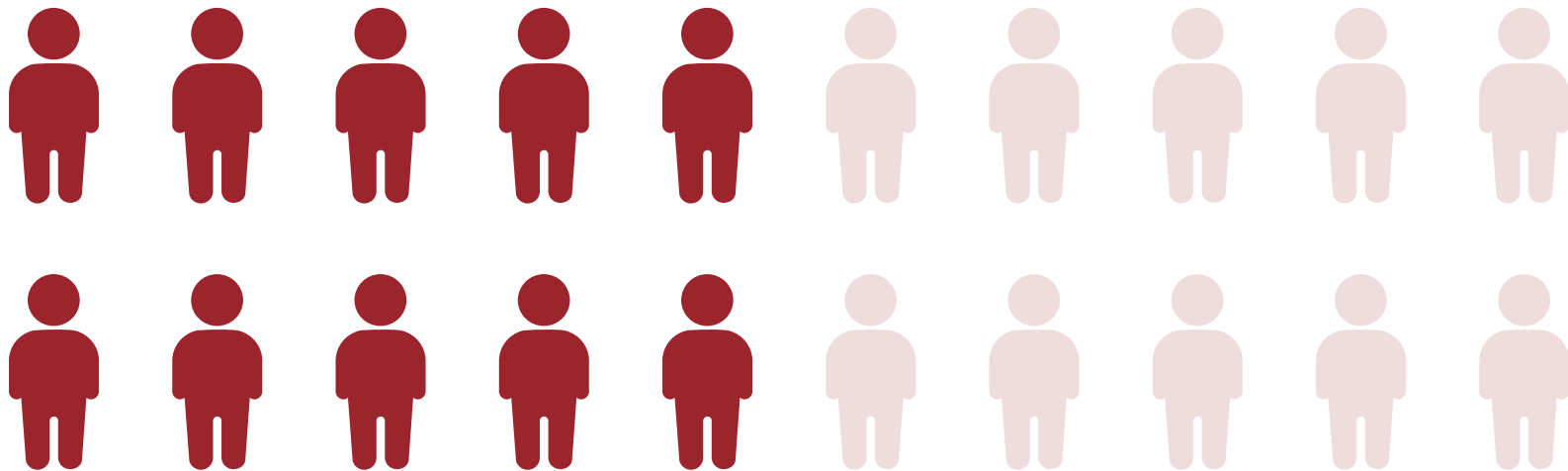





POLIO



WHAT IS INNOVATION IN GLOBAL HEALTH?

