Stop TB Partnership

TAG
Treatment Action Group

Tuberculosis Research Funding Trends, 2005–2020

ACKNOWLEDGMENTS

Treatment Action Group (TAG) is grateful to all of the participating TB R&D funders that make this report possible and to the Stop TB Partnership for supporting the writing of this report. TAG would like to thank the TB stakeholders who agreed to be interviewed and Derek Ambrosino for conducting the interviews.

ABOUT TAG

TAG is an independent, activist, and community-based research and policy think tank committed to racial, gender, and LGBTQ+ equity; social justice; and liberation; fighting to end HIV, tuberculosis (TB), and hepatitis C virus (HCV). TAG catalyzes open collective action by affected communities, scientists, and policymakers to ensure that all people living with or impacted by HIV, TB, or HCV—especially communities of color and other marginalized communities experiencing inequities—receive life-saving prevention, diagnosis, treatment, care, and information. We are science-based activists working to expand and accelerate vital research and effective community engagement with research and policy institutions for an end to the HIV, TB, and HCV pandemics.

CONTACT TAG

Treatment Action Group
90 Broad Street, Suite 2503
New York, NY 10004 USA

Cover image, design, and layout by Hollander Snow Studio, Inc.

Tuberculosis Research Funding Trends, 2005–2020

DECEMBER 2021

TREATMENT ACTION GROUP

WRITTEN BY CATHERINE TOMLINSON

EDITED BY MIKE FRICK

Table of Contents

Executive Summary

> "Maybe COVID-19 didn't take our money away from us, but it took our people away from us and it took our hospitals away from us. I can't tell you how many TB workers were sent to go work on COVID-19 because we are the only people who aren't afraid to be around people with a contagious respiratory disease. So many things that aren't measured were taken, including our colleagues' lives."
>
> — Jennifer Furin, The Sentinel Project on Pediatric Drug-Resistant Tuberculosis

The world's understanding of what is possible and achievable in terms of advancing research to address global health threats will forever be changed by 2020: the year that COVID-19 came crashing into our consciousness and lives.

Before 2020, researching, developing, and manufacturing not just one, but multiple, new vaccines to address a global health threat in under one year seemed inconceivable. We now know that it is not. With adequate funding and political support, scientists can rapidly develop new tools to curb deadly infectious diseases.

So why have we not seen this for tuberculosis (TB), which until the emergence of COVID-19 was the leading annual cause of death by an infectious agent? According to the World Health Organization (WHO), around one-quarter of the world's population is infected with TB. Every year, 10 million people fall ill from TB disease, while over one million people die from TB.[1] Yet, despite its massive public health burden, TB attracts only a fraction of the financing poured into COVID-19.

Recognizing the dire shortage of funding to advance critical research for TB, the Stop TB Partnership called on global funders to commit $9 billion to TB research between 2016 and 2020 in its *Global Plan to End TB*. Country governments expanded this goal at the 2018 United Nations (UN) High-Level Meeting on TB, which adopted a target to increase global funding for TB research to $2 billion annually.

With the data published in this report, we can now fully assess progress in meeting these targets. Between 2016 and 2020, cumulative global expenditure on TB research was $4.2 billion—less than half of the $9 billion target. And in 2020, annual funding for TB research reached only $915 million, with countries falling short of their political commitments to increase funding to $2 billion annually.

Let us compare this to COVID-19. Governments cumulatively spent $104 billion on research and development (R&D) of COVID-19 vaccines and therapeutics in the first 11 months of the pandemic, including through advanced market commitments.[2] That is 113 times more than the amount spent by all funders on TB research in 2020 ($915 million) and 162 times more than the amount spent by governments ($641 million).

What is the reason for this vast financing disparity between the world's two leading causes of death by an infectious agent? The answer seemingly lies in the unequal rollout of COVID-19 vaccines, which has prioritized vaccinating wealthy populations over poor ones: The lives of the poor matter less than the lives of the rich to those who hold the global purse strings. COVID-19 has attracted such significantly greater financing than TB because its health, social, and economic impacts have devastated not only poor countries and communities, but also wealthy ones.

> "It's not realistic to wait for COVID-19 to go away until we start focusing on TB. We have to think creatively within the context of COVID-19."
>
> — Sara Suliman, University of California, San Francisco Division of Experimental Medicine

This year's funding report may leave readers with mixed reactions. Anxieties that financing for TB research would be diverted toward COVID-19 did not materialize, as funding for TB research in 2020 remained similar to 2019 levels. Yet, a clear emerging theme from this year's interviews with TB stakeholders was that COVID-19 has changed our understanding of what is attainable in terms of financing and advancing research to tackle an infectious disease, and that our funding asks as a global TB community may be too modest.

In 2019, the Stop TB Partnership updated its *Global Plan* to call for annual investments in TB research of $2.5 billion between 2018 and 2022 to make up for funding shortfalls from previous years. Are we aiming too low? If so, why can't even these modest targets be met? And how can we overcome chronic funding shortages to accelerate the advancement of critical research efforts?

Previous advocacy efforts have achieved tangible goals in terms garnering political commitments to increase financing for TB—as seen at the 2018 UN High-Level Meeting on TB. The challenge now is to ensure that these commitments are actually met within a global biomedical research ecosystem that is designed and incentivized to prioritize the health needs of wealthy populations.

While funding for TB research remained stable in 2020 and the feared funding decrease due to COVID-19 did not materialize, at least not in the first year of the pandemic, it will take more years of monitoring before the full impact of COVID-19 on TB research funding is fully understood. Importantly, this history is not yet written.

COVID-19 may continue to eclipse TB in terms of attention and financing. Or it may provide an opening to improve awareness regarding the urgent need for expanded investment in TB R&D and to demand accountability from countries in meeting their financing commitments. Achieving the latter, however, will be no easy task and will continue to require significant activism from TB advocates and researchers in coming years.

Here are some key findings from this year's report:

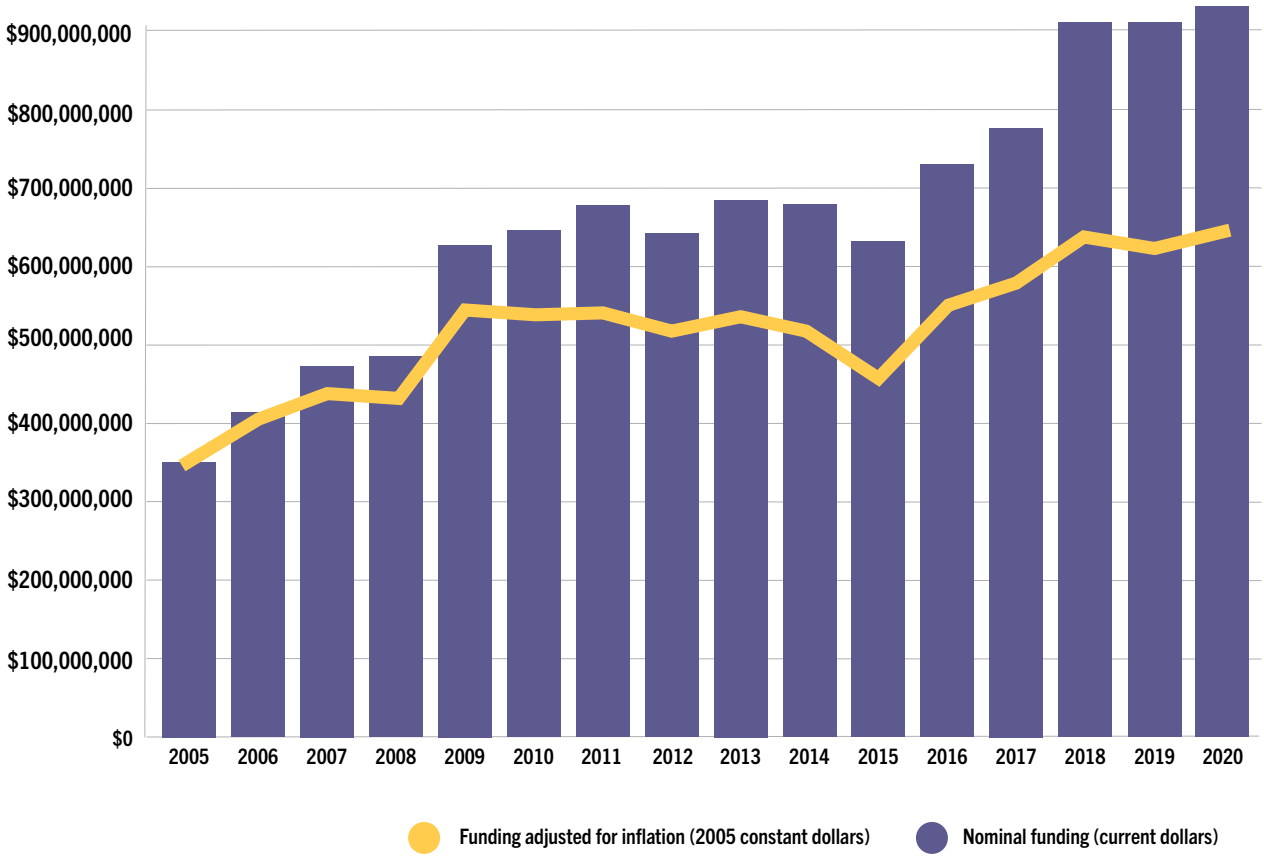
1. Cumulative funding for TB research between 2016 and 2020 totaled $4.2 billion—less than half of the $9 billion financing target called for in the Stop TB Partnership's *Global Plan to End TB 2016–2020*.

