

Perspectives and Issues in Building Global Health Alliances: The TB Alliance-Bayer Moxifloxacin Deal

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Public-Private Partnerships



*'I'm going to explain Public,
Private Partnerships until you
feel drowsy and fall asleep'*

Public-Private Partnership

An organization that pursues a social mission by employing the best practices of the private sector and drawing upon resources from the public and private realms

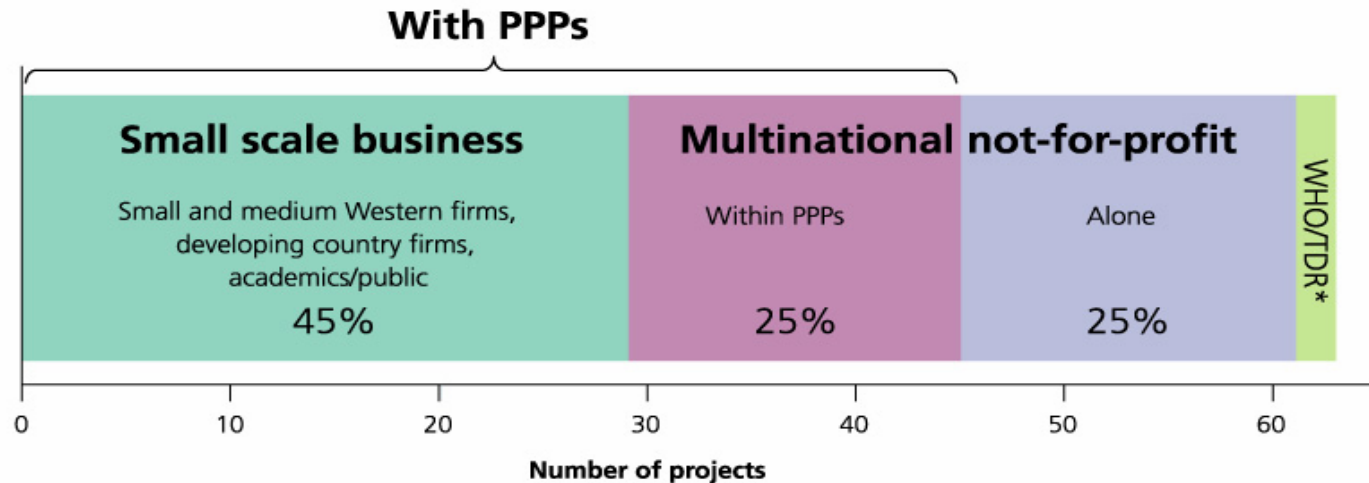
A Short History of Product-Development PPPs

- For decades public-private partnerships have been established for product distribution – recent statements call for more investment in product-development PPPs
- Communiqué on Africa by G-8 leaders in 2005 committed to “increasing direct investment and taking forward work on market incentives, as a complement to basic research, through such mechanisms as Public Private Partnerships . . . to encourage the development of vaccines, microbicides and drugs for AIDS, malaria, tuberculosis and other neglected diseases.”
- Report of WHO Commission on Public Health, Innovation, and Intellectual Property Rights (2006) recognizes that public-private partnerships “have an important part to play in developing new products”
- Such statements reflect emerging trend

The Numbers

- It has often been reported that of the 1393 new medicines approved between 1975 and 1999, only 13 medicines were for the treatment of neglected diseases that most impact developing countries
- Study done by Dr. Mary Moran at the Wellcome Trust/London School of Economics:
 - 63 drugs for the treatment of neglected diseases (not including vaccines) have been registered or are in development since 2000
 - 14 of those drugs are under development by industry alone and the remaining 49 through public-private partnerships.

Neglected disease R&D: A newly-active field*



*Unable to verify details for three WHO/TDR projects.

