



BILL & MELINDA
GATES foundation

THE IMPORTANCE OF INNOVATION IN ADDRESSING GLOBAL HEALTH GAPS IN THE DEVELOPING WORLD

Global Vaccine and Immunization Research Forum

March 6, 2014

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PRESIDENT, GLOBAL HEALTH

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



WHAT WE DO

GLOBAL HEALTH



GLOBAL DEVELOPMENT



UNITED STATES PROGRAM



OUR GLOBAL REACH AND PRESENCE

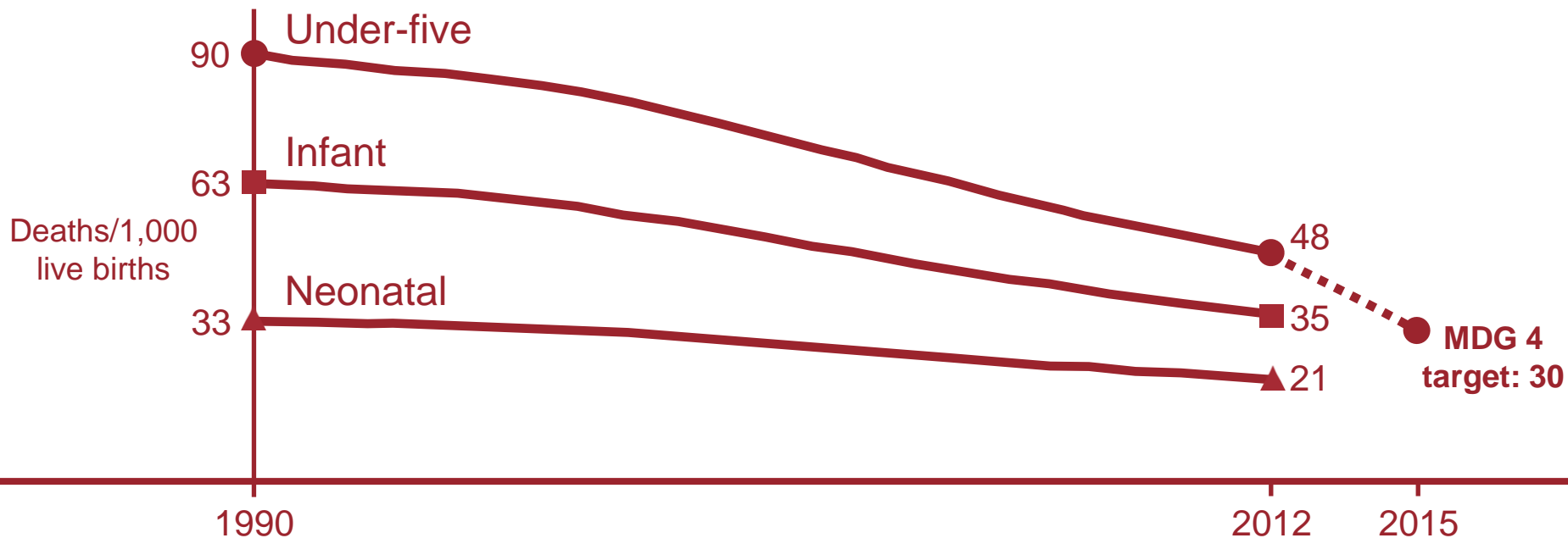


DO WE NEED INNOVATION IN GLOBAL HEALTH

...beyond better delivery of existing simple solutions?