2. Recognizing that funding shortfalls from previous years will need to be made up for in subsequent years, the Stop TB Partnership updated its *Global Plan* in 2019 by calling for a total investment of $12.8 billion in TB research between 2018 and 2022. Yet cumulative investments between 2018 and 2020 have only reached $2.7 billion—meaning that an additional $10 billion dollars in TB R&D investment is needed over the next two years to close the funding gap. This gap includes a $1.5 billion shortfall for basic-science research, a $5.8 billion shortfall for drug research, a $2.7 billion shortfall for vaccines research, and a $613 million shortfall for diagnostics research.

3. At the 2018 UN High-Level Meeting on TB, country governments committed to increase annual funding for TB research to $2 billion. These commitments have not been upheld and TB research funding has remained flat at around $900 million annually since 2018.

FIGURE 1

Total TB R&D Funding, 2005–2020



Year	Nominal funding (current dollars)
2005	$358,476,537
2006	$418,928,300
2007	$478,343,421
2008	$494,576,235
2009	$636,979,349
2010	$643,360,390
2011	$675,328,887
2012	$638,783,272

Year	Nominal funding (current dollars)
2013	$686,303,295
2014	$674,036,492
2015	$620,600,596
2016	$725,726,643
2017	$771,839,742
2018	$906,445,319
2019	$900,964,590
2020	$915,325,165

4. The number of countries meeting the fair-share target of investing 0.1% of their research budget into TB R&D has declined since TAG began monitoring this metric in 2017. Only one country—the United Kingdom—met its fair-share targets in 2020, and by less of a margin than in previous years. At the same time, the number of countries meeting at least half of the fair-share target, investing 0.05% of their research budget into TB R&D, has fallen in recent years.

5. After four years of increased investment by governments, public financing for TB research plateaued in 2020. Yet, despite flat funding levels, public funders continue to provide far more financing to TB R&D than any other category of funder—contributing 70 percent of overall TB research expenditures in 2020.

6. Philanthropies were the second largest funder of TB research in 2020, providing 15 percent of the overall TB research budget. The Bill & Melinda Gates Foundation (Gates Foundation) provided $0.94 of every dollar spent by philanthropies.

7. Private-sector companies were the third largest (or second smallest) funder of TB research in 2020, providing 10 percent of available financing for TB research. Companies showed a strong preference for investing in product development, putting $0.97 of every dollar spent into drugs and diagnostics research.

8. Multilateral organizations were the smallest funder of TB research by entity type in 2020, providing only 5 percent of total research funds. Unitaid gave $0.83 of every dollar spent by multilateral organizations.

9. Of every dollar spent on TB research in 2020, $0.18 went to basic-science research, which received a total investment of $163 million. Public funders provided $0.99 of every dollar spent on TB basic science in 2020—$0.75 of which came from the U.S. National Institutes of Health (NIH), the largest individual funder of TB research.

10. Of every dollar spent on TB research in 2020, $0.36 went to drug research, which received a total investment of $329 million. While TB drug R&D has consistently received more funding than any other research area over the past decade, funding for drug research has remained relatively flat over the past four years.

11. Of every dollar spent on TB R&D in 2020, $0.14 went to diagnostics research. Diagnostics research funding reached an all-time high in 2020 at $129 million.

12. Of every dollar spent on TB research in 2020, $0.13 went to vaccine research, which received a total investment of $118 million. Public funders provided 65%, philanthropies provided 33%, and private-sector companies provided 2% of available financing for vaccines research in 2020. No multilateral organizations invested in TB vaccine research during 2020. Vaccine research only received $0.03 of every dollar spent by companies.

13. Ten percent of total spend across all research areas was allocated to pediatric TB research. Financing for pediatric research increased to $91 million in 2020 from $58 million in 2019. USAID, the NIH, and the European & Developing Countries Clinical Trials Partnership (EDCTP) all significantly increased their investments in pediatric TB research in 2020—becoming the three highest funders of this research area.

14. As in previous reporting years, the NIH remained the largest funder of TB research in 2020, followed by the Gates Foundation. EDCTP significantly increased its investments into TB R&D in 2020, becoming the third largest funder. The three entities cumulatively provided 56 percent of the total TB research budget. The 15 largest funders of TB research provided 84 percent of overall funds.

The Big Picture

> "I've been working in TB research for the last 10 years, and the amount of funding has increased over that period of time substantially, although there's still not quite enough."
>
> — Francesca Conradie, University of The Witwatersrand Clinical HIV Research Unit

Over the past decade, annual funding for TB R&D has increased from just over $600 million per year to around $900 million per year. From 2010 through 2015, the mean annual investment in TB R&D was $656 million. Mean annual investments grew in 2016 and 2017 to $748 million, and then increased again to just over $900 million in 2018, where they have remained stubbornly flat for the past three years. Total TB research investments in 2020 were $915 million.

Cumulative investments in TB research between 2016 and 2020 reached $4.2 billion—just shy of half of the $9 billion target set out in the Stop TB Partnership's *Global Plan to End TB 2016–2020*, which sought to put the world on track to meet its goal to end TB by 2030.

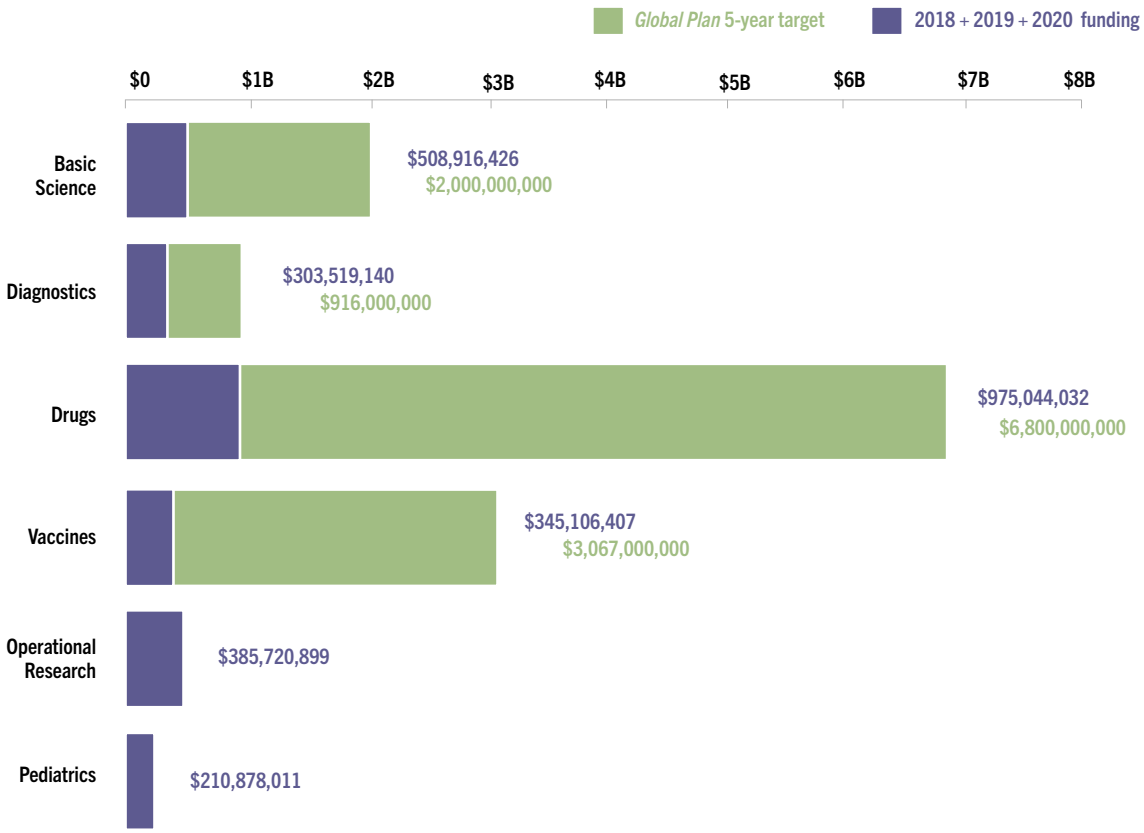
In 2018, UN member states endorsed a target to increase funding for TB research to $2 billion annually. Yet these political commitments have not been borne out in actual funding increases, and funding for TB research has remained flat at around $900 million per year since 2018. At the same time, the number of countries meeting the fair-share target of investing 0.1% of their annual R&D spend into TB research has declined.

Recognizing that funding shortfalls from previous years will need to be made up in subsequent years, the Stop TB Partnership updated its *Global Plan to End TB* in 2019. The updated plan increased annual research funding targets from $2 billion to $2.5 billion, to reach a total of $12.8 billion between 2018 and 2022.

