Introducing ‘Medicines for Malaria Venture’, MMV

Malariology Module Berlin
31 Aug 2006

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Medicines for Malaria Venture
MMV In a Nutshell

- Established in 1999, started business in 2000
- Discover, Develop, Deliver...Medicines...for Malaria
- Geneva Based: Swiss foundation (not for profit)
- Public Private Partnership (PPP or PDP)
- 20 Products in the Pipeline, 5 late stage products
- Funding from Foundations, Governments and Companies

- See [www.mmv.org](http://www.mmv.org) for background and much more
Developing costs for new medications

$800 Million für ein neues Medikament

- Synthese & Extraktion: 10%
- Screening: 14%
- Toxikologie & Arzneimittelsicherheit: 5%
- Formulierung & Stabilität: 7%
- Klinische Evaluation: Phase I, II, III: 29%
- Klinische Evaluation: Phase IV: 12%
- Prozessentwicklung, Herstellung & QC: 8%
- Behörden: IND & NDA: 4%
- Bioverfügbarkeit: 2%
- Andere: 9%

Medicines for Malaria Venture
1975 – 1999

• 1’393 new drugs were made available to the public by the pharmaceutical industry\textsuperscript{i}

• But only 13 drugs were developed for neglected diseases during that period\textsuperscript{ii}

\begin{itemize}
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• MMV is a **Not-for-Profit** foundation operating as a public-private partnership

• **Created in 1999 by**
  • WHO
  • The World Bank
  • Donor governments (CH, UK)
  • Philanthropic foundations
Our vision is a world in which affordable drugs will help eliminate the devastating effects of malaria and help protect the children, pregnant women, and vulnerable workers of developing countries from this terrible disease.

Our mission is to Discover, Develop and Deliver novel anti-malarial Drugs
• MMV’s overall objective is to ensure the sustainable and continuous generation of appropriate new malaria medicines that are accessible to those in need in developing countries at the lowest prices practicable.

• APPROPRIATE

• AFFORDABLE

• ACCESSIBLE
Public Private Partnership? (PPP’s or PDPs)

- Accountable to ‘stakeholders’ – donors, partners and supporters
- Disease or technology focus
- Portfolio Management as key value added
- R&D management in partnership with private sector and with private sector ‘in kind’ contributions
- Virtual R&D as the rule
- Strong links to global players (eg RBM, GMP/WHO)
- Long goals with no exits (sustainability – “as long as it takes”)
- Collectively manage/fund about 75% of global portfolio of “neglected” disease R&D
- Collectively advocate for greater public support for product R&D
R&D: A contractual balance of obligations and benefits

**MMV Input**
- $$
- Drug Profile
- Background IPR
- Link to WHO/Policy
- Malaria Expertise

**Pharma**
- Chemistry IPR
- Toxicology
- Know How
- Assets in Kind
- Technology

**MMV Gets**
- Drug ‘Rights’ in Endemic Countries
- IPR in ‘Field’

**Pharma/Bio Gets**
- Private Sector Rights
- IPR outside ‘Field’
- PR Benefit
- HR Benefit
- Validation of Technology

**Public**

**Private**

**Joint R&D Portfolio**
A lean qualified core staff – that depends highly on outside expertise:

**Total Headcount**
- **20**

**Males/Females**
- **9/11**

**Academic Qualifications**
- PH.D. **8**
- M.D. **1**
- M.B.A. **2**
- M.P.H **1**
- BA/BSc. **7**
- Diplomas **2**

**Languages**
- English
- French
- Portuguese
- Chinese
- Arabic

**Spoken**
- German
- Indian Languages
- Italian
- Russian

**Nationalities**
- American **6**
- British **2**
- Canadian **3**
- French **3**
- Monaco **1**
- German **1**
- Indian **1**
- Irish **1**
- Swiss **2**
- Dual **7**
  - American
  - British
  - Chinese
  - Lebanese
  - New Zealand
  - French
  - Swiss

Medicines for Malaria Venture
MMV Uses Many Types of Outsourced Support:

**Key Committees**
- Remuneration Committee
- Audit Committee
- Nominations Committee
- Expert Scientific Advisory Committee (ESAC)
- Access & Delivery Advisory Committee (ADAC)
- Authorization for Phase III Advancement Committee (APAC)

**Outsourced Support**
- Legal
- Fund Raising
- I.T.
- C.R.O.

**Geographic Presence**
- MMV Geneva
- MMV Europe
- MMV India Office
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<th>Exploratory</th>
<th>Discovery</th>
<th>Preclinical</th>
<th>Clinical Development</th>
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<td>Identification</td>
<td>Optimization</td>
<td>Phase II</td>
<td>Phase III</td>
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- **Dihydrofolate reductase (DHFR)**
- **Lactate dehydrogenase (LDH)**
- **OZ (synthetic peroxide)**
  - RBX11160 / OZ 277
- **Dihydroorotate dehydrogenase inhibition (DHOD)**
- **Falcipain (cysteine protease)**
- **Haem Polymerization**
Initial TPP: Uncomplicated Malaria and with support of Pediatric Formulations

