



**WHO List of 17 NTDs**  
**PLoS NTDs List of 40 NTDs**

- Helminth infections
  - Ascariasis/Trichuriasis
  - Hookworm infection
  - Dracunculiasis
  - Lymphatic Filariasis
  - Onchocerciasis
  - Cysticercosis
  - Echinococcosis
  - Food-borne trematodiasis
  - Schistosomiasis
- Protozoan infections
  - Chagas disease
  - HAT
  - Leishmaniasis
- Bacterial/Viral infections
  - Buruli
  - Leprosy
  - Trachoma
  - Dengue/Japanese Encephalitis
  - Rabies

**THE QUESTION:**  
Do we need a similar rallying cry to support or galvanize the NTD community of scientists?

Should it be around tools needed for the “end game” promoting a comprehensive R&D initiative to tackle the “seventeen”?

“Seventeen by 2017”

**FUNDING SPREAD ACROSS DISEASES >\$3 Billion**

G-FINDER: YEAR 3

❖ Funding more evenly spread across the neglected diseases since first G-FINDER survey

- HIV/AIDS, malaria and TB share down from 77% to 72%
- Diarrhoeal diseases, dengue and kinetoplastids share > 5% for the first time
- Leprosy, rheumatic fever, trachoma and Buruli ulcer each received less than \$11m (0.3%)

**Enlarging the “audacious” goal:**

- Eliminating all of the 17 NTDs (40 NTDs?)
- Comprehensive research effort to develop new diagnostics, drugs, vaccines for the NTDs
- Coupled with implementation research to fold these tools into control and elimination strategies
- And *basic research* on these conditions
- Scale up of international funding

Hotez PJ. PLoS NTDs May 2011

PLoS ONE

**New Antipoverty Drugs, Vaccines, and Diagnostics: A Research Agenda for the US President's Global Health Initiative (GHI)**

Author: Hotez PJ, et al.

Abstract: Allocating just 1%–2% of Global Health Initiative funds to conduct research and development for neglected tropical diseases drugs, vaccines, and diagnostics would create a new generation of tools to eliminate our planet's greatest scourges and help shape United States foreign policy.

**A Handful Of 'Antipoverty' Vaccines Exist For Neglected Diseases, But The World's Poorest Billion People Need More**

Health Affairs (Millwood) June 2011

**Human Vaccines**  
Buruli Ulcer  
Chagas Disease  
Dengue  
Food-borne Trematodiasis  
Hookworm  
Leishmaniasis  
Leprosy  
Onchocerciasis  
Schistosomiasis

**Veterinary Transmission Blocking**  
Cysticercosis  
Echinococcosis  
Food-borne Trematodiasis  
HAT  
Rabies

NTDs Requiring Vaccines  
*Health Affairs (Millwood) June 2011*


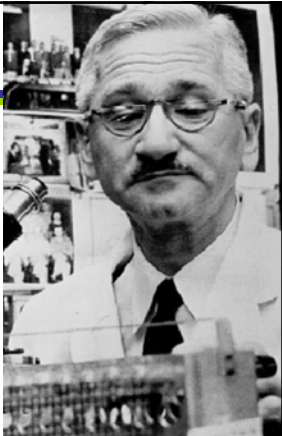
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**Veterinary Transmission Blocking**  
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**NTD Antipoverty Vaccines**  
**The Decade of Vaccines: “Outside Looking In”**

- Of the 17 Pharma only produces dengue vaccine and rabies vaccine
- AMCs and PRVs have not accelerated antipoverty vaccines
- Conspicuous by their absence
  - High morbidity (112 million DALYs)
  - but low mortality (200,000-600,000 deaths)
  - Hidden in remote rural areas LMICs (Zero market)
  - Expensive R&D
- Different model:
  - PDPs
  - Developing Country Manufacturers
  - Public Sector Vaccine Manufacturers in Brazil, Cuba, Mexico

**“The Business Plan from Hell”**

**THE RIGHT OF ACCESS TO INNOVATION**


*"A scientist who is also a human being cannot rest while knowledge which might reduce suffering rests on the shelf."*  
 —Dr. Albert B. Sabin

### Sabin Vaccine Development

PDP for NTD "Antipoverty Vaccines"






