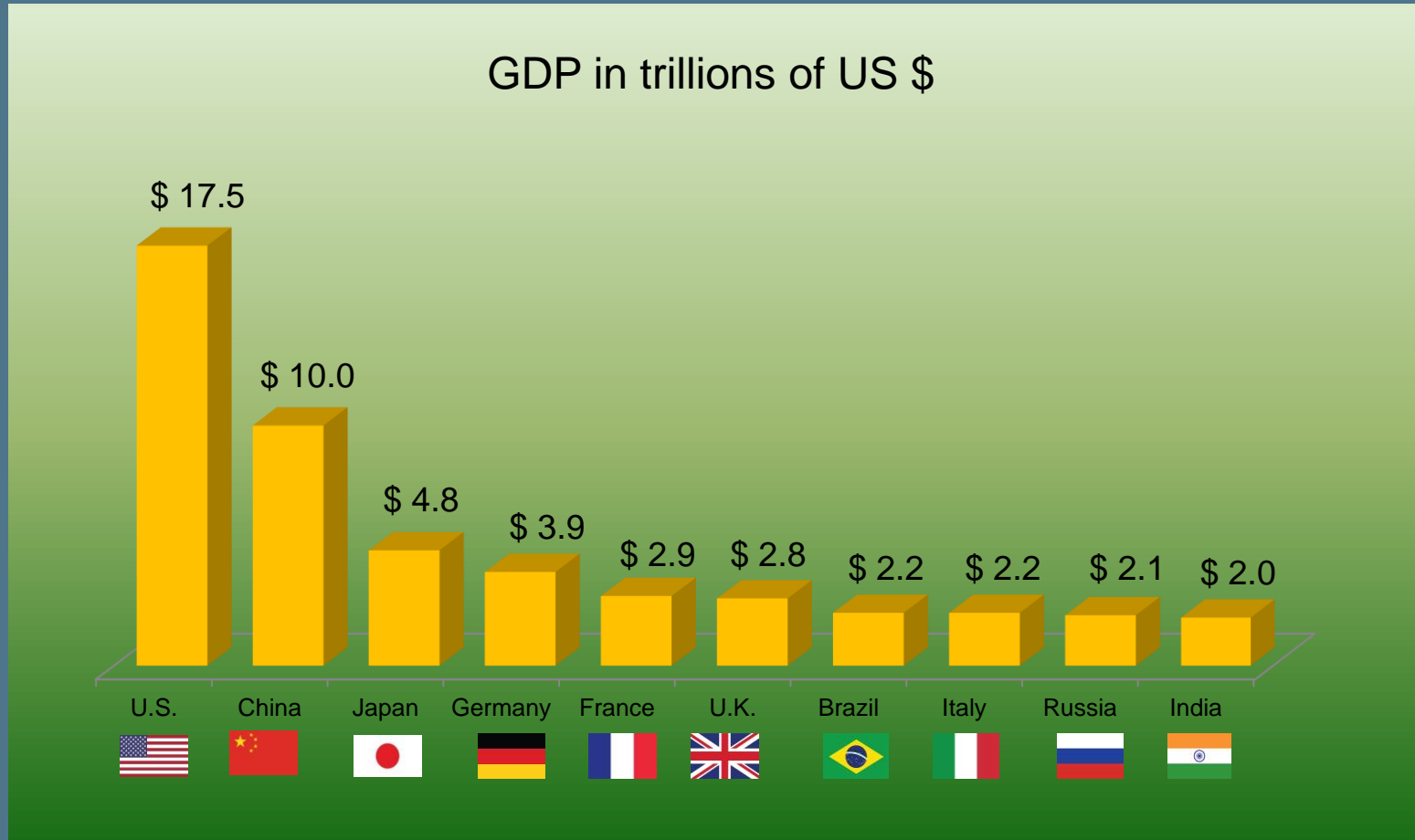




# Drug Discovery in Brazil Challenges and Opportunities

Dr Simon Campbell CBE FRS

# top 10 economies



Source: IMF, World Economic Outlook, 2014



# healthcare investment in Brazil and UK



UK

population: 64 million  
healthcare: 9% GDP  
per person: \$ 3,400  
world rank: 15



Brazil

population: 200 million  
healthcare: 9% GDP  
per person: \$ 1000  
world rank: 62

