‘Introduction to Developing World Health’

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Presentation Outline

• “Neglected Tropical Diseases”
• Pharmaceutical R&D
• NTD funding
• Background to DWH
The Devastating Effect of NTDs

- >1.4 billion people affected by NTDs
- 90% of the disease burden of NTDs is in Africa, accounting for > 600,000 deaths, many of which are children
- Two thirds of the total population of Africa have two or more NTDs and require regular treatment
- NTDs cause human misery (deformities, stigma, chronic, debilitating or permanent disability including blindness
- Reduce the economic productivity of adults
- Impair growth and cognitive development of children
The WHO has prioritised its efforts to control 17 NTDs:

- Buruli Ulcer
- Chagas Disease (American trypanosomiasis)
- Cysticercosis
- Dengue/dengue haemorrhagic fever
- Dracunculias (guinea-worm disease)
- Echinococcosis
- Fascioliasis
- Human African trypanosomiasis (HAT)
- Leishmaniasis
- Leprosy
- Lymphatic filariasis
- Onchocerciasis
- Rabies
- Schistosomiasis
- Soil-transmitted helminthiasis
- Trachoma
- Yaws
The Scottish Encounter with Tropical Disease

• NTDs have afflicted humanity for millennia and have acquired notoriety as disabling and deforming diseases

• In the past, their serious impact on health and productivity led to considerable knowledge about the diseases

• Much of this understanding came from the pioneering work of Scottish physicians and scientists such as Dr David Livingston, Sir Patrick Manson, Sir Ronald Ross, Sir David Bruce and Dr William Leishman

• Scotland is still considered a world leader in research into parasitic diseases
The Scottish Heritage in Tropical Diseases

- Dr David Livingstone (1813-1873)
- Born in Blantyre near Glasgow
- One of the greatest explorers of the Victorian age
- Found that quinine was effective against malaria
- Suggested tsetse fly as the agent that transmitted trypanomiasis
- Introduced use of arsenic to treat trypanomiasis
- Influenced a generation of Scottish doctors and scientists
2 quite different pioneers

Thomas Mitchell Morris Sr.
16 June 1821 - 24 May 1908
Old Tom Morris
The ‘father of Professional Golf’

Sir Patrick Manson
3 October 1844 - 9 April 1922
The ‘father of Tropical Medicine’
Pharma Landscape & Trends in relation to NTDs

• The increasing cost of R&D and the reducing returns in terms of products reaching registration, is leading Pharma companies to set far higher thresholds of potential sales before committing to a product

• Shareholder pressure dictates which diseases are targeted: chronic diseases affecting patients in developed countries are prioritised

• Traditionally pharma companies have little financial incentive to work on NTDs in the developing world even although they represent the most significant areas of unmet need

• Pharma is recognising that in a global world, health is an international concern

• NTD Pharma interest not motivated by commercial returns but by longer term business concerns; reputational risk, ethical issues & positioning in growing developing country commercial markets – Brazil, India, Africa
• Every year more than US $70 billion is spent worldwide on health R&D by the public and private sectors

• An estimated 10% of this is used for research into 90% of the world's health problems - "the 10/90 gap“

• This unequal allocation of the world’s health resources means that diseases that afflict the world’s poorest people have been largely ignored

• Of the 1,500+ new drugs approved from 1975-2000, just 18 drugs (~1%) were for infectious diseases that disproportionately affect the developing world

Source: Doctors Without Borders
"Some of the biggest or cruelest killers…have few advocates, no global funds and nowhere near the attention they deserve"

<table>
<thead>
<tr>
<th>Disease(s)</th>
<th>Burden (Billions of DALYs)</th>
<th>Funding for Research (Billions of Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS*</td>
<td>84.5</td>
<td>1.0575</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>62</td>
<td>0.11125</td>
</tr>
<tr>
<td>NTDs</td>
<td>56.6</td>
<td>0.19125</td>
</tr>
<tr>
<td>Malaria*</td>
<td>46.5</td>
<td>0.4575</td>
</tr>
<tr>
<td>Tuberculosis*</td>
<td>12.4</td>
<td>0.40075</td>
</tr>
</tbody>
</table>

*‘The Gates Big 3’*

Apparently there are only three diseases on that planet!
"Only 0.6% of overseas development assistance for health is allocated to neglected tropical diseases, despite such diseases affecting at least 1 billion people."