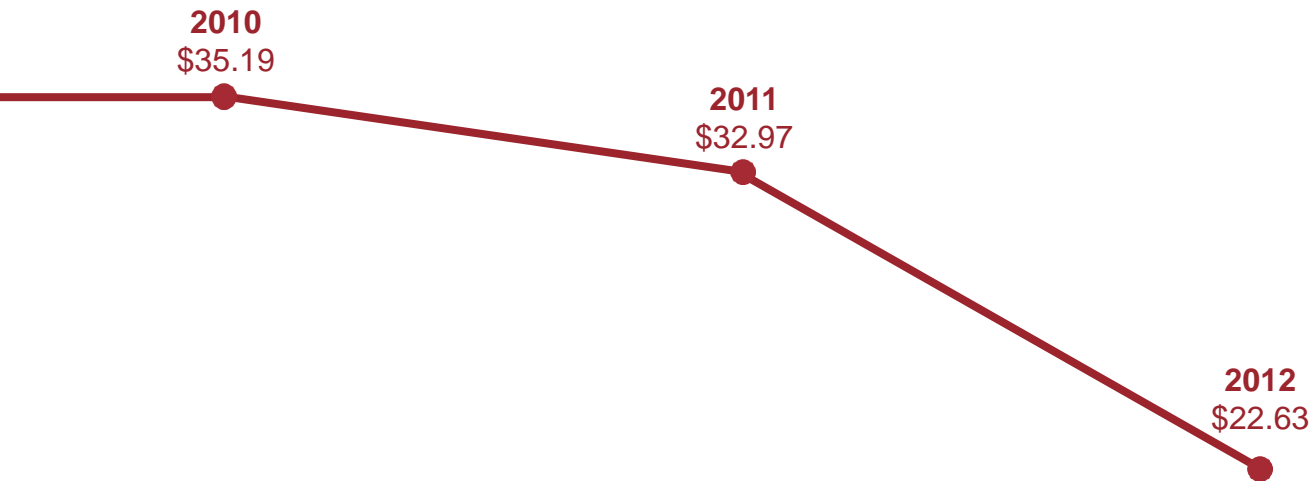


 **>50%** of GAVI's vaccine suppliers are DCVMs

ADDITIONAL CHILDREN IMMUNIZED

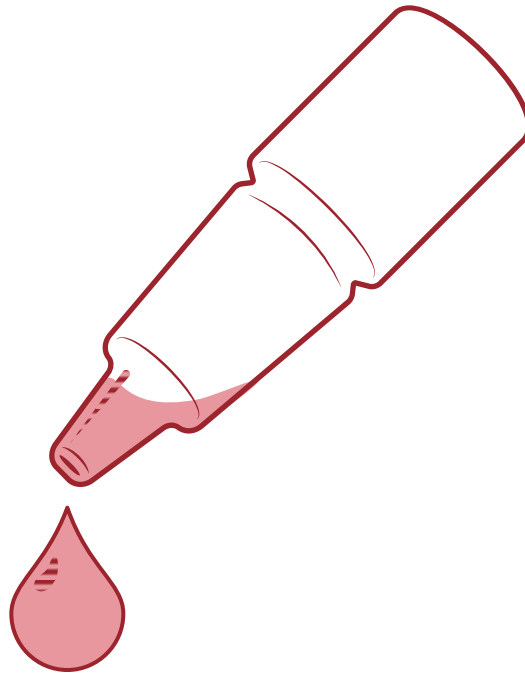
with GAVI support: **370 M**



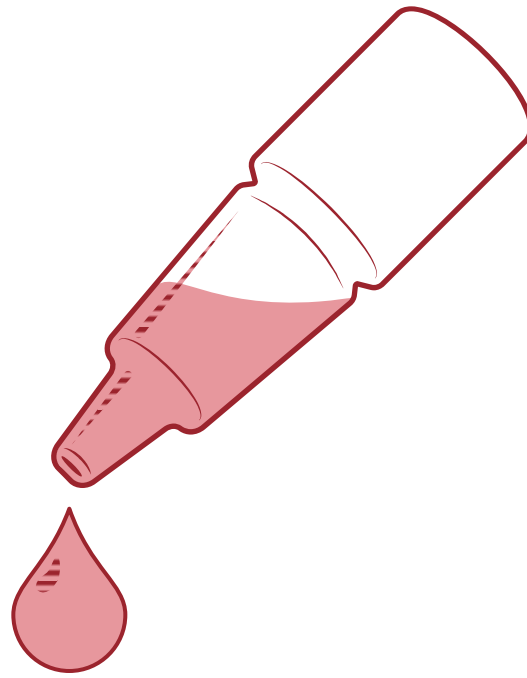


36% **DROP IN COST** to fully immunize a child with pentavalent, pneumococcal, and rotavirus vaccines.

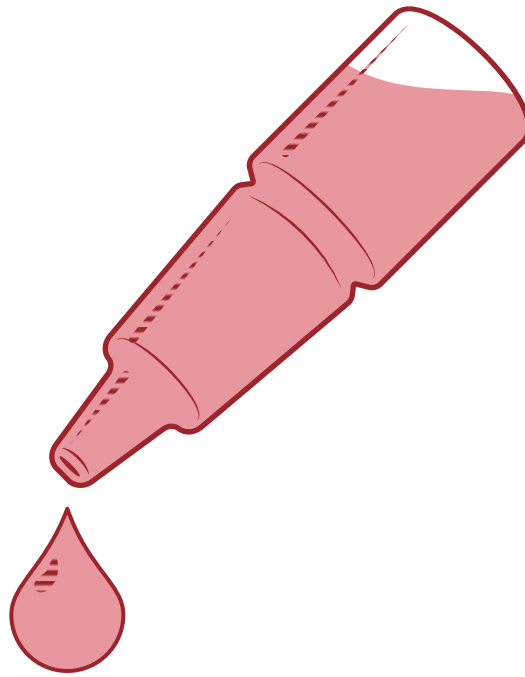
In 2009
rotavirus
vaccines were
\$7.50
per dose.



In 2012
rotavirus vaccines
dropped to
\$2.50
per dose.



In 2015
rotavirus vaccines
will drop to
\$1.00
per dose.

