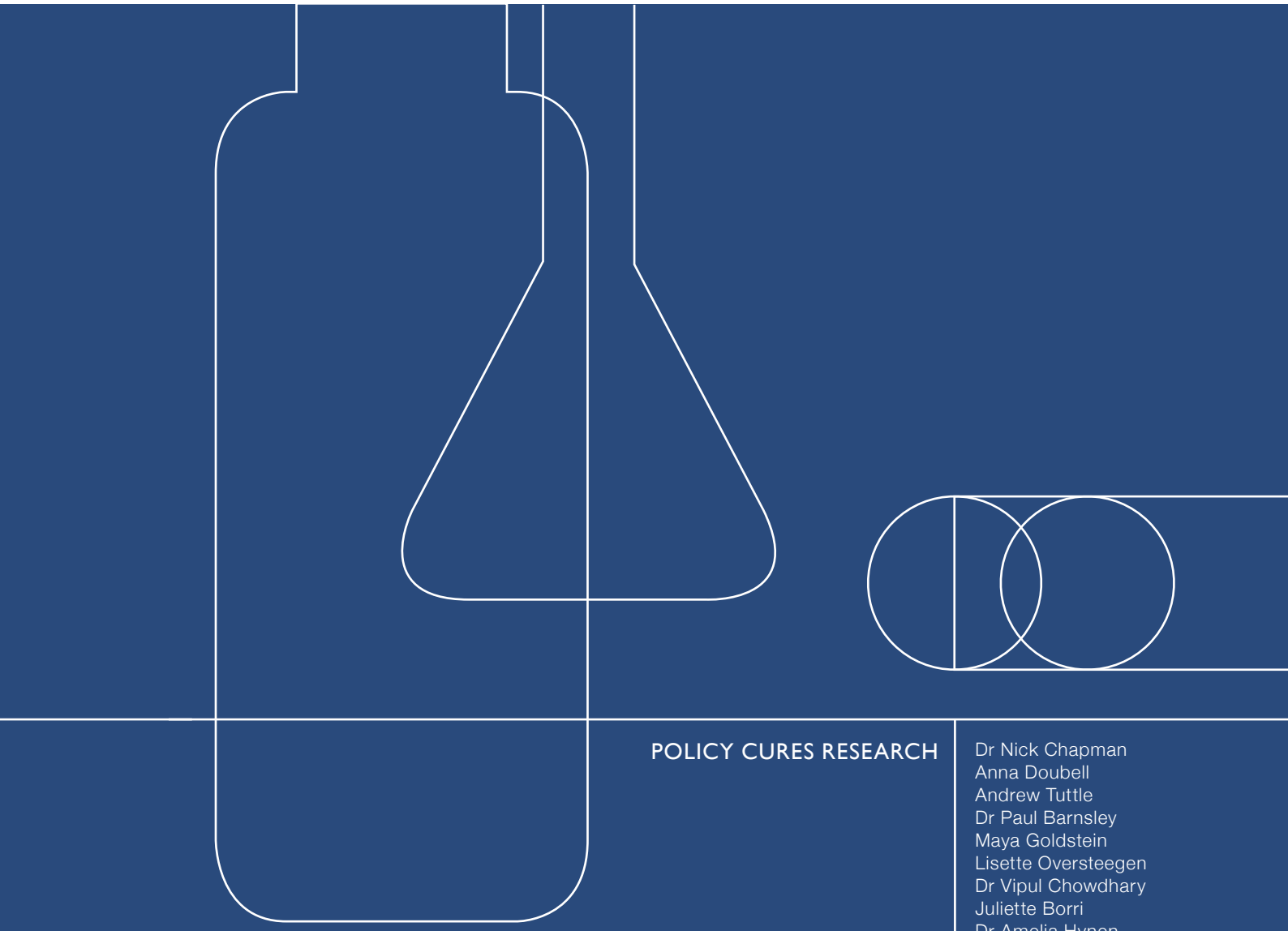
G-FINDER | 2020

POLICY CURES RESEARCH.

NEGLECTED DISEASE RESEARCH AND DEVELOPMENT: **WHERE TO NOW?**



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ACKNOWLEDGEMENTS

This is the thirteenth in a series of annual reports published as part of the G-FINDER project. We are very grateful to all of the survey participants who have contributed to this effort, particularly in a year where the COVID-19 pandemic diverted resources and attention away from other critical global health issues. With their commitment, we have been able to continue to provide accurate, up-to-date financial information in the field of research and development for neglected diseases. The patience and engagement of the participating government and multilateral agencies, academic and research institutions, product development partnerships, philanthropic institutions and pharmaceutical and biotechnology companies have made this project possible.

We would like to extend our gratitude to our Advisory Committee for their invaluable advice on the design and scope of our study. A particularly warm thank you goes to the Resource Tracking for HIV Prevention Research & Development Working Group for coordinating their initiatives with ours. We would also like to thank the International Federation of Anti-Leprosy Associations (ILEP) and the Brazilian National Council for State Funding Agencies (CONFAP) for their support in coordinating member participation.

We are especially grateful to Richard Fisher, our Executive Chairman; Lee Sternberg, our accounting manager; Shigemi Nakamura-Simms, our designer; Emmanuelle Bomo, our Communications Lead; and our research assistants, Dr Alex Ankomah, Dr Cara Fallis, Dr Naomi Koh Belic, Phoebe Nguyen, Delfina Rampone, Joelle Tan, Dr Megan Truong and Elyssa Wiecek. Their dedicated efforts were key to the survey's success.

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We would also like to acknowledge the following organisations for their commitment and patience in collating large datasets for the G-FINDER survey this year: the Bill & Melinda Gates Foundation; the Brazilian Support Foundation for Research in the State of Minas Gerais (FAPEMIG); the Brazilian Support Foundation for Research in the State of São Paulo (FAPESP); the Australian National Health and Medical Research Council; the Canadian Institutes of Health Research; the European & Developing Countries Clinical Trials Partnership; the European Commission; Institut Pasteur; Liverpool School of Tropical Medicine; the South Africa Medical Research Council; the Swiss National Science Foundation; the UK Medical Research Council; University of Pittsburgh; the US National Institute of Allergy and Infectious Diseases; the Wellcome Trust; and all of the product development partnerships.

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INTRODUCTION

The G-FINDER report

Each year since 2007, G-FINDER has provided policy-makers, donors, researchers and industry with a comprehensive analysis of global investment into research and development of new products to prevent, diagnose, control or cure neglected diseases in developing countries, making it the gold standard in tracking and reporting global funding for neglected disease R&D.

This year's report, the thirteenth overall, focuses on investments made in participants' 2019 financial year ('FY2019'). Data was collected during 2020, with a longer than normal survey period to allow for maximum survey participation despite the COVID-19 pandemic. As a result, this report is being published later than usual, and thus at an even greater than normal remove from the funding year being analysed. For this reason we've opted for a slightly different report format than in previous years, offering readers a more consolidated narrative and streamlined analysis, particularly of the disease-specific R&D funding trends.

The full suite of graphs and tables provided in previous reports can now be created on demand using our online data portal: **https://gfinderdata.policycuresresearch.org/**

This year's report contains an overview of neglected disease funding, measured in 2019 US dollars, including:

- figures for individual diseases and product categories;
- analysis of public, philanthropic and (anonymised, aggregated) private neglected disease funders;
- details of the flow of funds to product development partnerships, other intermediaries and directly to researchers and developers; and
- a discussion of this year's key findings and how they fit with longer term trends, including the future impact of COVID-19 on funding for neglected diseases.

The global pandemic did reduce participation in the survey, though not as much we had feared. Thanks to the commitment of survey respondents, data from funders representing nearly 96% of our FY2018 funding total was captured in our survey of FY2019 R&D funding.

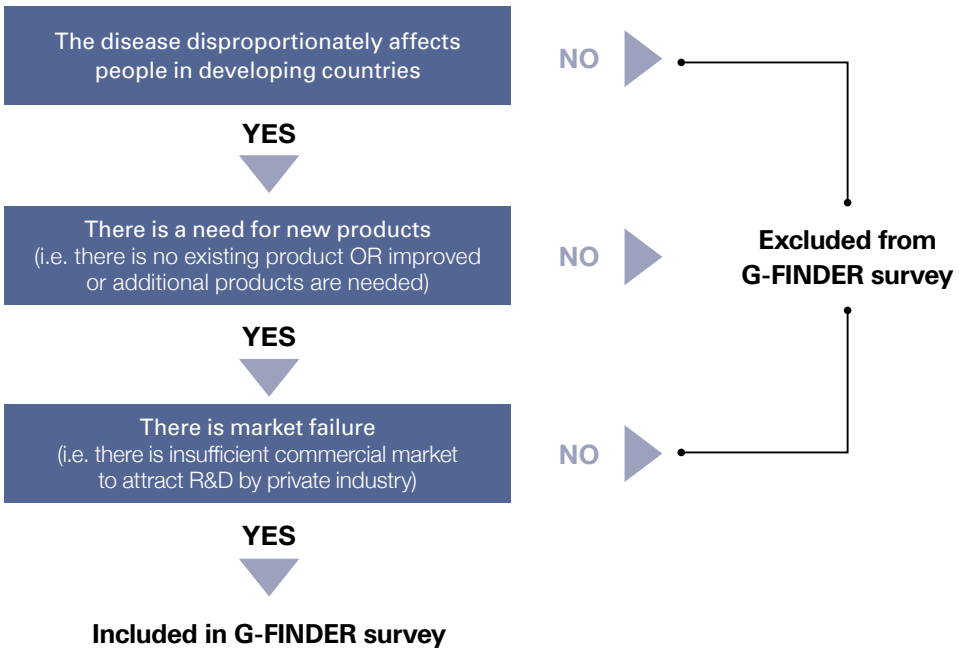
While the overall effect of COVID-19 on participation was relatively slight, some areas were disproportionately impacted by the absence of data for FY2019. All instances in which headline funding totals are potentially misleading due to survey participation effects are highlighted throughout the report.

What types of funding does G-FINDER include?

DEFINING NEGLECTED DISEASES

The scope of the G-FINDER survey is determined in consultation with an Advisory Committee made up of a broad cross-section of international experts in neglected diseases and product development. The basis of this determination is the three-stage filter outlined in Figure 1. As this filter is applied not only at the overarching disease level but also at the product level, not all product areas are included for all of the diseases in the G-FINDER scope, and some are included only where they meet additional conditions designed to identify products targeting low- and middle-income countries (LMICs).

Figure 1. Identifying neglected diseases



Multi-disease investments judged to have a sufficient connection with fighting neglected disease, including platform technologies (adjuvants and immunomodulators, diagnostic platforms, and delivery devices for drugs or vaccines), multi-disease vector control R&D and core funding to neglected-disease-focused organisations are captured in our 'non-disease-specific' funding category.

Table 1, overleaf, offers a complete breakdown of which disease and product combinations are included in our funding totals.

Table 1. G-FINDER neglected diseases, products and technologies

Disease		Basic research	Drugs	Vaccines	Biologics	Diagnostics	Microbicides	Vector control products
HIV/AIDS		Restricted	Restricted	✓	Restricted	✓	✓	-
Tuberculosis		✓	✓	✓	✓	✓	-	-
Malaria	*P. falciparum*	✓	✓	✓	✓	✓	-	✓
	P. vivax	✓	✓	✓	✓	✓	-	✓
	Multiple / other malaria strains	✓	✓	✓	✓	✓	-	✓
Diarrhoeal diseases	*Shigella*	✓	Restricted	✓	Restricted	✓	-	-
	Rotavirus	-	-	Restricted	-	-	-	-
	Cholera	✓	Restricted	✓	Restricted	✓	-	-
	Cryptosporidiosis	✓	Restricted	✓	Restricted	✓	-	-
	Enterotoxigenic *E. coli* (ETEC)	-	-	✓	-	✓	-	-
	Enteroaggregative *E. coli* (EAEC)	-	-	✓	-	✓	-	-
	Giardiasis	-	-	-	-	✓	-	-
	Multiple diarrhoeal diseases	✓	Restricted	✓	Restricted	✓	-	-
Kinetoplastid diseases	Leishmaniasis	✓	✓	✓	✓	✓	-	-
	Sleeping sickness (HAT)	✓	✓	✓	✓	✓	-	✓
	Chagas' disease	✓	✓	✓	✓	✓	-	✓
	Multiple kinetoplastid diseases	✓	✓	✓	✓	✓	-	✓
Helminth infections (worms & flukes)	Schistosomiasis (bilharziasis)	✓	✓	✓	✓	✓	-	✓
	Onchocerciasis (river blindness)	✓	✓	✓	-	✓	-	✓
	Lymphatic filariasis (elephantiasis)	✓	✓	-	-	✓	-	✓
	Tapeworm (taeniasis / cysticercosis)	✓	✓	-	-	✓	-	✓
	Hookworm (ancylostomiasis & necatoriasis)	✓	✓	✓	-	-	-	-
	Whipworm (trichuriasis)	✓	✓	-	-	-	-	-
	Strongyloidiasis & other intestinal roundworms	✓	✓	✓	-	✓	-	-
	Roundworm (ascariasis)	✓	✓	-	-	-	-	-
	Multiple helminth infections	✓	✓	✓	-	✓	-	✓
Dengue		✓	✓	-	✓	✓	-	✓
***Salmonella* infections**	Typhoid and paratyphoid fever (*S.* Typhi, *S.* Paratyphi A)	✓	✓	✓	✓	✓	-	-
	Non-typhoidal *S. enterica* (NTS)	✓	✓	✓	✓	✓	-	-
	Multiple *Salmonella* infections	✓	✓	✓	✓	✓	-	-
Bacterial pneumonia & meningitis	*S. pneumoniae*	Restricted	-	Restricted	-	✓	-	-
	N. meningitidis	Restricted	-	Restricted	-	✓	-	-
	Both *S. pneumoniae* and *N. meningitidis*	Restricted	-	-	-	✓	-	-
Hepatitis C		-	Restricted	Restricted	-	✓	-	-
Snakebite envenoming		Restricted	Restricted	-	Restricted	Restricted	-	-
Hepatitis B		Restricted	Restricted	-	Restricted	✓	-	-
Cryptococcal meningitis		-	✓	-	✓	-	-	-
Leprosy		✓	✓	✓	✓	✓	-	-
Buruli ulcer		✓	✓	✓	-	✓	-	-
Trachoma		-	-	✓	-	✓	-	-
Rheumatic fever		-	-	✓	-	-	-	-
Mycetoma		✓	✓	-	-	✓	-	-
Leptospirosis		-	-	-	-	Restricted	-	-