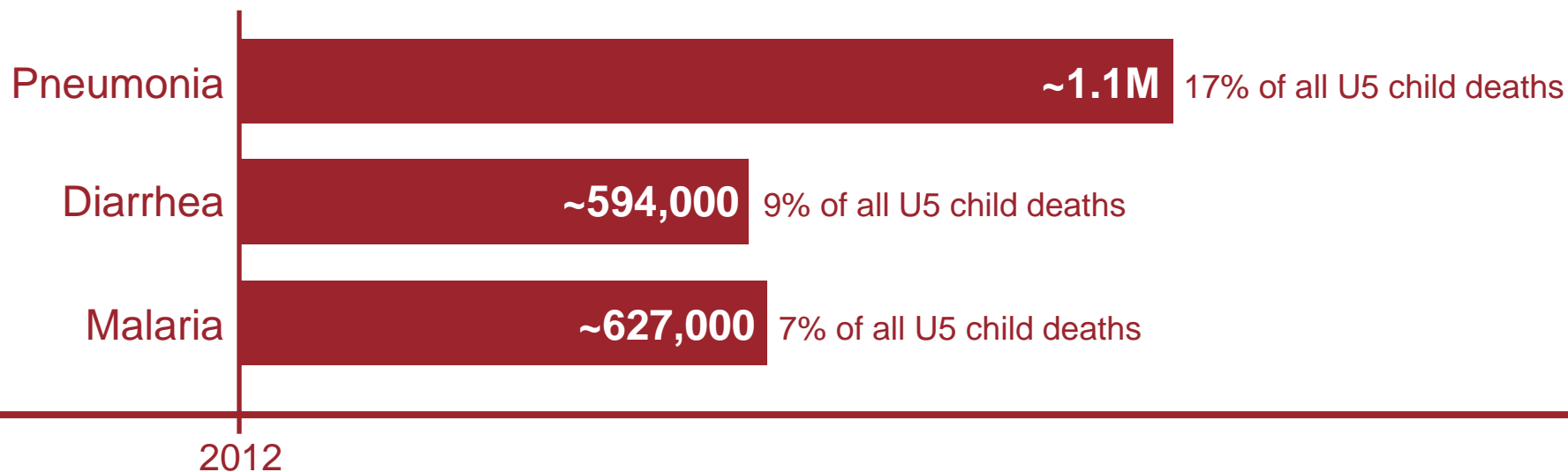
PROGRESS IN REDUCTION

of under-five, infant and neonatal mortality rates



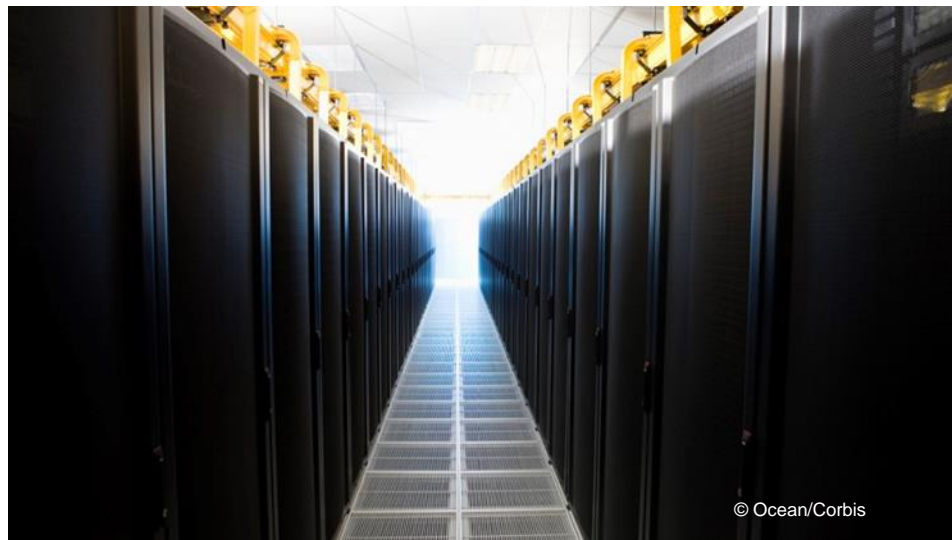
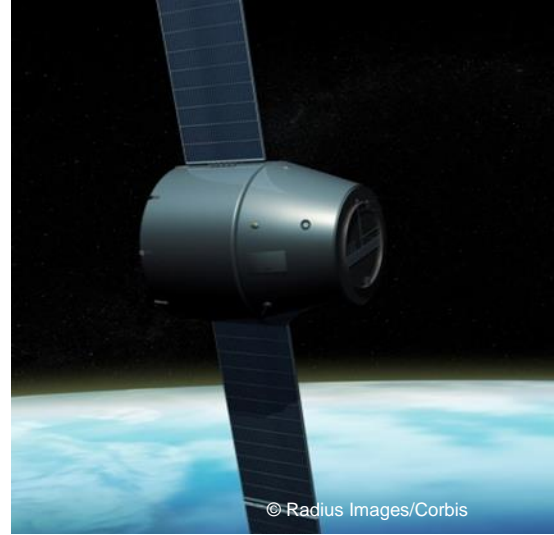
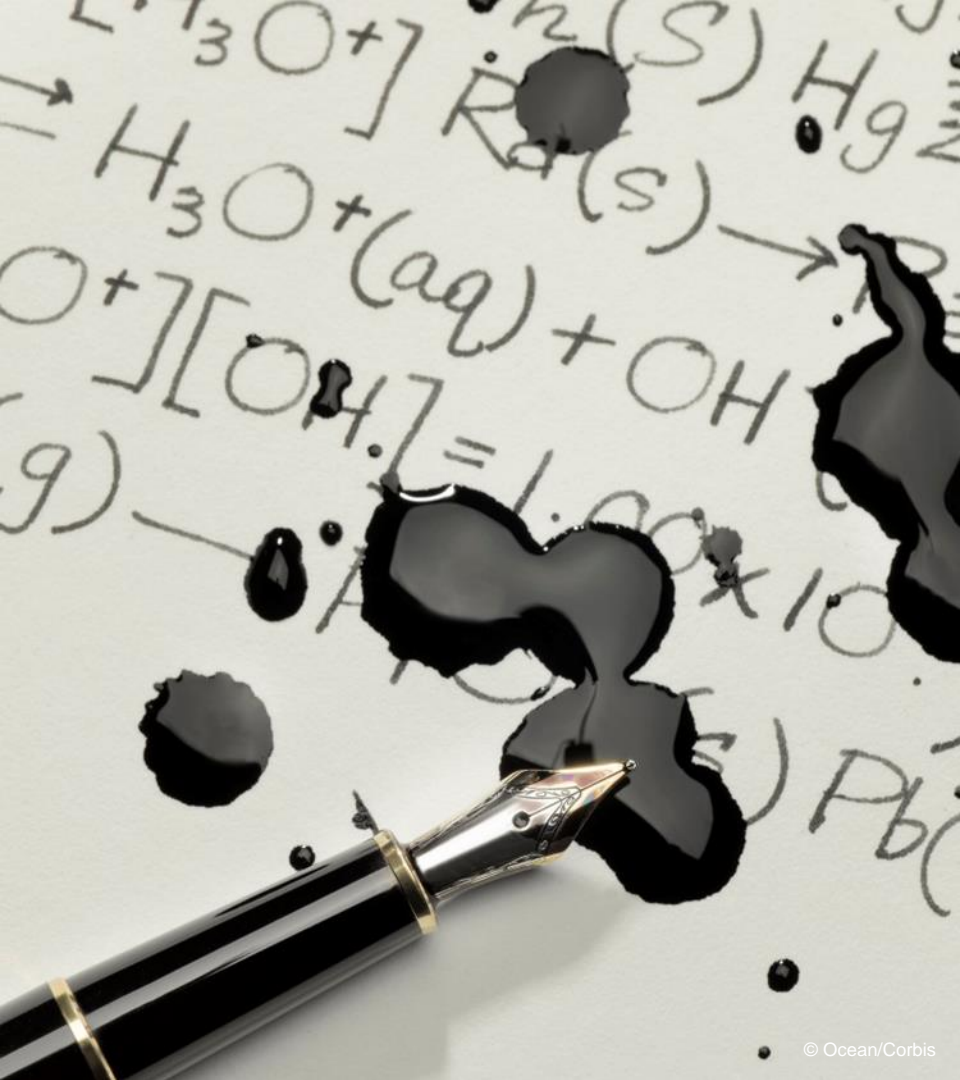
MAJOR PREVENTABLE CAUSES