### Process Development: Bridging the "Valley of Death"



### Sabin-Brazil Technology Transfer

### Sabin PDP Clinical Field Site: Americaninhas, Minas Gerais, Brazil

Hookworm  
 32 million cases  
 68% Minas Gerais

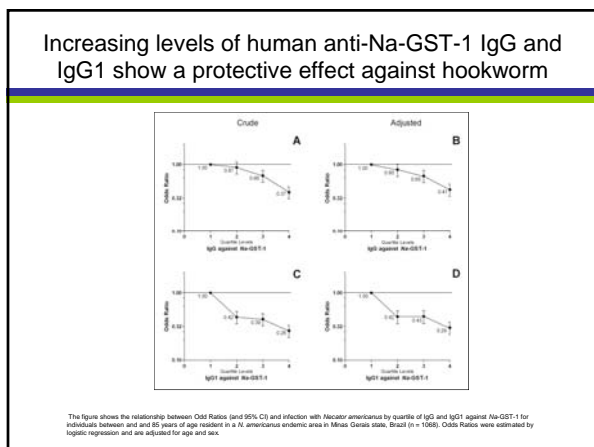
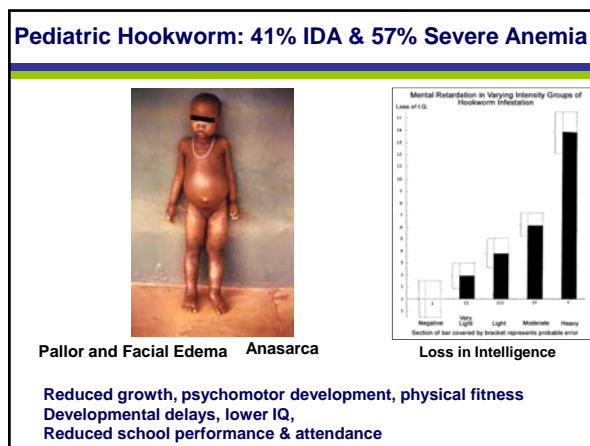
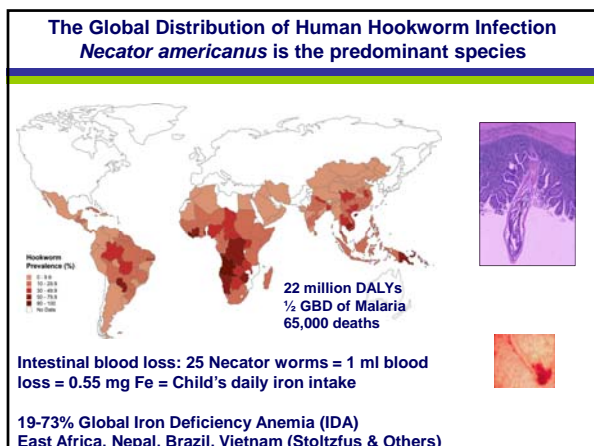
Schistosomiasis  
 2-7 million cases  
 45% Minas Gerais

**Hookworm and Schistosomiasis Co-Infections**

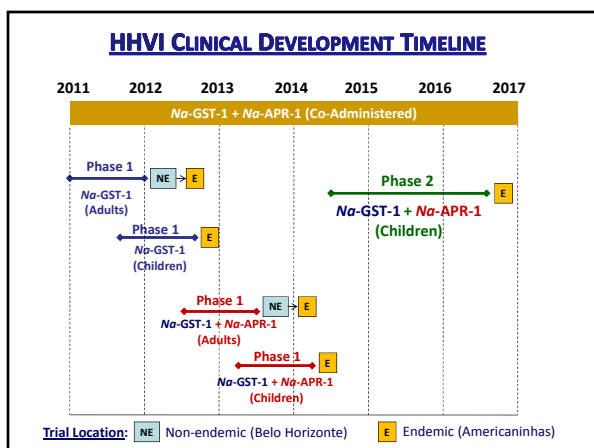
### Sabin Portfolio of Vaccines

- Human Hookworm Vaccine**
  - Bivalent recombinant protein vaccine: Na-GST-1 and Na-APR-1
  - Alhydrogel formulation ± synthetic lipid A
  - IND filing FDA – Phase 1 testing Brazil (FIOCRUZ Biomanguinhos)
- Human Schistosomiasis Vaccine**
  - Monovalent recombinant protein vaccine: Sm-TSP-2
  - Alhydrogel formulation ± synthetic lipid A
  - cGMP pilot manufacture Brazil (Instituto Butantan)
- Cruxmexvax® and Leishmexvax®**
  - Bivalent recombinant protein vaccines
  - Alhydrogel formulation + synthetic lipid A
  - Possible Nanoparticle-based vaccines
  - cGMP pilot manufacture Mexico (Birmex)