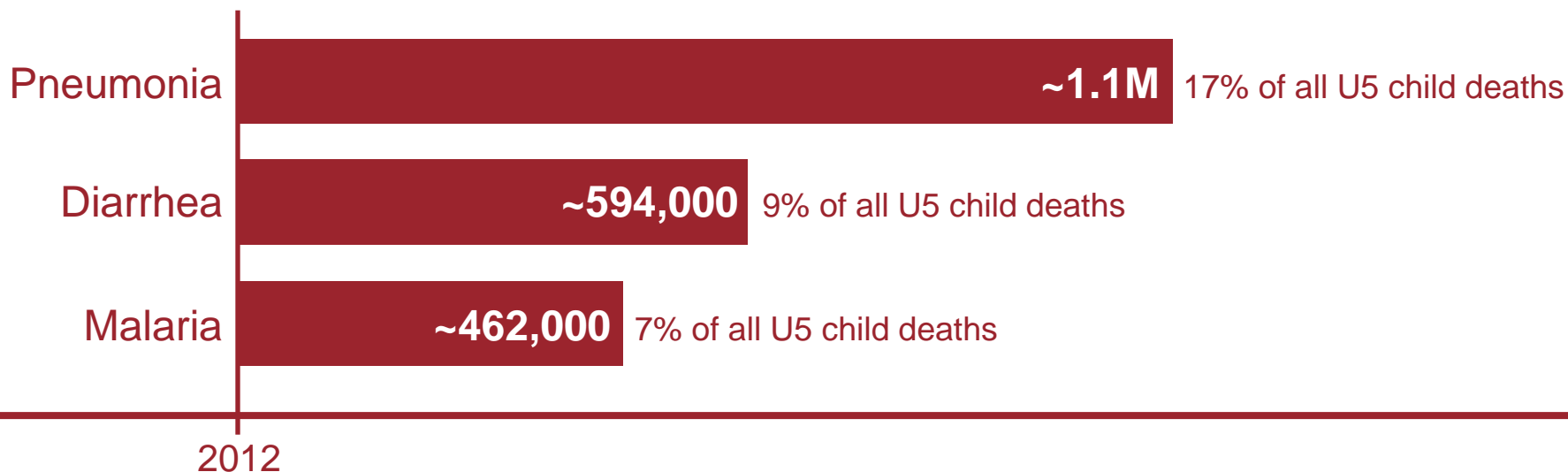


DO WE NEED INNOVATION IN GLOBAL HEALTH

...beyond better delivery of existing simple solutions?