Investment applicable to more than one neglected disease, or to more than one global health area*					
Platform technologies				Multi-disease vector control products	Core funding of a multi-disease R&D organisation
General diagnostic platforms	Adjuvants and immunomodulators	Drug delivery technologies and devices	Vaccine delivery technologies and devices		
Restricted	Restricted	Restricted	Restricted	✓	✓

✓ denotes a category where a disease or product is included in the survey
Restricted denotes a category where only some investments are eligible, as defined in the G-FINDER neglected disease R&D scope document
* The G-FINDER project covers three global health areas: neglected diseases, emerging infectious diseases, and sexual & reproductive health issues

TYPES OF RESEARCH INCLUDED

Funding included in G-FINDER covers the spectrum from basic research to post-registration studies of new products. We break these activities down into the broad categories of basic & early-stage research and clinical or field development & post-registration studies:

- Basic & early-stage research, includes:
  - Basic research
  - Discovery and pre-clinical development
- Clinical or field development & post-registration studies, includes:
  - Baseline epidemiology in preparation for product trials
  - Clinical development and field evaluation
  - Post-registration studies of new products, including Phase IV/pharmacovigilance, and operational research for diagnostics

The purpose of G-FINDER is to track and analyse global investment in the research and development of new health technologies for neglected diseases; it is not intended to capture investment in the entire spectrum of neglected disease research. This means that significant and important investments in health systems and operational/implementation research and sociological, behavioural and epidemiological research not related to the development of new health technologies are not included in these funding totals. Similarly, funding for health programme delivery, advocacy, routine disease surveillance programmes, community education and general capacity building to address neglected diseases falls outside the scope of G-FINDER.

For a detailed breakdown of the diseases, products and activities included, please see our neglected disease R&D scope:
https://gfinder.policycuresresearch.org/staticContent/pdf/G-FINDER_ND_R&D_scope.pdf

ONGOING CHANGES TO THE LIST OF NEGLECTED DISEASES

The G-FINDER scope is reviewed annually. In our previous report this led to the inclusion of hepatitis B, mycetoma and snakebite envenoming, as well as the refinement of our scope restrictions for hepatitis C. There have been no changes to our list of neglected diseases since last year's report, meaning that the figures presented here can reasonably be compared to those from the previous year, other than the changes due to survey participation mentioned above. For comparisons with earlier years, please take care when examining overall totals, since some changes may reflect the gradual expansion in our survey's scope.

A detailed history of the G-FINDER survey's scope is provided in last year's report
https://www.policycuresresearch.org/analysis

INFLATION ADJUSTMENTS AND AGGREGATION OF INDUSTRY DATA

Funding data is adjusted for inflation and converted to US dollars (US$) to eliminate artefactual effects caused by inflation and exchange rate fluctuations.

All pharmaceutical industry funding data is aggregated and anonymised for confidentiality purposes, with a distinction made between multinational pharmaceutical companies (MNCs) and small pharmaceutical and biotechnology firms (SMEs).

FUNDING FOR EMERGING INFECTIOUS DISEASES AND SEXUAL & REPRODUCTIVE HEALTH

For the last several years, the G-FINDER survey has been expanded to gather data about funding for R&D targeting emerging infectious diseases and sexual & reproductive health. This data and an analysis of the related R&D funding trends are not included in the G-FINDER Neglected Disease report, but are covered instead in our ongoing series of companion reports (see **https://www.policycuresresearch.org/analysis**). However, all available neglected disease, emerging infectious disease and sexual & reproductive health survey data (now including FY2019 figures) are available immediately via the G-FINDER data portal (**https://gfinderdata.policycuresresearch.org/**). Data on funding for COVID-19 will be gathered as part of our 2021 survey and will ultimately be captured in our future reporting on emerging infectious diseases and via the data portal.

SUPPLEMENTARY MATERIALS

Details on the survey methodology and data validation are available at:
http://www.policycuresresearch.org/g-finder

All of the data behind the G-FINDER report is available through the online search tool at
https://gfinderdata.policycuresresearch.org/

Table 2. Disease and product R&D funding 2019 (US$ millions)

Disease or R&D area	Basic research	Drugs	Vaccines	Biologics	Diagnostics	Microbicides	Vector control products	Unspecified	Total
HIV/AIDS	234.50	201.79	763.06	42.00	46.32	114.65		71.76	1,474.08
Tuberculosis	185.99	342.87	75.22	0.35	55.88			10.08	670.38
Malaria	149.96	224.35	135.62	2.61	27.19		51.03	12.33	603.09
P. falciparum	71.70	90.23	101.00	-	5.17		3.82	3.48	275.41
P. vivax	12.90	36.33	8.13	-	3.62		0.38	0.08	61.45
Multiple / other malaria strains	65.36	97.78	26.49	2.61	18.40		46.82	8.77	266.23
Diarrhoeal diseases	41.96	19.98	88.78	0.19	4.16			3.75	158.81
Shigella	8.74	1.33	31.56	-	0.65			-	42.29
Rotavirus			40.01						40.01
Cholera	22.04	0.79	5.72	-	0.81			-	29.37
Cryptosporidiosis	5.11	14.23	0.05	-	0.19			0.23	19.81
Enterotoxigenic *E. coli* (ETEC)			6.66		0.18			-	6.84
Enteroaggregative *E. coli* (EAEC)			0.22		0.11			0.07	0.40
Giardiasis					-			-	-
Multiple diarrhoeal diseases	6.06	3.62	4.56	0.19	2.22			3.45	20.10
Kinetoplastid diseases	51.73	88.20	3.59	0.02	4.24		0.02	0.25	148.05
Leishmaniasis	17.64	19.53	2.09	-	1.14		-	0.25	40.66
Sleeping sickness (HAT)	19.88	16.26	0.05	-	0.64			-	36.83
Chagas' disease	10.66	22.53	1.45	0.02	2.46		0.02	-	37.12
Multiple kinetoplastid diseases	3.56	29.88	-	-	-		-	-	33.44
Helminth infections (worms & flukes)	35.45	27.84	7.50	-	9.18		0.49	3.27	83.73
Schistosomiasis (bilharziasis)	9.91	5.02	2.51	-	4.66		0.46	1.05	23.61
Onchocerciasis (river blindness)	0.72	7.81	3.64		0.78		0.02	-	12.98
Lymphatic filariasis (elephantiasis)	5.25	2.45			1.03		0.02	2.15	10.90
Tapeworm (taeniasis / cysticercosis)	4.54	1.20			1.19		-	-	6.94
Hookworm (ancylostomiasis & necatoriasis)	1.55	0.88	1.34					-	3.78
Whipworm (trichuriasis)	1.75	1.99						-	3.74
Strongyloidiasis & other intestinal roundworms	2.60	-	-		-			-	2.60
Roundworm (ascariasis)	1.29	-						-	1.29
Multiple helminth infections	7.83	8.48	-		1.51		-	0.08	17.90
Dengue	26.84	22.27		6.05	7.02		9.40	1.91	73.49
***Salmonella* infections**	37.74	3.57	26.49	0.08	1.50			0.78	70.16
Typhoid and paratyphoid fever (*S.* Typhi, *S.* Paratyphi A)	27.77	3.56	24.34	0.08	0.92			-	56.68
Non-typhoidal *S. enterica* (NTS)	4.69	-	1.14	-	-			0.78	6.61
Multiple *Salmonella* infections	5.28	0.01	1.00	-	0.58			-	6.87
Bacterial pneumonia & meningitis	3.12		44.74		1.58			0.22	49.65
S. pneumoniae	1.59		36.92		0.27			0.08	38.86
N. meningitidis	1.52		7.82		0.27			0.15	9.76
Both *S. pneumoniae* and *N. meningitidis*	-				1.04			-	1.04

Disease or R&D area	Basic research	Drugs	Vaccines	Biologics	Diagnostics	Microbicides	Vector control products	Unspecified	Total
Hepatitis C		4.30	1.37		5.20			0.06	10.93
Snakebite envenoming	0.51	0.58		7.53	0.03			1.65	10.29
Hepatitis B	2.07	0.89		1.82	0.71			3.16	8.65
Cryptococcal meningitis		7.96		-				-	7.96
Leprosy	5.00	1.03	0.63	-	0.16			0.02	6.84
Buruli ulcer	1.26	0.92	-		0.14			0.45	2.77
Trachoma			1.87		-			-	1.87
Rheumatic fever			1.23						1.23
Mycetoma	0.58	0.33			-			-	0.91
Leptospirosis					0.79				0.79
Platform technologies									80.94
Adjuvants and immunomodulators									22.92
Drug delivery technologies and devices									5.19
General diagnostic platforms									32.01
Vaccine delivery technologies and devices									20.81
Multi-disease vector control products									60.02
Core funding of a multi-disease R&D organisation									303.62
Unspecified disease									47.71
Total R&D funding									**3,875.97**

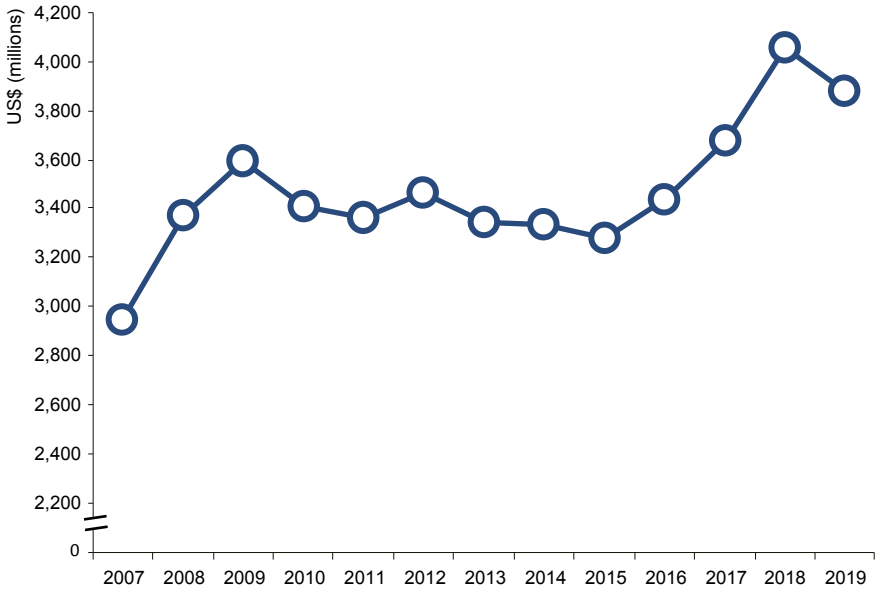
- No reported funding

Category not included in G-FINDER

OVERVIEW OF NEGLECTED DISEASE R&D FUNDING

Reported global funding for basic research and product development for neglected diseases in 2019 was $3,876m, an apparent drop of $185m from 2018. However this drop in funding actually reflects COVID-related difficulties with survey participation and data availability. Once these participation effects are accounted for, we estimate that 2019 funding was virtually unchanged from its record high in 2018, showing a marginal decline of only $8.0m – just 0.2% of global funding.

Figure 2. Total R&D funding for neglected diseases 2007-2019



Several diseases or disease groups were disproportionately affected by changes in survey participation: tuberculosis ($41m in 2018 funding from entities not captured in 2019), bacterial pneumonia & meningitis ($41m), *Salmonella* infections ($28m), malaria ($31m) and diarrhoeal diseases ($13m). To avoid focusing on purely artefactual changes in funding, we have used a participation-adjusted measure of the change in funding between 2018 and 2019 throughout our analysis, comparing only organisations for which consistent data is available in both years. The figures and tables show unadjusted reported totals and, as a result, may differ slightly from the participation-adjusted figures quoted in the text.