- Efficacy against drug resistant strains
- Cure within three days
- Low propensity to generate rapid resistance
- Safe in small children (< 6 mos.)
- Safe in pregnancy
- Appropriate formulations and packaging
- Low cost of goods
Drug Development Performance of PPP

Ref: Moran, Mary; Ropars, Anne-Laure; Javier, Guzman; Jose, Diaz; Garrison, Christopher. 'The new landscape of neglected disease drug development.' LSE Health and Social Care. London 2005
Summary Portfolio Development

- Largest jointly managed antimalarial R&D portfolio in history
- Over 50 cutting-edge research entities including universities, clinical research centres and non-profit organizations as well as pharmaceutical/biotech company based in 34 countries in Africa, America, Asia, Australia and Europe (see “MMV at a Glance” leaflet).
- The MMV portfolio has now reached an optimal size approx 20 projects, with 11 discovery projects, 4 preclinical projects, and 5 projects in clinical development.
- “Most companies would be delighted by having a portfolio so heavy in late stage projects“
May 2006 – 2010, $263m - but conditional on milestones

MMV - Medicines for Malaria Venture funding from Foundation to 2010 (May 2006)

(Total Received/Pledged $263 Million)
The True Finish Line
PUBLIC MARKET IMPLEMENTATION IN KEY COUNTRIES COULD TAKE SEVERAL YEARS

Product development pathway

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<th>Regulatory</th>
<th>Global Policy (WHO)</th>
<th>Local Policy</th>
<th>Manufacturing</th>
<th>Financing and procurement</th>
<th>Distribution</th>
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<td>Post-launch</td>
</tr>
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First country approval

Public sector adoption

3 yrs 2 yrs 1 yr 1 yr 2 yrs 3 yrs 4 yrs 5 yrs 6 yrs 7 yrs

Pre-launch

Post-launch

Pharmacovigilance

Regulatory

Global Policy (WHO)

Local Policy

Manufacturing

Financing and procurement

Distribution

Post distribution

Ongoing activity

Direct uptake impact

(1) Stringent Regulatory Authority (e.g., EMEA, FDA, other)
(2) National Regulatory Authority endemic country; may require additional small scale local studies
(3) Essential Drug List; (4) Pre-qualification
Source: WHO website, GFATM research, interviews
Who Spends on Malaria?

- Private sector spending dominates over public sector
- Private sector is more rapidly accessible than public sector
- Households spend up to 30% of their income on malaria interventions
- Subsidies are being explored to make ACTs more affordable
Public – Private Market Sector Dynamics

Public Sector
- ACT – "generic" demand creation
- Established distribution channels
- Distribution to public sector consumers
- Ensure access for vulnerable groups
- Local demand creation
- Distribute to wider populations
- But largely unregulated = low quality
- Non-Premium Private Sector and FBOs & NGOs
- Social Marketing

Premium
Private Sector
- Brand-specific RAPID demand creation
- Distribution to private sector consumers
- Expansion of market from urban to rural setting

Equity
- Patient awareness and demand
- Maximum Public Health Impact

ACT – "generic" demand creation

Medicines for Malaria Venture
Key Questions for Roll-out of New Drug

- Where & When to Launch: ensuring maximum availability
- Demand Forecasting and Manufacturing Capacity
- Supply Chain Management
- Price & Financing: lowest possible price, maximise availability
- Distribution and Delivery Channels
- Information on new drugs – forward planning
- Quality Assurance, Pharmacovigilence
- Resources Required: partners, resources, information
- Measuring Impact
Access and Delivery (A&D): A contractual balance of obligations and benefits

**MMV Input**
- $$$ mobilization of external support
- Advocacy
- Links to Global Fund PMI etc.
- Foreground IPR
- Need Profile
- Links to WHO, RBM and country policy makers
- Malaria specific Access Expertise, Advice (eg ADAC) and planning (GAPs)

**Public Gets**
- Affordable Drug Supply
- Private distribution in DEC
- Return on non DEC Sales
- Benefits of pooled procurement
- Available supplies
- Quality products
- Health Impact

**Pharma + Multinationals**
- Manufacturing
- QA
- Supply Chain & Delivery Know How
- Assets in Kind
- Liability Insurance

**Private Gets**
- Sales in non DEC
- IPR outside ‘Field’
- PR Benefit
- Guaranteed high sales volume
- Dependable clients