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

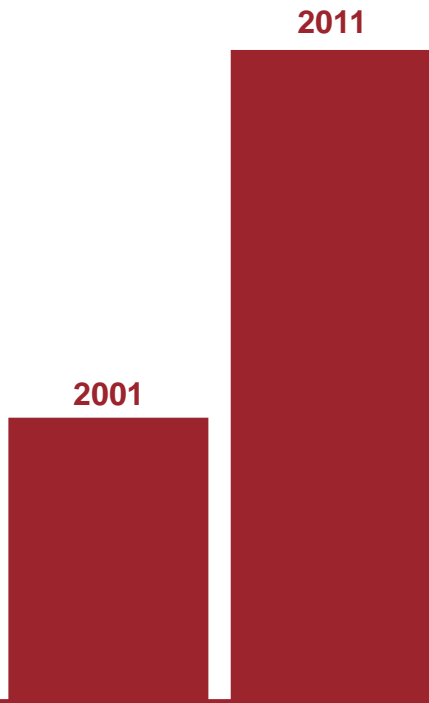


TECHNICAL HURDLES TO IMPACT ARE HIGHER IN GLOBAL HEALTH

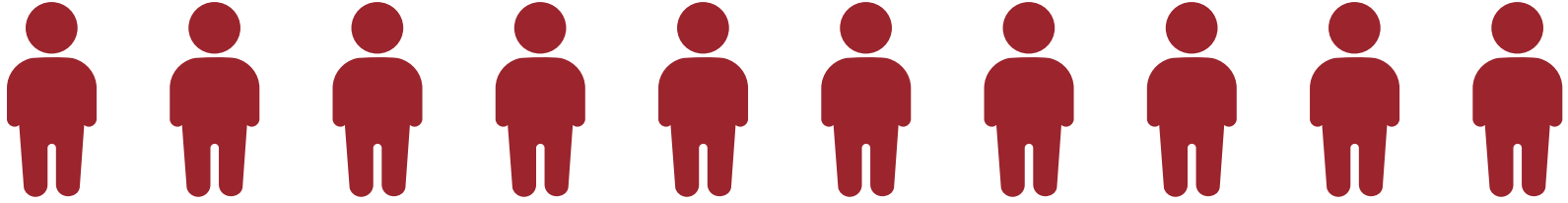
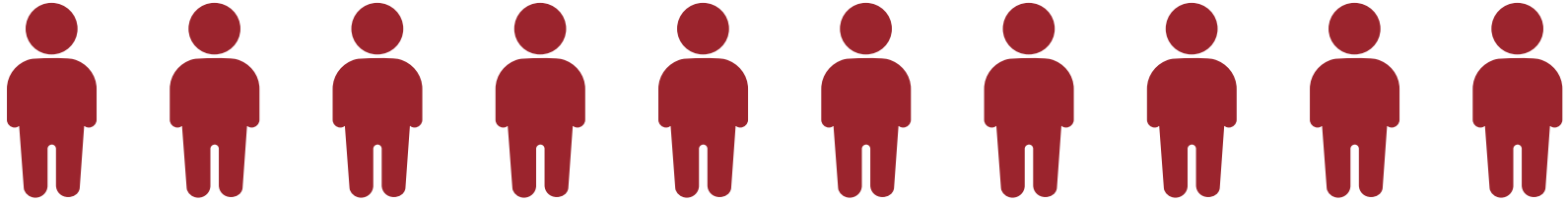
...due to environmental factors and broken delivery systems.



WHAT IS INNOVATION IN GLOBAL HEALTH?