Table 3. R&D funding by disease 2010-2019 ^

Disease or R&D area	US$ (millions)										2019 % of total
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
HIV/AIDS	1,309	1,267	1,297	1,183	1,194	1,136	1,210	1,300	1,454	1,474	38
Tuberculosis	653	610	578	592	610	609	613	634	681	670	17
Malaria	593	617	610	565	609	594	611	652	665	603	16
Diarrhoeal diseases	188	176	178	211	186	170	159	169	180	159	4.1
Kinetoplastid diseases	164	145	147	133	158	134	149	151	149	148	3.8
Helminth infections (worms & flukes)	85	91	97	97	97	82	78	89	89	84	2.2
Dengue	73	83	79	73	87	95	123	81	77	73	1.9
Salmonella infections	51	51	61	69	69	73	97	84	91	70	1.8
Bacterial pneumonia & meningitis	107	112	116	107	79	98	97	76	90	50	1.3
Hepatitis C				50	48	36	30	15	48	11	0.3
Snakebite envenoming									7.6	10	0.3
Hepatitis B									7.9	8.6	0.2
Cryptococcal meningitis				3.1	5.9	5.3	5.9	12	8.1	8.0	0.2
Leprosy	10	8.9	14	13	11	11	11	11	9.2	6.8	0.2
Buruli ulcer	5.7	6.0	6.3	6.7	3.8	1.9	2.9	4.3	2.5	2.8	0.1
Trachoma	3.7	6.2	2.2	2.3	1.4	1.2	2.3	2.7	1.9	1.9	<0.1
Rheumatic fever	2.0	0.9	1.0	0.9	1.4	2.3	1.3	1.4	1.2	1.2	<0.1
Mycetoma									0.6	0.9	<0.1
Leptospirosis				0.4	1.3	1.3	2.4	3.2	1.6	0.8	<0.1
Platform technologies	32	19	53	47	25	38	55	34	55	81	2.1
General diagnostic platforms	11	11	18	18	10	17	18	11	20	32	0.8
Adjuvants and immunomodulators	11	6.1	30	23	9.1	13	19	14	19	23	0.6
Vaccine delivery technologies and devices	6.6	2.0	0.9	4.7	2.5	4.9	14	2.3	14	21	0.5
Drug delivery technologies and devices	3.7	-	4.4	1.8	2.6	3.8	3.3	6.6	2.2	5.2	0.1
Multi-disease vector control products								30	40	60	1.5
Core funding of a multi-disease R&D organisation	75	90	108	119	110	146	164	285	335	304	7.8
Unspecified disease	58	80	116	78	41	48	39	44	66	48	1.2
Total R&D funding	3,410	3,363	3,465	3,351	3,336	3,282	3,451	3,681	4,061	3,876	100

Hepatitis C, cryptococcal meningitis and leptospirosis were added to G-FINDER in 2013. Multi-disease vector control products were added in 2017. Mycetoma, snakebite envenoming and hepatitis B were added in 2018.

^ Please note that some of the diseases listed are actually groups of diseases, such as the diarrhoeal illnesses and helminth infections. This reflects common practice and also the shared nature of research in some areas. For example, *Streptococcus pneumoniae* R&D is often targeted at both pneumonia and meningitis.

\- No reported funding

FUNDING BY DISEASE

HIV/AIDS, TUBERCULOSIS & MALARIA

The three diseases to receive the most investment – HIV/AIDS, TB and malaria – collectively accounted for just under three-quarters ($2,748m, 71%) of global funding for neglected disease R&D in 2019.

Global funding for **HIV/AIDS** R&D in 2019 was $1,474m. This was a marginal increase from 2018 (up $29m, 2.0%) but also an all-time high, and once again far more than any other neglected disease.

The small overall increase was a result of a record investment from the US NIH ($964m, 65% of HIV/AIDS funding), which increased its funding by $69m, via additional funding from its Office of AIDS Research across several product areas especially vaccines (up $25m, 5.3%) and basic research (up $21m, 12%) – pushing it to a record high.

Industry investment in HIV R&D declined slightly from its 2018 peak, falling by $14m (-7.0%). However, this drop came after five consecutive years of growth, and still left industry investment comfortably above its historical average.

HIV diagnostics funding decreased by almost a third (down $21m, -31%) following a reversal in last year's spike in funding from Unitaid (down $22m, -54%), as its LMIC-based post-registration studies for point-of-care diagnostics for early infants and HIV-positive mothers neared their conclusion. Funding for microbicides also fell, reaching a record low after more than a decade of gradual decline, as USAID and the German BMBF – both among the top funders in 2018 – saw substantial reductions in funding.

Funding for **tuberculosis** was $670m, up by $29m (4.6%). Since 2015, drug development has consistently accounted for around half of all TB R&D funding, up from a third when G-FINDER began. This remained the case in 2019 despite a drop in industry investment in TB drug R&D (down $18m, -19%), which in fact reflected a return to recent norms after a big increase in 2018, and was partly offset by increased investment from the Gates Foundation, including its first round of disease-specific funding for the Bill & Melinda Gates Medical Research Institute, and a tripling of drug funding from the German BMBF, which went mostly to TB Alliance.

Funding for TB vaccine R&D rebounded from a record low (up $14m, 22%), driven by increased investment by the US NIH, and new funding from the Gates Foundation to the Gates MRI. This came despite a drop in EC[1] funding as Horizon 2020 wound down, and the ongoing decline in industry investment, with vaccines now accounting for just 4% of the sector's investment in TB R&D, down from an average of 20% between 2012 and 2015.

Basic research funding also increased, jumping by $20m (12%) to reach its highest level since its American Recovery and Reinvestment Act-driven peak in 2009, on the back of record funding from the US NIH. The decade-long upward trend in NIH overall funding, alongside growth from the BMBF and the entry of Unitaid, have taken the public share of funding for TB R&D above two-thirds in 2019, up from around half in 2010.

Unlike HIV/AIDS and TB, funding for **malaria** dropped slightly in 2019, falling $32m (-5.1%) to $603m – its first drop since 2015. Public and philanthropic funding remained relatively stable, with the overall decline primarily due to a 26% fall in industry funding.

[1] The term 'EC' used here and throughout the report refers to funding from the European Union budget that is managed by the European Commission or related European Union partnerships and initiatives, such as the European & Developing Countries Clinical Trials Partnership (EDCTP) and Innovative Medicines Initiative.

The fall in MNC funding was concentrated in funding for drug development (down $35m, -51%), likely linked to changes in the pipeline, including the 2018 US FDA approval of tafenoquine as a single-dose radical cure and transfer of MNC-led artefenomel/ferroquine development to the Medicines for Malaria Venture (MMV). As a result, the share of malaria funding going to clinical development & post-registration studies fell to its lowest level since 2013.

Funding for vaccines and biological vector control products also fell, though mostly as a result of annual variation in Gates Foundation grant cycles, while investment to support the evaluation of ivermectin as an endectocide took multilateral investment in malaria close to record highs ($8.8m). Even after doubling in 2019, multilateral funding still made up only a small part of the overall public sector contribution, which once again accounted for more than half of all malaria funding globally ($335m, 56%).

NEGLECTED TROPICAL DISEASES

Buruli ulcer, dengue, helminth infections, kinetoplastid diseases, leprosy, mycetoma, snakebite envenoming, and trachoma

Global R&D funding for neglected tropical diseases (NTDs) included in the G-FINDER survey scope[2] has been stagnant for a decade, and this situation continued in 2019. After adjusting for participation, funding for NTDs increased by just $7.5m (2.4%), to $328m (8.5% of global funding), marginally above the record-low share of overall neglected disease funding they received in 2018.

In addition to seeing little overall change, most NTDs saw little change to their individual funding levels in 2019, although the majority received small increases.

The largest changes were seen among the **kinetoplastid diseases**, which collectively received $148m in 2019 – up a modest $6.0m (4.2%) from 2018. However this masked a major jump in funding for Chagas' disease, which nearly doubled to $37m, an all-time high. This was largely due to a fivefold ($13m) increase in industry investment, continuing a gradual increase in industry investment in drug R&D across all the kinetoplastid diseases.

Funding for human African trypanosomiasis, on the other hand, fell by $12m after a spike in 2018 funding, returning to around its 2016 and 2017 level following reductions in funding from the Gates Foundation, industry and the Wellcome Trust, the latter two having been mostly responsible for the increase in 2018.

Another relatively substantial increase was seen in funding for **snakebite envenoming** (SBE), which rose to $10m in 2019 – an increase of more than 60% ($3.8m) over 2018 (its first year in the G-FINDER survey).

The increase was driven by increases in funding from two UK public funders, with DFID investing an additional $4.7m (up 636% from 2018) and DHSC increasing its funding by $0.6m, nearly tripling its 2018 funding to support a Global Health Research Group on African Snakebite Research and – along with ongoing funding from the UK NHS – leaving the UK public sector responsible for nearly three-quarters of global SBE R&D funding. Industry funding also rose, more than doubling to $1.4m; like the DHSC's, this investment was focused on biologics R&D, helping drive a near-fourfold rise in funding for snakebite biologics.

[2] Not all of the NTDs recognised by the World Health Organization are included in the G-FINDER scope. For an explanation of the exceptions, see: https://www.policycuresresearch.org/rd-needs-for-global-health/

Dengue funding increased slightly, rising by $3.2m (4.5%) to $73m, though still far below its 2016 peak. Like SBE, the overall increase was driven by a rise in biologics R&D – included in the survey for the second time in 2019 – reaching a total of $6.0m in 2019 (up 208%) following increased funding from the US NIH and the Colombian Minciencias. The increase in biologics funding mostly offset a big ($5.8m) fall in dengue basic research funding, while funding for all other in-scope product areas increased slightly.

Funding for dengue clinical development & post-registration studies rose to $23m (up $7.2m, 46% from 2018), making it one of only three disease groups – along with kinetoplastids and *Salmonella* infections – reporting a meaningful increase in funding for clinical development in 2019. The bulk of this increase in clinical development funding went to drug R&D, with funding from the US NIH and an MNC shifting from early-stage drug R&D to clinical development in 2019.

Earmarked direct funding for **mycetoma** remained negligible, increasing from $0.6m to $0.9m, although this total doesn't reflect additional onward funding from the Global Health Innovative Technology Fund (GHIT Fund) to the Drugs for Neglected Diseases Initiative (DND*i*), which is supporting the Phase II trial of fosravuconazole for mycetoma in Sudan.

The only other NTD to see increased funding in 2019 was **Buruli ulcer**, which rose slightly (up $0.2m, 6.7%) to $2.8m, rebounding slightly after a fall in 2018.

All the other NTDs saw relatively small falls in funding, the largest of which was for **helminth infections**, which dropped to $84m, down $5.6m (-6.6%) from 2018.

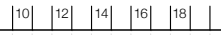
The slight overall decrease was due to rebalancing in funding away from lymphatic filariasis (down $5.0m), multiple helminth infections (down $5.9m) and – to a lesser extent – onchocerciasis (down $1.9m), in favour of smaller increases across the other, traditionally less funded, sub-diseases. These shifts drove a substantial reduction in the share of helminth funding going to the top four diseases (schistosomiasis, onchocerciasis, lymphatic filariasis and tapeworm) and R&D targeting multiple helminth infections.

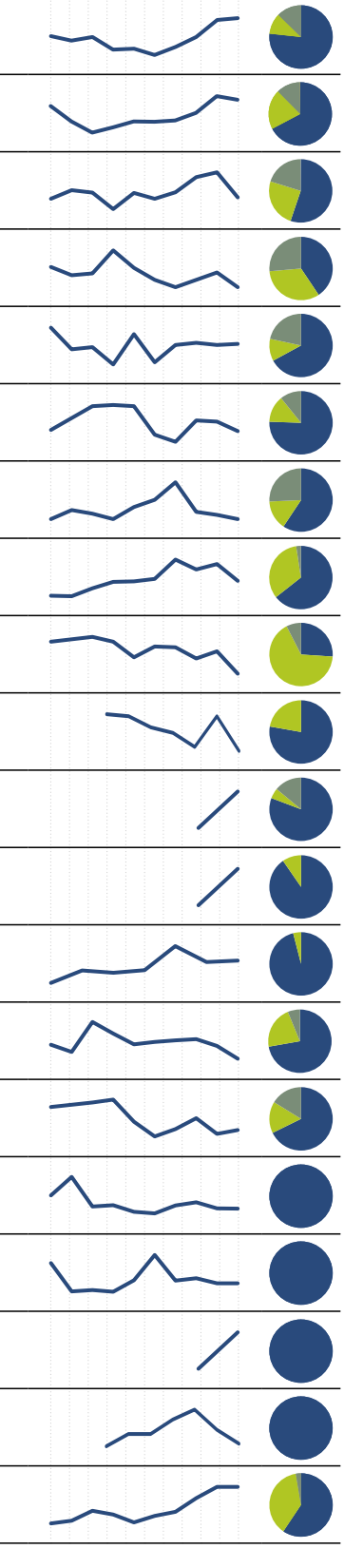
The only one of these 'top four' helminth infections not to see a fall in 2019 funding was schistosomiasis, which grew slightly thanks to increased diagnostic funding from the UK DHSC to the University of Glasgow. This helped to drive an overall rise in the amount and share of public funding for helminths R&D, partly offsetting big falls from the private and philanthropic sectors, and continuing an ongoing trend of increased public and declining philanthropic investment.

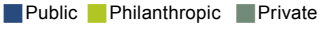
Funding for **leprosy** fell very slightly to $6.8m in 2019 – a 3.9% ($0.3m) drop, while funding for **trachoma** was basically unchanged at $1.9m.