Yet actual investments in TB research between 2018 and 2020 reached only $2.7 billion. This means an additional $10 billion would need to be invested over the next two years to close the funding gap—a feat that seems unlikely without a sea change in the magnitude of public pressure, political will, and investment directed toward ending TB.

FIGURE 2

Progress toward *Global Plan* 5-Year TB Research Funding Targets



Note on Methodology:

See Appendix 1 for a detailed methodology description.

TAG collects the expenditure data in this report through a global survey of TB research funders. Nearly 200 organizations received a request to participate in the survey, and 148 returned responses to TAG (including 28 of the 30 largest funders from the previous year's survey). The survey asked recipients to report expenditures on TB research in fiscal year 2020 and to categorize spending into one of six research areas: basic science, diagnostics, drugs, vaccines, operational research and epidemiology, and infrastructure/unspecified projects. Within these categories, surveyed institutions were asked to delineate pediatric TB research spending. In addition to the survey, TAG conducted 12 qualitative interviews with TB survivors, scientists, donors, activists, and implementers. Each interviewee received an early look at preliminary data in September 2021 and offered their views on TB research needs and funding trends. Quotations from the interviews are included throughout the report.

Trends in Public-Sector Funding

> "If you're talking about low- to middle-income countries, I do think governments need to recognize the crisis and really step up to the plate by allocating much more funding."
>
> — Willem Hanekom, Africa Health Research Institute

After four years of increased public funding for TB R&D, public-sector contributions plateaued in 2020, remaining essentially equivalent to 2019 investment levels at $641 million. Yet, despite flat contributions, investments from public-sector organizations remained far and away the leading source of funds for TB R&D in 2020. Public funders contributed $0.70 of every dollar spent on TB research in 2020.

Ten of the top 15 contributors to TB R&D in 2020 were public-sector entities, while 64 percent of entities that invested in TB R&D in 2020 were public (95 of 148).

The distribution of public-sector funds across research areas in 2020 remained similar to allocations seen in 2019, with no single research area receiving more than 30 percent of public funding.

Drug and basic-science research each received around a quarter of total public-sector investment at $165 million and $161 million, respectively. Operational and epidemiology research ($94 million), diagnostic research ($90 million), and vaccine research ($77 million) each received between 12 and 15 percent of total public investments. The remaining eight percent of public funds ($54 million) was allocated to infrastructure and unspecified projects. Ten percent of public-sector investment across all research areas was allocated toward pediatric research.

Public-sector investments dwarfed those from all other funding sources in every research area except drugs. Public-sector funds were essentially the only source of financing for basic-science research in 2020, accounting for $0.99 of every dollar spent. Public funders also provided $0.71, $0.69, and $0.65 of every dollar spent on pediatric research, diagnostics research, and vaccines research, respectively. For drug research, public-sector investments matched those from all other funding sources, making up $0.50 of every dollar spent.

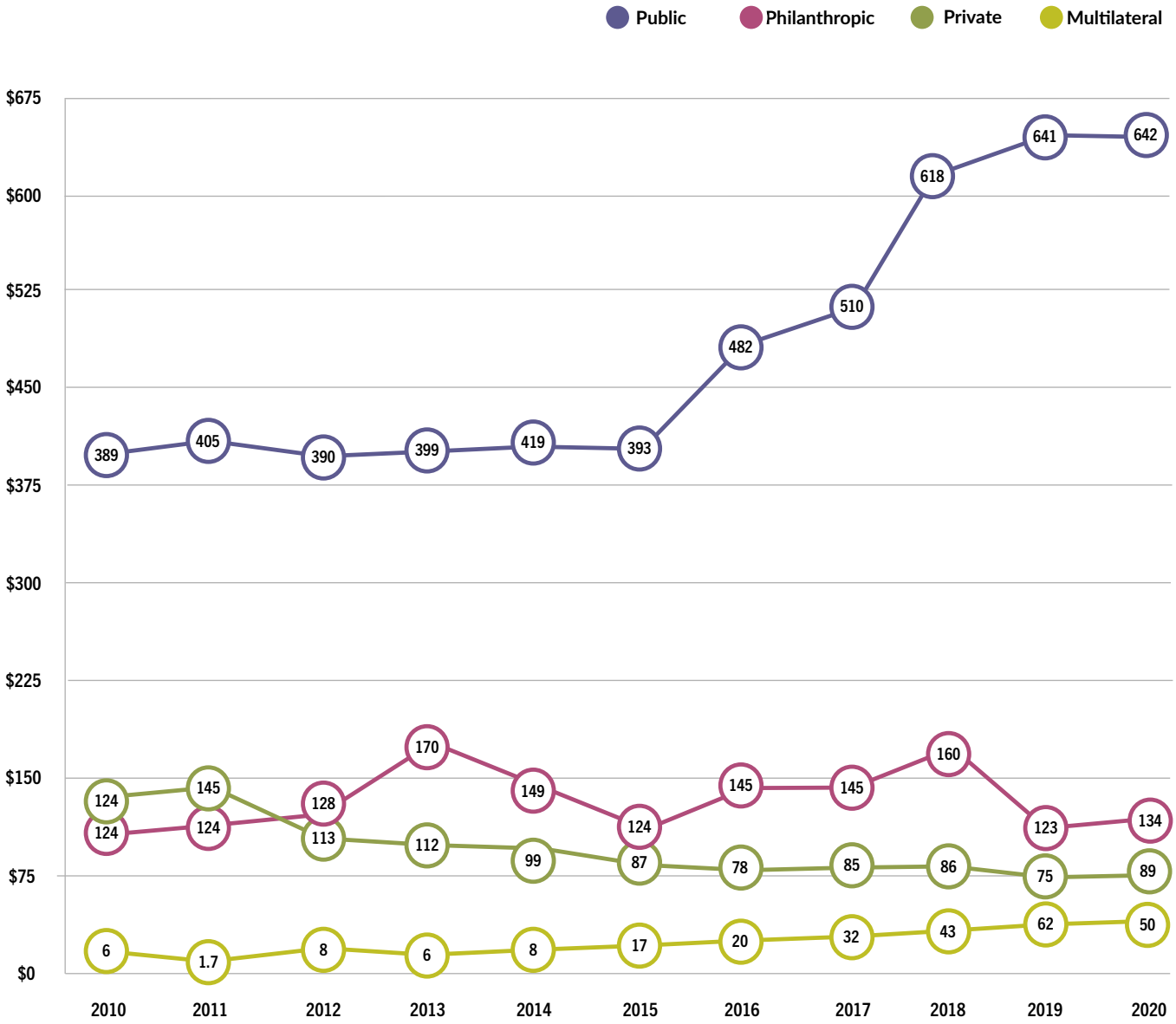
A more detailed breakdown of public financing is provided in on page 19, which looks at countries' progress in meeting their fair-share targets. While the United States did not meet the fair-share funding target, investments by the United States remained the largest source of financing for TB research by a significant margin in 2020.

The United States spent $401 million on TB research in 2020 across seven government agencies—which accounted for 63% of total investment by public-sector funders and 44% of overall funding for TB research in 2020. The United States spent more on basic research than any other research area: $0.30 of every dollar spent by the U.S. government went to TB basic science. The second largest area of investment by U.S. government agencies was drug research, which received $0.24 of every dollar spent. Thirteen cents of every dollar spent went to vaccine research, which received a total investment of $53 million from the U.S. government. Operational research and epidemiology, diagnostics research, and infrastructure and unspecified projects received $0.12, $0.11, and $0.09 of every dollar spent by the United States, respectively. Ten percent of spending by U.S. government agencies across all research areas was allocated to pediatric research.

As in previous reporting years, the NIH was the largest individual funder of TB R&D in 2020. (TAG is reporting a single, combined figure for funding from the NIH National Institute of Allergy

FIGURE 3

Total TB R&D Funding by Funder Type, 2010–2020 (in Millions)



Note: Data for years 2005–2009 not shown.

and Infectious Diseases [NIAID] and other NIH institutes and centers [NIH Other ICs] in this year's report instead of separating out NIAID from NIH Other ICs as done in previous years.) The NIH increased its investment in TB R&D from $332 million in 2019 to $339 million in 2020.

Of the $339 spent by the NIH, $316 million, or 93%, of the NIH's total spend was allocated to U.S.-based research institutes, universities, and companies through 591 contracts or grants. Only $22 million was allocated to research institutes, academic centers, and companies outside of the United States—40% of which ($9 million) went to South Africa. Forty states and jurisdictions received at least one grant or contract from the NIH to conduct TB research in 2020. Universities, research institutes, and companies in Massachusetts received more total funding and individual grants than any other state, receiving a total $47 million through 84 contracts and grants. California and New York received the second and third largest investments for TB R&D from the NIH in 2020. California-based entities received $35 million through 58 grants and contracts, while New York-based entities received $33 million through 71 awards.

"Really seeing TB garner the kind of resources that it deserves will require a lot more advocacy and political will."

— **David Lewinsohn, Stop TB Partnership Working Group on New TB Vaccines**

The second largest public funder of TB research after the NIH, the EDCTP, invested $51 million in 2020. Outside of EDCTP, the European Commission gave an additional $17 million toward TB research.

