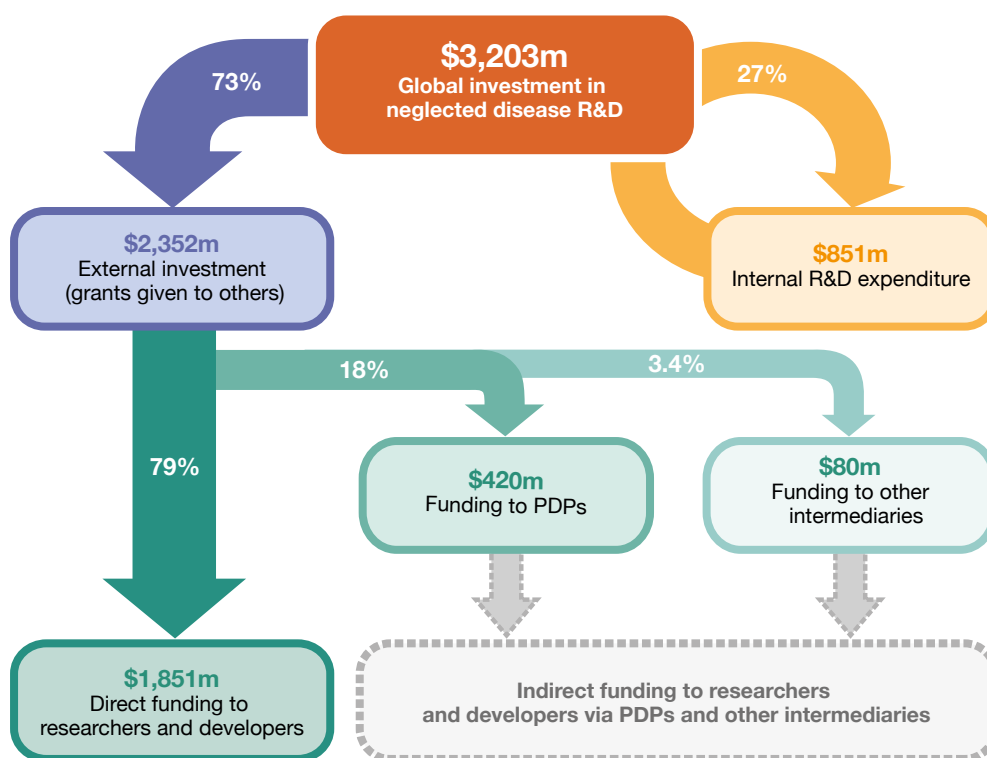


FUNDING FLOWS

Organisations can invest in neglected disease R&D 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 PDPs** and other intermediaries. Some organisations invest only internally (for example, most pharmaceutical companies); others, such as the Wellcome Trust, only invest externally (i.e. they do not conduct R&D themselves). Other organisations, such as the US NIH and the Indian ICMR, use a mixed model, providing external grants to others in addition to funding their own research programmes.

Figure 22. R&D funding flows 2016



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 providing around three-quarters of their funding). Philanthropic and aid agency funders are the source of the vast majority of PDP funding (approximately 90%). In contrast, non-PDP intermediary organisations generally have a broad funding base, supported by both S&T and development agencies, as well as philanthropic funders.

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 least vulnerable to changes from one donor funding stream.

** Although there is no single universally-accepted definition of PDPs, they are typically public health driven, not-for-profit intermediary organisations that use private sector management practices to drive product development in conjunction with external partners. Some PDPs focus on a single disease or product type, while others work across multiple diseases and products, but all share a common goal to develop products that are suitable for developing country use in areas of market failure. While their primary aim is the advancement of public health rather than commercial gain, PDPs generally use industry practices in their R&D activities, for instance portfolio management and industrial project management. Additionally, many PDPs conduct global advocacy to raise awareness of their targeted neglected diseases.

FUNDING FLOW TRENDS

Nearly three-quarters (\$2,352m, 73%) of all funding for neglected disease R&D in 2016 was given externally in the form of grants (or contracts), with internal investments (\$851m, 27%) making up the remainder. External funding increased in 2016 (up \$95m, 4.4%) for the first time since 2012, driven by the US NIH. Self-funding was essentially flat (up \$4.7m, 0.6%), with ongoing growth in industry investment (up \$20m, 4.6%), particularly from SMEs, offset by a decrease in internal investment by government agencies (down \$19m, -5.1%).

