G-FINDER FACTSHEET

GOVERNMENT FUNDING FOR NEGLECTED DISEASES: WHY IT DOESN'T ADD UP

(*Photo credit: iStockphoto*)

Every year, more than 6 million people in low- and middle-income countries die from 'neglected diseases', for which the vaccines, medicines and diagnostic tests (referred to collectively as products) are either ineffective or completely lacking.

These neglected diseases differ in one crucial aspect from diseases that have a commercial market. For commercial diseases, governments need to fund basic and early stage research but promising leads are then picked up and developed by companies without further government input needed. But this model doesn't hold true for the non-profit neglected diseases. For these, governments – working with others – need to support product development *throughout the process*, from traditional basic and early research to full fruition of new vaccines, drugs and diagnostics. This work is usually done in conjunction with companies, and most often through Product Development Partnerships (PDPs) that bring together companies, academia, governments and philanthropy to create new medicines for the developing world.

> Government funding has remained steady but funding allocation has deteriorated significantly

The overarching nature of the public role means that government decisions on neglected disease research and development (R&D) are crucial. Governments are not only the key funders, but also the key driving force to ensure that new neglected disease medicines are created for the patients that need them.

This paper reviews government support for neglected disease R&D. It finds that, although funding has remained largely steady since the financial crisis, the allocation of that funding has deteriorated significantly. As a result, the potential health impact of these public investments has also deteriorated – clearly the opposite to what cash-straitened governments are aiming for.

Generating health impact means investing the right amount of funding, but also ensuring that this funding is efficiently distributed across the R&D spectrum from basic research to product development.

Basic research is the process of discovering new knowledge about a disease, its progress, cause or vector, and its pathology (how it affects humans); it is not directed towards developing a specific product.

Product development builds on knowledge obtained through basic research and translates it into new tools – vaccines, drugs, diagnostics, and other prevention technologies to prevent, treat or cure disease.

The global distribution of government R&D investments between basic research and product development in turn depends on the interaction of three factors:

- The type of government funder, since different types of agencies fund different types of R&D recipients
- The type of R&D funding recipient, since different actors focus on different parts of the development pathway, some working upstream on blue skies research and early discovery, others working downstream to develop these discoveries into medicines
- Trends in either or both of these.

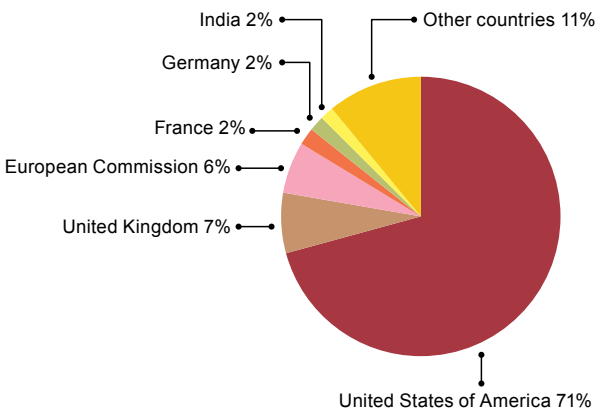
The interaction of these factors and their ultimate impact is discussed below.

GOVERNMENTS ARE THE MAIN FUNDERS OF GLOBAL HEALTH R&D …. ESPECIALLY THE US GOVERNMENT

Between 2008 and 2012, governments provided two-thirds – nearly $10bn – of global neglected disease R&D funding, far outweighing investments from philanthropists or the private sector.[1] The United States (US) provided a remarkable 71% – close to $7bn – of this funding, making it the chief driver of neglected disease R&D globally. The US National Institutes of Health (US NIH) was the single largest global funder, accounting for nearly two-thirds ($6bn, 61%) of global government funding during that time: as such its funding priorities have shaped the global health agenda.

Several other governments also have investments large enough to play a key role in creating new R&D and new medicines, including the United Kingdom (UK), European Commission (EC), France, Germany and India – although their influence over global trends does not match that of the US.

Figure 1. Share of global government neglected disease R&D funding (2008-2012)



Governments provide two-thirds of global neglected disease R&D funding

[1] Neglected disease R&D funding figures in this paper originate from the G-FINDER survey. All figures are adjusted for inflation and reported in 2007 USD.

WHICH AGENCY PROVIDES FUNDING? THE AID VERSUS SCIENCE EFFECT

Public funding mainly comes from two types of agencies: science and technology (S&T) agencies, who provide 82% of global government funding; and international aid and development agencies who provide 12%. The remaining 6% comes from unspecified sources.