With an investment of $47 million, the United Kingdom was the third largest public funder of TB R&D in 2020 and the only country to meet its fair-share targets. India and Canada each spent over $20 million on TB R&D, while Germany, South Korea, and Australia each spent over $10 million.

"We should also aim to increase the demand for newer diagnostics and a preventive vaccine from the patient community. As the demand increases, policy makers will be forced to deliver, which will increase funding not only for public health but also for research, like we saw in COVID-19."

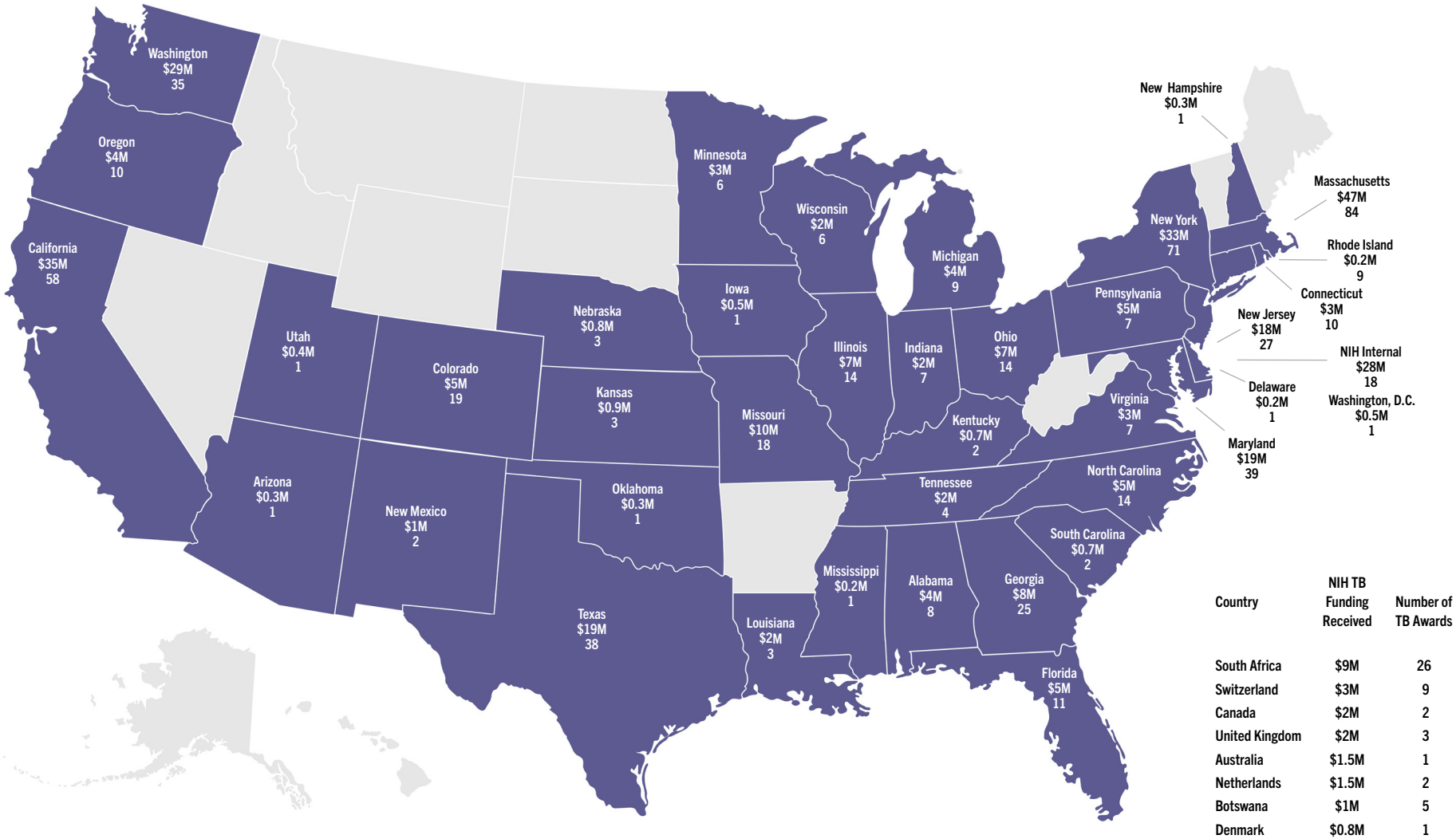
— **Chandrasekaran Padmapriyadarsini, ICMR-National Institute for Research in Tuberculosis**

It was not possible to calculate the total contributions from the five BRICS countries (Brazil, Russia, India, China, and South Africa), which jointly account for 47 percent of the world's TB cases,[3] as neither China nor Russia responded to requests for financing data from TAG (as similarly noted in previous years). India, Brazil, and South Africa jointly invested $27 million—18 percent less than their joint investments in 2019 and only four percent of the total public spend. This drop was driven by declining investments from India and South Africa. India's investments in TB research decreased from a peak of $30.8 million in 2018 to $22 million in 2020. South Africa's investments decreased from a peak of $8.4 million in 2017 to $1.3 million in 2020.

The reported drop in South Africa's TB research investments since 2017 has been exacerbated by the decline of South Africa's national currency, the South African rand (ZAR), against the U.S. dollar—which all investments are converted to and reported in by TAG (see Appendix 1: Methodology). The South African rand weakened by 33 percent against the U.S. dollar between 2017 and 2020.[4]

FIGURE 4

Recipients of NIH TB R&D Funding, 2020



Country	NIH TB Funding Received	Number of TB Awards
South Africa	$9M	26
Switzerland	$3M	9
Canada	$2M	2
United Kingdom	$2M	3
Australia	$1.5M	1
Netherlands	$1.5M	2
Botswana	$1M	5
Denmark	$0.8M	1
Argentina	$0.5M	1
Haiti	$0.3M	3
Georgia	$0.2M	1
Peru	$0.1M	1
Gambia	$0.1M	1
Uganda	$0.1M	1
Mali	$0.1M	1

LEGEND

State

NIH TB R&D Funding Received (millions)

Number of TB Awards*

*some awards may support the same project

TABLE 1

Top 15 Funders of TB Research, 2020

RANK	FUNDER	FUNDER TYPE	2020 FUNDING	2019 FUNDING
1	U.S. National Institutes of Health (NIH)	P	$339,250,929	$331,921,936
2	Bill & Melinda Gates Foundation	F	$126,008,832	$117,557,700
3	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$51,132,639	$24,591,735
4	Unitaid	M	$41,300,000	$35,800,429
5	U.S. Agency for International Development (USAID)	P	$37,386,798	$37,139,231
6	Company X	C	$31,313,865	$32,183,188
7	U.K. Foreign, Commonwealth and Development Office (FCDO; formerly DFID)	P	$22,574,821	$25,022,125
8	Otsuka Pharmaceutical	C	$19,176,250	$15,435,292
9	U.S. Centers for Disease Control and Prevention (CDC)	P	$19,124,770	$15,432,560
10	European Commission	P	$17,437,697	$14,252,272
11	German Federal Ministry of Education and Research (BMBF)	P	$15,351,882	$23,543,671
12	Indian Council of Medical Research (ICMR)	P	$14,469,739	$19,070,083
13	U.K. Medical Research Council (U.K. MRC)	P	$13,872,900	$15,384,488
14	Global Affairs Canada	P	$12,460,150	$12,965,569
15	Oxford Immunotec	C	$10,749,000	Not surveyed

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector R&D Agency

Closer Look: EDCTP

> "The other reason that has contributed to the increase [in EDCTP TB funding] is . . . the growing competitiveness of TB researchers; this is an encouraging trend. This is not only applying to researchers coming from high-income countries, but also researchers from the low- and middle-income countries."
>
> — Michael Makanga, European & Developing Countries Clinical Trials Partnership

Between 2019 and 2020, the EDCTP's investment in TB research doubled from $24 million to $51 million, enough for the organization to jump in ranking from the eighth to the third largest funder of TB research. The EDCTP is funded by the European Union and facilitates collaborative research efforts between European and sub-Saharan African countries to address poverty-related diseases. Dr. Michael Makanga, EDCTP's executive director, told TAG that "overall, TB is receiving about 30 percent of our total budget towards grants that go towards the various diseases," adding, "that is significant because we cover many diseases."

According to Dr. Makanga, the increase in financing for TB research from the EDCTP seen in 2020 was a result of several factors, including EDCTP's prioritization of key populations such as children and pregnant women, its focus on infectious diseases associated with comorbidities, and the increasing global competitiveness of TB research proposals, including from the Global South.