Almost four-fifths (\$1,851m, 79%) of all external funding disbursed in 2016 was given directly to researchers and developers. In line with overall external investment, YOY funding to researchers and developers also increased for the first time since 2012 (up \$147m, 9.1%), driven by both S&T agencies and philanthropic organisations. The increase in S&T agency funding to researchers and developers (up \$80m, 6.4%) was almost entirely due to increased external grant funding from the US NIH (up \$77m, 9.7%). Philanthropic funding given directly to researchers and developers increased by \$62m (up 18%) due to increased funding from the Gates Foundation (up \$43m, 16%) and the Wellcome Trust (up \$19m, 24%).

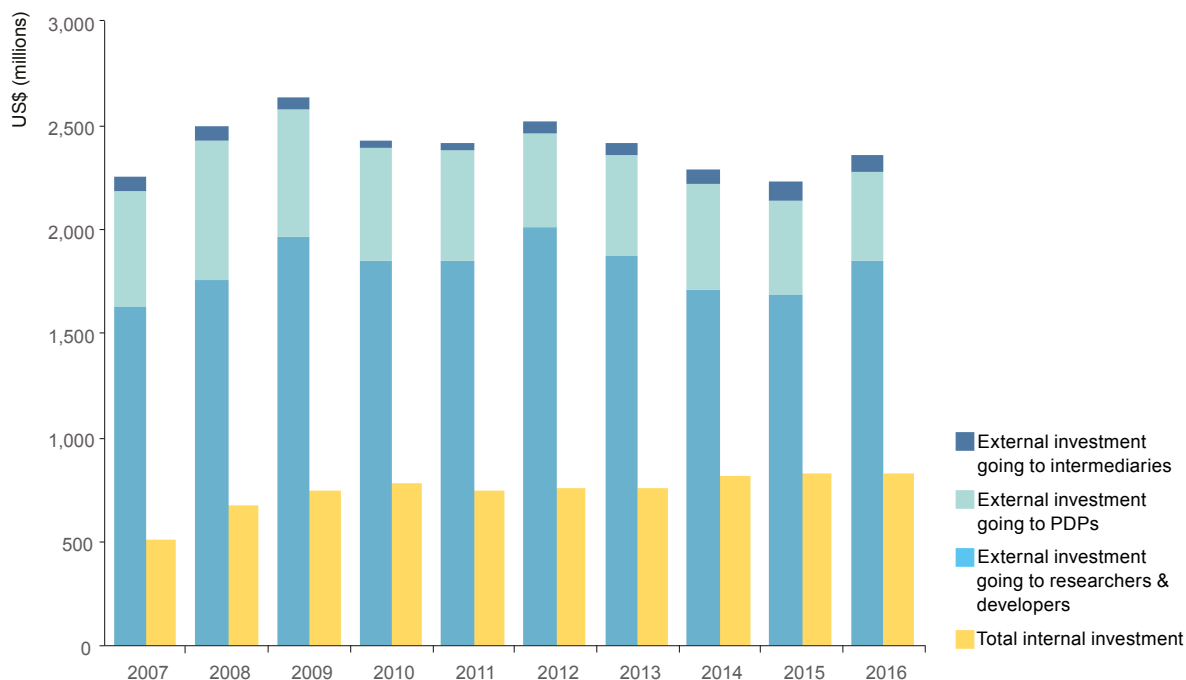
As noted earlier, not all external grant funding for neglected disease R&D is given directly to researchers and developers. Approximately one-fifth (\$501m, 21%) of all external funding disbursed in 2016 was given to fund managers (PDPs and other intermediaries), who then either pass this funding on to researchers and developers or invest it in their own internal R&D activities. This was a marked reduction in funding given to fund managers compared to 2015 (down \$52m, -10%), with this drop affecting both PDPs and other intermediaries.

A total of \$420m (18% of all external investment) was channelled through PDPs in 2016. This was the lowest level of PDP funding recorded in the history of the G-FINDER survey, although this should be interpreted with caution given the highly cyclical nature of funding to PDPs and other intermediaries, especially from the Gates Foundation. Funding to PDPs decreased by \$29m in 2016 (-6.8%), as disbursements from the top three funders of PDPs – the Gates Foundation, USAID and the UK DFID – collectively decreased by \$42m (-11%). The only notable increase in funding to PDPs came from the Dutch DGIS (up \$18m, 447%), which started a new PDP funding round, with funding from all other sources either down or flat.