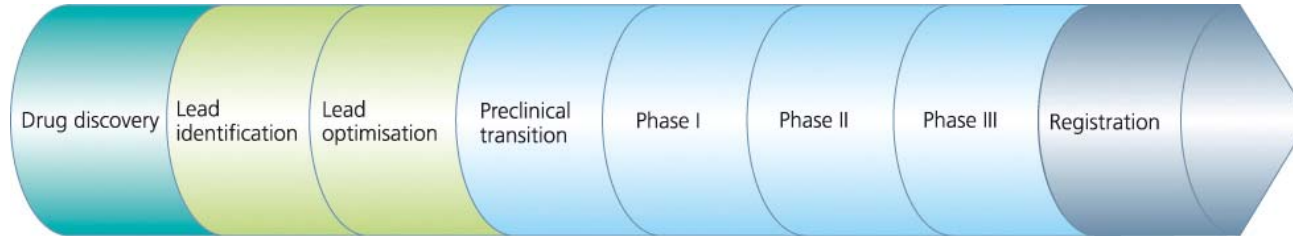
- Major R&D increase since 2000
 - 63 projects (at end 2004)
 - Translates into 8-9 new neglected disease drugs by 2010
- Large and small companies; predominantly in public-private partnerships
- Happening *outside* government policies and incentives and largely without government funding

* Slide used with permission, Dr. Mary Moran, The George Institute of International Health

Gaps Filled by PPPs

- Stages of Medicine Development:
 - (1) **Basic research**
 - (2) **Pre-clinical research**
 - (3) **Clinical research**
 - (4) **Registration**
- PPPs can fill gaps between public sector activities and private sector involvement – “Social Venture Capital”

New business model*



- Industry moves up-stream to lower-cost higher-innovation drug discovery
- Public partners help with end-pipeline clinical development and implementation of resulting industry drug candidates
 - Lower cost/risk to industry allows firms to deliver final drugs to developing country patients at cost-price

KEY POINT: The new R&D model relies on “public” partnering

* Slide used with permission, Dr. Mary Moran, The George Institute of International Health

Patents, Markets and Development

- Where the market supports it, intellectual property protection encourages private investment to fill gaps
- When the gaps remain unfilled, largely in markets where patients have no purchasing power, the result is scarcity of new medicines for diseases.
- Additional public sector funds can fill the gaps

Public Sector Goal

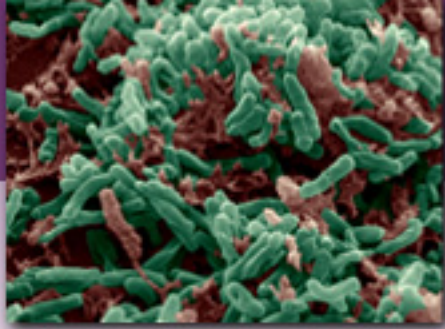
- Once the product is developed and approved, contractual arrangements in public-private partnerships generally provide that it will be distributed and sold in developing countries at lowest possible prices to promote access.
 - Contract may set the conditions of price and quantity in developing countries, or
 - Allow for multiple suppliers in developing countries.
- Access is not one-dimensional “price issue”

Specifics

- Intellectual property rights may be leveraged in three ways:
 - Price: Rights to intellectual property in high-income markets contingent on subsidizing price of medicines (at desired quality and quantity) for poor people in developing countries.
 - Generate Income: Where intellectual property that has broad applicability – such as outside the “field” of the treatment of neglected diseases – value may be harnessed to subsidize cost of existing medicines or may be channeled into the furtherance of other public health goals.
 - Control: Decide who will be able to manufacture and distribute medicines in given geographic area – in particular to ensure desired quality or other public health goals

Principles

- First, the starting point for public-private partnership and any ensuing agreements has to be the public health goal that is being sought
- Second, need to:
 - Be sure all parties understand goals of project,
 - What is needed to allow all parties to bring their background rights to a given project and
 - Whether certain intellectual property rights that arise in project should be protected and, if so, how managed to achieve public health goal
- Third, negotiate to ensure all pieces are in place to assure success
 - If parties to the agreement do not continue, other parties must have rights necessary to do so (including background and project intellectual property)
 - Any commitments as to price and quantity must have clear parameters as to how they are met and provisions to continue with another party if not met



TB Drug Development – The Global Alliance for TB Drug Development



GLOBAL ALLIANCE FOR
TB DRUG DEVELOPMENT



Tuberculosis

- One-third of the world's population is infected with *Mycobacterium tuberculosis*
 - 2 billion people
- 2 million deaths occur each year
 - 1 person dies every 15 seconds
- Leading cause of death in HIV-positive people
 - 12 Million people are TB/HIV co-infected
- 400,000 cases of MDR-TB each year