Table 4. **Summary of R&D funding by disease 2019**

Disease	Total R&D spend in 2019	% of global funding	% change from 2018 (participation-adjusted figure)	Total R&D spend 2010 - 2019	Sector share
HIV/AIDS	$1,474m	38%	+1.4% (+2.0%)		
Tuberculosis	$670m	17%	-1.5% (+4.6%)		
Malaria	$603m	16%	-9.3% (-5.1%)		
Diarrhoeal diseases	$159m	4.1%	-12% (-5.3%)		
Kinetoplastid diseases	$148m	3.8%	-0.7% (+4.2%)		
Helminth infections (worms & flukes)	$84m	2.2%	-5.6% (-6.6%)		
Dengue	$73m	1.9%	-5.0% (+4.5%)		
Salmonella infections	$70m	1.8%	-23% (+10%)		
Bacterial pneumonia & meningitis	$50m	1.3%	-45% (+1.3%)		
Hepatitis C	$11m	0.3%	-77% (-77%)		
Snakebite envenoming	$10m	0.3%	+36% (+61%)		
Hepatitis B	$8.6m	0.2%	+9.7% (+14%)		
Cryptococcal meningitis	$8.0m	0.2%	-2.2% (-2.2%)		
Leprosy	$6.8m	0.2%	-25% (-3.9%)		
Buruli ulcer	$2.8m	0.1%	+9.4% (+6.7%)		
Trachoma	$1.9m	<0.1%	-0.6% (-0.6%)		
Rheumatic fever	$1.2m	<0.1%	-0.5% (-4.9%)		
Mycetoma	$0.9m	<0.1%	+46% (+46%)		
Leptospirosis	$0.8m	<0.1%	-52% (+11%)		
Non-disease-specific funding	$492m	13%	-1.0% (-1.0%)		







OTHER NEGLECTED DISEASES

Bacterial pneumonia & meningitis, cryptococcal meningitis, diarrhoeal diseases, hepatitis B, hepatitis C, leptospirosis, rheumatic fever, and *Salmonella* infections

Funding for the eight other disease areas included in the G-FINDER survey reached a total of $308m in 2019 (8.0% of global funding), a drop of more than 10% from 2018 levels, almost entirely due to big falls in funding for hepatitis C and diarrhoeal diseases.

The fall in LMIC-focused **hepatitis C** research – down by $36m to $11m in 2019, a nearly 80% drop – reflected a spike in funding the previous year related to AbbVie's China and Brazil-based clinical trials of glecaprevir/pibrentasvir, a newly US FDA-approved pangenotypic treatment for hepatitis C. The one year increase associated with these trials temporarily halted years of consistent decline in funding for hepatitis C, but neither AbbVie, nor any other private sector funder, reported any LMIC-relevant funding for 2019.

Two other funders, MSF and the French ANRS, also sharply reduced their funding for hepatitis C drug development following the conclusion of their respective trials.

The fall in funding for **diarrhoeal diseases** was much less substantial, decreasing by $8.9m (-5.3%) to $159m. Not all diarrhoeal diseases saw their funding fall however: *Shigella* R&D reached an historic high of $42m, capping four consecutive years of rapid growth in funding for the clinical development of monovalent and multi-valent bioconjugate *Shigella* vaccines. Cryptosporidiosis funding also increased – by $2.5m – continuing its recent upward trend, while funding for all other diarrhoeal diseases declined or remained stable.

Despite the fall in 2019 funding, overall funding for diarrhoeal diseases appears to be stabilising thanks to the growth in *Shigella* funding and returning public sector investment, potentially reversing an extended decline between 2009 and 2016.

The only meaningful increases in funding among the Other neglected diseases were for *Salmonella* infections and hepatitis B:

Funding for ***Salmonella* infections** was $70m in 2019, an increase of $6.5m (10%) from 2018 – continuing a long-term upward trend. Funding for vaccine clinical development more than doubled, with almost all of the increase coming from the Gates Foundation and the Wellcome Trust and focused on typhoid and paratyphoid fever. This continued an ongoing upward trend in philanthropic funding, and, along with increases in funding from 13 different public funders – including Institut Pasteur, the Colombian Minciencias and the EC – reduced reliance on funding from the US NIH, although it continued to provide the majority of *Salmonella* funding, as it has every year.

Funding for LMIC-focused basic research and product development for **hepatitis B** rose by just under $1.0m (14%) relative to 2018, when it was first included in the G-FINDER survey. While last year's top three hepatitis B funders – the US NIH, Inserm and the UK MRC – continued to account for nearly 80% of total funding, 2019 saw several new funders, headlined by the Wellcome Trust and the new R&D efforts of the Hepatitis B Foundation. These new funders together contributed $1.3m, or 16% of total 2019 funding, with an additional $0.7m from the Brazilian National STD and AIDS Programme, a first-time survey participant in 2019.

The remaining Other diseases saw little change in their 2019 funding:

Bacterial pneumonia & meningitis was essentially unchanged from 2018, rising by just 1.3% to $50m. The large apparent fall (of $40m, 45%), mostly affecting *S. pneumoniae* vaccine R&D, reflects only changes in participation and data availability, mostly among SMEs.

Funding for **leptospirosis** similarly rose by 11% (less than $0.1m) after adjusting for a large participation-related fall.

Funding for the remaining two Other diseases both fell very slightly, with **cryptococcal meningitis** down by $0.2m (-2.2%) to $8.0m, as a rise in US NIH funding was offset by a scheduled fall in frontloaded funding for High Dose AMBISOME trials under the UK's Joint Global Health Trial programme, backed by several UK public funders.

Finally, funding for **rheumatic fever** fell by less than $0.1m to $1.2m, leaving it basically unchanged from 2018.

R&D FOR MORE THAN ONE DISEASE

Funding for R&D not allocated to a single disease totalled $492m in 2019, accounting for 13% of all global funding for neglected disease R&D. Despite a very slight fall in participation-adjusted funding, it remained basically unchanged from the previous year's record high, having risen steadily over the preceding four years.

This stable headline funding disguised some changes within individual categories, with funding for both platform technologies and multi-disease vector control research increasing by around half, offset by reductions in core funding to multi-disease organisations and in unspecified R&D.

The increase in overall platform technology funding occurred across all platform categories, especially general diagnostic platforms, funding for which jumped 102% to $32m, and vaccine delivery technologies (up $7.4m, 55% to a record high). The growth in diagnostic platform investment was driven by a new funding stream from the Open Philanthropy Project, as well increased funding from the US DOD, jointly worth $19m in 2019, while vaccine platform growth was fuelled by new funding from the US DOD ($3.6m in 2019) and the UK DHSC ($3.0m).

Funding for multi-disease vector control research increased by nearly half (up $19m, 48%) – driven by increased investment by the Gates Foundation – and has grown each year since it was first included as a distinct category in the G-FINDER scope.

Core funding fell by $33m to $304m, down from its record high in 2018 but still comfortably above its pre-2018 level after a long upward trend which took it from just 2% of global funding in 2009 to an average of nearly 8% over the last three years.

The bulk of the 10% fall in participation-adjusted core funding was due to a fall in the UK DHSC's contributions to the EDCTP following a one-year spike in their funding in 2018. There was a similar pattern in the Wellcome Trust's core funding for the GHIT fund and Hilleman Laboratories, both of which saw frontloaded payments in 2018 followed by no disbursements in 2019, leading to a net reduction of nearly $12m in Wellcome's core funding for 2019. As in 2018, the top three recipients of core funding were the EDCTP ($109m), the GHIT fund ($46m) and the Foundation for Innovative New Diagnostics ($21m), together accounting for nearly 60% of core funding received in 2019. Each of these organisations received less funding in 2019, collectively accounting for the majority of the fall in overall core funding.

NEGLECTED DISEASE FUNDERS

Global funding for neglected disease R&D remained basically stable in 2019 at $3,876m. After adjusting for differences in survey participation, this represented only a marginal fall from 2018 levels (down by $8.0m, just 0.2% of total funding) after three consecutive years of increases, leaving global funding at near-record levels.

While there was a more substantial drop in reported funding, which fell by $185m due to COVID-related challenges with survey participation and data availability, we analyse actual changes in funding between 2018 and 2019 on a 'participation adjusted' basis throughout this report, using data for a fixed group of organisations for which consistent data was captured in both years.

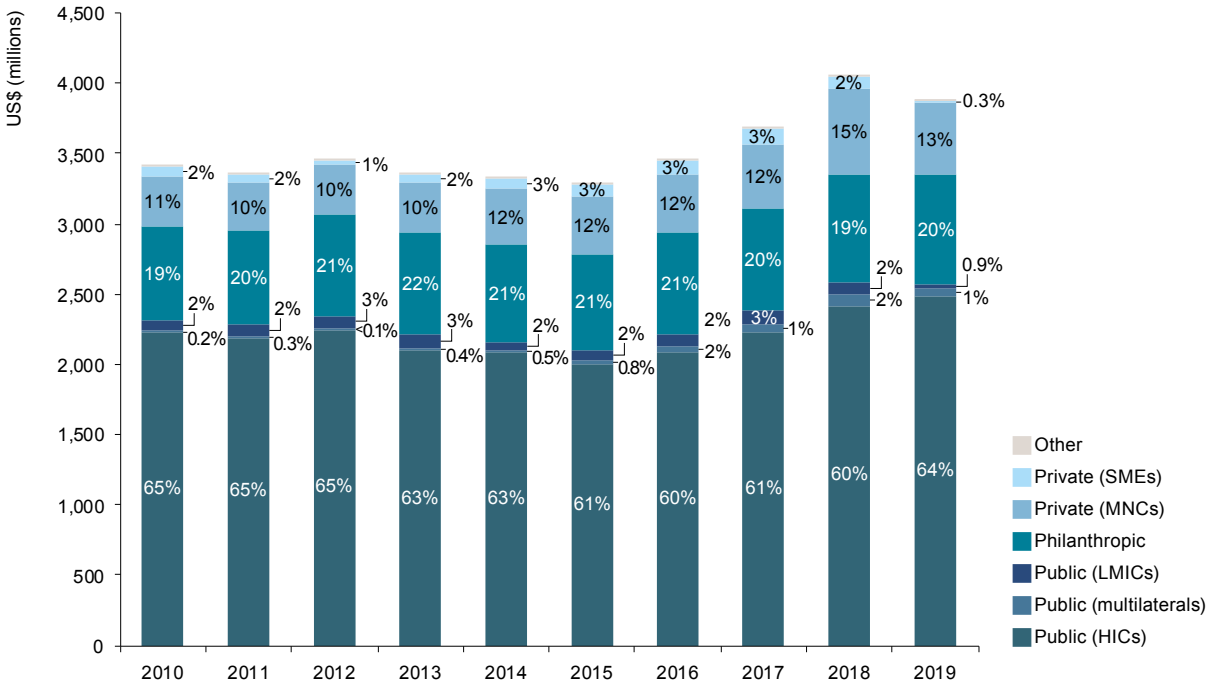
The stability in overall funding was due to modest increases from the public sector (up $70m, 2.8%) and philanthropic organisations (up $39m, 5.2%), which were sufficient to almost fully offset a significant drop in industry investment, which fell by a fifth (down $117m, -19%).

The drop in industry investment came almost entirely from multinational pharmaceutical companies (MNCs, down $113m, -18%). Investment by small and medium pharmaceutical and biotechnology companies (SMEs) also fell (down $4.3m, -26%), although not as steeply as suggested by the unadjusted figures in Figure 3.

The increase in public funding came mostly from high income country (HIC) governments (up $84m, 3.5%), alongside a much smaller rise in low- and middle-income country (LMIC) public sector funding (up $5.7m, 22%), which emerges only once we adjust for this year's fall in available LMIC data. These increases were somewhat offset by a $19m (26%) fall in funding from public multilaterals, reversing a similarly sized funding jump in 2018, and returning their funding to around 2017 levels.

Collectively, the increase in overall public funding and the decline in funding from MNCs combined to raise the public share of global funding to its highest level since 2012.

Figure 3. Total R&D funding by sector 2010-2019



PUBLIC FUNDING

Public funding for neglected disease R&D totalled $2,580m in 2019. Adjusting for the effects of participation, this meant that public funding increased for the fourth consecutive year (up $70m) to yet another record-high, although at just 2.8%, the rate of growth was sharply lower than the average annual growth of 7% seen over the preceding three years.

As noted, the overall growth in public sector funding occurred despite a $19m (-26%) fall in funding from public sector multilaterals, which returned to recent normal levels after jumping by nearly a third in 2018. This followed six consecutive years of multilateral funding growth – driven mostly by Unitaid – and at $55m, still left multilateral funding for neglected disease R&D in 2019 the second-highest on record.

The US government contributed close to three-quarters of total public funding ($1,878m, 73%), once again making it the largest public funder. The UK government was the second-largest contributor ($210m, 8.1%) followed by the European Commission ($121m, 4.7%). The near-tenfold gap between the US government and the next largest public funder increased in 2019 after having fallen to an all-time low in 2018, though the US share of public funding remained mostly unchanged from 2018, and still well-below its long-term average.