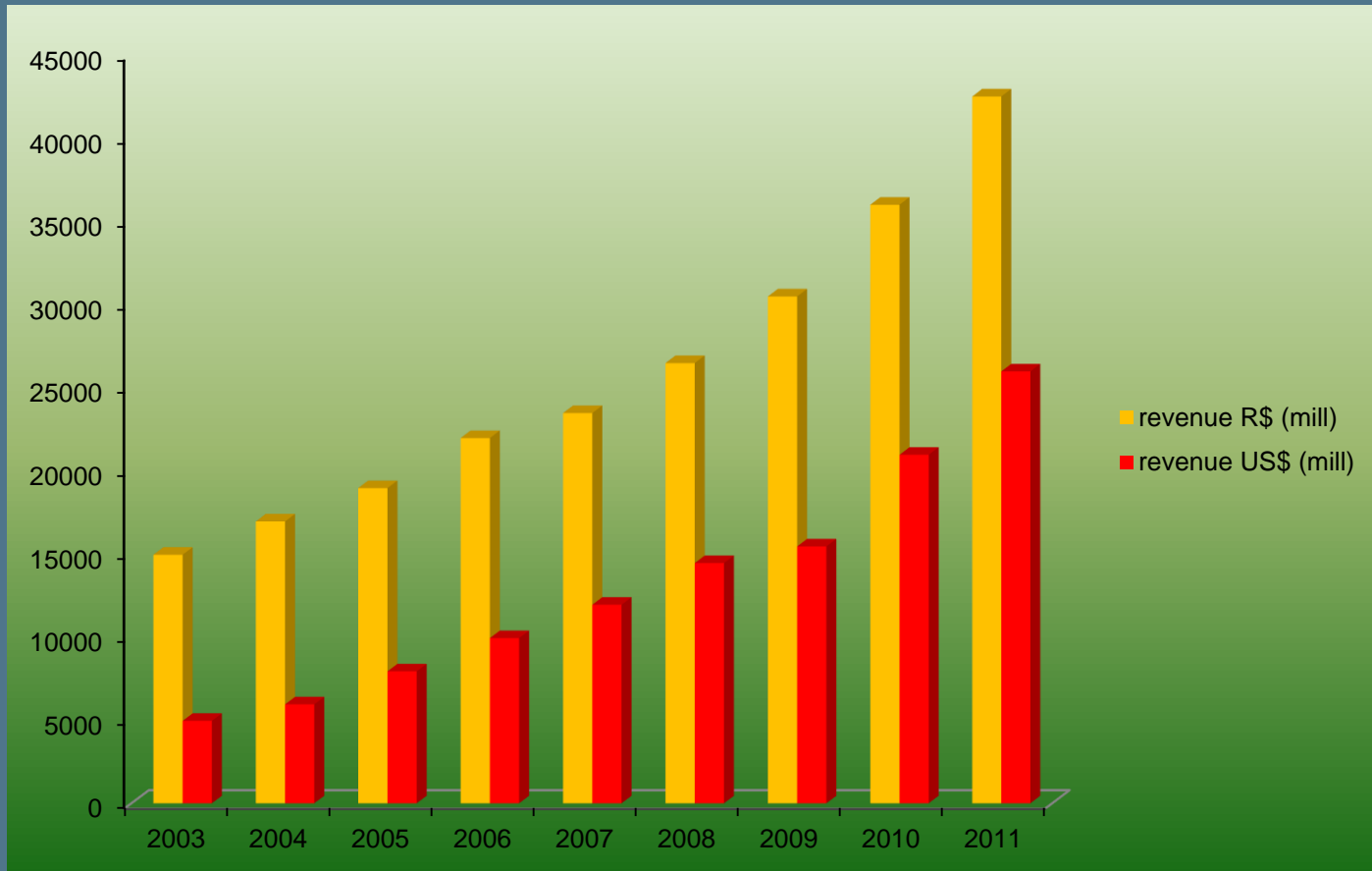


# pharmaceutical sales

| Rank | Country | \$ (Mill) | Growth (%) |
|------|---------|-----------|------------|
| 1    | USA     | 326,892   | -1         |
| 2    | Japan   | 112,067   | 0          |
| 3    | China   | 81,698    | 22         |
| 4    | Germany | 42,333    | -6         |
| 5    | France  | 36,674    | -8         |
| 6    | Brazil  | 29,112    | -6         |
| 7    | Italy   | 26,231    | -8         |
| 8    | Canada  | 21,877    | -2         |
| 9    | UK      | 21,635    | 0          |
| 10   | Spain   | 19,935    | -12        |