Current TB Drug Therapy

- **Active TB**
 - Standard therapy – 4 drugs (isoniazid, rifampin, pyrazinamide & ethambutol) for 2 months, followed by isoniazid and rifampin for 4 months
- **Multi-Drug Resistant TB (MDR-TB)**
 - Prolonged therapy, few available drugs, poorly tolerated and difficult to administer
- **TB/HIV Co-Infection**
 - Drug interactions with antiretroviral agents - simultaneous therapy difficult
- **Latent TB**
 - Standard therapy – isoniazid for 9 months



The Need for New TB Drugs

- Complex 6-9 months treatment with a 4 drug combination regimen
- No new anti-TB drug in over 30 years
- TB/HIV co-infections fueling each other
- MDR-TB is on the rise
- Unattractive market for private sector
- No capitalization of public sector research



The TB Alliance

- International Public-Private Partnership
- Non-profit organization
- Based in New York, Brussels and Cape Town
- Entrepreneurial, virtual R&D approach
 - Out-source R&D to public or private partners
- Pro-active fundraising



TB Alliance Mission

To develop a faster and affordable
tuberculosis cure
that will advance global health
and prosperity



Profile of New TB Drug

- Shorten the duration of TB treatment or otherwise simplify its completion
- Be effective against multi-drug resistant tuberculosis (MDR-TB)
- Improve the treatment of latent TB
- Be compatible with HIV treatment



TB Alliance AAA Strategy

- **Affordability**
 - Appropriate pricing in developing countries
- **Adoption**
 - Ensure that new drugs are incorporated into existing treatment programs
- **Access**
 - Procurement and distribution to those patients who need them most



Types of Deals/Agreements

- Licensing
- Sponsored Projects
- Outsourcing/Contracts
- Co-Development
- Co-Investments
- Partnerships
- Others



TB Alliance Portfolio 2006

	<i>Discovery</i>	<i>Preclinical</i>	<i>Clinical</i>
Compounds, Analogs and Derivatives	Quinolones (KRICT/Yonsei University)	Nitroimidazo-oxazole Backup Compound (Otsuka Pharmaceutical)	Nitroimidazole PA-824 (Chiron)
	Macrolides (University of Illinois at Chicago)		Moxifloxacin (Bayer HealthCare AG)
	Enoyl ACP Reductase Inhibitors (GlaxoSmithKline)		Nitroimidazo-oxazole OPC-67683 (Otsuka Pharmaceutical)
	Isocitrate Lyase Inhibitors (GlaxoSmithKline)		
	Pleuromutilins (GlaxoSmithKline)		
	Focused Screening (GlaxoSmithKline)		
	Carboxylates (Wellesley College)		
	Nitroimidazole Analogs (University of Auckland, NITD, NIAID)		
	Screening and Target Identification (AstraZeneca)		

 **Active TB Alliance program**
 **TB Alliance in discussion**



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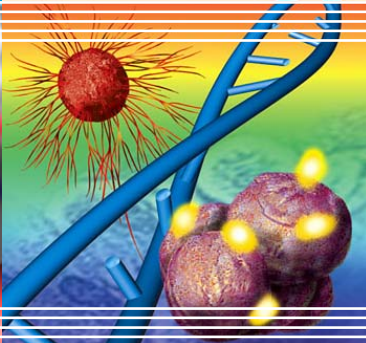
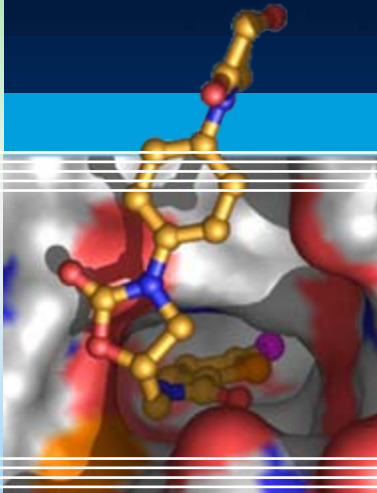
Global Alliance for TB Drug Development

www.tballiance.org



Bayer HealthCare

“Science for a Better Life”