Table 5. Top public R&D funders 2019

Country \ US$ (millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2019 % of total
United States of America	1,727	1,693	1,790	1,593	1,603	1,535	1,638	1,657	1,790	1,878	73
United Kingdom	139	112	79	109	115	94	102	193	216	210	8.1
EC	92	110	94	112	111	134	81	116	121	121	4.7
Germany	36	31	54	44	48	53	48	64	67	59	2.3
France	39	59	52	77	63	63	49	47	41	45	1.7
Australia	27	34	43	23	34	20	26	23	40	38	1.5
Japan	9.5	3.6	2.7	11	11	14	18	18	34	33	1.3
Switzerland	15	15	17	17	19	21	18	18	17	19	0.7
Netherlands	18	24	15	23	18	5.1	24	24	20	19	0.7
Brazil	14	11	19	16	9.0	8.9	14	7.8	11	16	0.6
Sweden	16	17	15	5.7	5.7	8.2	14	4.5	15	13	0.5
South Africa	7.4	6.7	5.4	12	4.2	6.6	11	14	12	12	0.5
Subtotal of top 12^	2,179	2,166	2,244	2,101	2,085	2,008	2,086	2,265	2,443	2,463	95
Total public funding	2,318	2,290	2,347	2,220	2,169	2,107	2,219	2,388	2,592	2,580	100

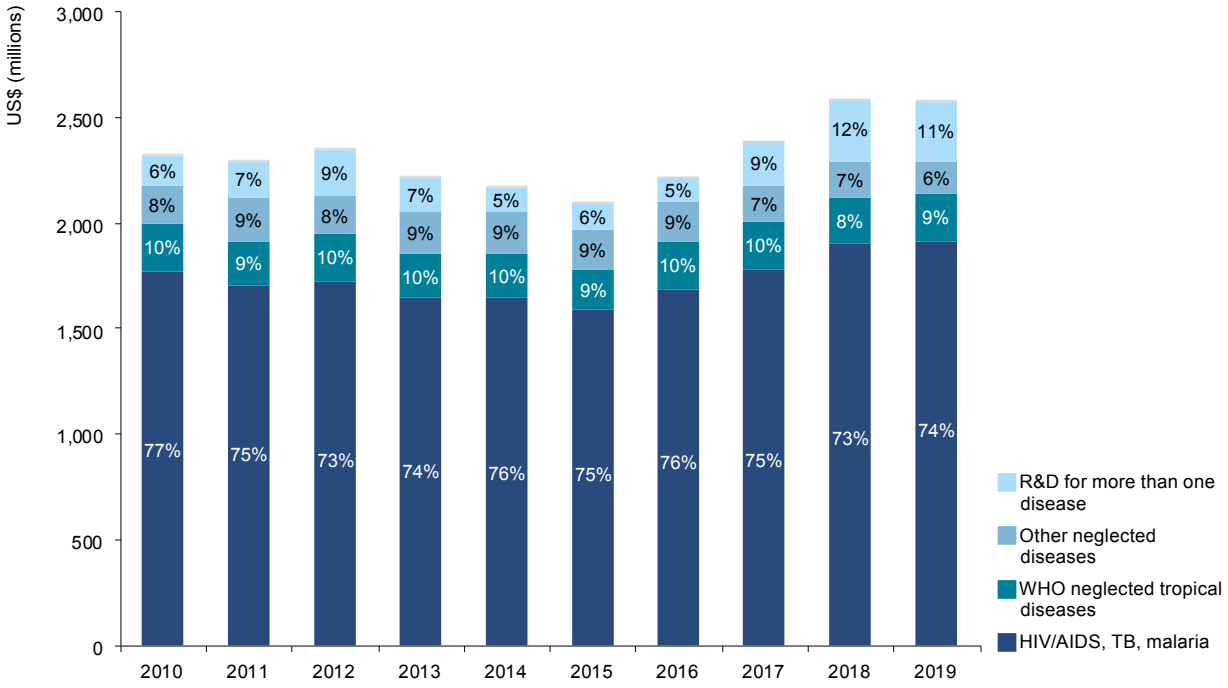
^ Subtotals for 2010-2018 top 12 reflect the top funders for those respective years, not the top 12 for 2019.

The overall growth in public sector funding came primarily from the US government (up $89m, 5.0%); if the US increase is excluded, funding from all other national governments (and the EC) was collectively entirely unchanged from the preceding year. After the US, the next largest increases came from two LMICs – Brazil (up $4.0m, 37%) and Colombia (up $3.5m, 188%) – along with France (up $3.5m, 8.5%) and Switzerland (up $3.1m, 19%).

There were no really significant declines in public funding, with the largest coming from the UK (down $6.1m, -2.8%) – a negligible drop which still left UK funding for neglected disease R&D more than double its 2016 level – followed by Canada (down $3.1m, -21%).

Funding from the governments of Japan (up $1.3m, 4.0%) and Australia (down $1.3m, -3.3%) remained relatively stable, following large increases in 2018.

Figure 4. Public R&D funding by disease 2010-2019



The distribution of public funding across disease groups did not change significantly between 2018 and 2019, with public funders continuing to concentrate on HIV/AIDS, TB and malaria.

Most of the increase in public funding was directed to these top three diseases, all of which received increased public funding: TB funding rose by $33m (8.0%) – a seventh consecutive year of growth – HIV/AIDS by $25m (2.2%) and malaria by $12m (3.6%). The increase in TB and HIV/AIDS funding was largely due to increased support from the US government, while the increase for malaria came from the UK government.

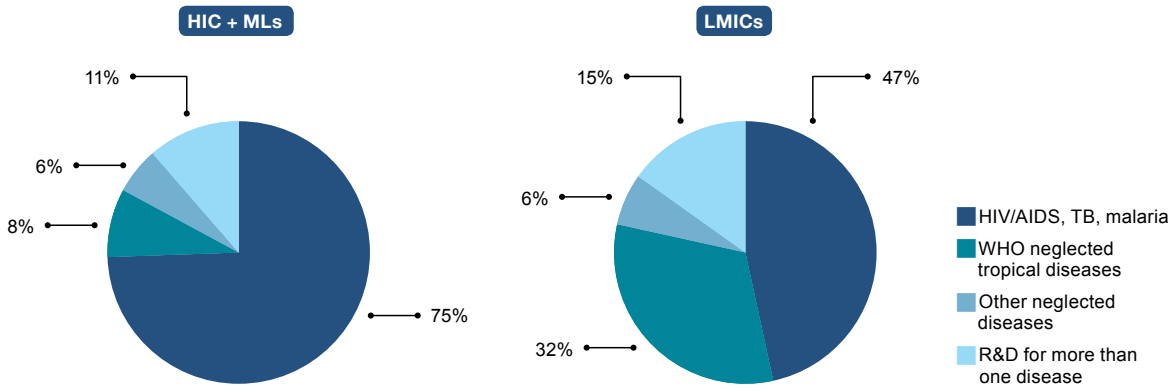
Non-disease-specific funding and diarrhoeal disease R&D saw the largest declines, falling by $11m (-3.7%) and $7.7m (-11%) respectively. The relatively slight drop in non-disease-specific funding came after two years of massive growth, and was driven by a decline in core funding from the UK government (down $19m, -30%). In contrast, the drop in diarrhoeal disease R&D was the result of decreases from several governments: Sweden (down $3.2, -84%), the UK (down $2.8m, -36%) and France (down $1.2m, -77%).

COMPARING HIC, MULTILATERAL AND LMIC CONTRIBUTIONS

Three-quarters (75%) of all funding from high-income countries and multilaterals (MLs) in 2019 went to HIV/AIDS, TB and malaria – compared to around half for LMIC funders. LMIC governments focused more on WHO NTDs, which accounted for a third (32%) of their funding, compared to just 8.3% from HICs and MLs, with around half of each groups' NTD funding going to kinetoplastid R&D.

The LMIC chart below would look somewhat different using pre-2019 averages, which incorporate the Indian public funding data absent from 2019. The share of LMIC funding dedicated to HIV/AIDS, TB and malaria rises to 58%, with historical data showing a much greater focus on TB (22% of pre-2019 LMIC public funding) than we observed in 2019. The increased historical focus on HIV/AIDS, TB and malaria leads to lower shares across the remaining categories, especially non-disease-specific funding, which pre-2019 had averaged just 6.4% of LMIC public funding.

Figure 5. Funding by disease from HICs + MLs and LMICs 2019

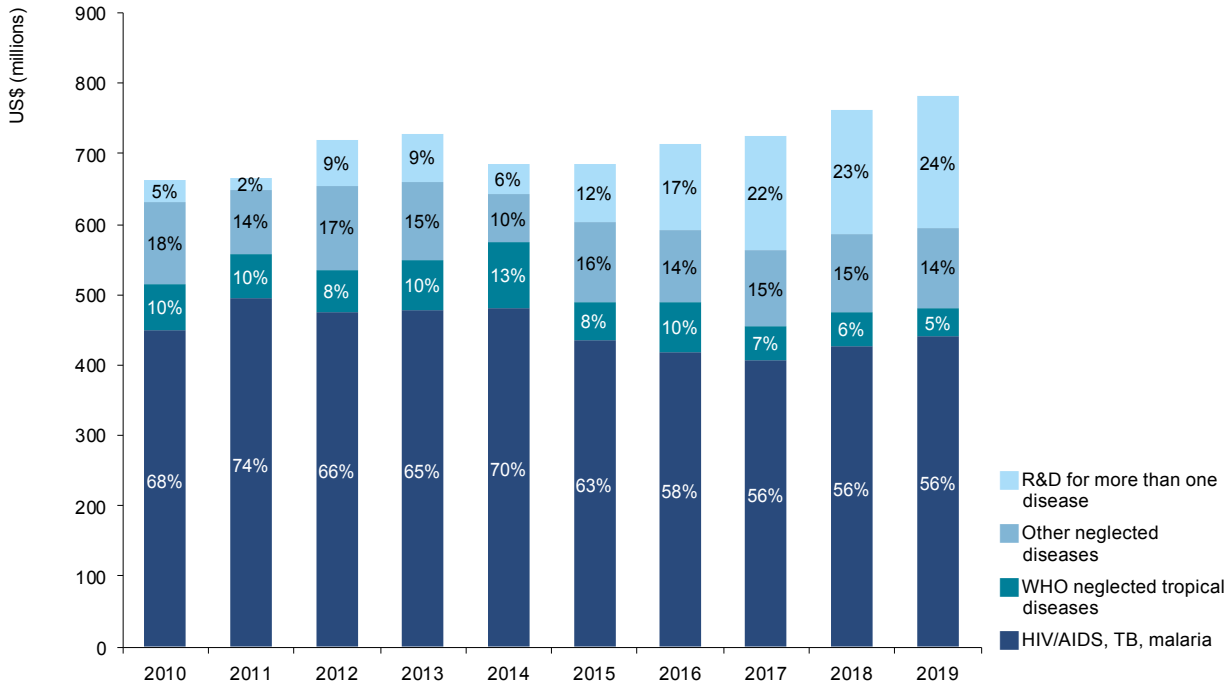


PHILANTHROPIC FUNDING

Philanthropic funding for neglected disease R&D totalled $782m in 2019. This was a $39m increase from 2018 (up 5.2%), and marked the highest level of philanthropic funding in more than a decade.

The increase came mainly from the Gates Foundation (up $35m, 6.1%) which, at $619m, provided more funding for neglected disease R&D than in any year since 2009. The only other material increase came from the Open Philanthropy Project (up $9.3m, 213%), which in fact became the third largest philanthropic funder of neglected disease R&D in just its third year providing funding for the area, albeit with a comparatively modest investment of $14m (the Wellcome Trust was again the second-largest philanthropic funder, providing $116m in 2019).

Figure 6. Philanthropic R&D funding by disease 2010-2019



The overall proportions of philanthropic funding for disease-specific and non-disease-specific R&D remained essentially the same as in 2018. The increases in 2019 funding went mainly to HIV/AIDS (up $18m, 13%), non-disease-specific funding (up $17m, 10% – mostly for multi-disease vector control products and platform technologies) and TB (up $16m, 13%), all primarily due to higher funding from the Gates Foundation.

A significant portion of the Gates Foundation's increase in funding was directed to the Bill & Melinda Gates Medical Research Institute (up $35m, 255%), which was reported at a disease-specific level for the first time in 2019, including $32m for TB drug and vaccine R&D, $3.9m for malaria and $3.1m for multiple diarrhoeal diseases.

Over the last decade, funding from philanthropic organisations has begun to focus more on non-disease-specific investments, rising from just 3.5% of philanthropic funding to 24% in 13 years – though a portion of this growth reflects the reallocation of multi-disease vector control products to the non-disease-specific category starting in 2017. On the other hand, both the amount and share of philanthropic funding going to NTDs has been trending in the opposite direction, reaching a low of $40m (a 5.1% share) in 2019.