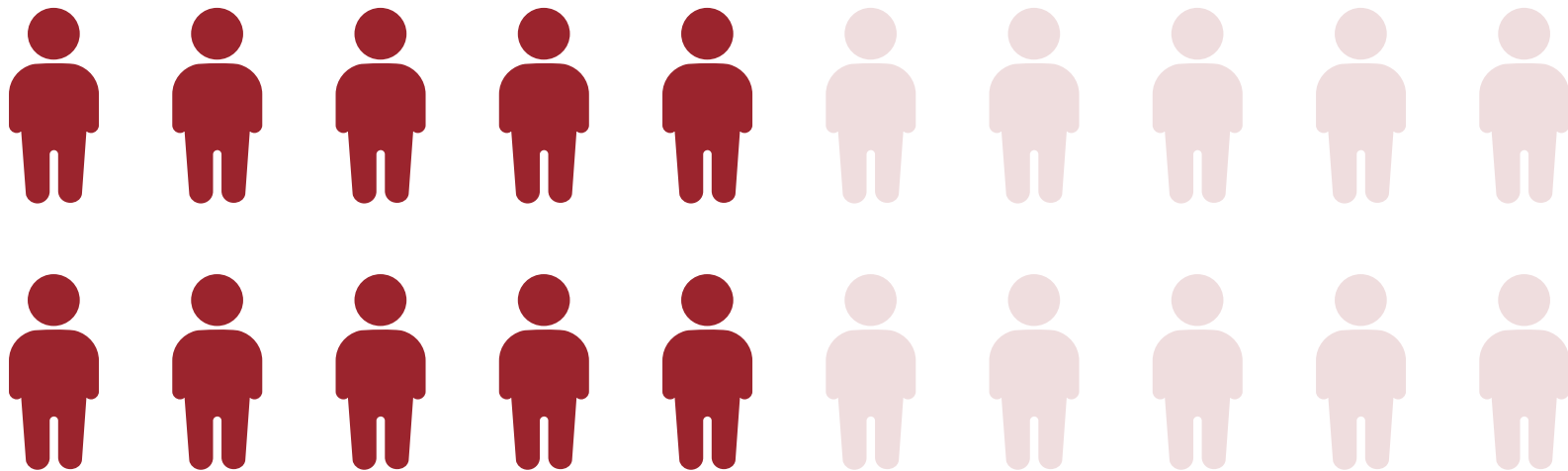


MANUFACTURERS
supplying GAVI-funded vaccines
DOUBLED



> **TWO THIRDS**
of children worldwide get vaccines from DCVMs





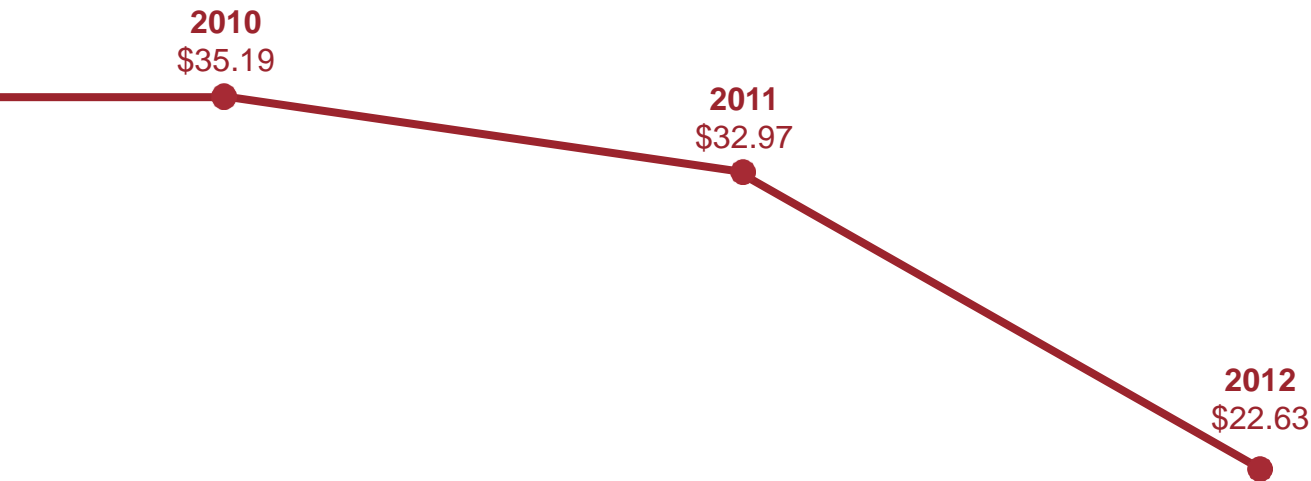
>50%

of GAVI's vaccine suppliers are DCVMs

ADDITIONAL CHILDREN IMMUNIZED

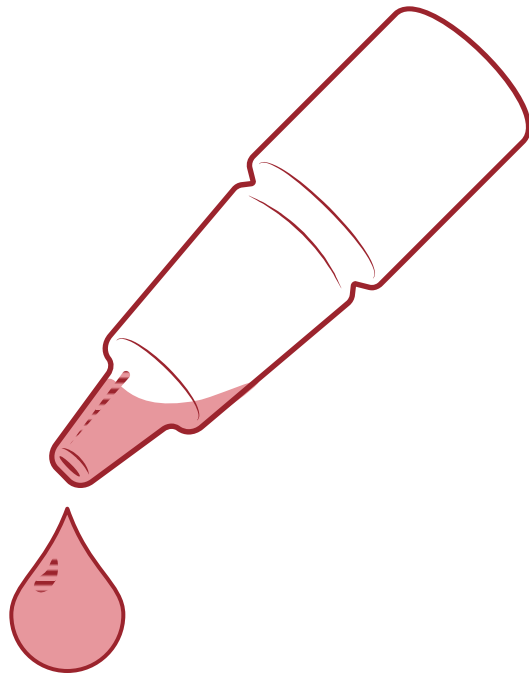
with GAVI support: **370 M**



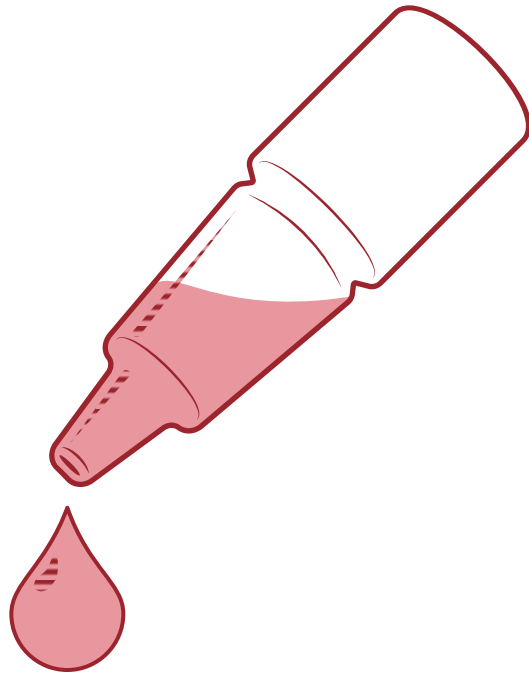


36% **DROP IN COST** to fully immunize a child with pentavalent, pneumococcal, and rotavirus vaccines.