Source: IMS, 2013

# Brazil pharmaceutical market



Source: Sindusfarma

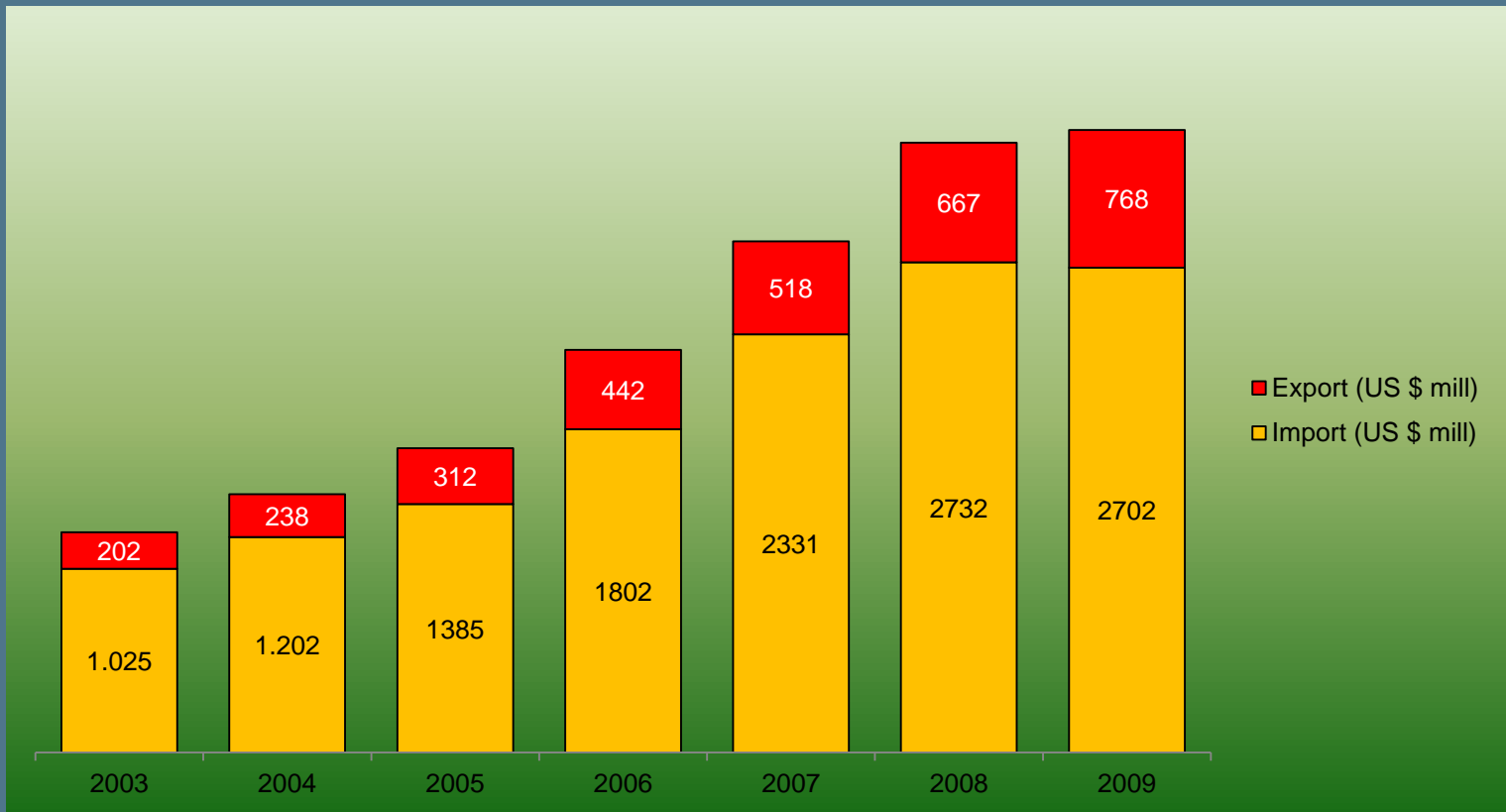


# top 10 pharmaceutical companies in Brazil

| Rank | Company               | Sales (R\$ million) |
|------|-----------------------|---------------------|
| 1    | Sanofi-Madley-Genzyme | 4,463               |
| 2    | EMS                   | 3,633               |
| 3    | Hypermarcas           | 2,839               |
| 4    | Novartis              | 2,593               |
| 5    | Aché                  | 1,992               |
| 6    | Pfizer                | 1,439               |
| 7    | Eurofarma             | 1,267               |
| 8    | Bayer                 | 1,168               |
| 9    | GSK                   | 1,066               |
| 10   | MSD                   | 972                 |
|      | Total                 | 21,432              |