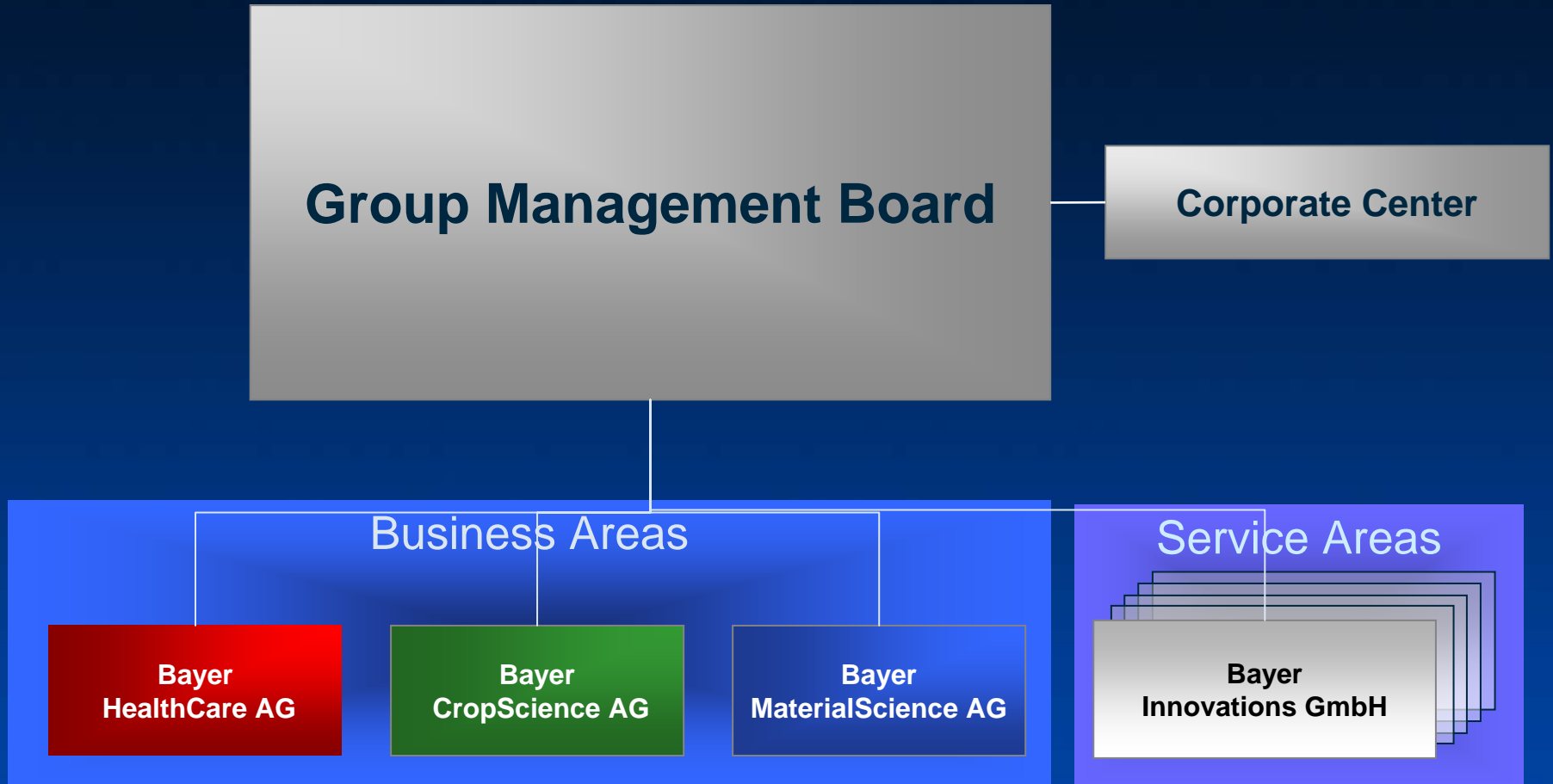
Forward-Looking Statements

This presentation contains forward-looking statements based on current assumptions and forecasts made by Bayer Group management.