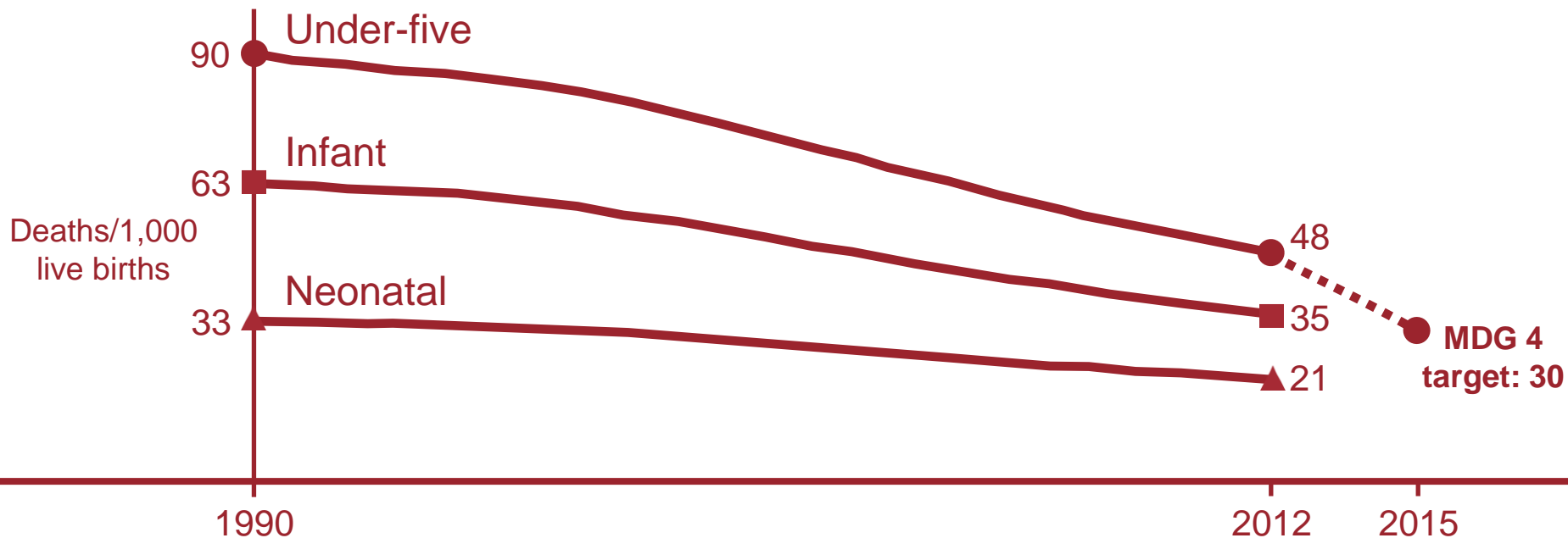
MAJOR PREVENTABLE CAUSES

of under-five (U5) child deaths from infectious diseases



PROGRESS IN REDUCTION

of under-five, infant and neonatal mortality rates



TECHNICAL HURDLES TO IMPACT ARE HIGHER IN GLOBAL HEALTH

...due to environmental factors and broken delivery systems.



■ CHALLENGES
IN INNOVATION FOR
GLOBAL HEALTH

SCIENTIFIC CHALLENGES

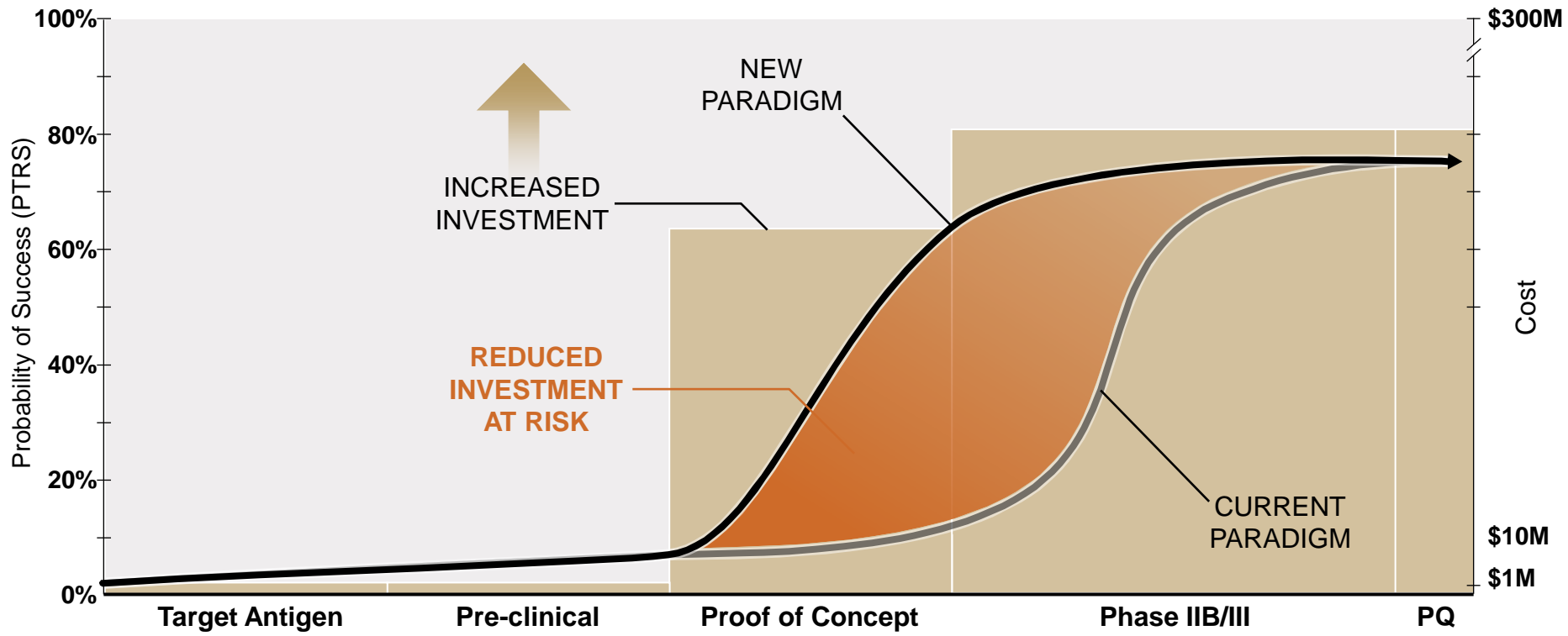
Innovating for the developing world poses a unique set of difficulties, including developing:

- 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

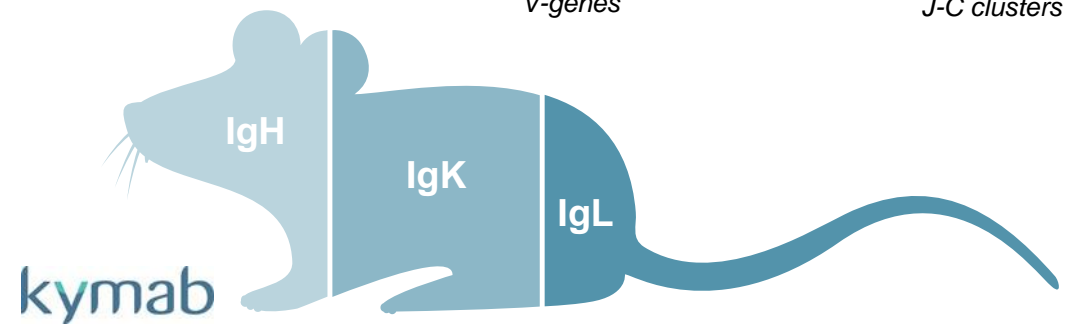
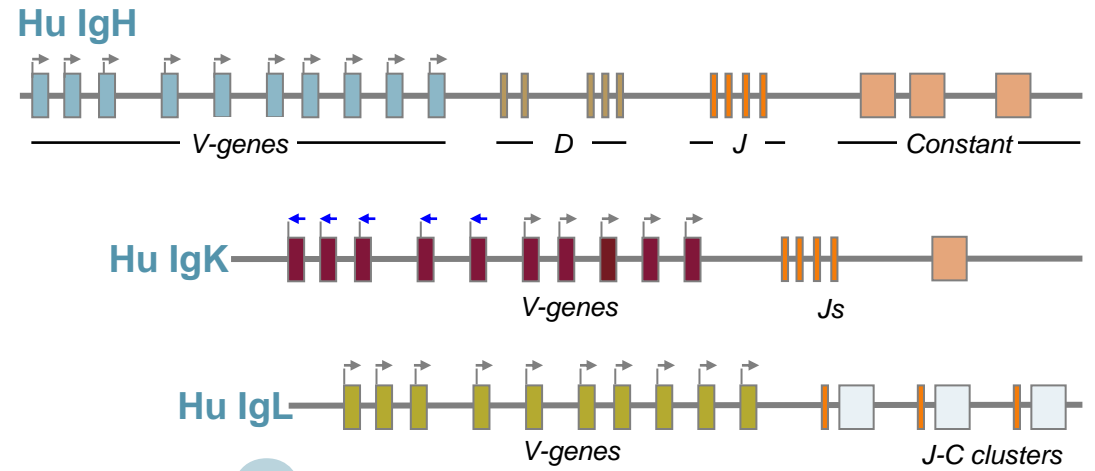
A strong shift to the left for maximal impact



KYMAB

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>

CHALLENGE WITH HUMAN MALARIA INFECTION

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



VAC054 Web Advert, Version 1.0, 14th Oct 2013

Malaria Challenge Study
Recruiting Now

UNIVERSITY OF OXFORD

Aged 18-45, in good health and never had malaria?
You could be eligible to take part in our study testing the effectiveness of new malaria vaccines.
You will be compensated for your time and expenses.
For more information, contact:
01865 857406
vaccinetrials@ndm.ox.ac.uk
www.jenner.ac.uk/clinicaltrials

A response to this advertisement will be recorded, but carries no obligation. You can withdraw at any time. Your general practitioner will be informed if you decide to take part. The study includes a period of up to 3 weeks of daily visits. If you do not reside in Oxford you will be required to stay in Oxford - accommodation will be provided.
Note: Participation in this study may affect your ability to donate blood.