These agencies have very different funding patterns, with S&T agencies tending to invest in academic and government institutions (often domestically based), who focus on basic scientific research and early stage product development. For example, Australia's National Health and Medical Research Council invested over 99% of its funding into academic research organisations between 2008 and 2012.

By contrast, government aid and development agencies are more likely to fund development of new medicines for developing world use, often through funding to PDPs who are based internationally. Thus the UK Department for International Development invested all of their neglected disease R&D funding ($346m) into PDPs and intermediaries between 2008 and 2012.

When discussing government funding patterns, it is important to highlight the impact of the US NIH, the biggest single funder of neglected disease R&D. For instance, we noted that S&T agencies provide more than three-quarters (82%) of global government neglected disease R&D funding. But, if the US NIH is excluded, the global breakdown of funding looks quite different with S&T agencies providing only 53%, aid agencies providing 30% and the remaining 17% coming from other government agencies.

A child receives a vaccine (*Credit: MVI*)

R&D FUNDING RECIPIENTS AND THEIR FOCUS

Governments fund four types of R&D organisations: academic research institutions, government-run research groups, PDPs and industry. These groups differ greatly in their research focus, with academic and government research institutes focussing predominantly on basic research and early product development, while PDPs and industry focus almost entirely on full product development.

As the single largest allocator of funding, the US NIH again plays a key role in determining the type of organisations (and thus the type of research) that is funded globally, as seen from Table 1.

Table 1. Profile of R&D sectors (2008-2012)^

R&D sector	Key characteristics	Breakdown of government funding (including US NIH)	Breakdown of government funding (excluding US NIH)	Research focus (% of programme funds)
Academic research institutions	■ Investigator-driven research, often university based ■ There are thousands of academic institutions each typically receiving small grants ■ Dependent on government funding (77% of their funding) ■ Primarily funded by S&T agencies	44% $4.3bn	29% $1.1bn	Basic laboratory research (54%). Product development, when done, is usually focussed on the very earliest stages.
Government-run research groups	■ Heavily dependent on government funding (96% of their funding) ■ Primarily funded by S&T agencies	22% $2.2bn	29% $1.2bn	Product development (69%) and basic research (31%)
Product Development Partnerships & intermediaries	■ 53% of their funding comes from non-government sources; 47% from governments ■ Government funding is primarily from aid agencies	14% $1.4bn	33% $1.3bn	Product development – all stages (95%)
Pharmaceutical industry	■ Bulk of funding from non-government sources; 19% from government ■ 91% of government support goes to small pharmaceutical companies and biotechs ■ Government funding mostly from S&T agencies	6% $553m	2% $93m	Product development – all stages (94%)

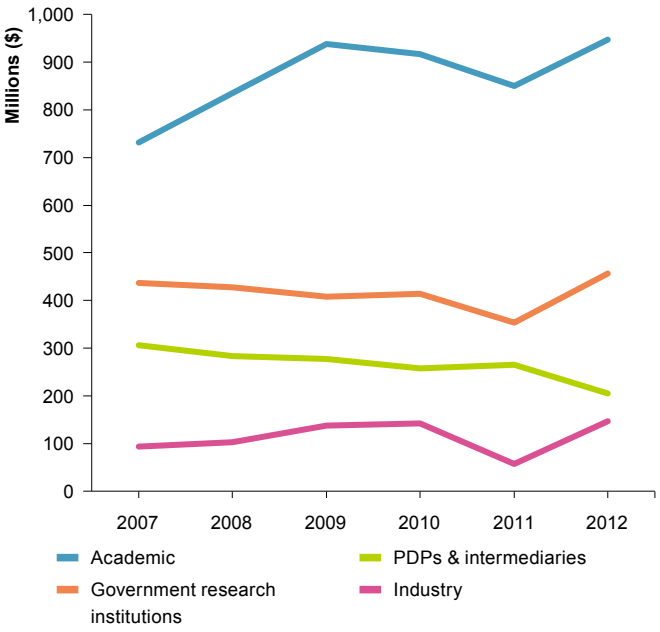
^ All figures calculated using cumulative total funding reported to G-FINDER (2008-2012)

TRENDS IN GOVERNMENT FUNDING

Government funding for global health R&D funding has remained largely steady. Funding in the pre- global financial crisis period sat at $1.8-$1.9bn and has returned to similar levels, with a $2.0bn government investment in 2012.

However, within this headline figure, there has been a significant shift in investment from aid agencies to S&T agencies as a source of neglected disease R&D funding. Following the financial crisis, aid R&D budgets were cut by a third (down $86m between 2009 and 2012), while funding from domestic S&T agencies increased very substantially throughout the 2007-2012 period (up $207m, 15%). As an aside, we note that these increased overall S&T budgets were largely due to US NIH investments. In a trend that needs watching, many other S&T agencies have been reducing their funding (down $55m, 14% in 2009-2012), with a pattern of more and greater cuts since 2009.