Other intermediaries received \$80m (3.4% of all external investment) in 2016, a decrease of \$23m (-25%). This drop was the result of sharply lower funding from the EC to EDCTP (down \$32m, -80%) – reflecting a number of extraordinary payments from the EC to the EDCTP in 2015 that would otherwise have been made in 2014 and 2016 – which more than offset slightly increased member state funding to EDCTP, and smaller increases in funding to the International Union Against Tuberculosis and Lung Disease (The Union) and the GHIT Fund.

A more in-depth analysis of funding for PDPs and other intermediaries is presented from page 97 onwards.

Figure 23. R&D funding flow trends 2007-2016



FUNDING FLOWS BY R&D STAGE

Nearly half of all funding for neglected disease R&D in 2016 was allocated to basic and early stage research (48%), followed by clinical or field development and post registration studies (32%), with the remaining funding comprising of core funding (4.2%), platform technologies (1.6%) and other R&D (14%).

Exactly half (50%) of all self-funding in 2016 was allocated to clinical or field development and post registration studies, with 37% allocated to basic and early stage research. The remaining 14% was not allocated to a specific disease or product area. However, this overall pattern obscures the very focus of industry investments compared to non-industry self-funding. Industry investment accounted for 57% of all self-funding; two-thirds (66%) of this industry investment was for clinical or field development and post registration studies, and less than one-third (28%) for basic and early stage research (all of which was for discovery and pre-clinical R&D, rather than basic research). In contrast, non-industry self-funding – primarily from government S&T agencies, and in particular the US NIH – was focused more on basic and early stage research (49%) than on clinical or field development and post registration studies (27%). The true extent of the upstream focus of non-industry self-funding is likely even higher, given that much of the remaining 24% of funding that was not allocated to a specific product or R&D stage is in fact highly likely to be for basic research.

Reflecting the fact that this funding stream is also dominated by S&T agencies (and especially the US NIH), almost two-thirds (62%) of all funding given directly to researchers and developers went to basic and early stage research, with just 22% for clinical or field development and post registration studies; the remaining 16% was not allocated to a specific product or R&D stage.

The very different pattern of funding given to PDPs reflects their product-development focus. More than two-fifths (42%) of all funding to PDPs was for clinical or field development and post registration studies, more than double the amount (19%) that was for basic and early stage research (essentially all of which was for discovery and pre-clinical R&D, rather than basic research). The remaining 38% of funding given to PDPs was not allocated to a specific R&D stage, but instead used to support the development of a portfolio of products from discovery through to post registration.

The small number of other intermediaries and the specific focus of each organisation results in different patterns of funding by R&D stage. For example, almost all (96%) of TB funding that went to other intermediaries was for The Union, all of which was allocated to clinical development and post registration studies for drugs. On the other hand, 88% of HIV/AIDS funding to other intermediaries went to the Aaron Diamond AIDS Research Center, with the vast majority (93%) of this allocated to basic and early stage research for vaccines. The EDCTP and the GHIT Fund received 88% of all non-disease-specific funding for other intermediaries, none of which was product- or R&D stage-specific.

FUNDING FOR PRODUCT DEVELOPMENT PARTNERSHIPS

PDPs received \$420m in 2016, accounting for 13% of all neglected disease R&D funding and 18% of all external investment. This was the lowest level of PDP funding recorded in the history of the G-FINDER survey, corresponding to the lowest funding from the Gates Foundation to PDPs recorded by G-FINDER. Annual changes in funding to PDPs should be interpreted with caution given the highly cyclical nature of this funding, especially from the Gates Foundation.

It is important to note that the central role of PDPs is somewhat obscured by the 'NIH factor'. The US NIH was by far the largest funder of neglected disease R&D, but allocated only a small portion of its funding to PDPs (\$8.8m or 0.7% of its total investment). If the US NIH is excluded, the role of PDPs in product development for neglected diseases becomes clearer, with PDPs collectively managing 34% of all non-NIH external grant funding for neglected disease R&D.

Although the cyclical pattern of funding to PDPs from philanthropic organisations and government aid agencies – the main funders of PDPs – means that their identities change, the three highest funded PDPs in any given year consistently account for between 40% and 50% of annual PDP funding. In 2016, these three PDPs were IAVI, MMV and PATH, who collectively received just under half (\$196m, 47%) of all PDP funding.