See Comment page 3
The Vital Role of Pharma

Merck & Co Inc
Mectizan for as long as needed for onchocerciasis and filariasis in Africa

Pfizer
Azithromycin for trachoma 120 million doses

sanofi aventis
Support for drugs for sleeping sickness treatment

Medpharm
(generic manufacturer)
Praziquantel via Canadian voluntary funds (0.20 US$/treatment)

Novartis
Continuing commitment to MDT for leprosy and drug for fascioliasis

GlaxoSmithKline
Albendazole for lymphatic filariasis at least to 2020

Johnson & Johnson
Mebendazole for intestinal worms
We are focused on the development of treatments and potential cures for some of the most devastating tropical diseases on Earth, affecting millions of people in the developing world.

Our Focus
Our initial focus is to target specific tropical infectious diseases which have no or limited treatments available. These include Chagas Disease, Leishmaniasis, Dengue Fever and Malaria.

Our Goals
The SGHF aims to seek partnerships with Pharmaceutical companies, Institutions and hospitals to conduct medical research on new cures or treatment approaches to specific diseases.

Latest News
Click to view the latest on events and initiatives at the Scottish Global Health Foundation, as well as publications related to the work we do.

Make a Difference. Donate Now

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Sir David Bruce (1855-1931)

• Born in Melbourne to Scottish parents, lived in Stirling & educated at University of Edinburgh
• Identified trypanosomes as the cause of ‘nagana’ in cattle and sleeping sickness in humans
• Discovered the bacterial cause of Malta fever (Brucellosis)
• Other Scottish scientists involved in the field of trypanomiasis:
  - George Law (1872-1952)
  - Murial Robertson (1883-1973)
Our Target

**NTD control is:**
a critical component of achieving
the United Nations Millennium
Development Goals (MDGs);
reducing poverty and childhood
mortality, improving opportunities
for education & maternal health
Our Focus

Developing World Health is a Scottish-based charity with two main strategic aims:

1) the development of new treatments for NTDs such as leishmaniasis (VL/CL), HAT, Chagas and Dengue

2) Fundraising and advocacy to help implementation of NTD MDA working in partnership with the Schistosomiasis Control Initiative (SCI), part of the Imperial College of London.

In 2010, DWH & SCI formed a joint campaign called the *50p Life Change Appeal* to raise necessary funds to treat as many school children in Sub Saharan Africa as possible.

70% of funds – MDA
30% of funds – R&D
DWH Scientific Advisory Board

• Prof. Michael Barrett  
  Glasgow Biomedical Research Centre, U of Glasgow

• Prof. Simon Croft  
  Head Dept. of Infectious & Tropical Diseases  LSHTM

• Prof. Alan Fairlamb, CBE  
  Welcome Principal Research Fellow & Prof. of Biochemistry, U of Dundee

• Prof. Alan Fenwick, OBE  
  Head of Schistosomiasis Control Initiative, Imperial College London

• Prof. Jim McKerrow  
  Director Sandler Institute, UCSF, USA

• Prof. David Molyneux  
  Centre for Neglected Tropical Diseases, Liverpool School of Tropical Medicine
Ambassadors & Friends of Developing World Health

Brian Cox
Ambassador

Ben Fogle, TV Presenter & Explorer

Gamu Nhengu, Singer

Shakira (Ripoll), Singer
“This is a vitally important area of healthcare intervention in Africa and we aim to significantly raise awareness of the association with these infectious diseases and the impact that a very cost-effective disease prevention strategy can have on the NTDs and HIV/AIDS transmission”