Various known and unknown risks, uncertainties and other factors could lead to material differences between the actual future results, financial situation, development or performance of the company and the estimates given here. These factors include those discussed in our public reports filed with the Frankfurt Stock Exchange and with the U.S. Securities and Exchange Commission (including our Form 20-F).

The company assumes no liability whatsoever to update these forward-looking statements or to conform them to future events or developments.

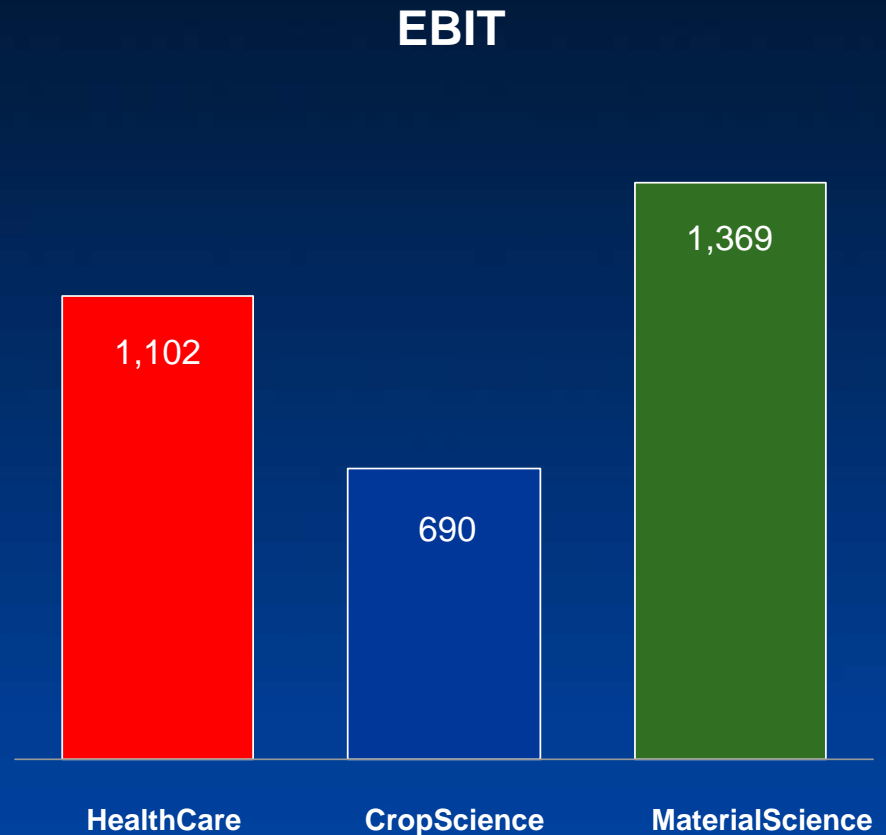
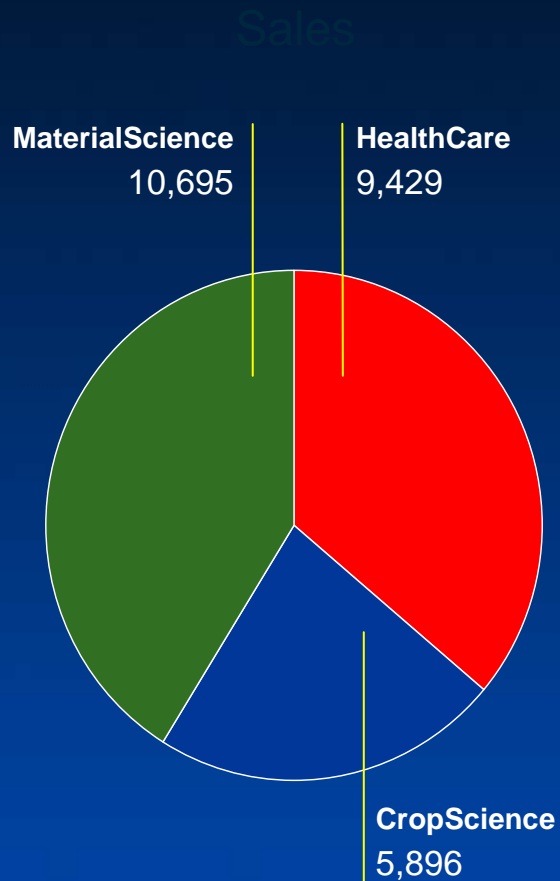
Bayer AG (Holding Company)