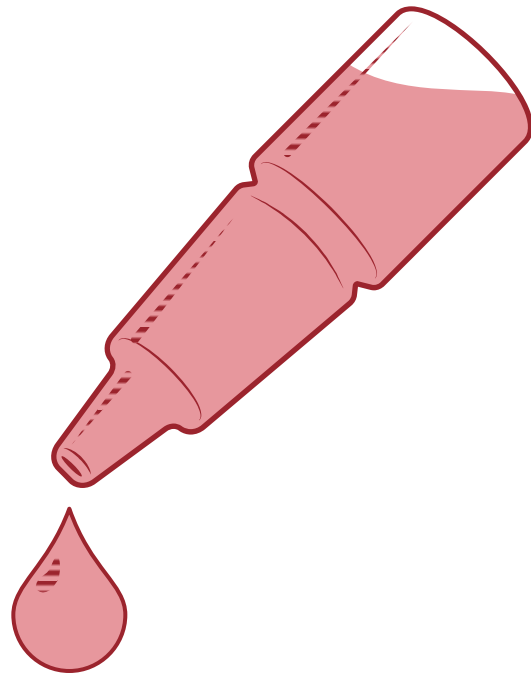
In 2009
rotavirus
vaccines were
\$7.50
per dose.



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



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





**■ 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



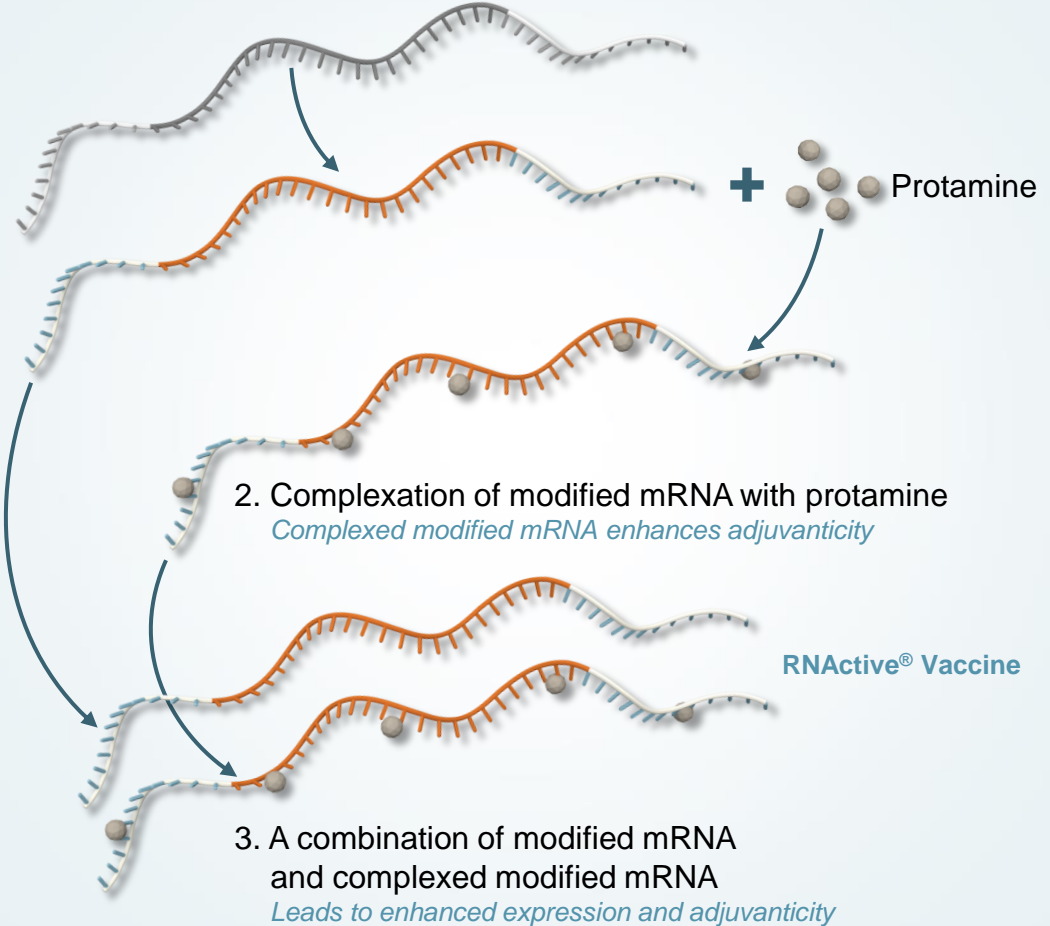
CUREVAC®

- Uses messenger RNA (mRNA) to test novel vaccines or vaccine concepts (e.g. influenza and non-live Rotavirus vaccines)
 - Efficient development - a very fast manufacturing process
 - Relatively streamlined - one manufacturing process for all product candidates
 - High stability
 - Self adjuvantage
 - Absence of any protein immunogen purification



1. RNA Modification

Modified mRNA increases antigen expression



2. Complexation of modified mRNA with protamine

Complexed modified mRNA enhances adjuvanticity

3. A combination of modified mRNA and complexed modified mRNA

Leads to enhanced expression and adjuvanticity

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



Overcoming Infrastructure Limitations

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%



AFFORDABILITY

- Sanofi-BMGF price support mechanism will enable US\$1/dose pricing for IPV
- IPV is necessary to achieve a polio-free world by 2018
- UNICEF will procure up to 300 million doses of IPV per year
- The GAVI Alliance will make IPV available for inclusion in routine immunization in 73 of the poorest countries



