PUBLIC-PRIVATE PARTNERSHIP IN DRUG DEVELOPMENT

SS7 NETHERLANDS SOCIETY OF TROPICAL MEDICINE AND INTERNATIONAL HEALTH (NVTG): WHERE AID MEETS TRADE: EXPLORING BUSINESS APPROACHES AND PUBLIC PRIVATE PARTNERSHIPS FOR HEALTH

Nathalie Strub Wourgaft – Medical Director – DNDi – Sept 8 2015
To respond to the needs of neglected people

- Poorest of the poor
- Living in remote areas
- Socioeconomic burden on family and community
- Marginalized & voiceless patients

A Decade Ago, Pipeline Virtually Empty for Neglected Diseases

Health R&D (1975 – 1999)

- 1,393 total products approved
- 11%: 16 new drugs for neglected diseases

A Fatal Imbalance

From 1975-1999:
- 16 of 1,393 new products for neglected tropical diseases = malaria and TB (1.1%) despite these diseases representing 12% of global disease burden
- approx. 10% of R&D dedicated to illnesses that affect 90% of global disease burden (‘10/90 gap’)

Fatal Imbalance Remains Despite Progress Over A Decade

- 3.6% of new products for neglected diseases (reformulations, combinations)
- 1.2% of NCEs for neglected diseases
- Only 14% clinical trials (of nearly 150,000 trials) focus on neglected diseases
- Only 1% of global health investment for neglected diseases*

*Source: 'Meeting of sustainable health research and development goals: what's been done, what's missing, and what role is there for global philanthropy?' Bottiglieri et al., Lancet, May 2013

Source: Fatal Imbalance: The Crisis in Research and Development for Neglected Diseases, MSF, 2001

Drugs for Neglected Diseases Initiative
Product Development Partnerships (PDPs) initiated 15 years ago….

- Not-for-profit organizations focusing on NTD drug/vaccine/diagnostics development created around a decade ago

- Main features:
  - Advance global health goals by accelerating the development of products that may not otherwise be developed
  - Fill the gaps in translational research and product development
  - Strategic collaborations with public and private sectors from developed and developing countries
  - Develop research networks
  - Use and strengthen developing countries R&D capacities

=> This innovative organizational model proves to be successful
DNDi:
Patient Needs-Driven & Innovative R&D Model

- Deliver **16 to 18 new treatments by 2023**
- Establish a **robust pipeline**
- Use and strengthen existing **capacity in disease-endemic countries**
- **Raise awareness** and advocate for increased **public leadership**

**Founding Partners**
- Indian Council for Medical Research (ICMR)
- Kenya Medical Research Institute (KEMRI)
- Malaysian MOH
- Oswaldo Cruz Foundation, Brazil
- Médecins Sans Frontières (MSF)
- Institut Pasteur France
- TDR (permanent observer)

*7 worldwide offices*
DNDi Portfolio June 2015
6 New treatments since 2003

- **HAT**
  - SCYX1330682
  - SCYX1608210

- **Leishmaniasis**
  - Nitroimidazoles
  - Oxaleish
  - Amino pyrazoles
  - CpG-D35 (CL)
  - Anfoleish (CL)
  - New CL combos

- **Chagas**
  - Chagas H2L
  - Biomarkers
  - Fexinidazole
  - New Benz Regimens/Combos

- **Filaria**
  - Macro Filaricide 2
  - Emodeside

- **Paediatric HIV**
  - Two ‘4-in-1’ LPV/r based FDC granules
  - Superbooster HIV/TB

- **Mycetoma**
  - Emodeside

- **Malaria**
  - ASAQ FDC
  - Artesunate-Mefloquine
  - ASPM FDC

- **New Chemical Entity (NCE):** Fexinidazole (for HAT, VL, and Chagas disease) = 1 NCE
DNDi’s Model for Drug Development

• At early discovery stage:
  – Compounds come from academia, pharmas, biotechs
  – Biological characterizations are conducted at major parasitology research centres ("reference centres")
  – Pre-clinical development with dedicated CROs, etc.

