Continuing challenge of clinical trial failure
New incentives for neglected disease innovation

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Lower respiratory tuberculosis
Hepatitis B nutritional deficiencies
Meningitis Chlamydia Otitis media
Upper respiratory Hepatitis C Perinatal conditions
HIV/AIDS Diarrhoeal diseases
Maternal conditions Measles Pertussis
Diphtheria Diarrhoeal diseases
Measles Pertussis
Chagas disease Measles Pertussis
Tuberculosis

Disparity

Western Countries’ Share of DALY Burden

DALY = Disability-adjusted life years

Source: Ridley, Grabowski, Moe
Scant R&D output for developing country diseases

Marketed New Chemical Entities

Source: Chirac, Lancet, 2006
Transition Probabilities for Clinical Phases

Other factors for simulation model

Transition Probabilities

- Phase I-II: 83.7% (Biotech), 71.0% (Pharma)
- Phase II-III: 56.3% (Biotech), 44.2% (Pharma)
- Phase III-Approval: 64.2% (Biotech), 68.5% (Pharma)
- Phase I - Approval: 30.2% (Biotech), 21.5% (Pharma)

Source: DiMasi and Grabowski, Managerial and Dec Econ 2007

Model factors: transition probabilities, clinical trial costs, stage duration

73% Likelihood
1 novel New compound
By 2019

95% Likelihood
1 novel New compound
By 2019

IF
+ 10 Ph II & III
+ 10 in earlier phases

Simulation model if the number of compounds in preclinical and clinical testing in 2005 is doubled.
Push Mechanisms fund inputs (R&D costs)

- Orphan Drug Act
  - Tax credits & grant support
  - Marketing exclusivity (pull)
- Bioshield
  - Fund R&D investments for terrorism counter-measures
- Public-private partnerships
  - Consolidate R&D effort and exchange information
  - Unintended consequences of vertical programs
  - Public & private still needed

Pull Mechanisms fund outputs (drugs, vaccines)

- AdvancedMarkets
  - Guaranteed price creating $3 billion market
- Transferable voucher for extended patent life
  - Reward for treatment for diseases of developing countries or bioterrorism
  - Gives bearer extra patent life
- Priority Review Voucher (PRV)
  - Public & private still needed
**Priority Review Voucher**

Sec 524 FDA Amendments Act

FDA guidance released Oct 08

**Government/Society**

1. Voucher
   - Treatment for neglected disease & that is approved as generic

2. Voucher
   - Priority Review Voucher
   - Sec 524 FDA Amendments Act
   - FDA guidance released Oct 08

3. Voucher + user fee
   - Priority review at FDA (6 vs. 18) + orphan credits

**Developer of treatment for neglected disease**

**Manufacturer of potential blockbuster**

$
5 Criteria for Incentives  
(Towse & Kettler, 2004)

1. Incentivize new research without wasting resources  
   • Individual “vertical” prizes/programs can be inefficient  
     • Co-morbidity & HS capacity building spill over effects

2. Specify which treatments are eligible  
   • PRV identifies 16 (incl TB) and others can be added  
   • Bioshield criticized for being too broad

3. Be credible in eyes of potential developers  
   • Criteria & prize persist multi-year with limited or no change  
   • Perception of capricious administration

4. Specify treatment of follow-on drugs  
   • ODA took 9 years to sort out “follow-on” issues  
   • Current PRV incentive specifies “new” chemical, biologic, vaccine, diagnostic  
     • Excludes drugs previously reviewed and in new combinations

5. Create product used by patients  
   • Additional criteria/incentives/sanctions  
     • ensure registration/use in endemic countries, resources for manufacture & access
• Backup slides
Existing priority review criteria
new modifications

• evidence of increased effectiveness in treatment
• elimination or substantial reduction of a treatment-limiting drug reaction
• documented enhancement of patient compliance
• evidence of safety and effectiveness of a new subpopulation
• Prize for successful neglected disease Rx/Dx
• PEPFAR generics
Novel new TB compound by 2010?
GATB goal

• “Portfolio model”
• 27 compounds currently in GATB pipeline
• Success probabilities at each stage, trial costs, time in stage
  – 1 successful compound by 2019 (73% prob.)
    • + 10 compounds (Ph.I + II) (93% prob.)
• Need +30 compounds (Ph.I) +$400m funding for 1 new compound by 2017
• Does not account for: trials capability, access and distribution investment needs
IGDM
Charitable Organization
501 (c) 3

- Screens novel targets
- Identifies novel chemical scaffolds
- Allows polypharmacy, compliance and access

Board sets priorities for selected communicable and non-communicable diseases

Duke University License

$$$ Charitable gifts provide initial capitalization

For-Profit Subsidiary

Select investor(s) $$

Seek partners

$$$ Investors & partners, e.g., VCs, pharma

For-Profit Board decides when to invest in further development and/or move to newco “subs” to attract outside investment in specific assets

Subs
Malaria-specific JV

Subs
Cancer-specific JV

Subs
TB-specific JV

Structure
Donations
Investment
Roles

For-Profit Subsidiary

Seek partners

$$$ Investors & partners, e.g., VCs, pharma