OVERCOMING MARKET FAILURES

We 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



GLOBAL HEALTH INVESTMENT FUND

An innovative approach to funding promising global health technologies

- A \$108 million social impact fund composed of individual and institutional investors
- Focused on development of drugs, vaccines, diagnostics, and other interventions for low-income countries
- New technologies will target malaria, TB, HIV/AIDS, and maternal and infant mortality

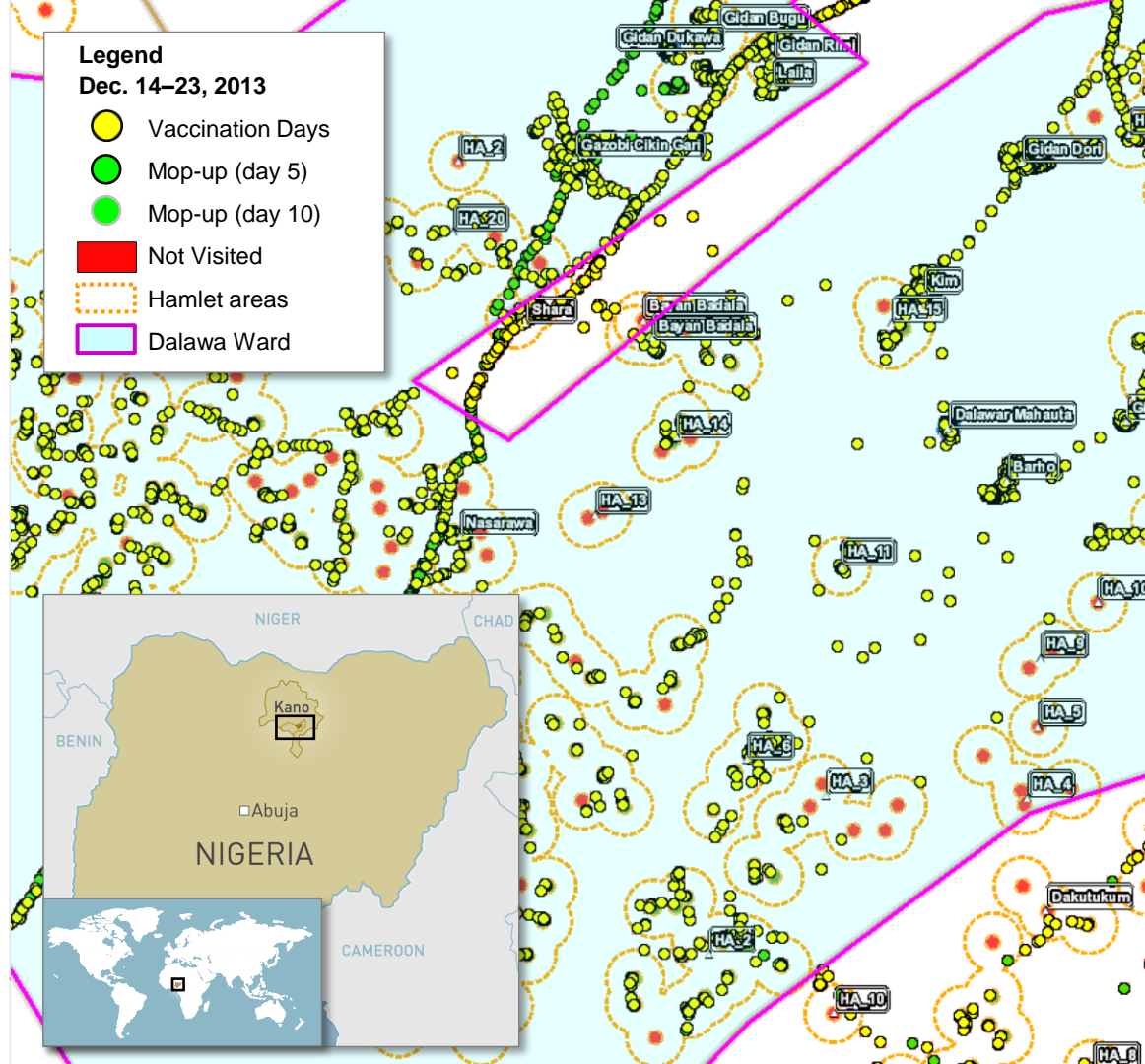


**■ IMPORTANCE OF
DATA ANALYTICS
AND MEASUREMENT**



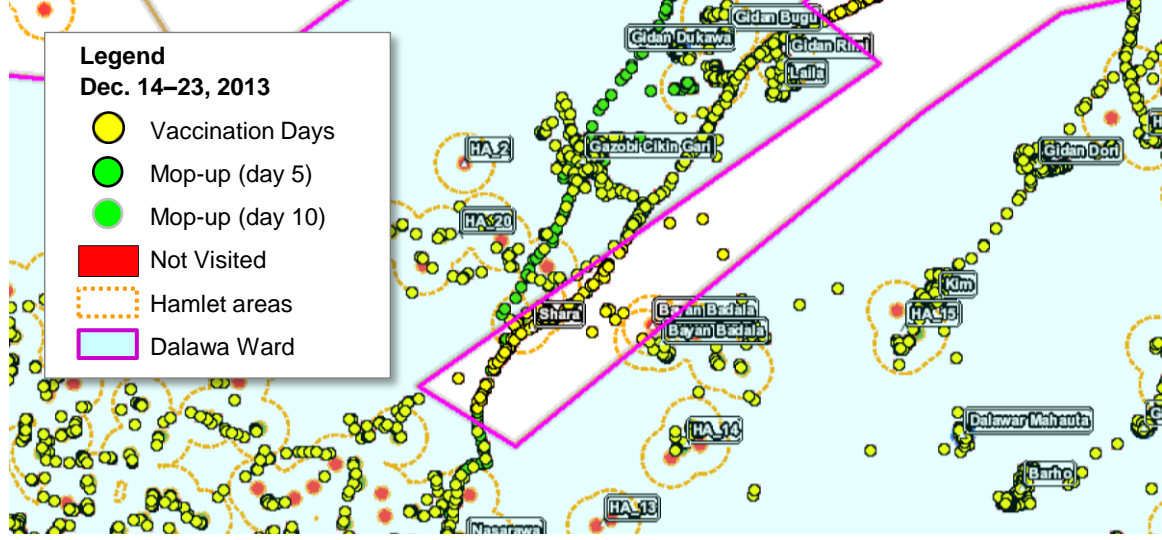
TRACKING POLIO VACCINATION IN NORTHERN NIGERIA

Using GIS mapping and GPS tracking of vaccination workers in Northern Nigeria yields data useful in improving microplanning and identifying communities missed during polio campaigns.