There were some large shifts in funding to PDPs in 2016, including decreases to the TB Alliance (down \$32m, -49%), PATH (down \$27m, -37%) and MMV (down \$14m, -20%); and increases to IAVI (up \$22m, 34%) and DNDi (up \$15m, 54%) – with these changes mostly attributable to cyclical funding from the Gates Foundation. The increased funding to DNDi was also due to the start of a new PDP funding round for the Dutch DGIS. The conclusion of Phase III trials of the dapivirine ring in 2016 led to a \$5.8m (-22%) reduction in funding to IPM, with USAID's contribution dropping by \$10m (-77%).

Most funding to PDPs in 2016 (\$315m, 75%) was invested in three diseases that received the most funding overall: of this amount, \$121m was for HIV/AIDS, \$113m was for malaria, and \$81m was for TB.

Table 37. Funds received by PDPs 2007-2016

PDPs	US\$ (millions)										2016 % of total
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
IAVI	85	93	75	70	64	63	61	41	66	88	21
MMV	85	50	45	73	76	52	67	74	77	60	14
PATH	45	130	145	77	102	87	84	122	76	47	11
DNDi	28	22	32	33	36	30	33	53	31	47	11
TB Alliance	44	38	39	52	38	46	52	56	71	38	8.9
IVCC	-	11	16	17	<0.1	11	22	9.9	29	33	7.7
Aeras	45	74	59	43	44	40	41	55	32	31	7.3
FIND	26	35	23	27	23	22	23	24	15	22	5.3
IPM	46	65	34	32	14	23	30	26	26	20	4.8
CONRAD	18	17	24	19	26	32	27	18	3.9	9.2	2.2
IDRI	9.5	17	19	13	24	11	6.1	14	6.3	8.2	2.0
IVI	15	2.3	13	9.9	5.7	8.4	9.8	6.5	7.1	6.5	1.5
Sabin Vaccine Institute	8.9	17	10	4.3	8.9	6.5	6.6	5.5	3.1	5.0	1.2
EVI	7.1	4.0	3.5	4.8	7.1	2.0	6.0	2.8	3.4	1.8	0.4
FHI360	15	20	19	20	12	6.0	4.6	0.2	-	1.3	0.3
TBVI ^A	-	-	0.1	3.8	3.5	4.9	5.3	1.3	1.5	1.3	0.3
WHO/TDR ^B	34	38	35	28	31	-	-	2.2	2.5	1.0	0.2
OWH ^C	32	33	17	23	11	7.3	-	-	-	-	-
Total funding to PDPs	544	667	609	550	526	452	478	512	452	420	100

^A The totals attributed to TBVI in 2014-2016 do not include funds from the EC that were paid directly to researchers under the auspices of TBVI's PDP activities. The totals only include EC's financial support for TBVI's services, as well as funding from other organisations

^B TDR's mission extends beyond product development, but it operated as a de facto PDP from the 1970s until 2012, when it decided to focus on implementation research and research capacity strengthening. Funds received in 2014-2016 are related to the pooled fund demonstration projects

^C As of 2013, OWH funding is included under PATH

- No reported funding

FUNDERS OF PDPs

Philanthropic organisations provided over half of all funding to PDPs (\$239m, 57%). Almost all remaining funding came from HIC governments (\$164m, 39%), mostly via their aid agencies (\$142m, 87% of HIC funding to PDPs).

Funding from almost all the top PDP funders was either lower or flat in 2016, with an overall decrease of \$29m (-6.8%). The largest decrease came from the Gates Foundation (down \$30m, -12%). Although it remained the largest funder of PDPs, with a contribution of \$229m (54% of all funding to PDPs), this represents the lowest investment in PDPs by the Gates Foundation recorded in the history of the G-FINDER survey. Funding from USAID to PDPs also declined (down \$12m, -21%), reflecting reduced funding to IPM (down \$10m, -77%) associated with the conclusion of its dapivirine ring Phase III clinical trials. The largest increase was the result of the Dutch DGIS opening a new funding round for PDPs (up \$18m, 447%). Three of the top 12 funders of PDPs – Dutch DGIS, Australian Department of Foreign Affairs and Trade (DFAT) and Irish Aid – once again allocated 100% of their funding for R&D to PDPs.

Public sector multilateral organisations gave \$14m to PDPs in 2016 (3.4% of all PDP funding). Almost all multilateral funding came from Unitaid (\$12m, 84% of all multilateral PDP funding), though Unitaid's funding to PDPs decreased (down \$3.9m, -25%) after a peak in 2015.