Support: B&M Gates Foundation, NIH, Dutch Ministry of Foreign Affairs, Carlos Slim Inst Health, Other Private Support



- ### Goals of Anti-Hookworm Vaccine
- Reduction of 80% of moderate/heavy hookworm infections
  - Worm burden reduction
  - Egg reduction
  - Reduced intestinal blood loss
  - Reduction in anemia and malnutrition
- 



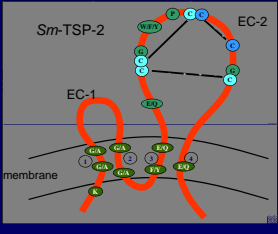
### Countries with High Hookworm & Schistosomiasis

Country	Hookworm	Schistosomiasis
Angola	11.3 million	6.1 million
Brazil	32.3 million	2-7 million
Cote d'Ivoire	10.0 million	6.6 million
DR Congo	31.0 million	14.9 million
Ethiopia	11.2 million	5.0 million
Ghana	5.5 million	15.1 million
Kenya	9.2 million	7.4 million
Nigeria	37.8 million	28.8 million
Sudan	8.1 million	5.0 million
Tanzania	9.9 million	19.0 million
Uganda	9.1 million	5.3 million
Zimbabwe	8.1 million	5.2 million



### Completed Genome Projects & Additional Vaccine

- Buruli Ulcer
- Chagas Disease
- Afr. Trypanosomiasis
- Leishmaniasis
- Leprosy
- Leptospirosis
- Lymphatic Filariasis
- **Schistosomiasis**
- Trachoma

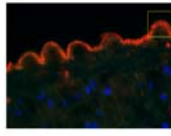


The Schistosome Tetraspanins

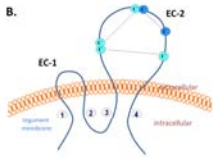
Hotez PJ, Ferris M. The antipoverty vaccines. *Vaccine* 2006

### Suppression of *tsp-2* mRNA expression results in impaired tegument turnover *in vitro*

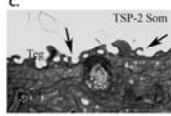
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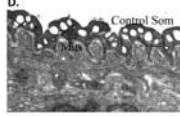


**C.**



TSP-2 Som

**D.**


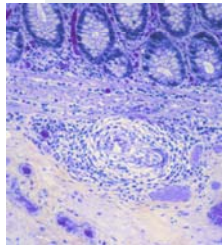


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### Goals of Anti-schistosome Vaccine

- Worm burden reduction
- Egg reduction
- Reduced end-organ pathology
- Reduction in inflammation
- Reduction in anemia and malnutrition





### Cruzmxvax: Therapeutic Vaccine for Chagas disease

Mexico




6 million cases in Mexico: Chiapas, Oaxaca, Puebla, Veracruz, Yucatan



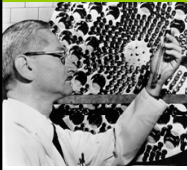

Up to one million cases in U.S.  
267,000 cases in Texas

Bivalent vaccine: Tc24 + TSA-1

Joint venture with Birmex



### Opportunity for "Vaccine Diplomacy"

"There are no better grounds on which we can meet other nations and demonstrate our own concern for peace and the betterment of mankind than in a common battle against disease" John Gardner

Hotez PJ. *SCIENCE* 2010

### Sabin's New Home Sabin Vaccine Institute & Texas Children's Hospital Center for Vaccine Development



Baylor College of Medicine  
Texas Medical Center





Feigin Center for Medical Research  
Texas Children's Hospital  
Baylor College of Medicine



100+ years of translational research & training  
in Tropical Medicine



No Equivalent School in U.S.

## Vision Statement

- The National School of Tropical Medicine will harness the scientific horsepower of the Texas Medical Center and apply it to solving global public health problems affecting the world's poorest people



Roy and Lillie Cullen Building  
Baylor College of Medicine

## Thank You

- Donor Support
  - Bill & Melinda Gates Foundation
  - Dutch Ministry of Foreign Affairs
  - Carlos Slim Institute of Health
  - NIAID, NIH
  - Brazilian Ministry of Health
  - Texas Children's Hospital-Baylor Coll. Medicine
  - Blavatnik Charitable Foundation
  - Mort and Chris Hyman