Performance by Subgroups

Full year 2005

EUR million



Bayer HealthCare AG

Bayer HealthCare AG

**Animal Health
Germany**



**Consumer
Care
USA**



**Diagnostics
PTS
USA**



**Diabetes Care
STS
USA**



**Pharma/
Biological
Products
Germany**



Bayer HealthCare

Bayer HealthCare in 2005

Consumer Care

- Aspirin®
- Alka-Seltzer®
- Canesten®
- One a Day®

25%

Diabetes Care

- Ascensia®
- Contour®
- Breeze®

8%

Diagnostics

- ADVIA® Centaur
- ADVIA® IMS

16%

41%

Pharma

- Cipro®
- Adalat®
- Avelox®
- Levitra®
- Kogenate®

Animal Health

- Advantage®
- Baytril®

10%

BHC
2005 Sales*
€9.5 Billion

+ 17 %

*) incl. Roche, excl. Plasma

What led Bayer to support the development of moxifloxacin in TB?

A sense of social responsibility and a desire to make available a drug that could potentially save millions of lives. This is not a new position for Bayer.

Bayer supports and subscribes universal environmental and social principles



United Nations **Global Compact**



The Global Compact Initiative set up by the United Nations is a unique project backed by the world organization and world business leaders. Its objective is to pursue Ten Principles relating to human rights, labor standards and environmental protection on a global basis. Bayer is not only committed to the principles but is one of just eight German companies and approximately 50 enterprises in the world which are founder members of the Global Compact.

- Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
- Principle 2: make sure that they are not complicit in human rights abuses.
- Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4: the elimination of all forms of forced and compulsory labor;
- Principle 5: the effective abolition of child labor; and
- Principle 6: the elimination of discrimination in respect of employment and occupation.
- Principle 7: Businesses should support a precautionary approach to environmental challenges;
- Principle 8: undertake initiatives to promote greater environmental responsibility; and
- Principle 9: encourage the development and diffusion of environmentally friendly technologies
- Principle 10: Businesses should work against all forms of corruption, including extortion and bribery.



Bayer Developing New Malaria Medicine - artemifone



- For Bayer, this project is a further successful example of partnerships with public organizations and foundations to combat diseases that affect primarily developing countries.
- 300 to 500 million people become infected with malaria each year, and the disease almost exclusively affects developing countries.
- Of the one to three million people who die of malaria each year, most are children under five years of age.
- The demand for new treatment options is likely to continue to rise in the coming years due to increasing resistance to currently used medicines.
- About 2.5 billion people live in regions where there is a risk of contracting malaria.
- MMV's stated goal is to halve the number of malaria cases by 2010 and ultimately eradicate the disease.
- Registration of artemifone is planned for 2009.

Bayer has chosen cooperation with the WHO as one relevant forum to contribute to the dissemination of the principles of the Global Compact.

- Sleeping sickness threatens over 60 million people in 36 countries of sub-Saharan Africa.
- Only 3 to 4 million people at risk are under surveillance, with regular examination or access to a health centre that can provide screening.



Bayer is involved in PATTEC - the Pan African Trypanosomiasis and Tsetse Eradication Campaign, which was established in July 2000 - by contributing to vector control activities.

The enterprise has agreed to provide Germanin to the WHO free of charge for an initial five-year period. The WHO will inform the governments of disease-endemic countries of the availability of free supplies of suramin, including the procedure to be followed for obtaining such supplies. The drug will be donated to the World Health Organization which, on recommendation of a group of WHO-appointed experts, will conduct six-monthly reviews of the amounts needed to treat the disease and approve requests for drugs.

In addition and as part of its corporate commitment to combat African sleeping sickness, Bayer intends to support studies for a label extension of its pharmaceutical product Lampit (active ingredient: nifurtimox) for use in treating African Sleeping Sickness. Originally, nifurtimox had been registered for the treatment of Chagas' disease. Several trials have taken place using different dosages for treatment of sleeping sickness.