• Clinical trials:
  – Collaborating partners include institutions and experts from disease-endemic countries, health authorities, and regulatory experts, and frequently MSF teams

• Registration and manufacturing:
  – Pharmaceutical partners provide essential capabilities to register, and ensure sustainable production and distribution
  – Technological transfer for production in Southern countries
  – adoption and deployment by National Programs
Working with private pharmaceutical industry – the bilateral value

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<th>For DNDi</th>
<th>For the pharmaceutical partner</th>
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<td>□ expertise in drug development, manufacturing and registration</td>
<td>□ fulfilling Social Corporate Responsibility committment</td>
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<td>□ access to libraries</td>
<td>□ opening access to new markets</td>
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<td>□ in-kind expertise along development chain</td>
<td>□ shared risk</td>
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<td>▪ expand scientific know-how</td>
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<td>▪ expand access to new partners</td>
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<td>(academia, policy, regulatory)</td>
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Dynamic Industrial Partnerships at All Stages of Development

**Research**
- **Screen**
  - HAT
  - Leishmaniasis
  - Chagas
  - Filaria
  - Paediatric
  - HIV
  - Malaria

**Translation**
- **Pre-clinical**
  - Phase I
  - Phase Ila/PoC

**Development**
- **Phase IIb/III**

**Implementation**
- **Registration**
- **Access**

- **New Chemical Entity (NCE); Fexinidazole (for HAT, VL and Chagas Disease) = 1 NCE**

Jan. 2014
Some public partners ... from Bench to Bedside

- Antwerp University
- Broad Institute
- CRESIB
- FIOCRUZ
- Fuenlabrada University Hospital
- Griffith university
- ICMR
- IEND, University of Khartoum
- Institut de Recherche pour le Développement (IRD)
- Institute of Tropical Medicine
- Institute Pasteur Korea
- Instituto de Salud Carlos III
- ICCDRB (Bangladesh)
- KEMRI
- LSHTM
- Makerere University
- McGill University
- Medical Research Council
- Monash University
- Rheinische Friedrich Wilhems Univeristät
- Shaheed Sukhrawardy Medical College Hosp.
- Stellenbosch University
- Swiss TPH
- Texas Biomedical Research Institute
- The Ohio State University
- Universidad Peruana Cayetano Heredia
- University of California San Francisco
- University of Dundee
- University of Georgia Research Foundation
- University of Gondar
- University of Nairobi
- University of Oxford (WWARN)
- Uppsala University

And also ...
Three Regional Disease Platforms to Strengthen Capacities

**Clinical Research Platforms**
- Defining patient needs and TPP
- Strengthening local capacities
- Conducting clinical studies (Phase II/III)
- Facilitating registration
- Accelerating implementation of new treatments

**Transfer of technology**
- Data Management Centre – Nairobi
- Clinical sites with good practices
- Building networks of excellence (i.e. ANDi)
Success of discovery & research partnership: SCYX7158 now in Phase 1

Challenges: compounds access, optimization, IP management

Anacor
- Boron-based compounds
- Input on product development

DNDi
- Project management
- Funding
- Gets IP rights for neglected diseases

SCYNEXIS
- Compound screening
- Developing leads into clinical candidates

IP
- Funding

Pace University and STI
- in vivo models
- Animal testing

licenses on NTD
Leveraging Expertise for Development

**Key Partnership Characteristics**

- **Co-Development**
  - Managed by a joint development committee
  - DNDi in charge of clinical development via its regional clinical platforms
  - Industry partner in charge of manufacturing, registration & distribution

- **Non-restrictive licensing in endemic countries**

Sanofi for Sleeping sickness

Bayer for onchocerciasis

Eisai for Chagas Disease
NECT, Improved Therapy Option for HAT
Implemented in 13 Countries (100% of reported stage 2 *T.b. gambiense* cases)