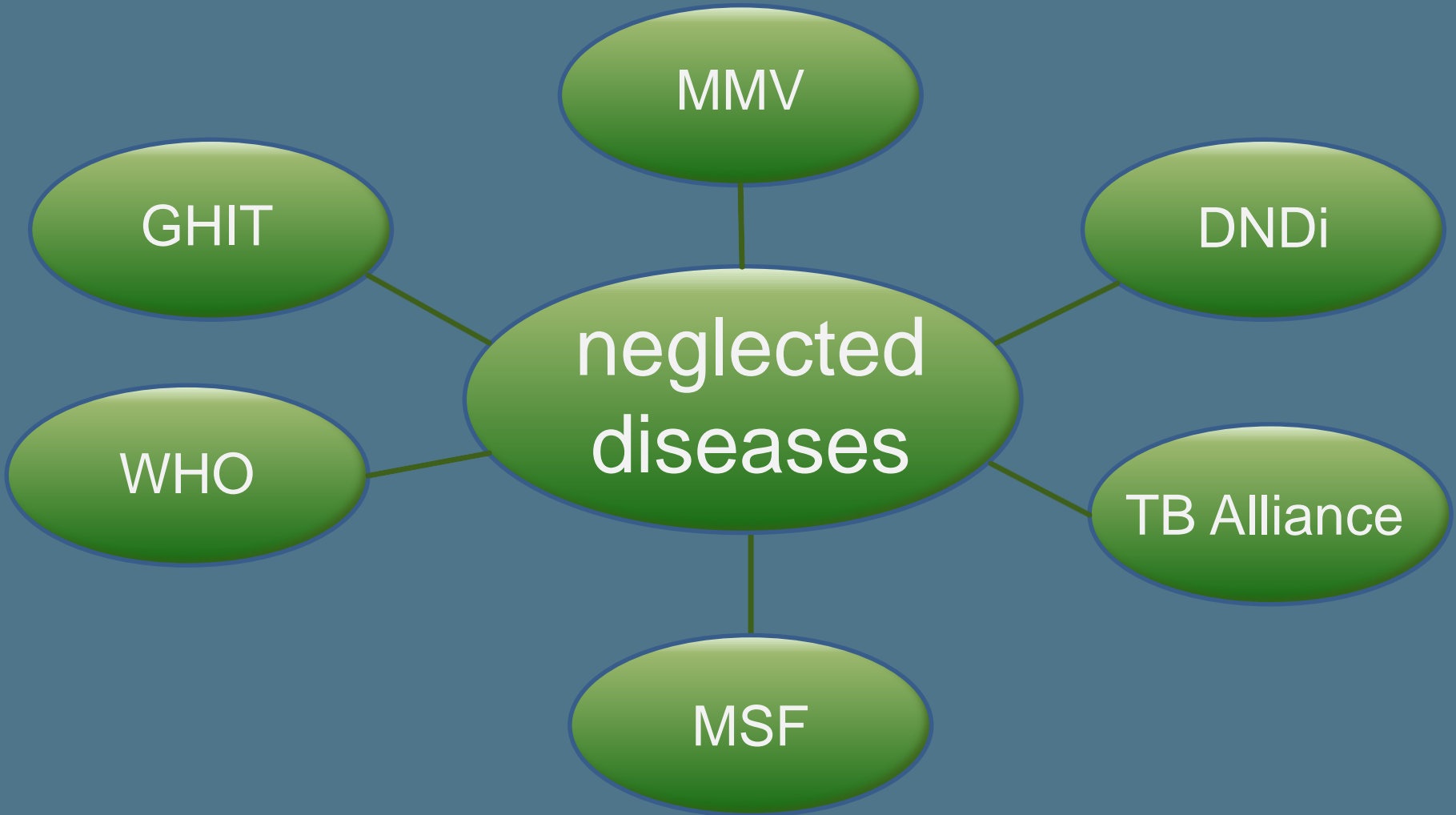
Source: IMS Health, 2010

# pharmaceutical imports and exports



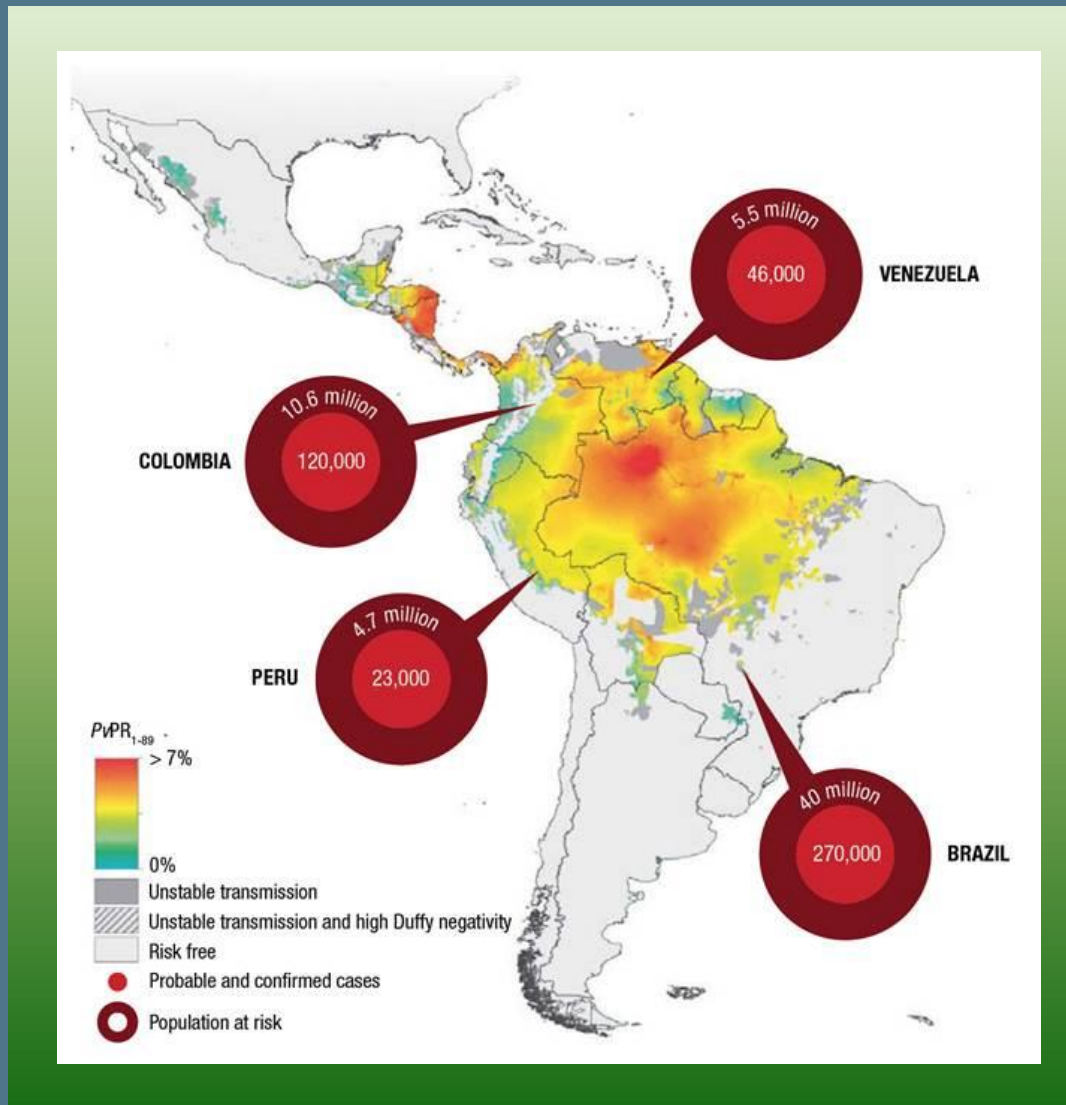
Source: Ministry of Development, Industry and Trade

# worldwide commitment and investment



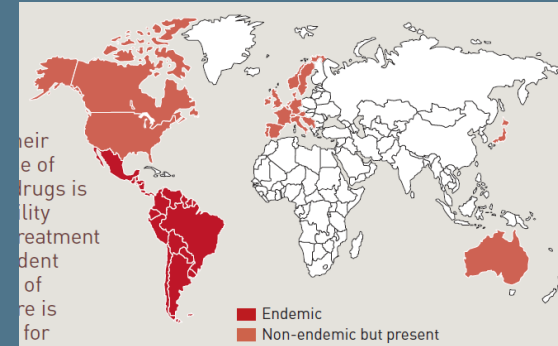


# malaria – the challenge



# Chagas – the challenge

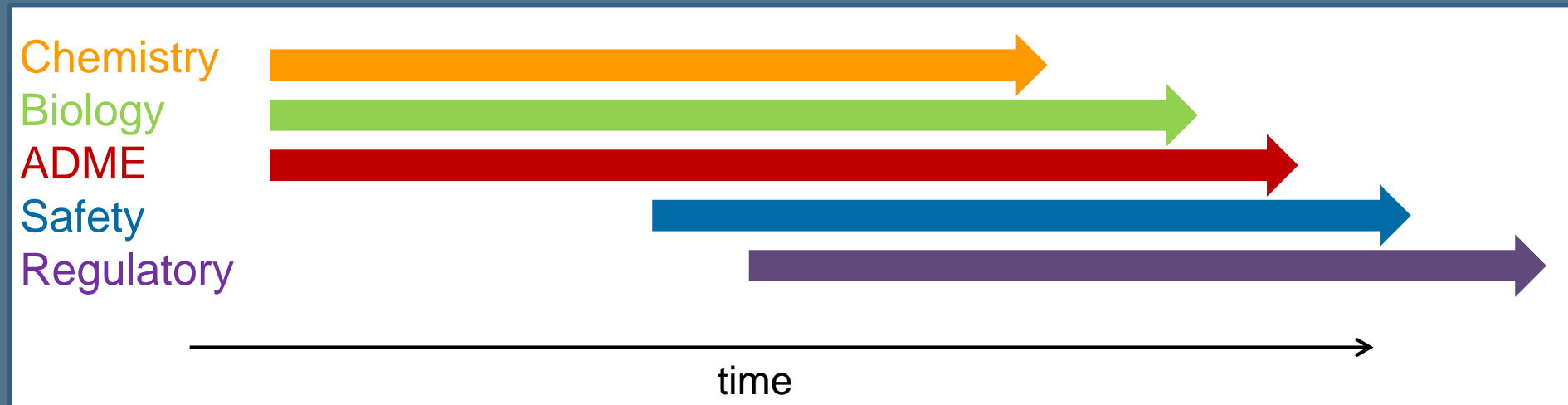
- 100 million at risk in Latin America
- Transmitted by triatomine insects, blood transfusion, organ transplantation, congenitally or orally
- 7.6 million people affected by CD
- Largest parasitic cause of death in western hemisphere
- Leading cause of cardiomyopathy
- Kills more people in region than malaria
- Patient number growing in non-endemic, developed countries
- Majority of patients undiagnosed until late stage