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INFRASTRUCTURE LIMITATIONS

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



VILLAGE REACH - MOZAMBIQUE

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



GSK ROTARIX PRICING GUARANTEE

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

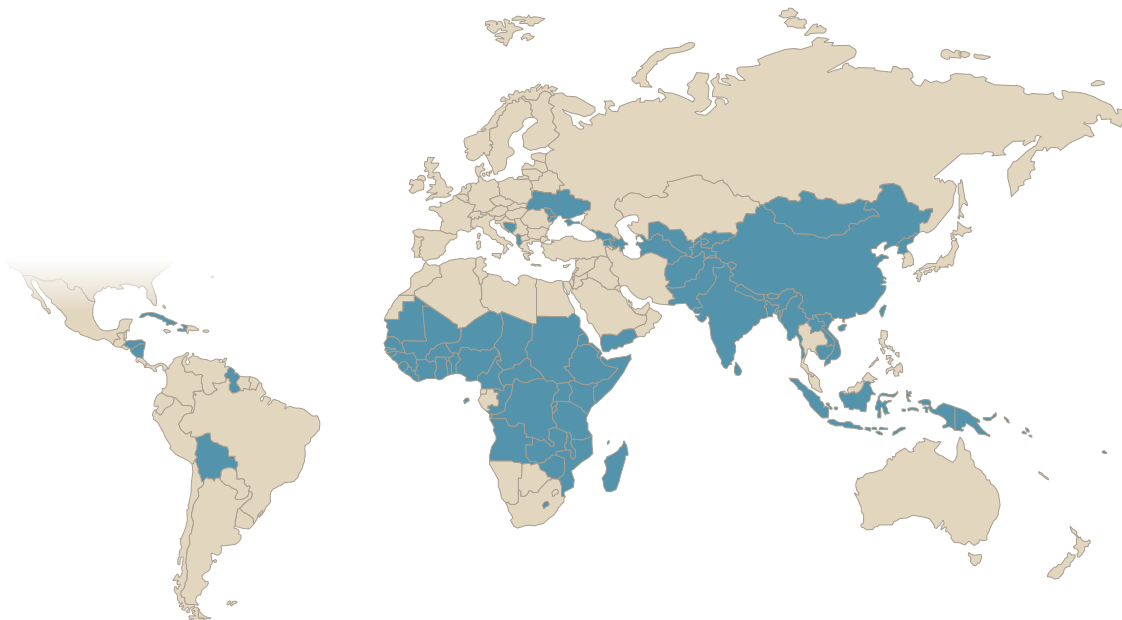
- This represented a reduction in price of two thirds for GAVI markets



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)

GAVI-eligible and Graduating Countries



Source: <http://www.gavialliance.org/country/>

■ IMPORTANCE OF DATA ANALYTICS AND MEASUREMENT



MALARIA ATLAS PROJECT (MAP)

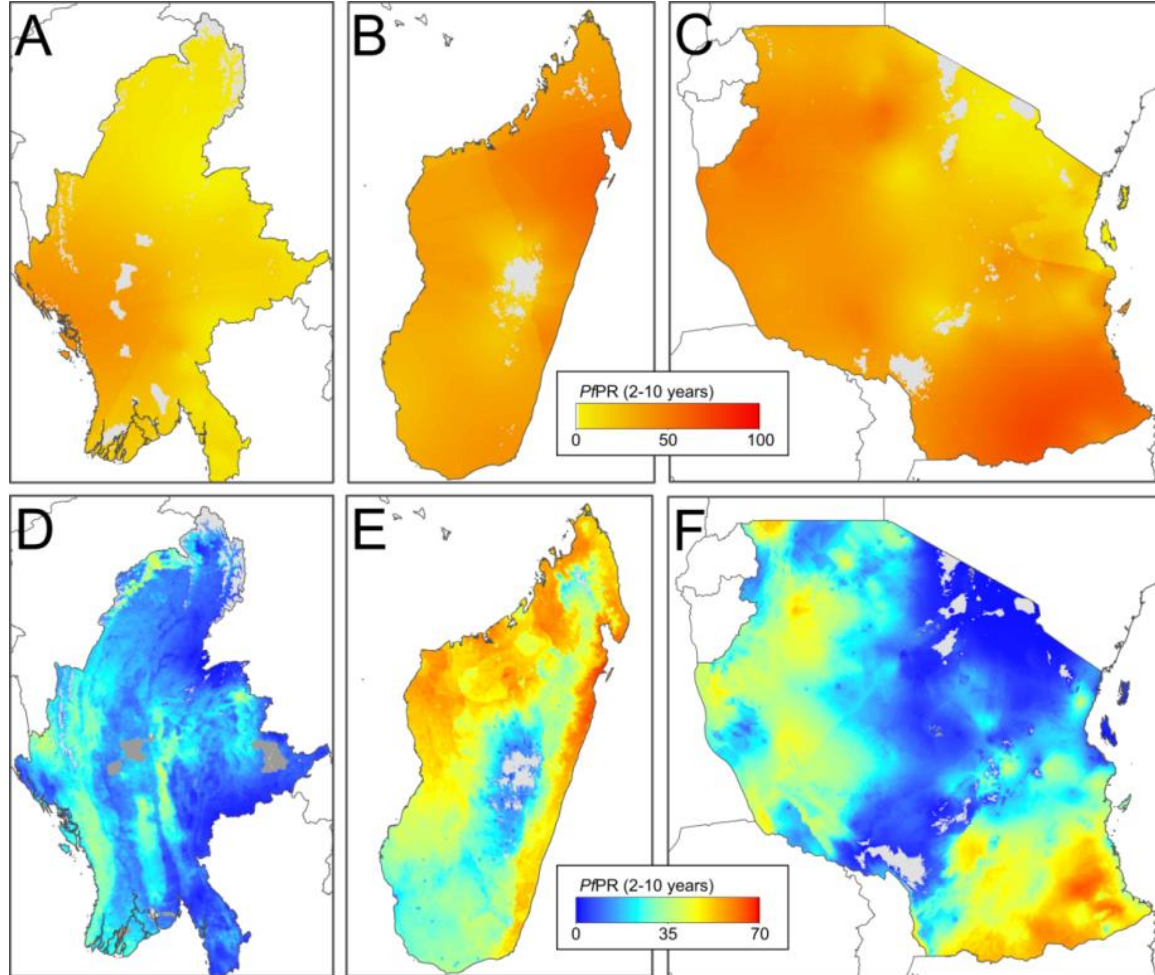
The aim of this work is to develop an open-source, cartographic information suite to inform malaria control and elimination globally