PRIVATE SECTOR FUNDING

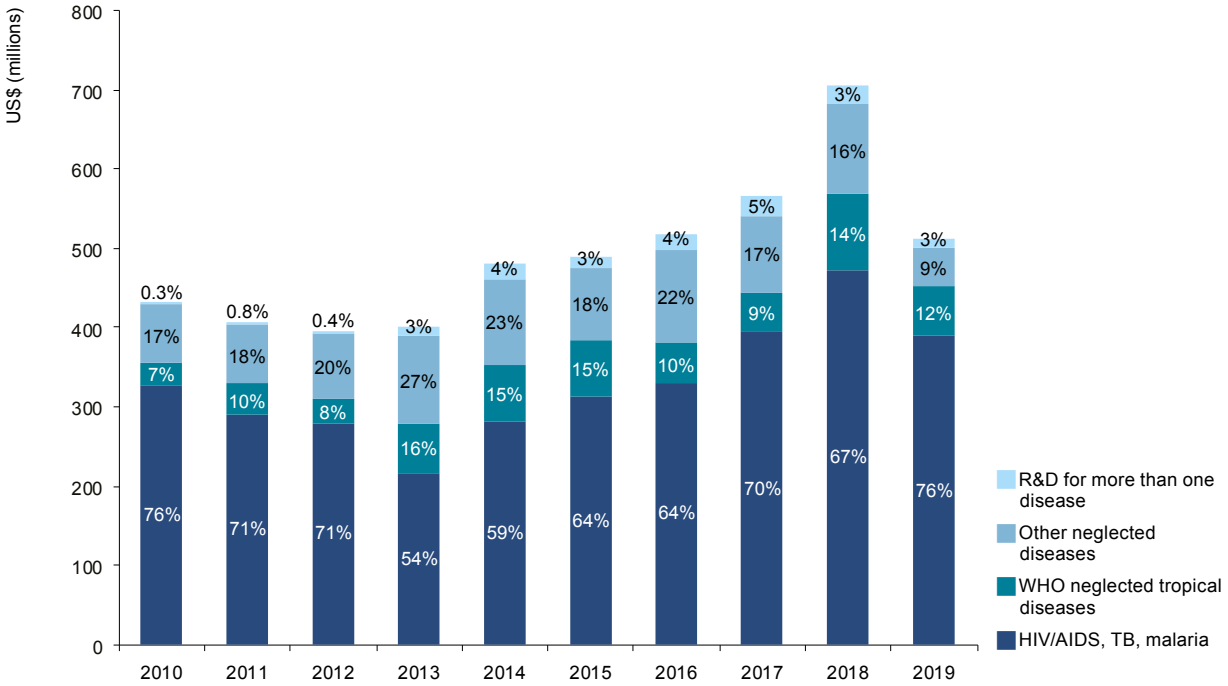
Industry invested $513m in neglected disease R&D in 2019, the majority of which was contributed by MNCs ($500m), with the remaining $13m coming from SMEs.

Adjusted for participation, overall industry funding declined by close to a fifth from the previous year (down $117m, -19%) with roughly similar proportional drops from both MNCs and SMEs. Despite representing a marked reduction, it seems likely that – once the pandemic-related participation effects are accounted for – 2019 actually saw the second-largest annual investment by industry on record, rather than the more extreme drop shown in Figure 7. While this reversed much of the sector's 2018 spike, it did not come close to reversing the effects of a decade-long upward trend in industry investment. Even after this year's drop, funding from industry remains more than 60% higher than it was ten years before.

The fall in industry investment was primarily for clinical development & post-registration studies, which fell by nearly $100m from its 2018 peak, headlined by big falls in hepatitis C, malaria, TB and HIV/AIDS. As with industry investment as a whole though, this drop was still substantially smaller than the 2018 increase ($146m), and occurs in the context of a long-term upward trend in industry's investment in clinical development & post-registration studies.

The majority of the decline in clinical development investment from the private sector appears to reflect a natural decline in clinical trial spending as a number of late-stage products advance to registration or reach key clinical milestones, and as such should not necessarily be a cause for concern.

Figure 7. Private R&D funding by disease 2010-2019



Malaria was one of the diseases impacted by this kind of pipeline-linked reduction in clinical trial expenditure, following the successful approval of tafenoquine and the hand-off of artefenomel/ferroquine to MMV, which saw overall industry investment in malaria decline by more than a quarter (down $42m, -26%). Funding for TB R&D was also affected, falling by $19m (-19%).

The most obvious clinical trial-driven fall in funding was for hepatitis C, which received no LMIC-focused private sector investment for the first time since its inclusion in 2013 (down $34m, -100%). This drop – and the preceding jump in 2018 funding – was associated with LMIC-specific trial costs for a shorter duration pangenotypic treatment.

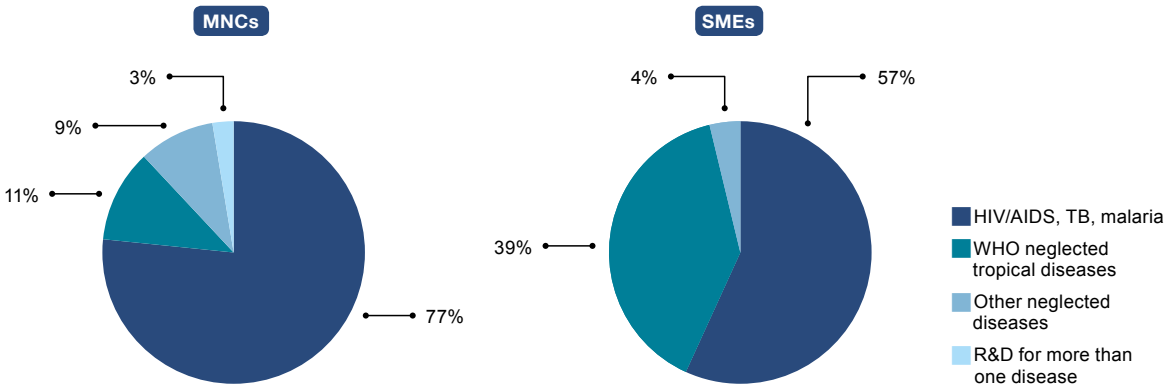
The large apparent drop in funding for other neglected diseases in the figure above reflects only the absence of data covering funding reported in previous years by Indian SMEs. Data from significant ongoing funders of both bacterial pneumonia & meningitis and *Salmonella* infections was unavailable in 2019, leading to an artefactual decline in each disease and the overall category. On a participation-adjusted basis, private sector funding for both diseases is basically unchanged, and the share of private funding going to other neglected diseases decreased only marginally in 2019.

COMPARING MNC AND SME CONTRIBUTIONS

Over three-quarters (77%) of MNC investment in 2019 went to either HIV/AIDS, TB or malaria, nearly half of which was for HIV/AIDS. SMEs, on the other hand, directed just over half (57%) of their investment to these three diseases.

As noted above however, this picture of the distribution of SME funding in 2019 reflects the absence of data from India-based SME's which have historically invested significant amounts in bacterial pneumonia & meningitis and *Salmonella* infections. In 2018, almost three-quarters (73%) of all reported SME investment was in the Other neglected diseases category, compared to just 20% in HIV/AIDS, TB and malaria, and 5.4% in NTDs. This focus on diseases other than HIV/AIDS, TB and malaria or NTDs has grown over time, although they still account for almost half (47%) of all SME investment prior to 2019.

Figure 8. Funding by disease from MNCs and SMEs 2019



TOP FUNDING ORGANISATIONS

The top 12 funders did not change significantly between 2018 and 2019. In the absence of data from the Indian Council of Medical Research this year, the UK MRC entered the top 12 in its place.

As usual, the US NIH was the top overall funder, providing $1,718m; this was yet another record high from the NIH, on the back of three consecutive years of funding growth. Its 2019 funding grew by $109m (up 6.8%), driven by increases in HIV/AIDS (up $69m, 7.7%) and TB (up $41m, 15%). With 44% of global funding, the NIH contributed nearly three times as much funding as the second-largest funder, the Gates Foundation – the largest such gap between their contributions since 2012. This came despite the fact that the Gates Foundation also increased its funding (up $35m, 6.1%) – representing the only other substantial increase among the top funders – to the highest level in over a decade.

Nearly all the UK-based top funders reduced their funding in 2019, including the DHSC (down $9.0m, -17%), the Wellcome Trust (down $4.8m, -3.9%) and the DFID (down $3.7m, -3.2%). Only the UK MRC bucked the trend, re-entering the top 12 after an $8.8m (25%) increase, mostly directed to TB, malaria, and diarrhoeal diseases.

Funding from Unitaid dropped by more than a quarter (down $20m, -28%) returning to around its 2017 level following a sharp peak in 2018 caused by a front-loading of project disbursements. USAID funding dropped by $11m (-15%), falling below last year's all-time low after cuts in its funding for HIV/AIDS and TB.

Table 6. Top neglected disease R&D funders by disease 2019

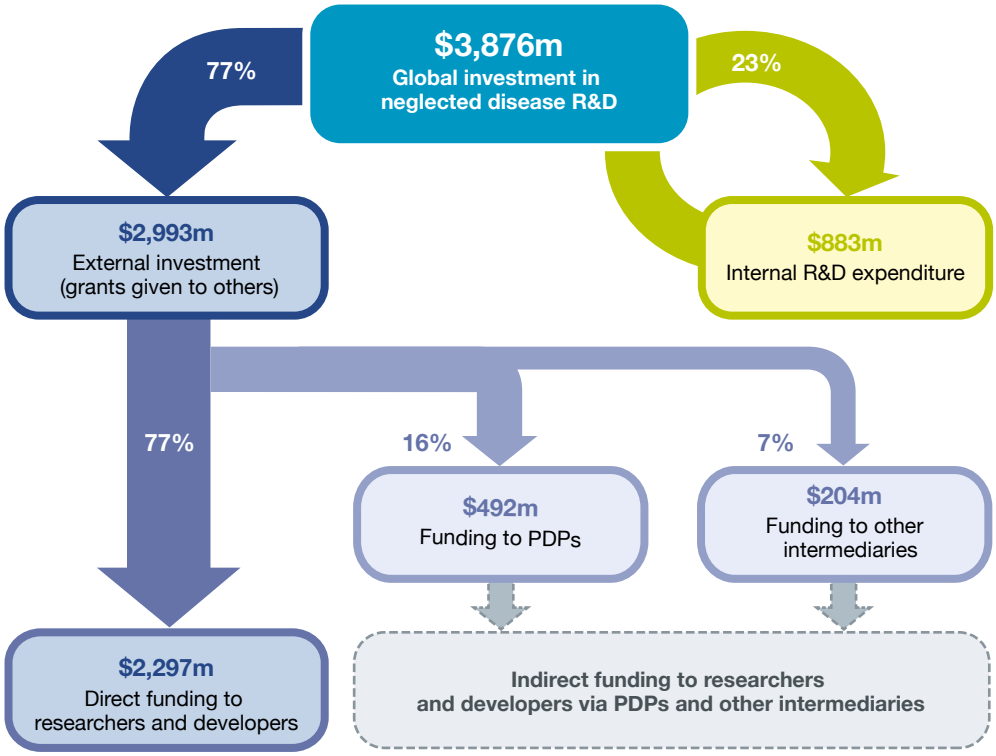
Funder \ US$ (millions)	HIV/AIDS	Tuberculosis	Malaria	WHO NTDs	Other neglected diseases	R&D for more than one disease	Total
US NIH	964	315	169	124	98	48	1,718
Gates Foundation	150	117	123	21	93	115	619
Aggregate industry	187	83	120	62	47	13	513
EC	11	8.5	11	7.1	4.5	80	121
Wellcome Trust	2.9	12	18	15	13	55	116
UK DFID	11	17	34	25	10	16	113
US DOD	18	-	31	5.6	7.0	21	82
USAID	41	12	9.9	-	-	0.8	64
Unitaid	26	15	7.3	-	3.1	-	51
German BMBF	3.4	23	7.0	8.4	0.3	5.8	48
UK MRC	3.2	11	10	7.3	6.3	6.8	45
UK DHSC	3.4	0.6	6.7	4.8	0.6	28	44
Total R&D funding	1,474	670	603	328	308	492	3,876

- No reported funding

FUNDING FLOWS

Organisations can invest in neglected disease basic research and product development in two main ways: by funding their own in-house research (internal investment, also referred to as intramural or self-funding); or by giving grants to others (external investment). This external investment can either be given directly to researchers and developers, or it can be provided via product development partnerships (PDPs) and other intermediaries. Some organisations invest only internally (most pharmaceutical companies, for example); others, like the Wellcome Trust, only invest externally (i.e. they do not conduct R&D themselves). Other organisations, such as the US NIH, use a mixed model, providing external grants to others as well as funding their own research programmes.

Figure 9. R&D funding flows 2019



A key point to note when analysing external investment flows is that different types of funders generally invest in different types of recipients. Science and technology (S&T) agencies, for example, mainly provide funding directly to researchers and developers (usually accounting for around three-quarters of their funding). Philanthropic foundations and aid agencies are the source of the vast majority of PDP funding (typically 80-90%). In contrast, non-PDP intermediary organisations ('other intermediaries') generally have a broad funding base, supported by both S&T and aid agencies as well as philanthropic foundations. As a result, changes in S&T agency funding are more likely to affect researchers and developers; changes in philanthropic or aid agency funding are more likely to affect PDPs; and non-PDP intermediary organisations are the least vulnerable to changes from one donor funding stream.

FUNDING FLOW TRENDS

More than three-quarters ($2,993m, 77%) of global funding was directed externally via grants or contracts, while the remaining 23% ($883m) was internal investment.

After adjusting for changes in survey participation and data availability – as we continue to do throughout the report – external funding increased by $101m (3.5%), reaching the highest level ever reported. This was entirely due to an increase in funding going directly to researchers (up $171m, 8.1%), offsetting falls in funding for both product development partnerships (down $43m, -8.0%) and non-PDP intermediaries (down $27m, -12%). The increase in direct funding to researchers came from high income country governments (up $99m, 6.4%) and philanthropic organisations (up $87m, 18%) – primarily the US NIH and the Gates Foundation – while the falls in funding to PDPs and other intermediaries are analysed in more detail under their respective subheadings below.

Internal investment fell by 11% (down $109m), due to big reductions from multi-national pharmaceutical companies (MNCs), but remained well above its historical average.

