OECD Global Forum on Development

Impact of Product Development Partnerships on R&D

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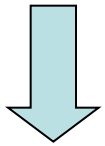
Starting point

- R&D now very active but no product developer cited any existing or planned incentive as a factor behind their activity
- Financing mechanisms rarely reflect a good understanding of industry processes/ needs/ motivations



- Consequently often poorly targeted, oversized, inefficient: a blunt instrument for a sophisticated industry and markets
- *Successful* PDPs work because they use a more sophisticated business model

Different products need different incentives

- Drugs, vaccines etc have very different R&D profiles
  - Cost, difficulty, risk, development time
  - FDC through to infant vaccine
- Different diseases have very different R&D obstacles/ needs
  - Science, competition … not just market

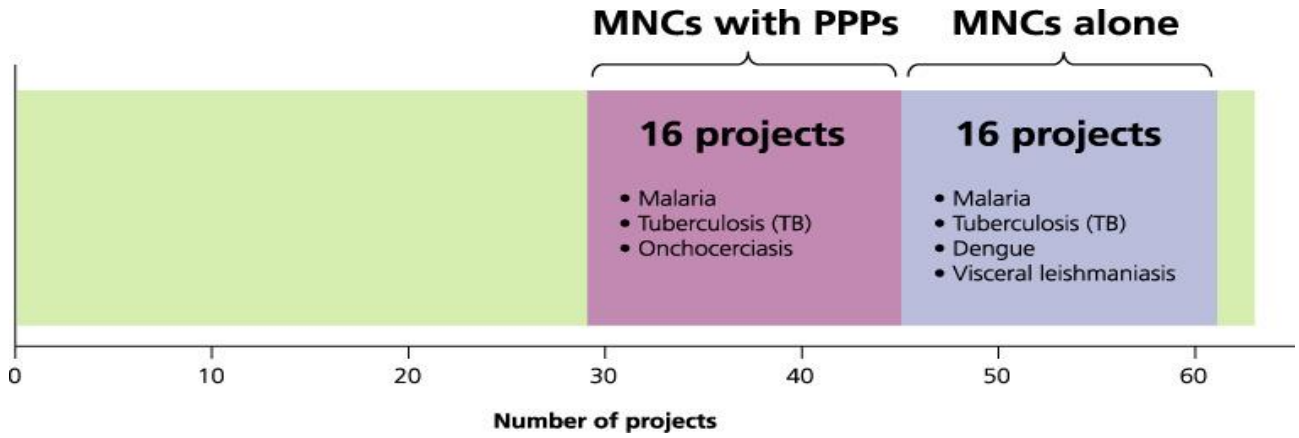
Neglected disease doesn’t necessarily mean no market

- Market is made up of many elements: may be dispersed/ small/ non-Western/ non-human
- Pneumonia (MNC size)
- Leishmaniasis (SME size)
- Helminths
- Dengue, TB
- Buruli ulcer; sleeping sickness

Different players need different incentives

- Different R&D players have different comparative advantages/ risk profiles/ needs
  - Innovation (academia)
  - Translation (biotech)
  - Development and manufacture (MNCs)
  - DC firms

Multinational pharmaceutical companies (MNCs)



- **Company activity is *not* driven by ROI in the neglected disease market: ALL low or no profit**
- Needs to be cost-neutral (or very low cost); risk-minimal; have a sustainable partner/ model

One-product rewards won't bring in MNCs

- Developing a new profitable R&D area means
  - Min 10-15 year commitment
  - Compounds, scientists, building expertise (targets/ chem etc)
  - A multiple product pipeline
  - A major re-tooling of a companies strategy

For a large company:

- A billion dollars in 10-15 years time is not a lot of money
- A one-product incentive (e.g. for one vaccine) will not bring a large company into play