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

Detail - 2007 (A-C) vs. 2010 (D-F)



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

- Japan
- Spain
- South Korea
- Singapore
- Switzerland
- Andorra
- Taiwan
- France
- Italy
- Australia
- Sweden
- Austria
- Chile
- Israel
- Germany
- Canada
- Slovenia
- New Zealand
- Portugal
- Malta
- Cyprus
- Belgium
- Costa Rica
- Ireland
- China
- Greece
- Netherlands
- United Kingdom**
- Uruguay
- Iceland
- Luxembourg
- Norway
- Czech Republic
- Finland
- United States
- Denmark
- Poland
- Estonia

tral Asia High-income
frica and Middle East South Asia

United Kingdom



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.

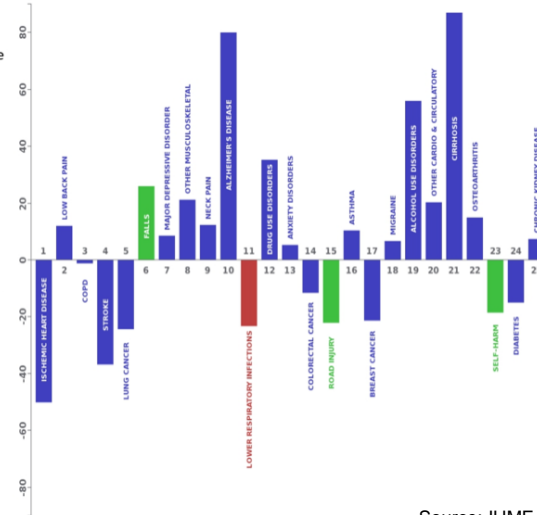
The leading risk factor in the United Kingdom is dietary risks.

DALYs Deaths YLLs YLDs

Leading causes of DALYs and percent change 1990 to 2010 for the United Kingdom

Communicable, maternal, neonatal, and nutritional
Non-communicable
Injuries

Disability-adjusted life years (DALYs) quantify both premature mortality (YLLs) and disability (YLDs) within a population. The top 25 causes of DALYs are ranked from left to right in order of the number of DALYs they contribute in the United Kingdom. Bars going up show the percent by which DALYs have increased since 1990. Bars going down show the percent by which DALYs have decreased.