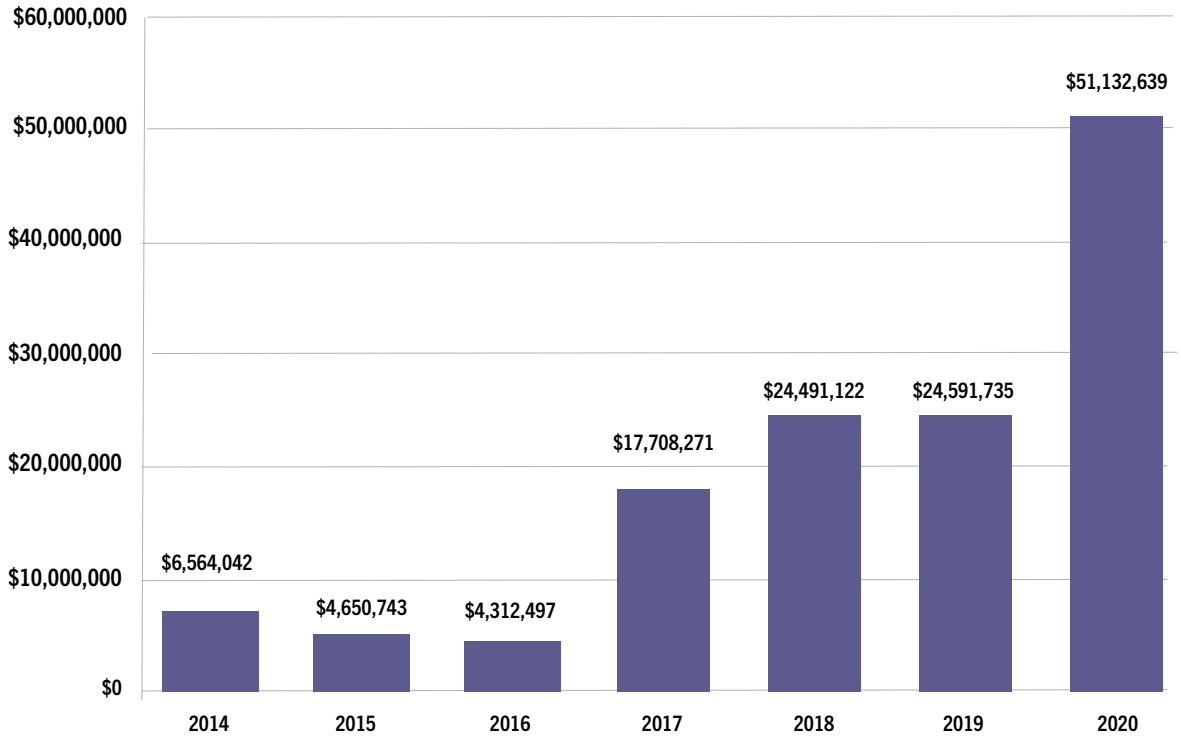
"The other reason that has contributed to the increase is also the growing competitiveness of TB researchers; this is an encouraging trend. This is not only applying to researchers coming from high-income countries, but also researchers from the low- and middle-income countries. When we look at the scientific excellence from the proposals that we are receiving from South Africa, they are very, very highly competitive globally in the TB area," explains Dr. Makanga. He adds that "the other thing is that they are coming through with highly collaborative proposals, where you see very substantial South-South collaboration." Dr. Makanga notes that intentional investment in developing African researchers by the EDCTP has contributed to the growing competitiveness of proposals.

In April 2021, the EDCTP and the Amsterdam Institute for Global Health and Development jointly launched a global roadmap for research and development of TB vaccines.[5] Dr. Makanga explains that "This roadmap identifies priorities for development and implementation of new TB vaccines, with an aim to coordinate and accelerate global action. It is designed to identify the key barriers to TB vaccine R&D and implementation, as well as potential ways in which these barriers can be overcome." In 2020, $0.25 of every dollar spent on TB research by the EDCTP went to vaccine research.

EDCTP investments are currently supporting research and development of three TB vaccine candidates: MTBVAC, VPM1002, and H56:IC31. The MTBVAC and VPM1002 vaccine candidates are being studied in EDCTP-funded trials as potential alternatives to the bacillus Calmette-Guérin (BCG) vaccine for use in infants. H56:IC31 is undergoing evaluation of its effectiveness and safety in preventing TB disease recurrence among adults treated for TB disease.

FIGURE 5

EDCTP TB R&D Funding, 2014–2020
Total = $133,451,049



In addition to the $0.25 of every dollar spent by the EDCTP in 2020 going to vaccine research, $0.33 went to drug research, $0.28 went to diagnostics research, $0.12 went to operational research and epidemiology, and $0.02 went to infrastructure and unspecified projects.

Thirty-four percent of EDCTP's spending across all research areas was directed toward pediatric research. Some of this spending supported pediatric-specific trials, while part reflects the inclusion of children and adolescents in larger studies—a sign that efforts to mainstream the greater inclusion of children in TB research are starting to pay off. EDCPT's total investment in pediatric research in 2020 was $17 million, making it the third largest funder of pediatric TB research in 2020.

According to Dr. Makanga, the TAG report captures "actual investments and actual disbursements; however, our commitment to TB is a much higher figure, so you will see that our figures will continue to grow."

"We need a lot of capacity building. What I don't mean is let's build a really high-tech lab somewhere. We need that cadre of researchers that really get the issue, that really want to work on it. And I think the challenge there is to make it sustainable."

— **David Lewinsohn, Stop TB Partnership Working Group on New TB Vaccines**

Trends in Philanthropic Funding

> "It does seem that the private sector and the philanthropic sector are underrepresented and something that we haven't quite tapped fully for TB. In terms of the philanthropic sector, I know a little bit about it because in Pakistan we have a very strong philanthropic drive that supports the health sector, but we really need to create awareness around R&D needs."
>
> — **Farhana Amanullah, Stop TB Partnership Child and Adolescent TB Working Group**

Philanthropies were the second largest funder of TB R&D in 2020, contributing 15 percent of overall research funding. Philanthropic organizations made up 14 percent (20 of 148) of funders that invested in TB R&D in 2020. Philanthropic funders jointly spent $134 million in 2020—up from $123 million in 2019, but below the 2013 peak of $170 million.

The Gates Foundation remained the largest philanthropic funder and the second largest overall funder of TB R&D in 2020. The Gates Foundation invested $126 million in TB R&D in 2020, which accounted for $0.94 of every dollar spent by philanthropies. Fifty-seven percent of Gates Foundation funding supported drug research, 30% vaccine research, 7% diagnostics research, and 6% operational and epidemiological research (what the Gates Foundation refers to as "delivery"). No funding was allocated toward pediatric research.

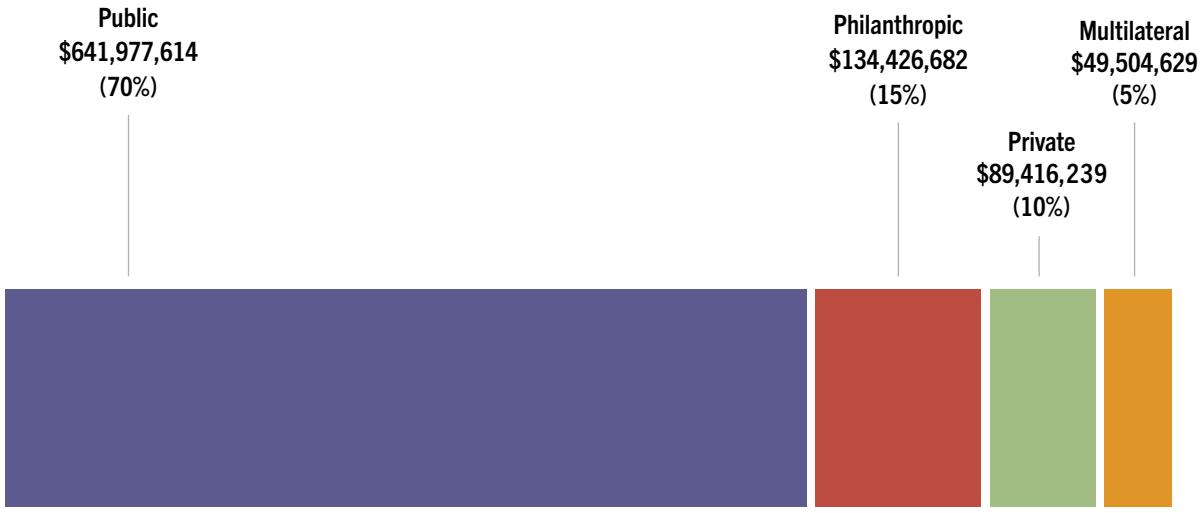
Within its overall spending, the Gates Foundation reported giving $33 million to the Gates Medical Research Institute (GMRI), of which $12 million went to TB drug research and $21 million to TB vaccine research. In 2020, the GMRI, which operates as a wholly owned subsidiary of the Gates Foundation, announced the creation of the PAN-TB (Project to Accelerate New Treatments for Tuberculosis) collaboration with the pharmaceutical companies Evotec, GlaxoSmithKline, Johnson & Johnson, and Otsuka Pharmaceutical.[6] PAN-TB partners aim to develop novel TB drug regimens that can treat TB regardless of preexisting drug resistance. On the vaccine side, the GMRI is preparing to launch a phase III trial of TB vaccine candidate M72/AS01E, completing a study of M72/AS01E in people living with HIV, and supporting a confirmatory trial testing the strategy of revaccinating adolescents with BCG to prevent sustained infection with TB.[7]

The Wellcome Trust remained the second largest philanthropic funder of TB research in 2020. The steep decline in funding for TB R&D by the Wellcome Trust from $10.3 million in 2018 to $1.5 million in 2019 was discussed in last year's report. This was reportedly due to unpredictable outcomes of open calls for non-disease-specific research funding. In 2020, the Wellcome Trust invested $4.5 million in TB R&D, 20 percent of which went toward pediatric research.