- MSF & Epicentre initiated trial
- **Bayer & sanofi**
- WHO & PNLTHA
- A simplified, safe & effective treatment for stage 2 HAT
- WHO Essential Medicines List (2009)
- Implemented in 13 Countries (100% of cases)
  - Over 13,000 treatments distributed
- Drastic decrease in melarsoprol use

Treatments for stage 2 HAT in DRC (2012)
First innovative partnership ASAQ FDC
Over 400 Million Treatments Distributed

- Partnership signed in 2005
- Pre-qualified by WHO in 2008
- Less than 1 USD for adult & less than 0.5 cents for children
- Easy-to-use
- Non-patented product
- Registered in 30 African countries, India, Ecuador & Colombia
- First Risk Management Plan with MMV and Sanofi
- Transfer of technology to Zenufa (Tanzania)

In partnership with Sanofi
Artesunate-Amodiaquine Fixed Dose Combination: FACT Partnership

Industrial Partner
Sanofi & Zanufa

DNDi / (TDR):
scientific coordination & project management

Other partners worldwide

DNDi
Drugs for Neglected Diseases initiative
Target Product Profile:
- 4 products in 1: granules (FDC)
- Simply open and use with water, milk, food
- No taste
- No cold chain
- Suitable for infants (< 2 months-3 yrs)
- TB-treatment compatible
- Affordable

Planned with LPV/r pellets & NRTIs dispersible tablet – Phase 3b to start in Kenya Q3 2015 followed by Uganda, Tanzania, South Africa, Malawi and Zimbabwe.

LPV/r pellets received USFDA tentative approval May 2015.
DNDi’s Funding Strategy

**Independence** through diversified sources of funding

- 50% of funding from public institutional donors in line with DNDi’s advocacy objective (public responsibility for NDs)
- 50% from private sector (foundations, major donors, general public)
- Key contributions to come from Founding Partners
- Maximum of 25% per donor

**Sources of funding - Projection**

- **New investments**: €433 m
- **To be secured**: €293 m
- **Secured**: €140 m
- **Expenses 2003-2014**: €217 m
- **Total**: ~€650 m

- New mechanism & Emerging countries [Pub & private] ~20-25%
- Public Traditional donors ~35-40%
- Private Traditional donors ~35-40%

*Business plan 2015/2023*
Large Diversification of public & private donors €359 M Raised since 2003

Core Funding
- United Kingdom – DFID
- Médecins Sans Frontières
- Spain – AECID
- Switzerland – SDC
- Other Private Foundations - Rockefeller, Slim, Starr, FINEP, Moreau

Portfolio Funding
- BMGF–
- Netherlands – DGIS
- France – AFD & MAEE
- Germany – KFW & GTZ
- Norway – NORAD
- Brazil – MoH

Project Funding
- BMGF
- UNITAID
- USAID
- Wellcome Trust
- EU– FP5,6,7 & EDCTP
- Medicor Foundation
- Japan GHIT Fund
- USA – NIH/NIAID
- Switzerland – Canton de Genève
- UBS Optimus Foundation
- The Global Fund – AMFm
- Ruta’N Medellin –
Lessons learned …

Like for any partnership

Set-up common goal

- … Identify respective skills and competencies, avoid duplication, build up trust, manage expectancies, agree to disagree … but define operating rules and decision making process
- Be clear on partner/service provider
- Share ownership at the end
- Be flexible and understand the partner’s working culture and their constraints – encourage F2F meetings
Partnerships: No One Can Do It Alone
A Global Network to Leverage Resources

Criteria for Success:
- Share the same vision
- Mutual understanding
- Involvement throughout the whole process

Universities / Research institutes
Pharmas / Biotechs
PDPs
Int. Org / NGOs
CROs
MoH / Gov / Hospitals
To Give a voice to neglected patients

They exist....

They must be heard.

THANK YOU!