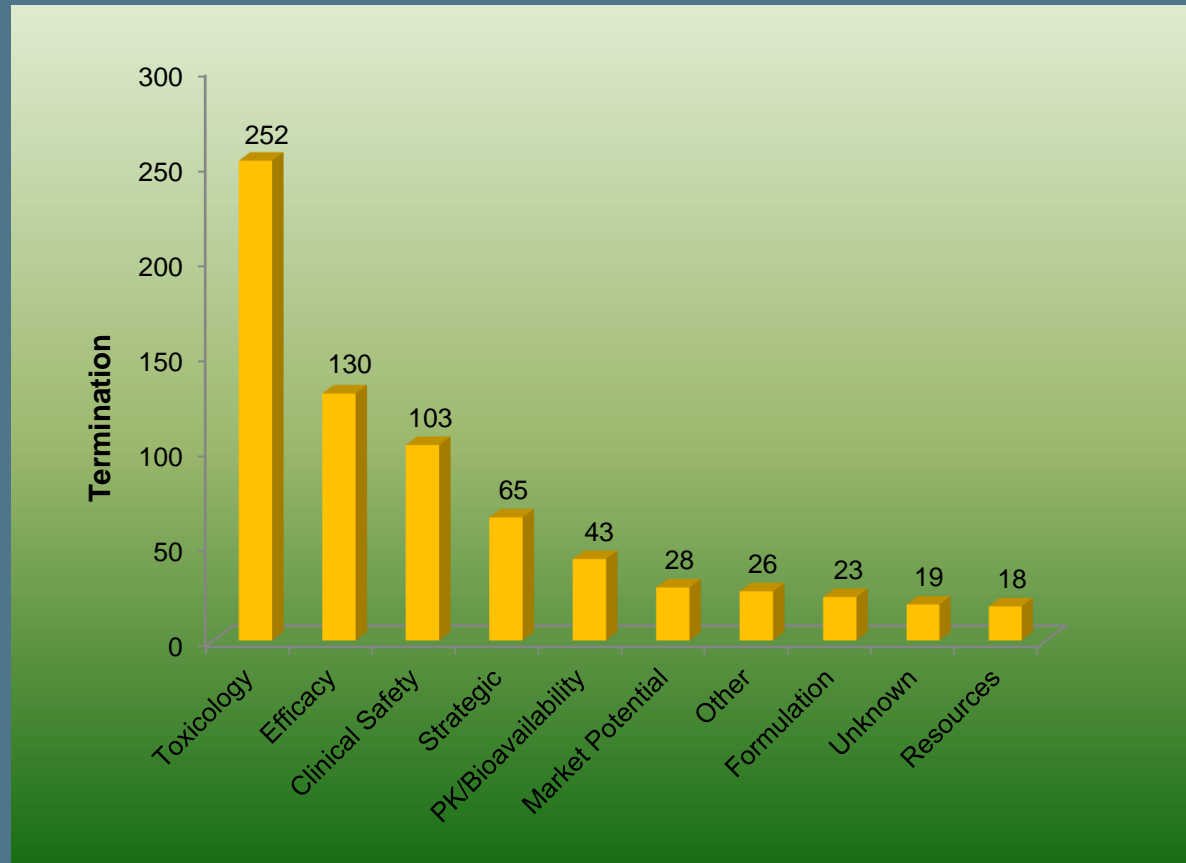
# challenges – expertise and time

## R&D timeline

hit → lead → candidate → clinical → registration

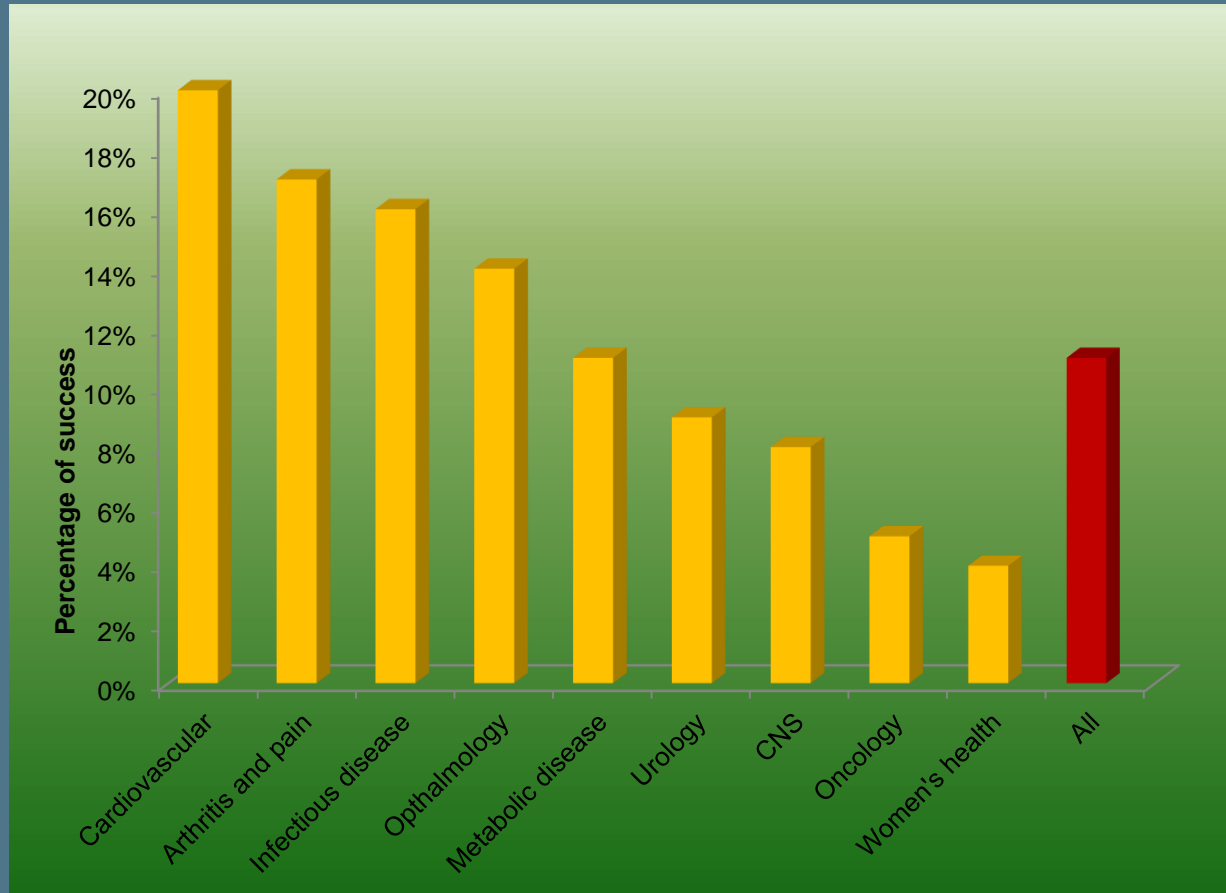


# challenges - attrition



# challenges – attrition

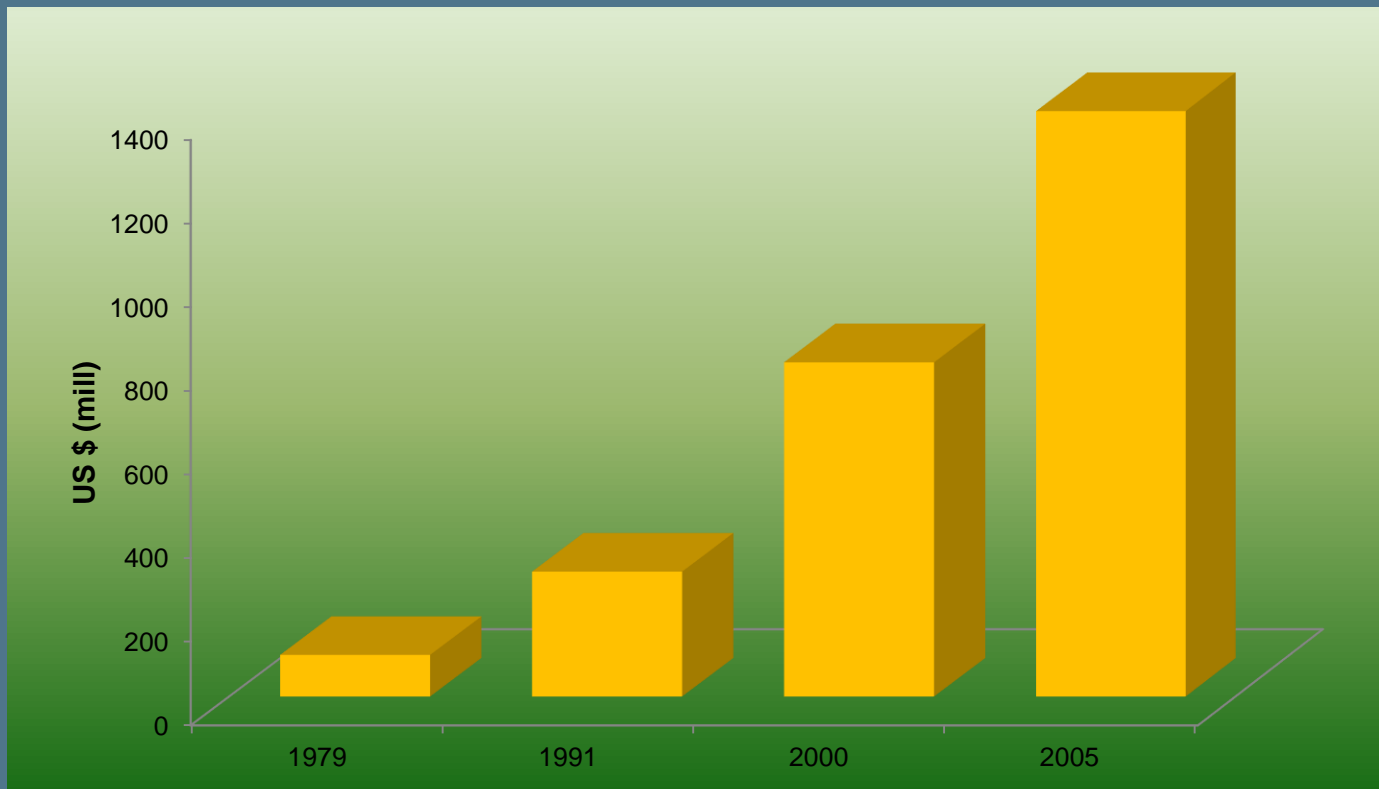
## success rate from FIM to registration