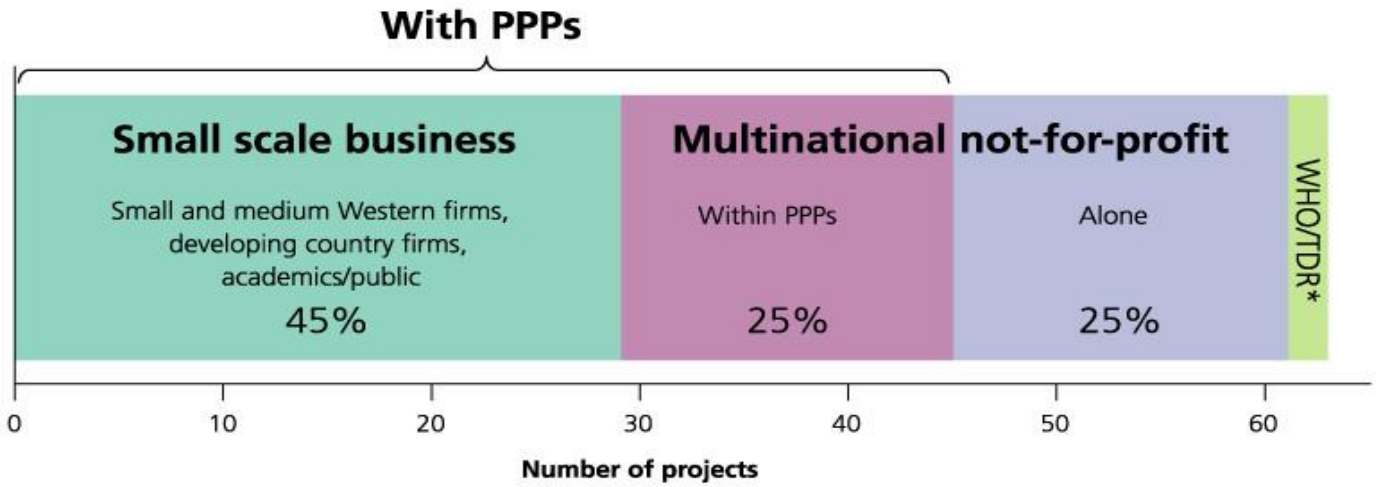
DC firms (now)

- Involved in one-quarter of PDP projects by 2005
- Generally on a **commercial basis** (much leaner model) but can offer excellent terms in return for knowledge/ tech transfer
- Motivated by:
  - Flow-on gains for commercial markets e.g. tech transfer/ moving up the regulatory learning curve/ familiarity with FDA etc
  - RoI in neglected disease markets considered commercially attractive (TB and leishmaniasis in India)
  - “Freedom to operate” in the home market

The new world

- Modular not monopoly
  - Companies buy in leads
  - Outsource R&D (ADME/ tox/ trials...)
  - DC manufacture and distribution
- DC industry not just Western
  - Process development
  - Manufacture and distribution
  - Increasingly discovery and development

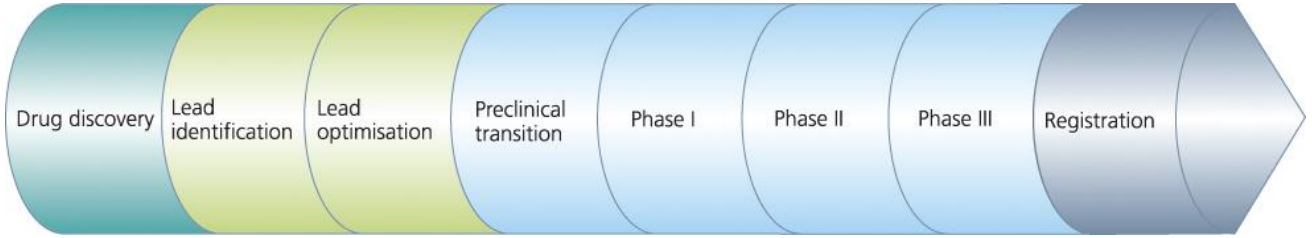
The impact of PDPs



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

- Over 60 neglected disease drug projects in development (by 2005)
- One-third of these projects are already in clinical trials
- Expected to deliver 8-9 new neglected disease drugs by 2010 (3 already; 3 in 08/09)
- All this has happened without big new commercial incentives