Figure 2. Funding to research sectors (2007-2012)



This overall shift in funding from aid agencies to S&T agencies has led to a marked change in funding allocation across research sectors, with large increases to academic and government groups (mostly domestic); a modest increase to small pharmaceutical and biotechnology firms (also mostly domestic); and a significant decline in funding for PDPs and intermediaries (mostly internationally based organisations).

Between 2007 and 2012 funding for academic research organisations increased by a third ($215m, 29%) largely due to an increase in funding from S&T agencies; industry funding increased by $53m (57%, albeit from a low base); and government research organisations saw a modest increase of $19m (4%). By contrast, the fall in PDP funding has been dramatic, with a drop of $102m (-33%) that mirrors cuts to aid agencies, the chief source of public funding for PDPs and intermediaries.

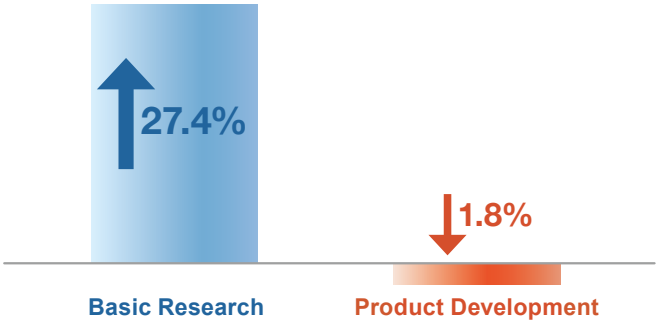
DISCUSSION

Behind the headline figure of largely stable government funding for neglected disease R&D lies a different and quite troubling reality. The interaction of the factors and trends outlined above has had an unintended – and potentially serious – impact on development of new neglected disease medicines for the poor, which is in turn leading to a marked decline in the potential health impact of government R&D funding for neglected diseases.

The key feature of the post-financial crisis period has been a dramatic shift in government funding from product-focussed activities to blue-skies and basic research. This is not due to any single government, although the US NIH has had a significant impact; rather it is the consequence of uncoordinated decisions by multiple sovereign governments to change their funding in ways that work better for them when budgets are tight: in particular to cut aid funding and to invest R&D dollars at home.

The unintended flow-on effect of these collective changes is a marked deterioration in the potential health impact of each government's investment, as well as in the impact of their collective investment. This is because the shift in funding away from product development coincides with the progress into end-stage development of many of the products in the global health pipeline – a pipeline that funders have been increasingly building and investing in since 2000. Many of these products are just now entering the final stages of the 10-15 year pharmaceutical development process supported by funders since that time.

Figure 3. Change in basic research and product development funding (2007-2012)



They include:

- The first new TB regimen in 50 years. Expected to cost $50-90 for a 16-week cure of standard TB and prevent up to half of all cases of drug-resistant TB, as opposed to the current drug-resistant regimen, which costs $5,000-$10,000 per patient, requires two years of treatment and has a 40% failure rate. Entering final trials in 2014.

- The first short-course radical cure for *P. vivax* malaria, replacing the existing two-week therapy (very difficult to ensure in poor and remote settings). Entering final trials in 2014.

- A malaria vaccine that can cut the number of infant malaria cases by up to half. Final trial results expected in 2014.

- As well as technologies such as the vaccine vial monitor (1990s) that has saved US$140 million by preventing the discard of undamaged vaccines; helping to deliver 1.5 billion more doses in remote settings, and to save more than 150,000 lives.

Many new medicines, including some of those above, are just a few years away from preventing millions of deaths a year from neglected disease – and saving potentially hundreds of millions of aid dollars with their higher efficacy, easier administration and in many cases lower overall cost. However, these products will not move through the necessary clinical trials, their development will be slowed and this goal will not be achieved without appropriate funding to organisations equipped to take them through to registration and delivery to patients in the developing world. Cutting funding for product development at a time when decades of effort is finally paying off is probably the most effective way of wiping out over a decade of public investment. And, somewhat counter-intuitively, it costs more than it saves. This is because neglected disease R&D is one of the few areas where each government contributes only a fraction of the cost, but each nevertheless gets the full benefit of every new product created. Cutting R&D investment is a false economy, knocking out one of the few areas that offers high health impact, substantial savings on future aid budgets, and leverages returns well beyond the original investment of any single government.

> Cutting funding for product development is undermining a decade of public investment.

In today's tight funding environment, cutting global health R&D funding and in particular shifting funds away from product development simply doesn't add up.