Table 38. Top funders of PDPs 2016

Funder	US\$ (millions)											2016 % of org's funds given to PDPs	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016 % of total PDP funding	2016 % of total PDP funding	
Gates Foundation	273	399	334	297	266	252	244	301	260	229	42	54	
UK DFID	28	24	69	82	64	38	62	67	50	51	90	12	
USAID	79	79	81	80	78	77	64	58	59	47	65	11	
Dutch DGIS	29	18	18	15	19	11	21	17	4.1	22	100	5.3	
Unitaid			6.9			0.4	8.6	10	16	12	30	2.8	
US NIH	4.9	3.9	8.8	3.0	21	8.2	12	9.5	4.7	8.8	0.7	2.1	
German BMBF			-	-	1.2	5.7	4.8	6.6	8.2	7.6	27	1.8	
Australian DFAT						8.0	-	7.6	7.5	7.4	100	1.8	
Swiss SDC	2.3	2.3	2.5	4.6	3.6	3.3	4.4	6.6	7.8	5.7	97	1.4	
Irish Aid	22	6.3	4.8	6.0	5.8	5.7	7.8	2.2	5.6	4.8	100	1.1	
MSF	6.6	6.7	4.2	4.3	4.6	5.4	5.5	4.4	4.4	4.4	43	1.1	
Aggregate industry	1.1	6.6	2.1	2.2	1.7	1.7	1.5	1.8	1.4	3.2	0.7	0.8	
Subtotal of top 12 funders of PDPs [^]	498	611	561	518	486	423	445	494	430	403			
Total PDP funding	544	667	609	550	526	452	478	512	452	420			
% of total PDP funding (top 12)	92	92	92	94	93	94	93	97	95	96			

[^] Subtotals for 2007-2015 top 12 reflect the top funders for those respective years, not the top 12 for 2016

- No reported funding

■ Funding organisation did not participate in the survey for this year. Any contributions listed are based on data reported by funding recipients so may be incomplete

A decade of neglected disease R&D funding for PDPs

- PDPs are highly dependent on the Gates Foundation and government aid agencies, which have collectively provided almost 90% of all PDP funding over the last decade. The Gates Foundation alone has accounted for more than half (55%) of all funding for PDPs over this period.
- Global funding of PDPs and Gates Foundation funding of PDPs both fell to record lows in 2016. Although a number of the year-to-year drops can be explained by funding cycles, total funding to PDPs in 2016 is down a quarter of a billion dollars (\$246m, -37%) from its 2008 peak.
- PATH has been the largest recipient of all PDP funding over the last decade, and has been the top funded PDP in seven of the last ten years, with the others to hold this spot being IAVI (twice) and MMV.

FUNDING FOR OTHER INTERMEDIARIES

'Other' intermediary organisations (i.e. those that are not PDPs) also aim to accelerate neglected disease product development, but do so without managing a product portfolio of their own. Instead, they generally act as coordinating agencies, receiving funding from multiple sources and passing this on to researchers and developers (either directly or via PDPs). They may also perform research themselves (often operational research or research into existing treatment regimens) or be involved in clinical trials of novel products being developed by other organisations.

Non-PDP intermediaries collectively received \$80m in 2016, representing 2.5% of all neglected disease funding, and 3.4% of all external funding. The organisations that received the most funding were the GHIT Fund (\$32m, 39%), EDCTP (\$23m, 29%), The Union (\$12m, 15%) and the Barcelona Institute for Global Health (ISGlobal, \$9.2m, 11%).

The \$23m decrease in funding to other intermediaries (-25%) was a reflection of a number of extraordinary payments from the EC to the EDCTP in 2015 that would otherwise have been made in 2014 and 2016, rather than a structural shift away from funding for these organisations. YOY funding for EDCTP decreased (down \$26m, -53%), while funding for most other non-PDP intermediaries increased – led by The Union (up \$3.2m, 37%) and the GHIT Fund (up \$1.7m, 5.9%).

Most funding for intermediaries (\$63m, 78%) was not earmarked for a specific disease by the funder. Of the \$18m (22%) of funding given to non-PDP intermediaries that was disease-specific, \$12m was for TB, \$3.2m was for HIV/AIDS, \$1.9m was for malaria and \$0.4m was for kinetoplastid diseases.

FUNDERS OF OTHER INTERMEDIARIES

Non-PDP intermediary organisations receive funding from a relatively diverse range of sources, with less reliance on a single 'type' of funding organisation than either PDPs or researchers and developers. The majority of funding for other intermediaries comes from government agencies, with S&T agencies usually providing approximately half of all funding to other intermediaries, and aid agencies around one-fifth.