The PDP business model



• Industry do up-stream drug discovery (lower-cost lower-risk higher-innovation)

- Public partners do downstream clinical development (higher-risk and higher-cost ameliorated by public involvement)

- Lower cost/risk to industry allows firms to deliver final drugs to developing country patients at cost-price or for a modest margin (3-8%)

Impact

- Greatly increased private sector activity (more companies can do more)
- Leverage private sector investment +++
  - Discovery centres ~ $20 mill/year/company
- New products deliver
  - Higher health value
  - Higher innovation value
  - At a substantially lower R&D cost

Health value

Industry-alone drugs

- Only 1 of the 13 industry neglected disease products widely (or even moderately) used in the developing world

Partnered drugs

- 3 of these 8 "partnered" products **have contributed significantly to reducing global health burdens**

  ✓ halved the global burden of onchocerciasis between 1990 and 2000 (ivermectin)
  ✓ eradicated schistosomiasis in major parts of the world (praziquantel)
  ✓ introduced the first suitable new paediatric anti-malarial for decades (Coartem)

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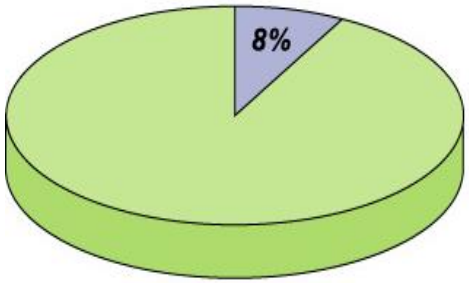
Greater innovation for lower company investment

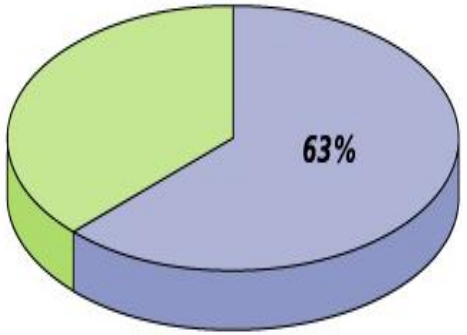
Industry alone

Drugs developed by Industry alone **1975-1999** (13 projects)



Partnered industry

Drugs in development by Industry alone (with view to partnering) – **end 2004** (16 projects)



Breakthrough innovation

Other types of innovation

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More cost efficient

Project Name	Type of project	R&D costed	Indication	Cost * US $million	Unquantified pro bono input
ACTUAL COSTS					
FAS II	New chemical entity	**Lead identification**	Malaria	**2.7**	Nil
PFT inhibitors	New chemical entity	**Lead identification**	Malaria	**2.2**	Some expert advice and data from BMS
Pyronaridine-artesunate	Fixed dose combination	**Preclinical (+3 months Phase I)**	Malaria	**5.3**	Shin Poong's input (formulation chemistry)
PA-824	New chemical entity	**Preclinical**	Tuberculosis	**4.5**	Expert advice from ex-company employee
Synthetic Peroxide	New chemical entity	**Discovery Lead identification Lead optimisation Preclinical (+6 months Phase I)**	Malaria	**11.5**	Expert advice from Roche
PROJECTED COSTS					
Pyronaridine-artesunate	Fixed dose combination	**From preclinical up to registration**	Malaria	**15-20**	
PA-824	New chemical entity	**From preclinical up to end of phase III**	Tuberculosis	**86**	

* We have used internal budgets, and added pro-rata'd indirect scientific costs

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Thoughts on incentive design

- Don’t use big pull incentives if the science isn’t there (it won’t work)

- Don’t allow public funds to crowd out existing players and markets
  - Leishmaniasis, dengue
  - Pneumonia vaccine (2 already in late-stage before AMC announced)

- Listen to companies!
  - PRVs

- Target the incentive to the need
  - Scientific gap: academic push funding
  - Production needs: DC or large firms

- **BE CREATIVE: Make R&D costs match the market not the other way round!**
  - DC public trial contribution (now 80% of the cost)?
  - Regulatory assistance
  - Remove soft barriers to company entry into DC markets etc
  - We’ll need it ourselves one day …