International Commitment



Philosophy

Our efforts are designed to benefit society and our company.

Sustainable Development

Bayer's commitment to society and the environment

- Bayer has operations in more than 150 countries around the globe, and the company is committed to social projects in many of these countries. Bayer's foreign subsidiaries bear responsibility for selecting and managing these projects, both according to local needs and in line with corporate policy considerations and interests.
- Projects are selected in dialog and often in cooperation with Non Governmental Organizations (NGOs) that are prepared to work by mutual agreement to solve specific problems.
- At a number of sites, Bayer also maintains Public-Private- Partnerships, which are cooperation projects with local and government organizations.
- At Bayer, we believe our technical and business expertise involves a responsibility to work for the benefit of mankind and contribute to sustained and environmentally friendly development. Our goal is to grow the value of our company over the long term and generate a high value added in the interests of our stockholders, employees and society at large in all the countries in which we operate.



Bayer also spearheads public health initiatives.



The World Health Organization (WHO) report on infectious diseases 2000 points out that antibacterial drug resistance will become one of the most serious health care challenges in the 21st century.

Bayer has launched a global initiative to preserve the effectiveness of antibiotics. It aims to work with leading health organizations and experts to help tackle the growing threat caused by bacteria rapidly developing resistance to today's antibiotics, a serious problem affecting developing countries as well as industrialized states. Since Article 25 of the Universal Declaration of Human Rights (UDHR) states that everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, the project is perfectly in line with the Global Compact Initiative and its aims.

Bayer continues to develop and foster new programs

SOCIAL RESPONSIBILITY



Water for the World: We promote research on our most precious resource

In a unique collaborative effort, Bayer and NATIONAL GEOGRAPHIC want to promote scientific projects focusing on the development of new sources of water supply, the distribution of water and the careful management of this raw material.

Youth Environmental Program

Bayer is committed to strengthen young people's environmental awareness and improve their knowledge about the environment.



Science For A Better Life



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Bayer HealthCare
Pharmaceuticals

Moxifloxacin



Moxifloxacin

- Fluoroquinolone antibiotic
- Orally active
- Once-a-day dosage
- Approved in 104 countries for the treatment of bacterial respiratory and skin infections



Moxifloxacin for TB

- Novel mechanism of action: kills *M.tb.* by inhibition of DNA gyrase
- *In vivo* studies showed moxifloxacin reduced treatment time by two months when substituted for isoniazid
- Safe to use with antiretroviral agents since it is not metabolized by the cytochrome P-450 enzyme system



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Bayer HealthCare
Pharmaceuticals

The TB Alliance-Bayer Moxifloxacin Deal



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Bayer HealthCare
Pharmaceuticals

October 18, 2005

TB Alliance and Bayer HealthCare announced a partnership to coordinate a global clinical trial program to study the potential of moxifloxacin, an approved product, to shorten the standard six-month treatment of TB



The Partnership

- Clinically assess the efficacy and safety of moxifloxacin as a front-line agent for the treatment of TB
- If clinical trials are successful, register moxifloxacin for a TB indication
- Committed to making the product affordable and accessible to patients in the developing world



Clinical Trials

- Phase II program will evaluate whether substitution of moxifloxacin for one of the standard TB drugs (ethambutol or isoniazid) eliminates TB infection faster than current standard therapy
- Trials to be run in Brazil, Canada, South Africa, Spain, Tanzania, Uganda, the United States and Zambia
- Nearly 2,500 TB patients are being enrolled



Bayer Commitments

- Donate moxifloxacin for each clinical trial site
- Cover costs of regulatory filings
- Provide moxifloxacin at an affordable price for patients with TB in the developing world



TB Alliance Commitments

- Coordinate and help cover the costs of the clinical trials
- Ensure coordination of information and results towards the goal of registration
- Leverage substantial support from:
 - U.S. Centers for Disease Control and Prevention (CDC)
 - Orphan Products Development Center of the U.S. Food & Drug Administration
 - European and Developing Countries Clinical Trials Partnership (EDCTP)



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Thank You