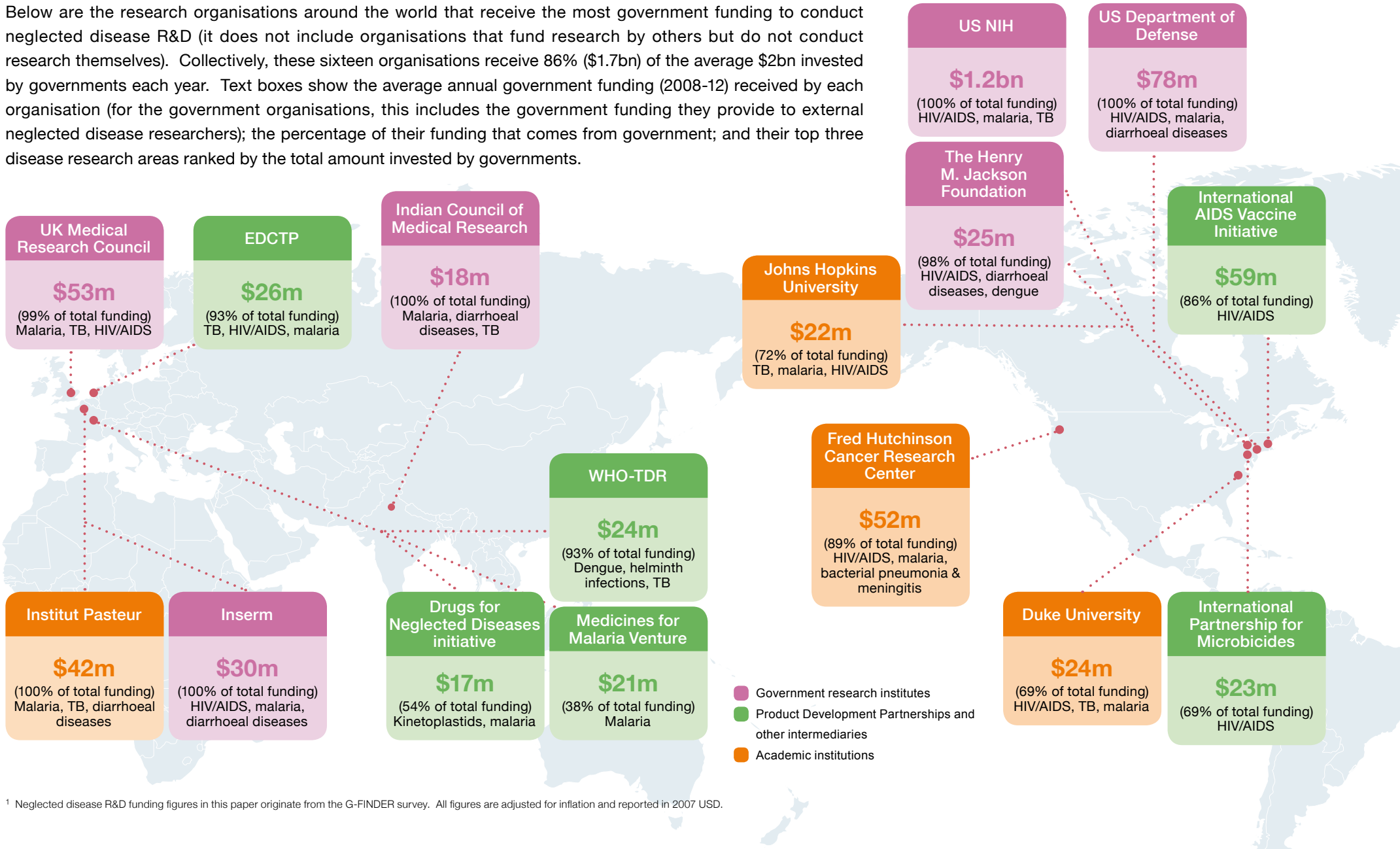
Children at risk of malaria (*Credit: IVCC*)

POLICYCURES

G-FINDER
Global Funding of Innovation for Neglected Diseases

NEGLECTED DISEASES: TOP GOVERNMENT-FUNDED RESEARCH ORGANISATIONS (2008-12)[1]

Below are the research organisations around the world that receive the most government funding to conduct neglected disease R&D (it does not include organisations that fund research by others but do not conduct research themselves). Collectively, these sixteen organisations receive 86% ($1.7bn) of the average $2bn invested by governments each year. Text boxes show the average annual government funding (2008-12) received by each organisation (for the government organisations, this includes the government funding they provide to external neglected disease researchers); the percentage of their funding that comes from government; and their top three disease research areas ranked by the total amount invested by governments.



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