In 2016, funding for other intermediaries was uncharacteristic, with a marked decrease in the share of funding from S&T agencies (to 22% of all funding for other intermediaries) and an increase in funding from the Japanese government (up to 23% of all funding for other intermediaries). However, these irregularities were due to the EC's extraordinary payments to the EDCTP in 2015 and an increase in Japanese government investments in the GHIT Fund.

The EC is usually the largest funder of non-PDP intermediaries, due to its support for EDCTP. The large drop in EC funding to EDCTP in 2016 (down \$32m, -79%) meant that it fell to third place in the list of top funders of intermediaries, behind the Japanese government, which increased its investment in the GHIT Fund (up \$5.5m, 50%), and USAID, which increased its funding to The Union (up \$3.2m, 37%). The drop in EC funding to EDCTP (which was due to extraordinary payments made in 2015), meant that European Union member state contributions to EDCTP in 2016 exceeded the EC's for only the second time. These included the UK DFID (\$5.4m), the Swedish International Development Agency (SIDA, \$4.4m), the UK MRC (\$2.7m), the German BMBF (\$2.3m), the Portuguese Foundation for Science and Technology (\$0.2m) and the Dutch Organisation for Scientific Research (\$0.2m).

Funding to other intermediaries is geographically driven. Of the top 12 funders, essentially all funding to intermediaries from the EC, the UK DFID, the Swedish SIDA and the German BMBF went to the EDCTP; Japanese government and industry investment went to the GHIT Fund; and Spanish public sector organisations funded ISGlobal. Few funders – beyond the EC, the US NIH and the Gates Foundation – support more than one non-PDP intermediary organisation.

Table 39. Top funders of intermediaries 2016

Funder	US\$ (millions)										2016 % of org's funds given to intermediaries		2016 % of total intermediary funding	
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016				
Japanese government							10	10	11	17	100	21		
USAID	<0.1	4.3	5.4	5.9	5.8	5.6	5.1	9.4	8.7	12	16	15		
EC	39	36	18	2.0	23	24	24	22	41	8.7	11	11		
Aggregate industry	-	1.4	3.2	-	-	-	3.8	8.3	5.5	7.7	1.6	9.6		
Gates Foundation	11	8.4	14	6.0	5.3	4.2	6.9	7.6	7.6	7.5	1.4	9.3		
UK DFID	12	13	6.1	-	-	-	-	-	3.1	5.4	9.7	6.8		
Swedish SIDA	4.0	1.9	2.1	1.9	<0.1	-	0.6	-	3.0	4.4	79	5.5		
Fundació La Caixa					1.0	1.0	1.0		1.8	3.3	100	4.1		
Catalan Department of Health					-	1.0	0.7			3.2	100	3.9		
US NIH	-	1.1	3.5	3.2	1.3	2.1	1.8	3.6	3.3	2.8	0.2	3.5		
UK MRC	-	-	-	4.4	-	<0.1	-	-	2.7	2.7	6.4	3.4		
German BMBF			-	1.1	0.2	<0.1	0.1	0.1	0.1	2.7	9.8	3.4		
Subtotal of top 12 funders of intermediaries [^]	70	76	55	31	41	53	56	64	97	77				
Total funding to intermediaries	70	76	55	32	41	54	57	64	98	80				
% of total intermediary funding (top 12)	100	100	99	97	100	98	99	100	99	96				

[^] Subtotals for 2007-2015 top 12 reflect the top funders for those respective years, not the top 12 for 2016

- No reported funding

■ Funding organisation did not participate in the survey for this year. Any contributions listed are based on data reported by funding recipients so may be incomplete

A decade of neglected disease R&D funding for other intermediaries

- The EC has been the largest contributor of funding to other intermediaries for neglected disease R&D. It has provided 38% of all funding to other intermediaries over the last decade, primarily to EDCTP.
- The US government has been the next largest funder (providing 14% of all funding to other intermediaries over the last decade), followed by the Gates Foundation (12%), both of whom have supported a wider range of recipient organisations. The Japanese government has also become a notable funder, averaging \$12m per year to the GHIT Fund since its creation in 2013.
- The two largest recipients of funding of all the other intermediaries are the EDCTP (which received 48% of all funding to other intermediaries over the last decade) and the GHIT Fund (17% of all funding, despite only having been established in 2013).