Funding from science and technology agencies rose by more than $100m – driven by record funding from the US NIH – to reach an historic high; while aid agency funding declined slightly for the second year in a row, falling by $8.2m. The fall in aid agency funding fell nearly exclusively on funding to researchers and developers, leaving the share of remaining aid agency funding going to PDPs at a record high.

FUNDING TO PRODUCT DEVELOPMENT PARTNERSHIPS

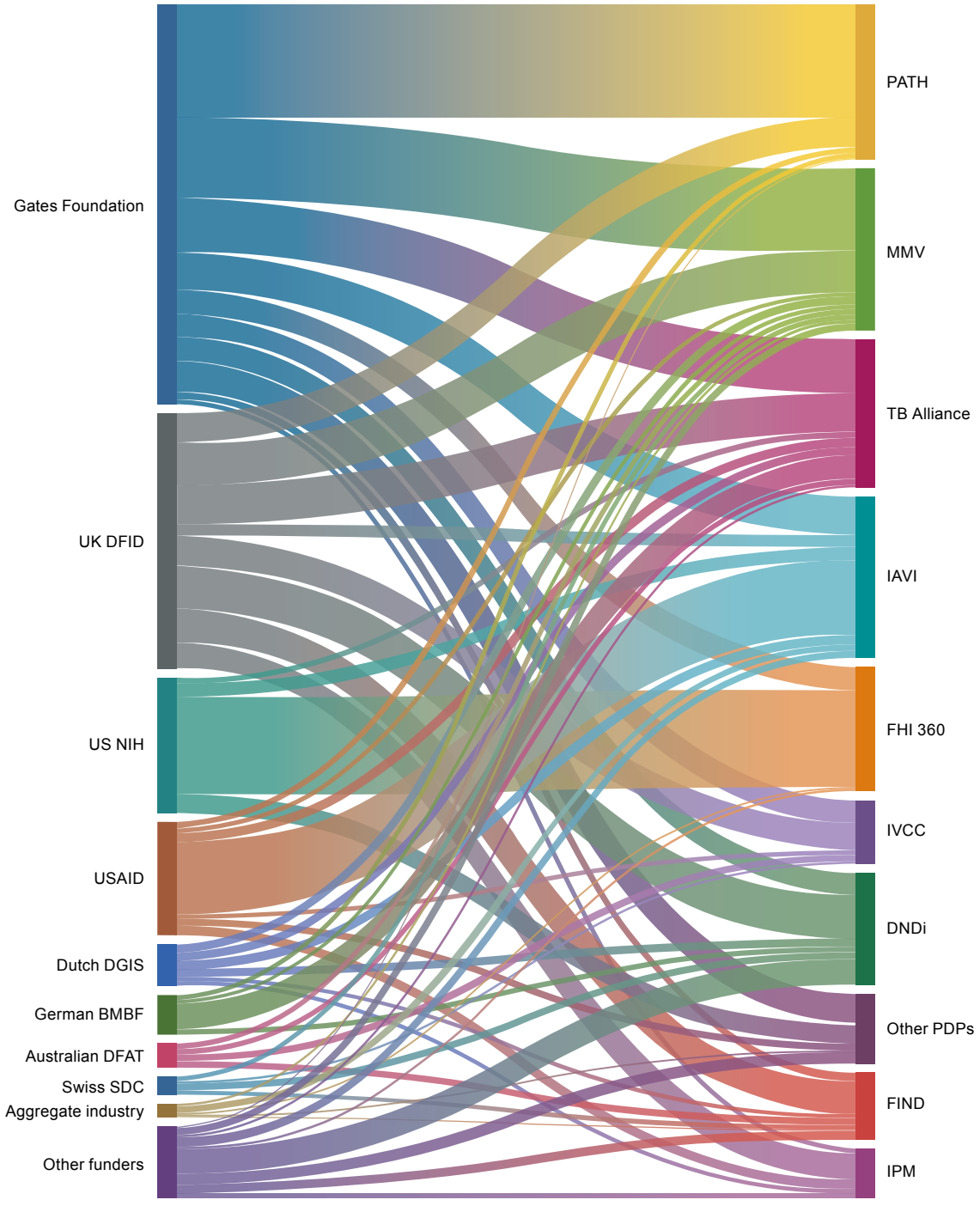
Funding to PDPs in 2019 totalled $492m, a fall of $43m (-8.0%) from 2018. While this was not a record low, it did represent the lowest-ever share of global funding going to PDPs. The overall fall was almost entirely due to reduced funding from the two sectors which provide nearly all funding to PDPs: philanthropic funders (down $33m, -15%) and high-income country governments (down $11m, -3.8%).

The fall in philanthropic funding came from the Gates Foundation, which remained the top funder of PDPs in 2019, a position it has held every year since the G-FINDER survey began. However, this marked the fourth fall in the Foundation's funding to PDPs in the past five years, taking its funding to another record low. This ongoing decline means that funding to PDPs from the Gates Foundation has now fallen by nearly 60% from its 2008 peak, and by nearly half since 2014.

The fall in public PDP funding came mostly as a result of reduced funding from the UK DHSC (down $4.9m, -92%) and the EC (down $4.7m, -61%). The DHSC first reported providing funding to PDPs in 2017, with its $19m contribution to TB Alliance and MMV making it the sixth largest funder that year. Its funding has declined sharply each year since then, falling to $5.3m in 2017 and dropping a further $4.9m in 2019, to just $0.4m. The decline in the EC's PDP funding – which, like the DHSC, also fell in 2018 – has been slightly more gradual. A further $4.7m reduction in 2019, following the conclusion of the Horizon 2020-backed TBVAC2020 project, left its funding at $3.0m – outside the top 10 PDP funders for the first time since 2009.

As a result of the overall reduction in funding to PDPs, most individual PDPs reported receiving less funding in 2019, most notably PATH (down $30m, -30%), IAVI (down $11m, -14%) and Aeras (down $8.6m, -91%) – though Aeras' decline was an expected result of its conclusion of operations, and the transfer of its staff and projects to IAVI.

Figure 10. **PDP funding 2019**



FUNDING TO OTHER INTERMEDIARIES

Funding to non-PDP intermediaries in 2019 totalled $204m. Funding fell by $27m (-12%) from the previous year's record high, but this was still comfortably the second-highest total on record.

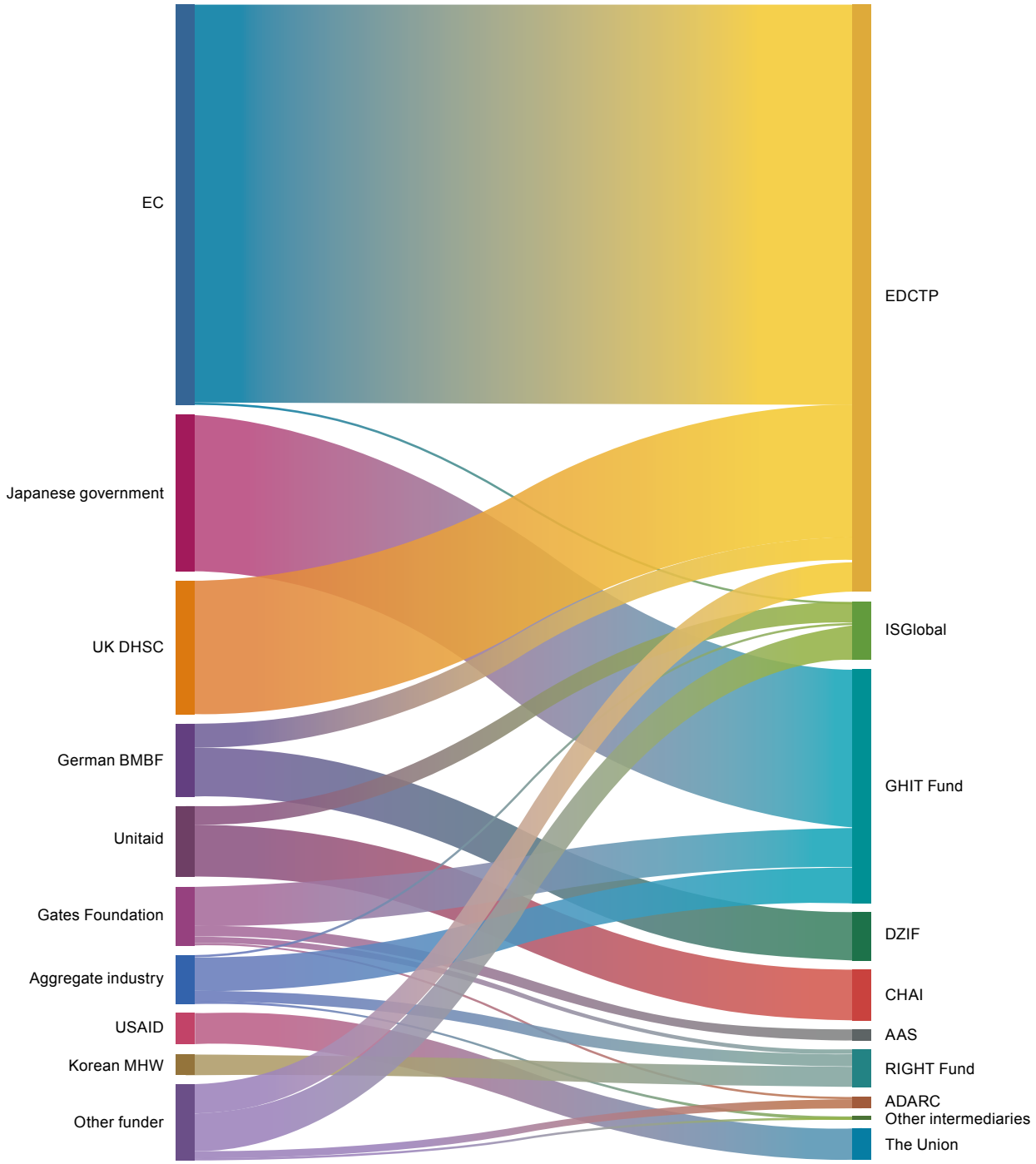
As with PDP funding, the decrease resulted mostly from reduced funding from HIC governments (down $17m, -9.9%) and philanthropic funders (down $11m, -41%). Decreases in funding from the UK DHSC (responsible for most of the overall fall with a decline of $19m) and the Gates Foundation (down $3.5m) – also the two organisations responsible for most of the drop in PDP funding – were accompanied by falls from the Wellcome Trust (down $6.7m) and USAID (down $2.3m).

The substantial decline in funding from the DHSC follows a doubling of its disbursements to EDCTP the previous year, and returns its contribution to just above 2017 levels. The drop in Wellcome Trust funding was the result of frontloaded disbursements to the GHIT fund in 2018.

The EC remained the top funder of other intermediaries after a third consecutive year of growth (up $4.2m, 6.0%). This funding was directed exclusively to the EDCTP, which received a record high of $74m in EC funding and remained the top recipient of intermediary funding, despite a drop in its overall funding level.

The only intermediary to receive a material increase in funding was the Korea-based Research Investment for Global Health Technology Fund (RIGHT Fund), which was established late in 2018 and received $7.3m in 2019 – an increase of $6.7m over its initial reported funding in 2018.

Figure 11. **Intermediary funding 2019**



DISCUSSION

Last year's MNC-led increase in funding for clinical development largely disappeared, but industry funding for clinical development remains at near-historic highs

When global funding for neglected disease R&D surged to yet another record high in 2018, it was in large part due to a big increase in funding for clinical development & post-registration studies, particularly from multinational pharmaceutical companies (MNCs), following a decade-long trend of increasing investment in this area. While overall neglected disease R&D funding stayed close to this peak in 2019, funding for clinical development fell by $139m (-11%), two-thirds of which was due to reduced investment by MNCs.

Despite this, funding for clinical development still remained comfortably at near-historic levels (indeed, at the second-highest level ever reported, when adjusting for participation). As well as increasing in absolute terms, funding for clinical development & post-registration studies has also occupied an increasing share of total funding. Between 2007 and 2013, only about a quarter of all funding for neglected disease R&D went to clinical development, compared to half of all funding going to basic & early-stage research. Between 2014 and 2019, though, this share increased to almost a third (32%).

In absolute terms, the fall for clinical development in 2019 fell most heavily on HIV/AIDS, TB and malaria – the three diseases which continue to receive more than 80% of clinical development funding. In proportional terms, though, the fall was steepest for hepatitis C (which saw its funding fall by nearly 90% after a one-year spike in 2018), malaria (down by nearly a quarter after falling in 2018 as well) and helminth infections (down 20%). In most cases, these reductions represent the movement of candidates along the product development pipeline, and in many cases the recent successful approval of new drugs.

Record funding from the US NIH helped to offset reductions elsewhere

That overall funding for neglected disease R&D remained stable despite a significant drop in industry investment was essentially down to the US National Institutes of Health (NIH), whose record investments in HIV/AIDS, TB, helminths, leptospirosis, diagnostic platforms and multi-disease vector control research contributed to the organisation providing record high funding for neglected disease R&D for the second consecutive year.

NIH funding for neglected disease R&D has grown by more than a quarter of a billion dollars (up $276m) in the past two years alone, pushing its share of global funding to 44%: the highest level since 2012. In 2019, this growth helped protect against reductions from other funders in seven different disease areas, including three – HIV/AIDS, leptospirosis and TB – for which the NIH was entirely responsible for there not being an overall decline in global funding.