No other philanthropies invested over $1 million in TB research during 2020—although the Swedish Heart-Lung Foundation, Médecins Sans Frontières, and the Fondation Botnar each spent over a half-million dollars.

FIGURE 6

Total TB R&D Funding by Funder Type, 2020
Total: $915,325,165



Overall investments by philanthropies were allocated as follows: 55% to drug research, 29% to vaccine research, 8% to diagnostics research, 6% to operational research and epidemiology, 2% to basic science, and less than 1% to infrastructure and unspecified projects. Of the overall funding committed to all research areas, less than 1% went toward research for pediatrics. This distribution of resources was largely influenced by spending allocations at the Gates Foundation, whose contributions significantly exceeded those from other philanthropies.

"I think that governments need to step up, one, but also have all other stakeholders step up. You have the richest men and women in the world—imagine what the situation would be if they donated a percentage of their income or their worth to TB. We're so dependent on the Bill & Melinda Gates Foundation and on a couple of donors here and there, and because of them we're this far, but we need to increase the pool of people who are supporting TB R&D."

— Rhea Lobo,
Affected Communities
Board Member (Alt),
Stop TB Partnership

Trends in Private-Sector Funding

> "There is need for more incentives to de-risk research and development for TB. This is the only way that we can get the companies interested to move this forward with a long-term perspective. If the de-risking mechanisms are there, I'm sure that more companies will be more willing to engage and do more."
>
> — Michael Makanga, European & Developing Countries Clinical Trials Partnership

Private-sector companies were the third largest funder of TB R&D in 2020, spending a total of $89 million, or just under 10 percent of overall funding. While this is an increase over the previous year's spend of $74 million, industry spending remains far below the financing levels seen in the first half of the decade, which peaked in 2011 at $145 million. The increase seen in 2020 was largely the result of first-time reporting by Oxford Immunotec, which spent $10 million on TB research in 2020.

Private-sector companies accounted for 18 percent (27 of 148) of the entities that invested in TB R&D in 2020. Three of the top 15 largest funders were industry groups: Company X, Otsuka Pharmaceutical, and Oxford Immunotec. Expenditure by these three companies accounted for 68% of total private-sector spending. Company X and Otsuka Pharmaceutical spent $31 million and $19 million, respectively, on drug research. Oxford Immunotec spent $10 million on diagnostics research. All other companies investing in TB R&D spent under $4 million.

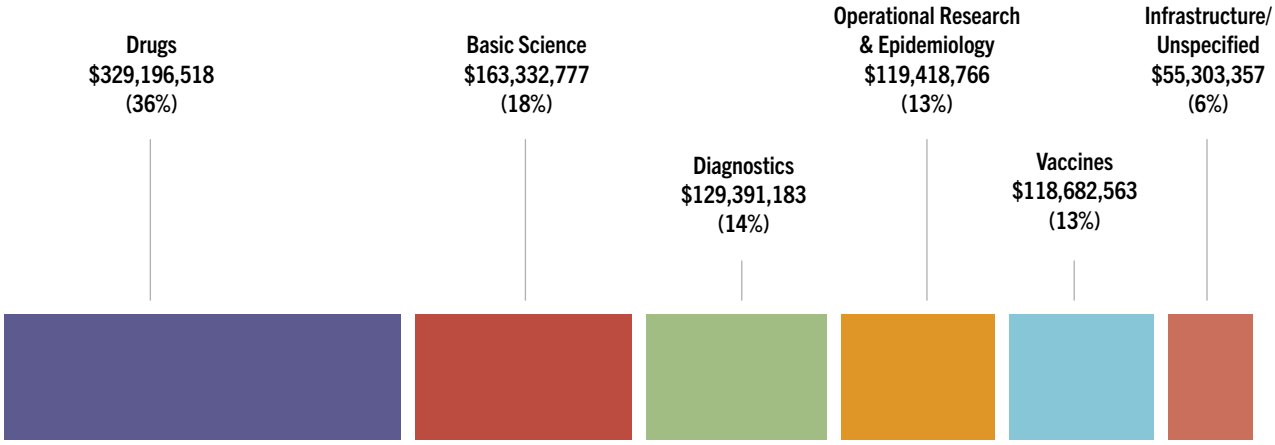
Industry groups focused their investments on drug research, allocating $0.74 of every dollar spent to this area. The next highest area of investment by private-sector companies was diagnostics research which received $0.23 of every dollar spent. Spending on drug and diagnostics research together consumed $0.97 of every dollar spent by the private sector. Eleven companies invested a total of $66 million in drug research, with investments ranging from $31 million to $272,000. Twelve companies invested a total of $20 million in diagnostics research, with investments ranging from $10 million to $10,000.

Companies showed a strong preference for investing in product development, with almost no investment into the basic-science research needed to inform the development of new innovative products or the operational research required to inform their rollout. Only one company, Japan BCG Laboratory, reported expenditures on basic research.

Vaccine research received only $0.03 of every dollar spent by private-sector companies, receiving a total investment of $2 million in 2020. Four companies invested in vaccine research, only one of which (Archivel Farma) spent over $1 million. The dearth of private-sector spending on

FIGURE 7

Total TB R&D Funding by Research Area, 2020
Total: $915,325,165



TB vaccine R&D indicates that no company has stepped forward to fill the role previously played by GlaxoSmithKline Biologicals (GSK). As expected, spending by GSK has declined from its peak of $17 million in 2015 following the winddown of the M72/AS01E phase IIb trial and the transfer of rights to develop the M72/AS01E TB vaccine candidate to the GMRI. From 2015 to 2020, GSK spent $42 million on TB vaccine research, but 2020 accounts for just $300,000 of that sum. Of note, several companies active in TB vaccine research did not return surveys to TAG, including the Serum Institute of India, Vakzine Projekt Management, and Quratis.

Nine percent of the spending across all research areas by industry groups was allocated toward pediatric research, though not every company was able to disaggregate pediatric-specific expenditures from larger investment totals.

"Undoubtedly the breakthrough has been the M72 results [...] but it's a little sad that it's taking such a long time to take it into phase III testing, because even if the vaccine has 50% efficacy, [it] will make a massive difference in the epidemic. And it's very disappointing that we are having to wait an extra two years for manufacturing and other issues to be solved before development can proceed."

— **Willem Hanekom,**
Africa Health Research Institute

Trends in Multilateral Funding

> "TB in general has always been marginalized. We've tried to do a lot of advocacy, and they [donors] tell you that the world does not have really a strong appetite for TB—rather HIV; all the money goes to HIV. So, this is a reflection of what is happening in all TB spectrums."
>
> — Austin Arinze Obiefuna, Afro Global Alliance

After slowly but steadily increasing over the past five years, multilateral financing for TB R&D declined in 2020. Multilateral organizations jointly invested $49 million in 2020—down from $61 million in 2019. This decline was due to non-reporting by the World Bank, which invested $12 million in 2019, as well as decreased investment by the Global Fund from $10 million in 2019 to $3 million in 2020. As in previous years, the Global Fund figure represents spending on projects classed as "surveys" in its TB, HIV/TB, resilient and sustainable systems for health, and multicomponent grants. The Global Fund shared with TAG that this drop in spending may be connected to challenges country programs experienced in implementing surveys during the COVID-19 pandemic.

In 2020, six discrete multilateral entities invested in TB R&D. The largest was Unitaid, whose investment of $41 million accounted for 83 percent of total investment by multilateral entities. Over half of Unitaid's investment went to drug research (54%), while the remainder went to operational research and epidemiology (33%) and diagnostics research (13%). TB was Unitaid's second largest disease-specific area of funding during 2020, receiving 27% of Unitaid's total project expenditure. The most funded disease-specific area, HIV, received 43% of Unitaid's project funding. The remainder went to malaria (14%) and cross-cutting projects (16%).[8]

The second largest multilateral investor was the Global Fund. The third and fourth largest multilateral funders were two public private partnerships (PPPs): the Global Health Innovative Technology Fund (GHIT) and the RIGHT Fund. GHIT, a PPP established in Japan in 2013, invested $2.9 million in TB R&D in 2020. Seventy-two percent of this investment went to diagnostics research, while the remainder went to drug research. The RIGHT Fund, a PPP established in Korea in 2018, appears in the report for the first time this year with spending of $1 million on diagnostics research. The RIGHT Fund did not return a survey to TAG (the $1 million included here was reported by a funding partner), so this amount may only give a partial view of the organization's TB portfolio.

Finally, TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization, spent just over $900,000 on TB R&D in 2020, while the Stop TB Partnership spent $73,000.

