Creating a Health Policy for Forgotten Diseases & Forgotten People

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The Millennium Development Goals

The NEGLECTED TROPICAL DISEASES: The “NTDs”

*Born out of Desperation of “the other diseases”*

1. Eradicate extreme poverty and hunger.
2. Achieve universal primary education.
3. Promote gender equality and empower women.
4. Reduce child mortality.
5. Improve maternal health.
7. Ensure environmental sustainability.
8. Develop a global partnership for development.
The Neglected Tropical Diseases

- **13-14 tropical infections:**
  - Highly prevalent among the poor
  - Endemic in rural areas of low-income countries
  - Ancient (“the biblical diseases”)
  - Chronic
  - Disabling (growth delays, blindness or disfigurement)
  - High morbidity but low mortality
  - Stigmatizing
  - Poverty promoting

*NTDs: The most common afflictions of the “bottom billion”*
The 17 Neglected Tropical Diseases

- Ascariasis: 816 million
- Trichuriasis: 465 million
- Hookworm Disease: 444 million
- Schistosomiasis: 252 million
- Onchocerciasis: 44 million
- Lymphatic Filariasis: 36 million*
- Food-borne Trematodiases: 16 million*
- Leishmaniasis: 10 million
- Chagas disease: 7.5 million
- Trachoma: 4.4 million*
- Cysticercosis: 1.4 million*
- Echinococcosis: 1.1 million
- Leprosy: 181,000
- Dengue: 179,000*
- African Trypanosomiasis: 37,000*
- Rabies: 1,100
- Yellow Fever: 100
- Yaws: ND
- Buruli ulcer: ND

*No cases specific morbidities
“It’s quite a problem for me when I have to stand at work for long periods.”

Lymphatic Filariasis (“Elephantiasis”)
“My parents brought me two suitors but neither decided to marry me.”

Lymphatic Filariasis ("Elephantiasis")
NTDs & Poverty

The 17 NTDs
Chronic & Disabling Conditions

- Reduce productive capacity
- Impair intellectual & physical development in children
- Cause adverse pregnancy outcomes

The Bottom Billion Suffers from Multiple NTDs!

Ascariasis, Trichuriasis, Hookworm, Schistosomiasis, LF, Onchocerciasis, Trachoma, Food-borne Trematodes
The Rapid Impact Package

- Albendazole (GSK) or Mebendazole (J&J)
- Diethylcarbamazine (Eisai) or Ivermectin (Merck & Co)
- Praziquantel (Merck KgaA)
- Azithromycin (Pfizer)

BIG SEVEN NTDs
- Ascariasis
- Trichuriasis
- Hookworm
- Lymphatic Filariasis
- Onchocerciasis
- Schistosomiasis
- Trachoma

Bonuses:
- Strongyloidiasis
- Trematodiases
- Taeniasis
- Scabies

US $0.50 all inclusive

DRUGS
+ Delivery
+ Equipment
+ Health education materials
+ Training of personnel
+ Monitoring and Evaluation

US $0.50 per person per year

NTD Control and Elimination Highly Cost Effective
Rapid Impact Package = Cost Effective

Range of treatment costs per person per year

HIV/AIDS
Malaria
TB
“Rapid Impact” Package

Cost per patient treatment per year (US dollars)

Only 50¢ per person per year!
NTD Scale up with the U.S. Government

George W. Bush 2001-2009
USAID NTD Program

USAID SUPPORT SINCE 2007
Cumulative Number of NTD Treatments Provided: 572,800,000
Cumulative Number of People Treated: 251,300,000

Funding in Million USD

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Funding (Million USD)</th>
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<td>2012</td>
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Africa:
- Benin
- Burkina Faso
- Cameroon
- DRC
- Ghana
- Guinea
- Mali
- Mozambique
- Niger
- Nigeria
- Sierra Leone
- Senegal
- Tanzania
- Togo
- Uganda

Asia:
- Bangladesh
- Cambodia
- Indonesia
- Philippines
- Lao PDR
- Nepal
- Vietnam

Americas:
- Haiti
Post-2015 MDGs and SDGs
The Global Dengue Pandemic

- 390 million dengue infections annually
  - Bhatt et al 2013 *Nature*
  - India 132 million
  - Indonesia 31 million
  - China 26 million
  - Brazil 22 million
  - Bangladesh 16 million
  - Pakistan 14 million
Dengue and Bollywood

Priyanka Chopra
Ranveer Singh

Yash Chopra
“BLUE MARBLE HEALTH”
The Poor Among the Wealthy

The New Face of NTDs?
Opportunity for Science Diplomacy?

Blue Marble photographed by Apollo 17, Dec 7, 1972
NTDs in Texas & Southern United States

>12 million Americans with NTDs

- Toxocariasis  3 million
- Chagas disease  1 million
- Trichomoniasis  7 million
- Cysticercosis  0.2 million
- Toxoplasmosis  1 million
- Dengue  0.1 million
- **Human Hookworm Vaccine**
  - Bivalent recom protein vaccine
  - Na-GST-1 + Na-APR-1
  - Alhydrogel formulation + synthetic lipid A
  - IND filing FDA – Phase 1 testing Brazil (FIOCRUZ Biomanguinhos)

- **Ascariasis and Trichuriasis Vaccines**
- **Human Schistosomiasis Vaccine**
  - Monovalent recombinant protein vaccine
  - Sm-TSP-2
  - Alhydrogel formulation + synthetic lipid A
  - cGMP pilot manufacture Brazil (Instituto Butantan)

- **Chagas disease and Leishmaniasis Vaccines**
  - Bivalent recombinant protein vaccines
  - Alhydrogel formulation + synthetic lipid A
  - cGMP pilot manufacture Mexico (Birmex)

- **SARS vaccines**
Origins of Vaccine Diplomacy