At a product level, the NIH was responsible for nearly three-quarters of all global basic research funding in 2019 – eclipsing the record set last year – and nearly all of the $46m overall increase in basic research funding in 2019. The NIH likewise provided three-quarters of global microbicides R&D funding – another record – almost two-thirds of all biologics funding, and provided the only funding for reservoir targeted vaccines in three of the last four years.

NIH funding for NTDs rose slightly in 2019, following two years of decline, accounting for more than half of the global increase in NTD funding in 2019. Between 2010 and 2019, the NIH has also been responsible for nearly two-thirds of the cumulative growth in funding for HIV/AIDS, and was almost entirely responsible for the growth in global TB funding.

Funding for product development partnerships fell in 2019, erasing two years of growth

Funding for product development partnerships (PDPs) fell by $43m in 2019, an 8.0% drop which left PDPs with their lowest-ever share of global funding. Less than 13% of 2019 funding was directed to PDPs, down from a peak of 19% in 2008.

The downward trend in funding for PDPs since its 2008 peak has come despite a jump in high-income country (HIC) public funding, which has averaged nearly $300m annually over the last three years, after averaging a little over $200m across the first ten years of the G-FINDER survey.

The decline in PDP funding has, instead, been driven mostly by reductions in philanthropic funding, which are almost exclusively the result of a long-term decline in PDP funding from the Gates Foundation – the top funder of PDPs throughout the life of the G-FINDER survey. Since 2014, funding to PDPs from the Gates Foundation has almost halved (down $142m, -44%), while the amount it has given directly to researchers and developers has increased by nearly two-thirds (up $145m, 62%).[3]

While the changes in the Gates Foundation's funding are responsible for most of the long-term shifts in global funding for PDPs, they have been offset slightly by new and increased streams of funding from several HIC public funders over the last several years: ongoing increases from the UK DFID and the US NIH are responsible for most of the long-term increase in public funding for PDPs, alongside new, post-2010 funding streams from the German BMBF and Australia's DFAT – respectively the sixth and seventh biggest funders of PDPs in 2019 and over the last three years.

There have been longer-term shifts in the pattern of product funding towards drugs, vector control products and diagnostics, and away from vaccines and basic research

Beyond the specific changes we observed in this year's industry, US NIH and PDP funding, the ten years of changes in neglected disease R&D since 2009 have led to a gradual but striking shift in how global funding is shared across the different products included in the G-FINDER survey.

There has been a gradual fall in the amount, and especially the share, of funding going to vaccines to a record-low of 32% in 2019,[4] down from a peak of 40% in 2009 when the passage of the American Recovery and Reinvestment Act (ARRA) in the wake of the global financial crisis drove NIH funding to a then-record $1.57 billion. Like vaccines, funding for basic research peaked in 2009 – at nearly a quarter of global funding – and has trended gradually downwards since, rebounding slightly from a low in 2018 to 21% of total funding in 2019.

As shown in Figure 12, below, this decline in basic research and vaccine funding has been accompanied by an ongoing shift towards drug R&D, which has followed an overall upward trend from its 2009 low of 16%, reaching 23% of global funding in 2019. These trends have reversed the initial relationship between drug funding and basic research – with drugs now receiving more funding than basic research in each of the last six years – and narrowed the gap in funding between drugs and vaccines from a peak of $828m in 2009 to only $317m in 2019.

The decade-long decrease in funding going to vaccines and basic research has benefited not just drug R&D, but also helped create a gradual upward trend in the share of funds going to the smaller product categories. As shown in Figure 13, we have seen product funding grow more diversified, driving ongoing increases in the share of global funds going to biologics, diagnostics and vector control products. Only microbicides did not benefit from this overall trend, instead seeing a sharp fall from 7.0% of the global total in 2009 to a record low of 3.1% in 2019.

[3] This does not include additional funding to the newly-established Bill & Melinda Gates Medical Research Institute
[4] In order to avoid focusing on the impact of changes in survey participation, we have quoted all figures on a participation-adjusted basis

Figure 12. Funding for basic research, drugs and vaccines 2009-2019^

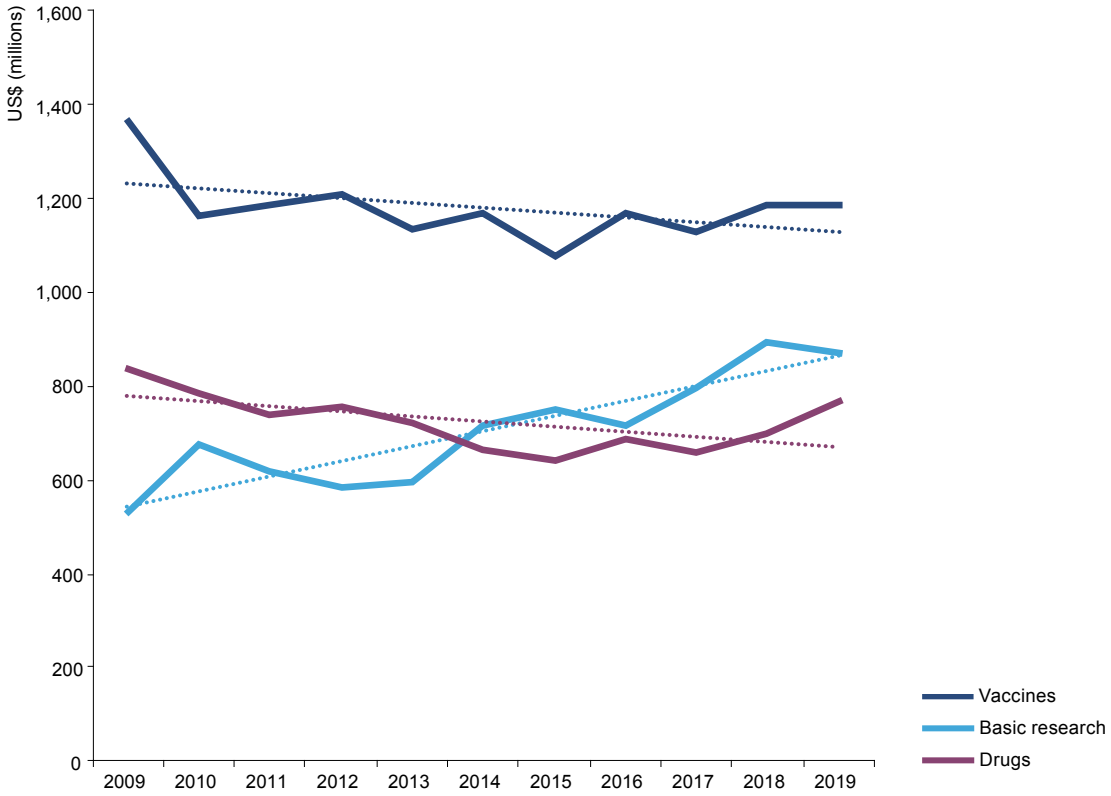
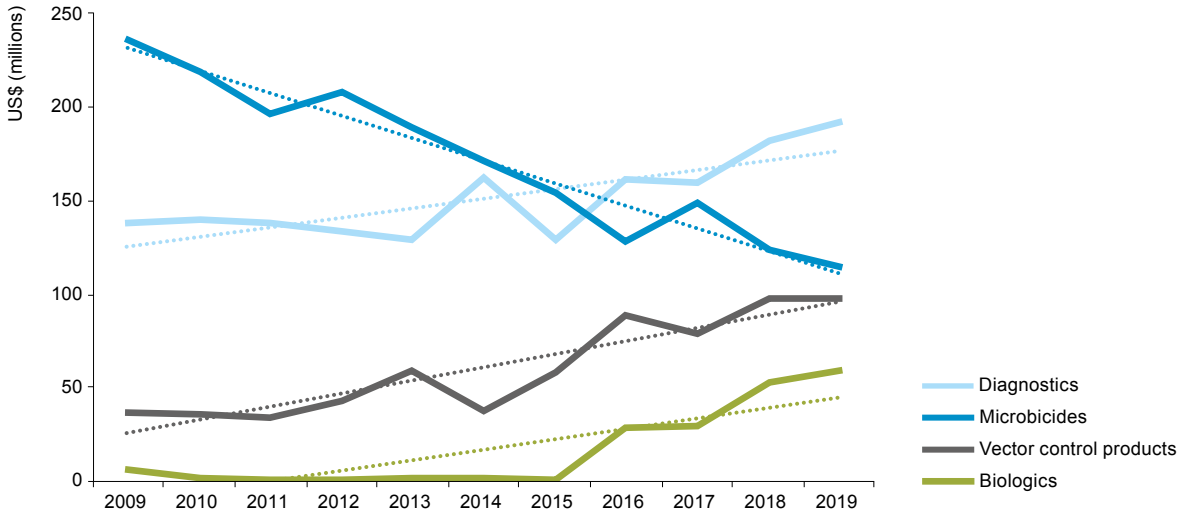


Figure 13. Funding for other product categories 2009-2019^



^ Figures 12 and 13 use long-term participation-adjusted figures.

How will the global response to COVID-19 and its after-effects influence funding for neglected disease R&D?

Beyond the rapid maturation of new technologies, new trial and approval processes and new models for manufacturing and distributing treatments at pandemic scale, many of the features of the global response to COVID-19 sit in interesting contrast to the trends in neglected disease R&D funding discussed above.

While 2019 saw a sharp fall in MNC investment in neglected disease R&D, 2020 saw them invest in COVID-19 on an unprecedented scale at unprecedented speed. After a year in which PDPs saw their funding decline, the global COVID-19 response relied heavily on mechanisms designed to pool and distribute product funding. And after a decade of gradually declining investment in vaccines, the global response to COVID-19 has focused overwhelmingly on this area, with the emerging platforms and technologies heavily skewed towards prevention rather than cure.

Whether or not any changes to how neglected disease R&D is directed and funded flow through as a result, the sheer scale of the global response to COVID-19, and the economic devastation it leaves behind, will likely profoundly alter the funding environment for neglected diseases. Based on preliminary funding data gathered by Policy Cures Research from public funding commitments, there was nearly $9.2 billion in committed funding for COVID-19 R&D between January and September 2020, along with more than $25 billion pledged to support the manufacture and distribution of vaccines and treatments. In comparison, a total of $11.6 billion was invested in R&D for all neglected diseases combined over the past three years.

The size of this response – which has drawn heavily from traditional funders of neglected disease R&D, alongside several newcomers – raises concerns that funding for COVID-19 will displace R&D for other pathogens over the next few years. While we do not yet have data showing the impact of COVID-19 on neglected disease funding, one positive note is that the substantial increases in funding for neglected diseases we observed over the three years to 2018 occurred alongside comparable increases in funding for emerging infectious diseases, which rose by nearly 19% over the same period – suggesting that funders are capable of dividing their attention and resources between multiple areas of global health (at least at the current scale of investment) without sacrificing one for the other. Whether the unprecedented scale of their commitments to COVID-19 tests this ability remains to be seen.

Even if funding for COVID-19 R&D isn't partially drawn from a fixed pool of global R&D funding, the impact of the COVID-19 pandemic on the global economy has the potential to impact how governments, and possibly also other groups of funders, think about their commitment to neglected diseases. While it is difficult to predict how governments will respond to an economic shock, we would expect the current efforts towards fiscal stimulus – at least in high-income countries – to continue in the short term, as nations attempt to spend their way out of pandemic-induced recession, and a subsequent fiscal contraction as they pivot to dealing with their accumulated public debt. The first phase of this process might mirror the 2009 spike in US public funding for neglected disease R&D following the passage of the ARRA act in the wake of the global financial crisis, though there will be a tendency for funding conceived of primarily as a fiscal stimulus to prioritise domestic rather than international recipients.

Subsequent public-debt-driven fiscal contractions, though, may put pressure on all areas of government spending, particularly those perceived as discretionary or outward-looking and perhaps especially overseas aid and development assistance. The fear is that a likely future contraction in the global economy will put significant downward pressure on funding for neglected diseases, an outcome that would be dangerously shortsighted given the lessons of the last year.

ADVISORY COMMITTEE MEMBERS

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Dr Ripley Ballou	International AIDS Vaccine Initiative	ADVANCE Program lead and Principal Investigator
Professor Balram Bhargava	Indian Council of Medical Research	Director General
Dr Graeme Bilbe	Drugs for Neglected Diseases Initiative	Senior Advisor
Dr François Bompart	Drugs for Neglected Diseases Initiative	Access Committee Chair
Dr Wanderley de Souza	Financiadora de Estudio e Projetos (FINEP)	Former President
Dr Emily Erbelding	National Institute of Allergy and Infectious Diseases, National Institutes of Health	Director, Division of Microbiology and Infectious Diseases
Professor Alan Fenwick	Imperial College London	Professor of Tropical Parasitology
Dr Arnuad Fontanet	Institut Pasteur	Head of Emerging Diseases Epidemiology Unit
Dr Sue Kinn	UK Department for International Development	Head of Southern Africa Regional Hub for Science, Innovation and Technology
Dr Jean Lang	Sanofi Pasteur	Associate Vice President
Dr Carl Mendel	TB Alliance	Senior Vice President, Research & Development
Dr Firdausi Qadri	International Centre for Diarrhoeal Disease and Research (icddr,b)	Senior Scientist and Head of Immunology
Dr John Reeder	World Health Organization; Special Programme for Research and Training in Tropical Disease	Director
Professor Nelson Sewankambo	Makerere University College of Health Sciences	Professor of Internal Medicine
Dr Soumya Swaminathan	World Health Organization	Chief Scientist
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