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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



China

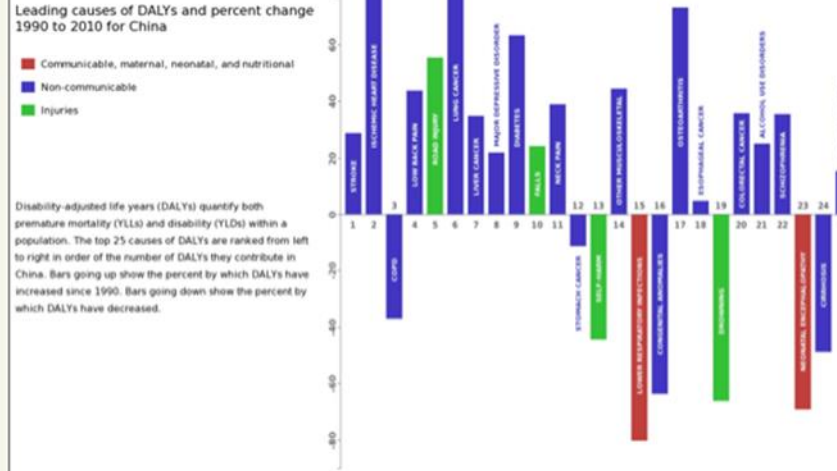


In terms of the number of years of life lost (YLLs) due to premature death in China, cerebrovascular disease, ischemic heart disease, and chronic obstructive pulmonary disease were the highest ranking causes in 2010.

Of the 25 most important causes of burden, as measured by disability-adjusted life years (DALYs), lower respiratory infections showed the largest decrease, falling by 80% from 1990 to 2010.

The leading risk factor in China is dietary risks.

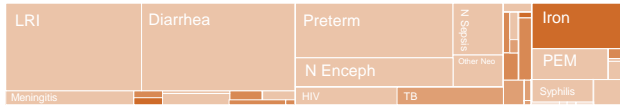
DALYs	Deaths	YLLs	YLDs
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COMMUNICABLE, MATERNAL, NEONATAL AND NUTRITIONAL DISORDERS



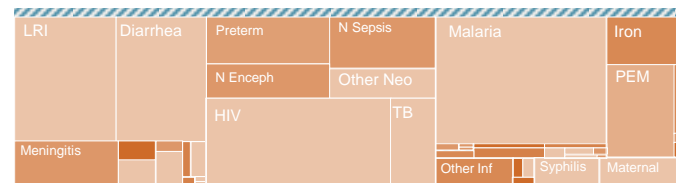
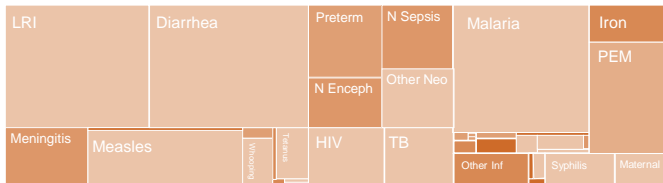
1990