Overall financing by multilateral organizations was allocated as follows: 47% to drug research, 36% to operational research, and 17% to diagnostics research. Of the overall expenditure across research areas, 34% was spent on pediatric TB research, driven by investments by Unitaid, which allocated 41% of its overall research investments toward projects with pediatric elements. No multilateral organizations invested in TB vaccine research during 2020.

Fair-Share Targets

> "The UN High-Level Meeting on TB was an event with a lot of hope, a lot of political commitment, but nobody delivered. You can make up whatever excuses you want, but even the year before COVID-19 happened, nobody delivered. It's not just about talking in a fancy event and making headlines. It's about actually delivering. And how do we go about getting nations to deliver? I think the first thing is, you need to get the community engaged."
>
> — **Rhea Lobo, Affected Communities Board Member (Alt), Stop TB Partnership**

The fair-share targets are a metric for measuring countries' investments in TB research against their ability to pay. The metric seeks to encourage solidarity and equitable investment by countries in ending TB. The fair-share targets, which were initially developed and championed by civil society, have gained political traction as a metric for evaluating countries' TB research investment. The WHO's *Global Strategy for Tuberculosis Research and Innovation*, published in 2020, called for countries to "gradually increas[e] funding for TB research and development in relation to GDP and gross domestic expenditure on research and development on health research and development to address unmet needs in TB research."[9]

The fair-share targets call on countries to invest at least 0.1% of their overall expenditure in R&D (gross expenditure on R&D or GERD) into TB research. Investment at this level by all countries would put the world on track to meet and exceed the $2 billion annual funding target committed to by governments at the 2018 United Nations High-Level Meeting on TB.[10]

TAG has reported on countries' progress in meeting the fair-share targets since 2017. While TB research investments from public sources have steadily increased since 2017—plateauing in 2020—the number of countries meeting their fair-share targets has declined. Further, only four countries have met or exceeded the fair-share funding target in at least one of the reporting years: the Philippines, South Africa, New Zealand, and the United Kingdom.

In 2020, only the United Kingdom met the fair-share target—although expenditure by the country on TB R&D fell from $56 million in 2019 to $47 million in 2020.

At the same time, the percentage of reporting countries meeting at least half of the fair-share targets has declined. In 2017, 8 of the 25 (32%) reporting countries met at least half of their fair-share targets, while in 2018 and 2019, 10 of the 24 (42%) reporting countries met at least half of their investment targets. But in 2020, only 6 of the 23 (26%) spent at least 0.05% of total R&D expenditure on TB research.

The declining number of countries meeting their fair-share targets (or least half of the target) and the failure of any new countries (beyond the four that met the target in at least one reporting year) to meet their targets highlights that political commitments to expand TB research investments have not been followed by actual spending. The situation also indicates that expansions in funding for TB R&D have failed to keep pace with growth in overall research spending by countries.

In addition to the United Kingdom, which met its fair-share target in 2020, three other countries achieved at least two-thirds of the 0.1% funding target. The United States achieved 90% of the funding target, New Zealand achieved 81% of the target, and Canada achieved 80% of the fair-share target.

TABLE 2

Majority of Countries Have Not Met TB R&D Fair Share Funding Targets

RANK	COUNTRY	2020 FUNDING	ANNUAL FAIR SHARE TARGET	PERCENT OF TARGET MET IN 2020	CHANGE SINCE 2019
1	United States	$401,391,947	$444,500,000	90%	↑
2	United Kingdom	$47,090,721	$40,400,000	117%	↓
3	India	$22,358,190	$46,500,000	48%	↓
4	Canada	$20,289,163	$25,300,000	80%	↑
5	Germany	$17,137,166	$99,700,000	17%	↓
6	South Korea	$15,841,339	$64,000,000	25%	↓
7	Australia	$12,805,434	$21,200,000	60%	↑
8	France	$7,105,060	$55,400,000	13%	—
9	Switzerland	$5,508,219	$13,400,000	41%	↑
10	Brazil	$3,726,864	$35,000,000	11%	↑
11	The Netherlands	$3,697,337	$15,100,000	24%	↓
12	Sweden	$2,664,660	$13,700,000	19%	↓
13	Japan	$2,391,602	$154,900,000	2%	↓
14	Ireland	$1,640,509	$3,300,000	50%	↑
15	Norway	$1,557,923	$5,300,000	29%	—
16	New Zealand	$1,453,112	$1,800,000	81%	↓
17	South Africa	$1,351,209	$4,600,000	29%	↓
18	Spain	$1,232,655	$20,799,869	6%	↑
19	Thailand	$960,027	$4,900,000	20%	↑
20	Colombia	$741,226	$1,748,730	42%	↓
21	Finland	$596,857	$7,100,000	8%	—
22	Denmark	$402,077	$7,500,000	5%	↓
23	China	Not reported	$305,600,000	NA	NA
24	Indonesia	Not reported	$2,100,000	NA	NA
25	Pakistan	Not reported	$2,400,000	NA	NA
26	Russian Federation	Not reported	$36,500,000	NA	NA
28	Vietnam	Not reported	$1,300,000	NA	NA
29	Philippines	Not reported	$700,000	NA	NA

Countries that met the target of spending at least 0.1% of overall R&D expenditures on TB research are shaded green.

Countries that did not meet the full fair share target (0.1%) but satisfied at least half of the target by spending 0.05% of overall R&D expenditures on TB R&D are shaded in blue.

Table includes countries that reported more than $250,000 in TB R&D expenditures to TAG and select other high-income or high-TB-burden countries.

Fair share funding targets for European Union (EU) member states do not include member state contributions to the EU budget that support spending on TB R&D by the European Commission or the EDCTP.

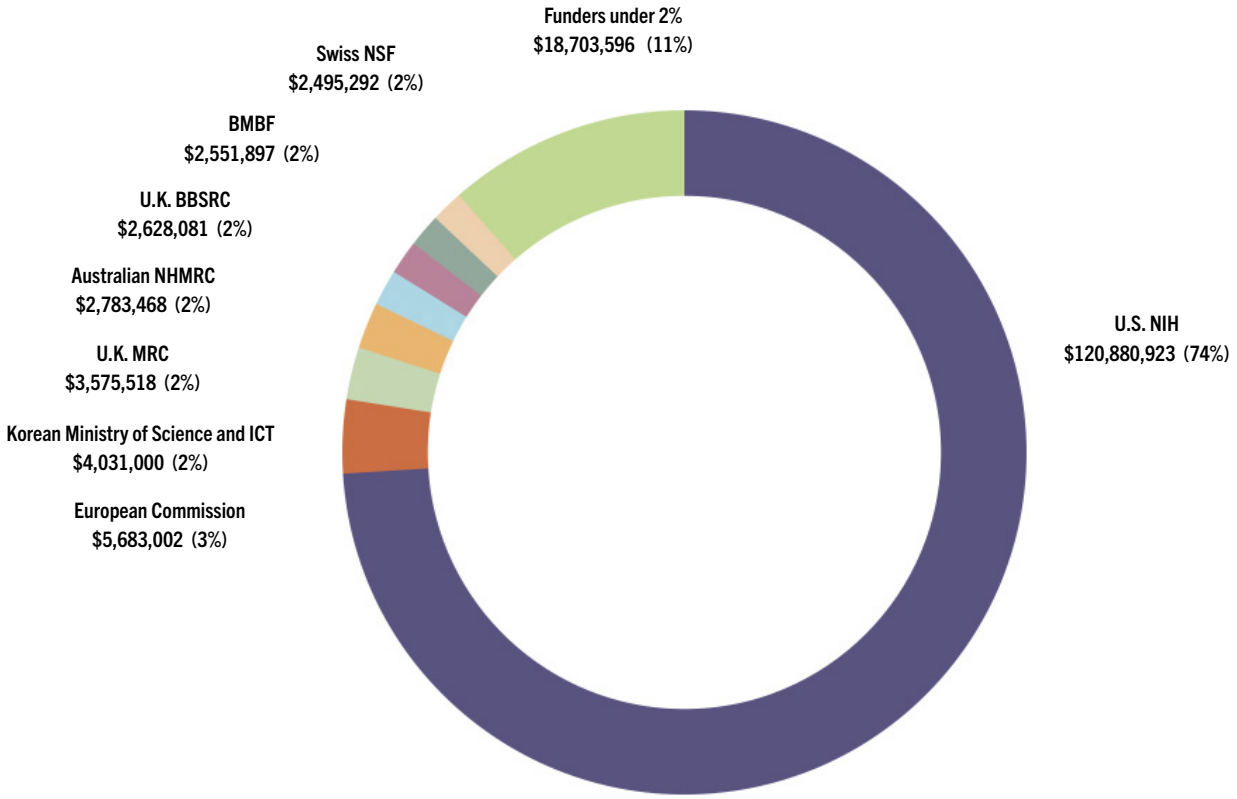
Although data on TB R&D financing was not provided to TAG from the high-burden BRICS countries Russia and China, available data demonstrate a concerning backtracking by South Africa and India in meeting the fair-share targets. While South Africa achieved 183% of the fair-share funding target in 2017, it achieved only 29% of the target in 2020. While India achieved 66% of the fair-share target in 2018, it achieved only 48% of the target in 2020. Yet, while India's expenditure on TB has declined, the country continues to outspend many high-income countries both in terms of absolute investment in TB R&D and as a percentage of overall research investment.