**Private**
Access & Delivery Advisory Committee (ADAC)

**Members:** Awa Coll-Seck–Chair Executive Director RBM Chairperson

Members will be appointed from the following areas of expertise: Epidemiology, Regulatory, Quality Assurance/ PharmacoVigilance, Malaria Treatment & Coverage (Clinical), National Drug Policy Formulation, Finance, Pricing, Procurement / Supply Chain Logistics, Treatment / Local Delivery (Systems), Demand Creation / Marketing / Comms OR / Phase IV, Economics of Malaria / Willingness to Pay / Health Outcomes,

**Terms of Reference**

To advise on the development and implementation of product access plans to ensure timely and effective delivery of new anti-malarial drugs in malaria endemic countries

To provide more general advice & information to the CEO on appropriate strategies to achieve the MMV access and delivery goals
Market Pull: ADAC

Technology Push: ESAC
Wanted: High Quality convenient affordable drugs at a seller near you
Many Issues in the Non-Premium Sector for Access & Delivery

- **Regulation/enforcement virtually non existant: quality and price control mechanisms are limited**
  - Kenya: ~60% of fevers treated at home with locally purchased herbs or drugs;
  - Ghana: ~66% use Licensed Chemical Sellers (LCS) for first line therapy;
  - Togo: ~83% of fevers treated at home,
  - Burkina Faso: ~87% mild / 54% of severe fevers treated outside professional services

- **Low quality and counterfeit drugs are widespread**
  - Kenya: more than 200 drugs available on market, only 50 % were officially registered (A Amin & R Snow, Malaria Journal 2005, 4; 36)

- **Who can pay? Malaria costs for poor households**
  - 10% or more of income is spent on malaria prevention and treatment (S Russell, Am. J. Trop. Med. Hyg., 71(2 suppl), 2004, 147 and Onwujekwe, Health Policy, 2000, (54) 143)

- **Equity issue**: very poor don’t seek treatment from public sector (Ndola Prata, SEAM conf 2003 and B Uzochukwe, Int. Jnl for Equity in Health, 2004, 3:6)
Conclusions: Health Benefit of MMV products are dependent on

- Presence of ‘alternate/competitor’ products (initially ACTs)
- Promotion and Policy environment
- Time to private market*
- Time to public market*
- Price (Subsidy)
- Additional indications e.g. pediatric or pregnant women
- Shelf life
- Country Variables (existing malaria control programs, market segmentation)
- Emergence of resistance

*first mover advantage in innovation is significant
MMV: ...Now Creating a Future Network for Access & Delivery

Potential Partners for Access:

- Pharmaceutical partner
- Donor
- Research/Technical Institute
- National Malaria Control Programme
- International agency
- Implementation or Collaboration Partner
Reduced Malaria Incidence Through New Drug Treatments

Growing Drug Resistance -- More People Not Treated Effectively

New Drugs Delivered More People Treated Effectively

MMV’s Contribution to the Fight Against Malaria Once New Drugs Are Developed

Health impact is not just an aspiration – it is happening

Disease Burden Of Malaria

High

Low
But this changed and will continue to change over time: See www.mmv.org

- **2000** Discover, Develop, Register
- **2003** Discover, Develop, Deliver (Passive - Facilitator)
- **2005** Discover, Develop, Deliver. Active role endorsed by MMV Board
- **2006** Delivery planning/fundraising activities in full swing
- **2008-10** Registration of first MMV products
- **2010-20** Growing focus on Health Impact*

* Possibility of greater ‘downstream integration’ with other PDP’s
Thank you for your attention!
Early Focus …

**Discovery**
- Project Team and Plans
- Synthesis of Compounds
- Screening

**Exploratory Development**
- Studies in Healthy Volunteers Phase I
- Large Amounts of Candidate Medicine Synthesized
- Formulations Developed

**Full Development**
- Studies in 100-300 Patients (Phase II)
- Candidate Medicine Tested in 3-10,000 Patients (Phase III)

**Registration**
- Clinical Data Analysis
- NDA/MAA

**Candidate Medicine Tested**
- Early Safety Studies
- Phase I: Candidate Medicine Tested in 3-10,000 Patients (Phase III)
- Phase II: Studies in 100-300 Patients (Phase III)
- Phase III: Studies in 100-300 Patients (Phase III)
Delivery Access Plan Imperatives for MMV and Partners

- **Availability**
  - Policy Environment
  - Product Development
  - Demand
  - Supply Chain

- **Affordability & Sustainability**
  - Pricing
  - Financing
  - Subsidy & Markups
  - IFC etc.

- **Acceptability & Quality**
  - Acceptability
  - Product QA
  - Packaging

- **Delivery: Public & Private Use**
  - Product QA
  - Distribution Chain
  - Pharmacovigilance