Professor David Molyneux
Centre for Neglected Tropical Diseases, Liverpool School of Tropical Medicine

Annie Lennox, singer & AIDS Campaigner
A New Partnership: Targeting NTDs that urgently need new & safe treatments
Developing World Health
&
The Life Change Appeal

Based at The University of Stirling Innovation Park
Life Change Appeal

‘50p to eradicate 7 NTDs’

‘For as little as 50 pence an individual can receive treatment for all 7 of these most common NTDs for an entire year, and we can continue to develop new treatments for those NTDs, such as African sleeping sickness, which urgently need them’ Brian Cox
Thank You
Developing World Health
Founder & CEO: Dr Stuart WG Smith

• 20+ years experience in healthcare
• BSc (Hons) and PhD in tropical parasitology (Schistosomiasis)
• Post-doc University of Newcastle Medical School - Leukaemia
• Experience in human and veterinary tropical parasitology (CAMCO/Schering AG- UK & Africa)
• Drug development & Commercial experience in Pharmaceutical & Biotech sectors
• Founder of 3 healthcare companies (DMC, BIVN, NuCana)
• Fellow of the Linnean Society, New York Academy of Sciences & Royal Society of Tropical Medicine & Hygiene
“Dr Livingston I presume?”
The WHO has listed 17 NTDs & the list is growing!

- **Protozoan Infections:**
  - Leishmaniasis (VL, CL, MCL)
  - Human African trypanosomiasis (HAT)
  - Chagas Disease (American trypanosomiasis)

- **Helminth Infections:**
  - Schistosomiasis
  - Soil-transmitted helminth infections
  - Lymphatic filariasis
  - Onchocerciasis
  - Dracunculiasis (guinea-worm disease) [eradicated – almost!]
  - Fascioliasis
  - Cysticercosis & other zoonotic diseases

- **Viral Infections:**
  - Dengue/dengue haemorrhagic fever
  - Rabies

- **Bacterial Infections:**
  - Buruli Ulcer
  - Leprosy
  - Trachoma
  - Yaws

  New Kids on the Block 'neglected' conditions:
  - Podoconiosis
  - Snakebite
  - Strongyloidiasis
The NTD Landscape

- Major advances in biotechnology over the last 30 years have transformed medicine in the industrialized world, but these innovations have yet to reach the world’s poorest countries
- Today, 1.1 billion people live on less than $1 US dollar per day
- 11 million children under the age of 5 die every year, many from preventable or treatable diseases
- Malaria claims the lives of approximately 1 m children every year
- 1.4 billion people (one sixth of the world's population) suffer from one or more neglected tropical diseases (NTDs)
NTDs & HIV/AIDS in SSA

• Over 1 billion people in SSA are infected with the 7 most common NTDs

• These NTDs have an adverse, albeit largely hidden, impact on the AIDS epidemic in Africa

• Due to the extremely high prevalence of these NTDs more people are susceptible to HIV/AIDS (x3-x10 more at risk)

• Research in Zimbabwe revealed 75% of women had female genital schistosomiasis (FGS) which increased their chances of contracting HIV 3-5 fold

• NTDs represent a potent force fuelling Africa’s AIDS epidemic

• A combined and integrated approach between HIV/AIDS and NTD control and elimination would increase the cost-effectiveness of both NTD and HIV/AIDS efforts while also becoming a powerful tool to combating these diseases.
“Having recently visited Africa, I’ve personally witnessed the devastation that these diseases cause. It’s in all our power to help tackle the scourge of neglected tropical diseases. Whilst children are the most vulnerable, these diseases cause human misery to millions due to social stigma, deformities, chronic and debilitating pain.”

Brian Cox, Hollywood actor
Ambassador of Developing World Health

Child suffering from Trachoma, the biggest cause of reversible blindness Worldwide