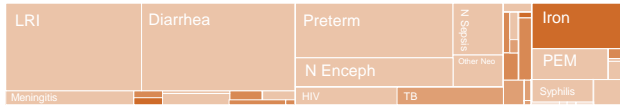


Source: IHME

COMMUNICABLE, MATERNAL, NEONATAL AND NUTRITIONAL DISORDERS



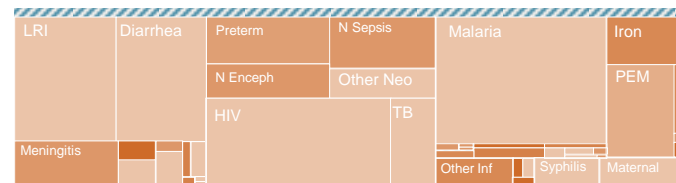
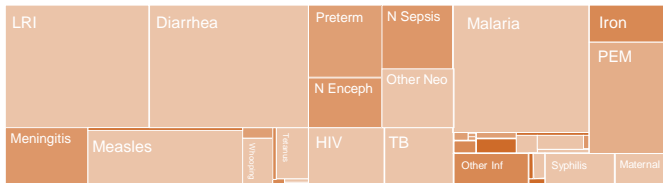
1990



2010



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



Sub-Saharan Africa, DALYs - both sexes, all ages



■ IMPORTANCE OF PARTNERSHIPS

SOME OF OUR PARTNERS



LONDON DECLARATION

- 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

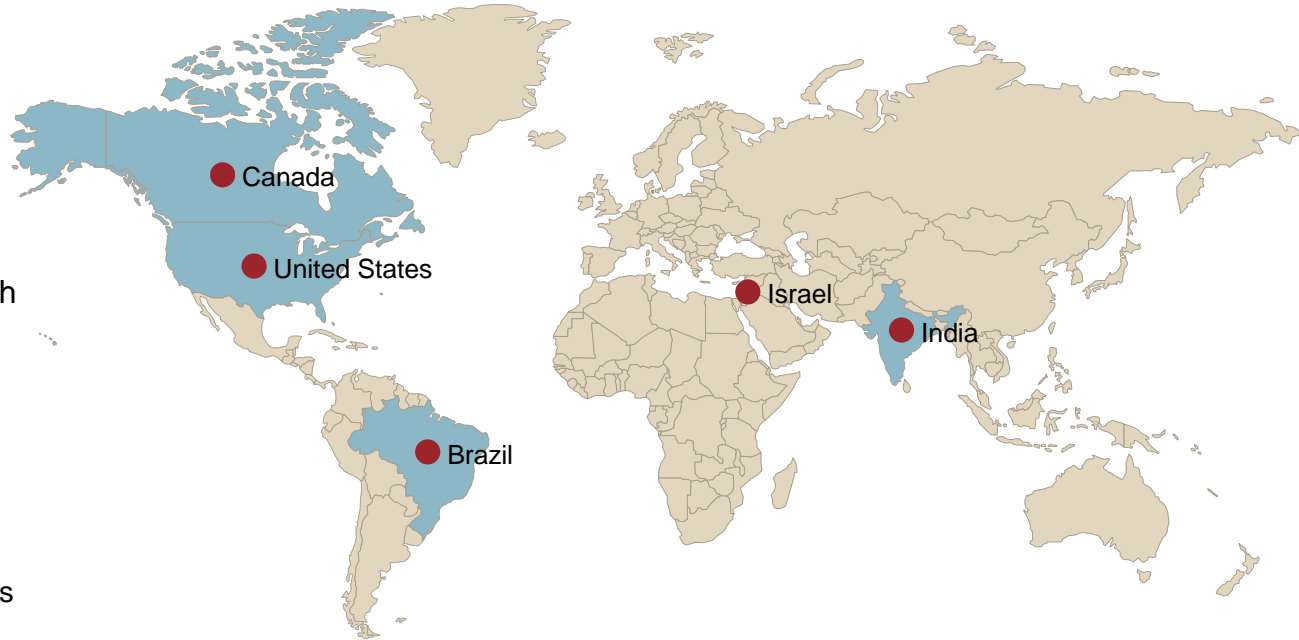
- We are delighted to announce \$122 million in new commitments toward three soil-transmitted diseases that affect nearly one in four people worldwide - hookworm, roundworm, and whipworm
- This includes \$50 million from CIFF to support school-based soil-transmitted helminth (STH) treatment programs



GRAND CHALLENGES

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
in Global Health

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



EVERY PERSON
DESERVES THE
CHANCE TO LIVE
A HEALTHY,
PRODUCTIVE LIFE

BILL & MELINDA
GATES foundation
VISITOR CENTER

ENTRANCE
CURRICULUM