2010



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



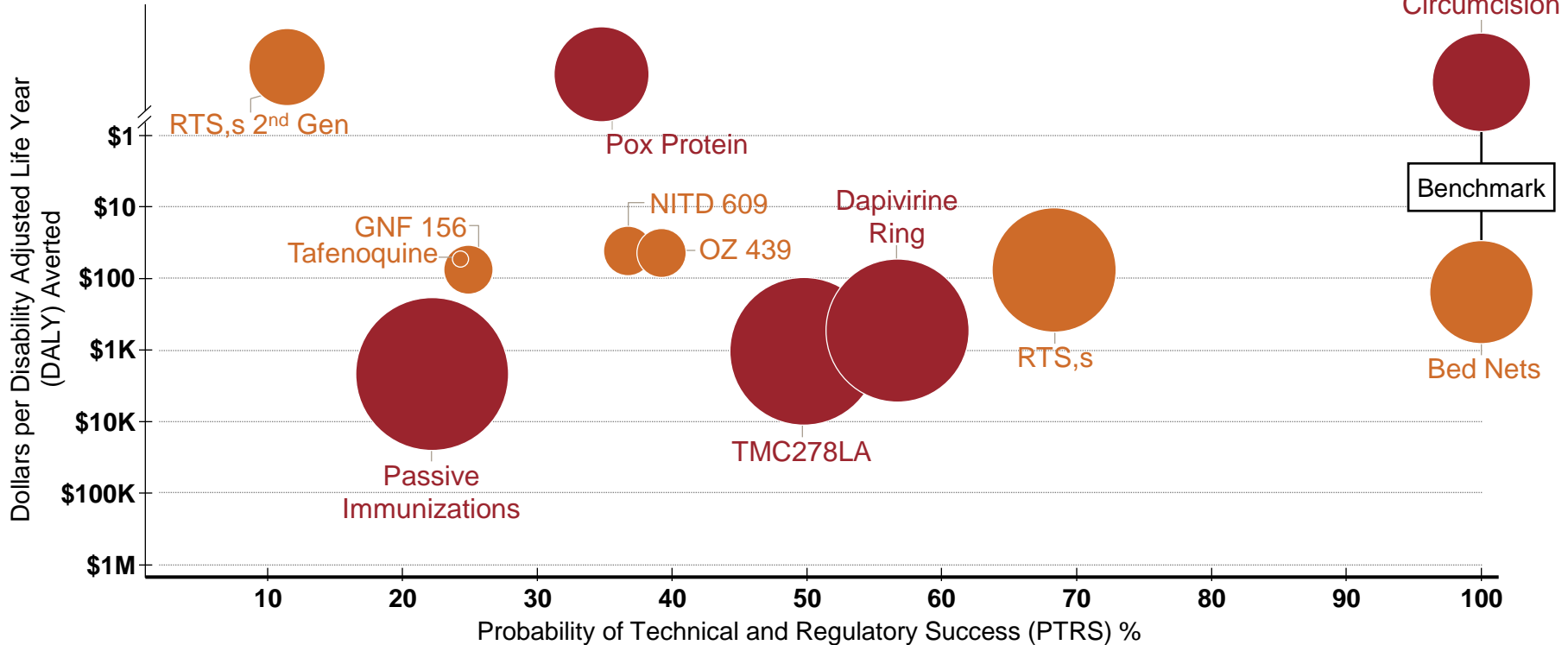
Sub-Saharan Africa, DALYs - both sexes, all ages

GUIDING OUR INVESTMENTS IN GLOBAL HEALTH

- HIV/AIDS
- Malaria
- TB
- Pneumonia
- EDD
- NID

Bubble size is equivalent to the amount of DALYs averted

100M DALYs Averted

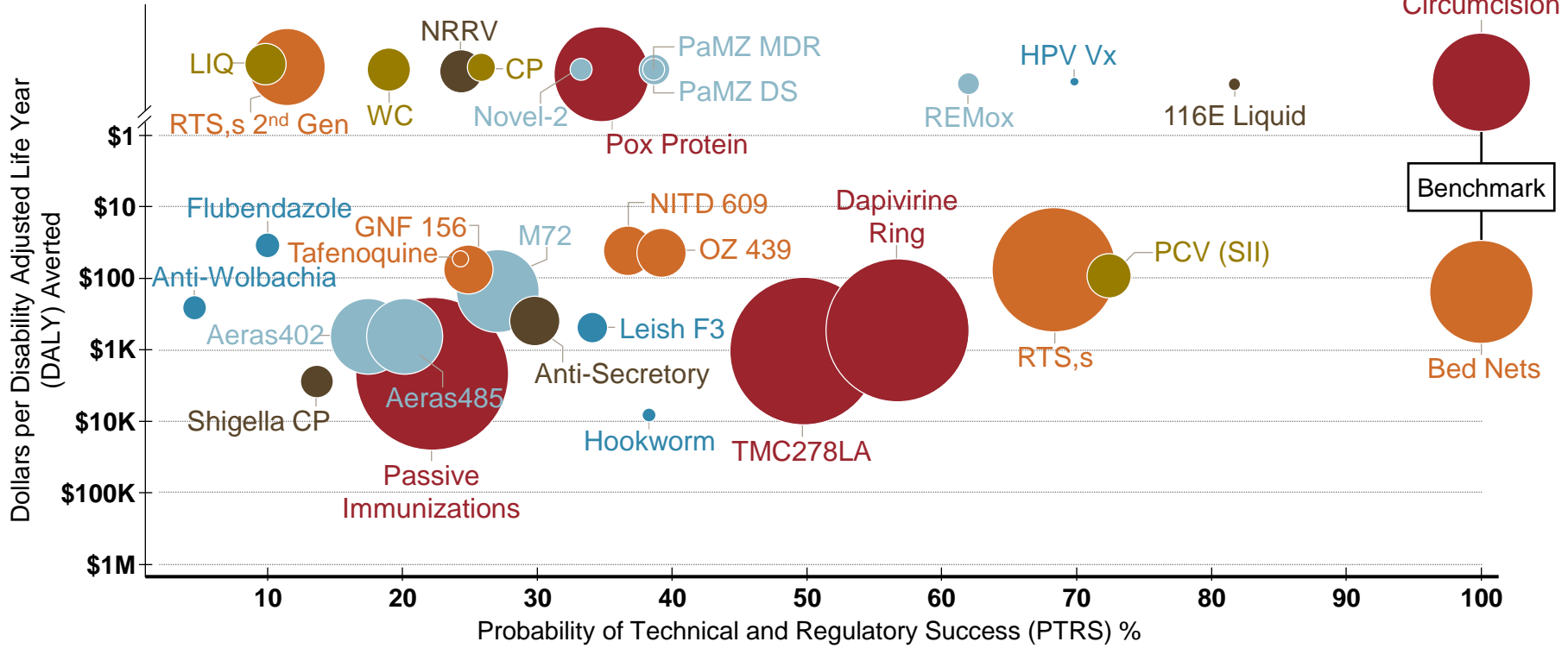


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**■ IMPORTANCE OF
PARTNERSHIPS**

SOME OF OUR PARTNERS



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

BILL & MELINDA
GATES foundation
VISITOR CENTER

ENTRANCE
CURRICULUM