Source: Datamonitor in Pharmaceutical Benchmark Study

# challenges – cost

## cost to develop an NCE (\$m)

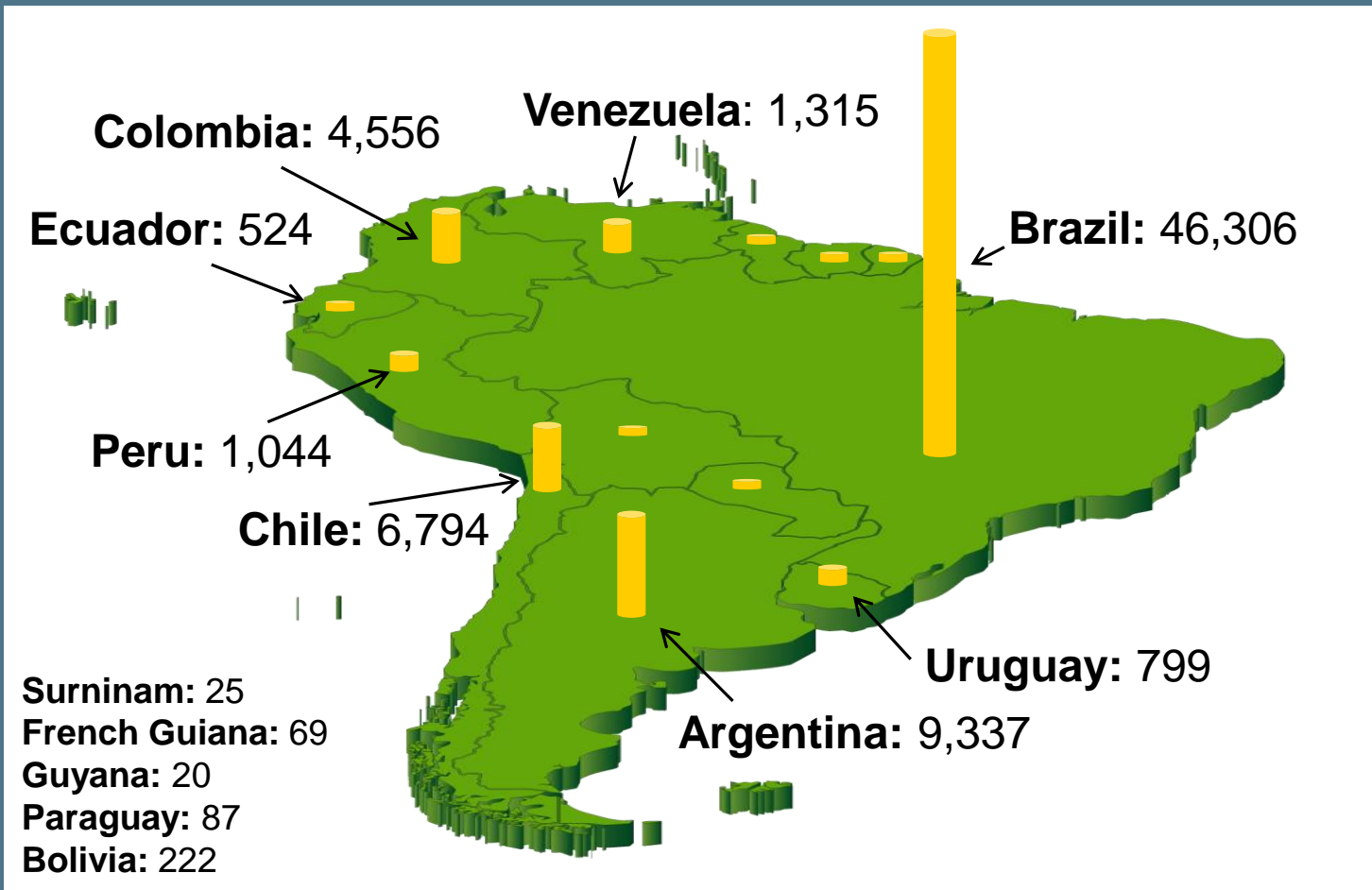


Source: J.A DiMasi et al 2007

# opportunities – Brazil push

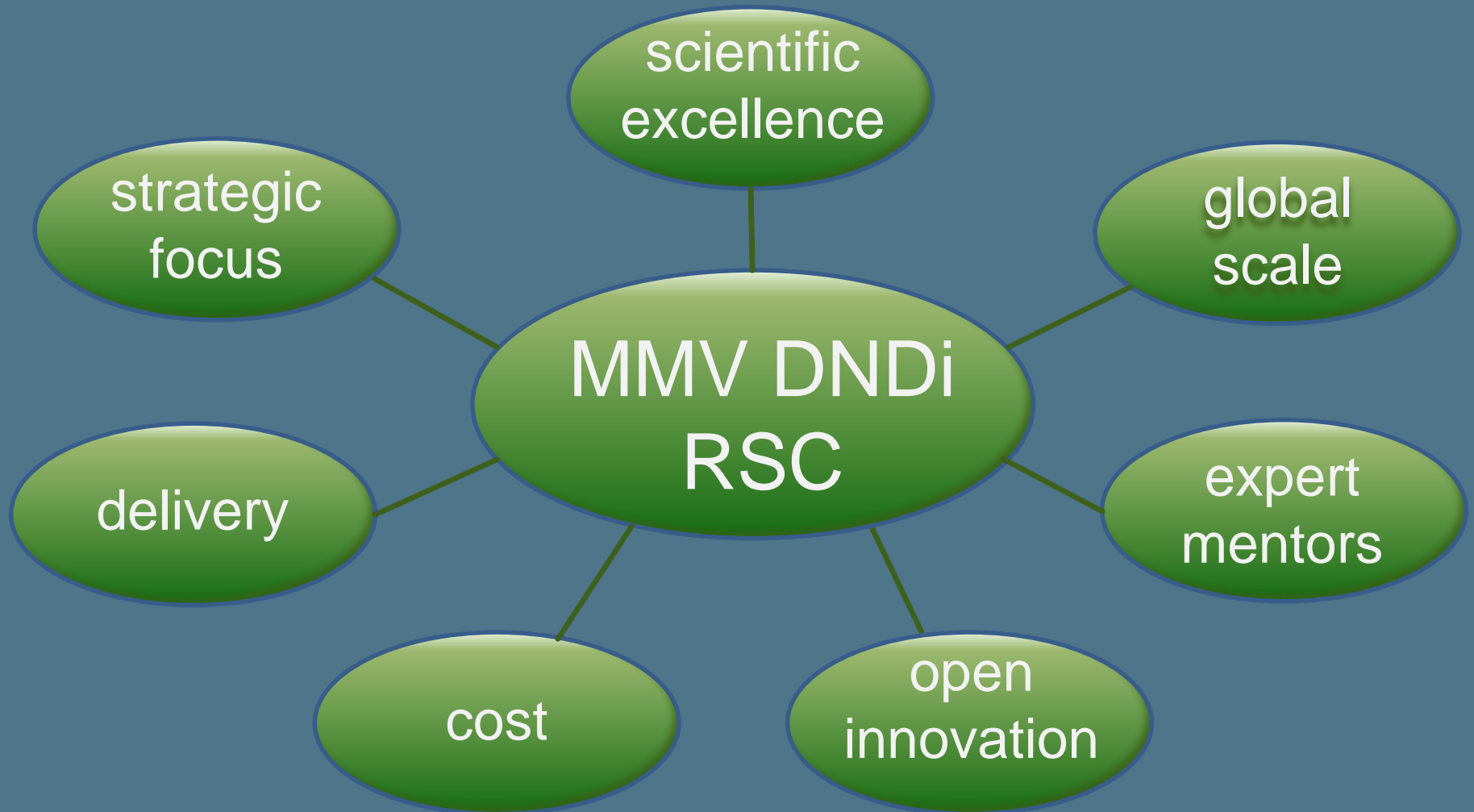


# the publishing landscape



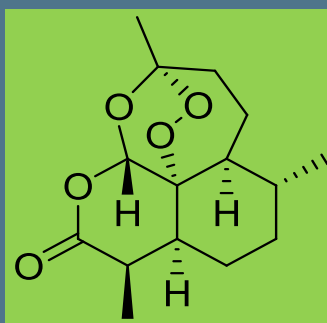


# opportunities – PDP push

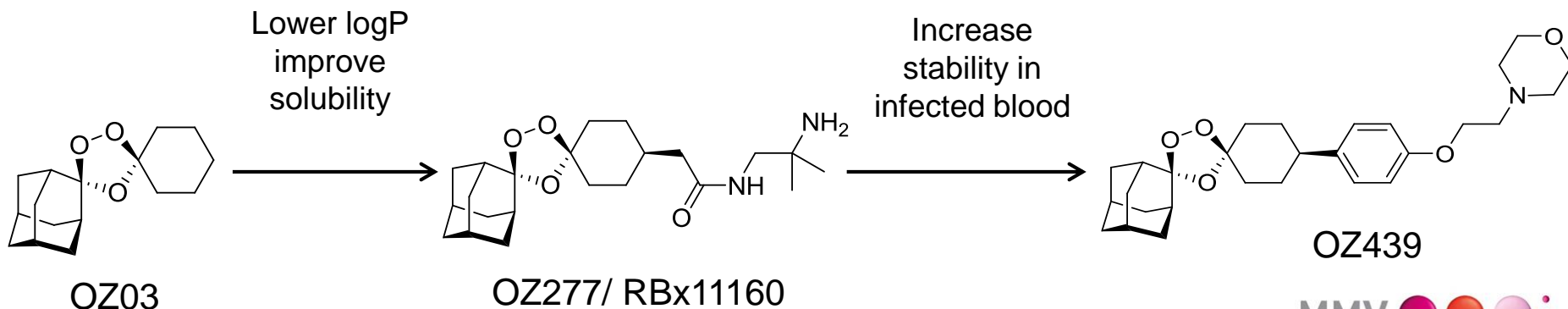


# experience and delivery - MMV

Going even better than artemisinin - synthetic peroxides



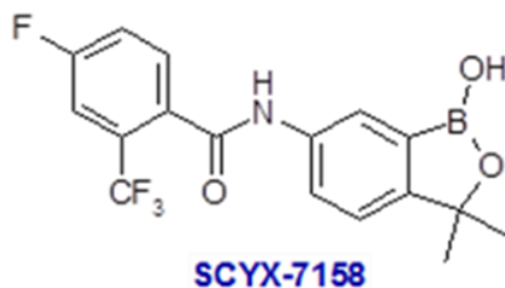
PI Prof. Jonathan Vennerstrom Univ. of Nebraska, Monash Univ, Swiss TPHI



# experience and delivery - DNDi

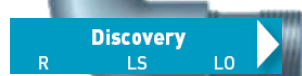
## Oxaboroles SCYX-7158 for HAT From Lead Optimization to Clinical Candidate

- Identified as hits against *T. brucei* at Sandler Center, showed activity in animal models of HAT
- Innovative US partnership with 2 biotechs and 1 university
- First candidate issued from DNDi Lead Opt. Programme
- Clinical Phase I study ending



Potential to be oral, effective against both stages 1 and 2

Key partners:  
Scynexis, Anacor, Pace University,  
Sandler Center UCSF, Swiss TPH



**DNDi**

Drugs for Neglected Diseases *initiative*  
*Iniciativa Medicamentos para Enfermedades Olvidadas*  
*Iniciativa Medicamentos para Doenças Negligenciadas*



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