Funding by Research Area

Basic science

FIGURE 8

Basic Science: $163,332,777



Funders with investments under 2%

Korean Ministry of Health and Welfare	$1,928,609
Japan Agency for Medical Research and Development (AMED)	$1,915,538
French National Research Agency (ANR)	$1,811,490
German Research Foundation (DFG)	$1,785,284
Canadian Institutes of Health Research (CIHR)	$1,573,141
Wellcome Trust	$1,287,078
Norwegian Ministry of Education and Research	$864,778
Swedish Research Council	$764,266
Indian Ministry of Science and Technology	$571,576

Academy of Finland	$561,601
U.S. Department of Veterans Affairs	$536,250
Korean Ministry of Education	$508,675
U.S. National Science Foundation (NSF)	$488,132
U.S. Department of Defense Congressionally-Directed Medical Research Program (CDMRP)	$465,370
Indian Council of Medical Research (ICMR)	$402,805
Other funders with investments under $400,000	$3,239,004

> "There's less interest in being more innovative and less funding opportunities to allow for that creativity because funders want to fund what they know people can do. Because of that, new ideas don't have funding sources for them."
>
> — Sara Suliman, University of California, San Francisco Division of Experimental Medicine

Basic-science research received a total investment of $163 million in 2020, further declining from its 2018 peak of $177 million. Of every dollar spent on TB research in 2020, $0.18 went to basic science.

At current funding levels, investment in basic science remains far below the annual target of $400 million called for in the Stop TB Partnership's updated Global Plan and the shortfall to achieving the investment target of $2 billion between 2018 and 2022 is widening. From 2018 to 2020, cumulative investments in basic science have only reached half a billion. This means another $1.5 billion needs to be spent on basic-science research in the next two years to close the funding gap.

Fifty-eight discrete entities invested in basic science in 2020, including 48 public agencies, nine philanthropies, and one company. Public funders provided $161 million of the $163 million spent on basic science in 2020—or $0.99 of every dollar spent. With an overall investment of $120 million, the NIH remained far and away the largest funder of basic science in 2020, funding every $0.74 of every dollar spent on basic science.

The European Commission, which increased its investments in basic-science research from $2.4 million in 2019 to $5.6 million in 2020, was the second largest funder in 2020. The third largest funder was the Korean Ministry of Science and ICT which spent $4 million—up from $2.8 million in 2019. Only five other entities spent more than $2 million on TB basic-science research in 2020, all of which were public agencies.

Philanthropies jointly spent $2 million on basic science. The largest philanthropic funder of basic science research in 2020 was the Wellcome Trust, which spent $1.2 million, or $0.60 of every dollar spent by philanthropies on basic science.

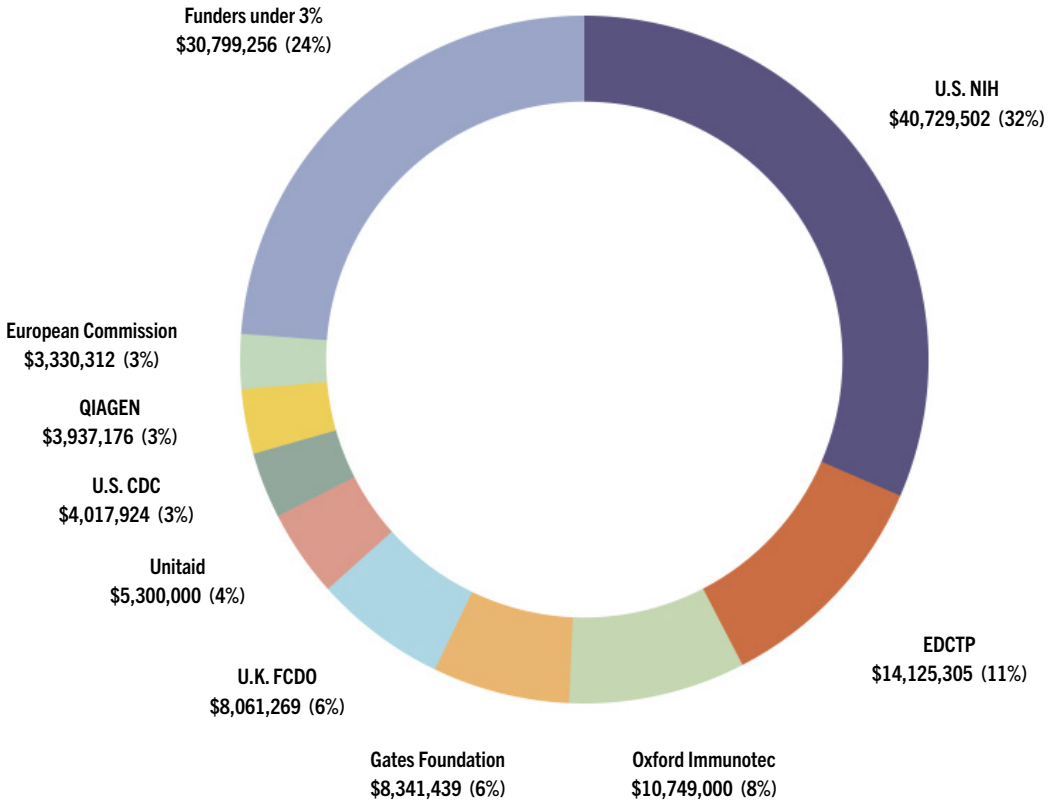
Two large drops in funding for basic science were seen from funders who each contributed over 2% of the total basic science budget in 2019. The Japan Agency for Medical Research and Development (AMED) decreased its investments in basic science from $5.3 million in 2019 to $1.9 million in 2020, and the Gates Foundation decreased its investments from $3 million to $90,000.

Missing from these data: TAG obtained information from all of the funders with documented investments in basic-science research in 2019. Funders with known investments in basic research on TB that have not participated in the survey in several years include the Singapore National Medical Research Council and the Hong Kong Health and Medical Research Fund.

Diagnostics

FIGURE 9

Diagnostics: $129,391,183



Funders with investments under 3%

Australian Department of Foreign Affairs and Trade (DFAT)	$2,578,538
Korean Ministry of Health and Welfare	$2,428,500
Fujifilm Corporation	$2,200,000
Brazil Ministry of Health	$2,132,071
Global Health Innovative Technology Fund (GHIT)	$2,103,087
Wellcome Trust	$1,609,256
Company Y	$1,591,794
U.K. Engineering and Physical Sciences Research Council (EPSRC)	$1,526,917
German Federal Ministry of Education and Research (BMBF)	$1,508,888
U.K. Medical Research Council (U.K. MRC)	$1,342,238
Molbio	$1,321,000
Swiss Agency for Development and Cooperation	$1,242,375
RIGHT Fund	$1,085,493
Australian National Health and Medical Research Council (NHMRC)	$873,480
Korean Ministry of SMEs and Startups	$579,260
Innovate UK	$573,218
Dutch Ministry of Foreign Affairs (formerly DGIS)	$558,192
Other funders with investments under $500,000	$5,544,949

"We are lacking a rapid point-of-care diagnostic for TB. We need same-day diagnosis and treatment, and we don't have that."

— Francesca Conradie, University of The Witwatersrand Clinical HIV Research Unit

Investment in diagnostics research reached an all-time high in 2020 at $129 million—up from $94 million in 2019. Of every dollar spent on TB R&D in 2020, $0.14 went to diagnostics research.

Despite a positive upward investment trend, spending on diagnostics research remains well below what is called for in the Stop TB Partnership's *Global Plan*. In its updated *Global Plan*, the Stop TB Partnership calls on funders to spend $916 million on diagnostics R&D between 2018 and 2022. As of 2020, funders have cumulatively spent $303 million. To close the funding gap, an additional $613 million in financing for diagnostics research is needed over the next two years.

Sixty-six discrete organizations invested in diagnostics research in 2020, including 43 public agencies, 12 companies, eight philanthropies, and three multilateral organizations. Public funders spent more on diagnostics research than any other funder group, funding $0.69 of every dollar spent in 2020. Private-sector companies were the second largest source of funding for diagnostics research, funding $0.16 of every dollar spent. The remainder was funded by philanthropies and multilateral organizations, who provided $0.08 and $0.07 of every dollar spent, respectively.

The NIH remained the largest funder of diagnostics R&D in 2020, providing 31% of the total budget for diagnostics research, with an investment of $40 million. The EDCTP, which increased its investments in this area from $7.5 million in 2019 to $14 million in 2020, was the second largest funder in 2020, contributing 11% of the total.

The Gates Foundation, whose investments in diagnostics research declined from $11 million in 2019 to $8 million in 2020, fell from the second to the fourth largest funder of diagnostics research between 2019 and 2020.

Two entities whose investments are reported by TAG for the first time this year, the private company Oxford Immunotec and the multilateral RIGHT Fund, concentrated their investments in diagnostics research. Oxford Immunotec spent $10 million on diagnostics research in 2020, making it the third largest funder of diagnostics R&D, while the RIGHT Fund invested $1 million.

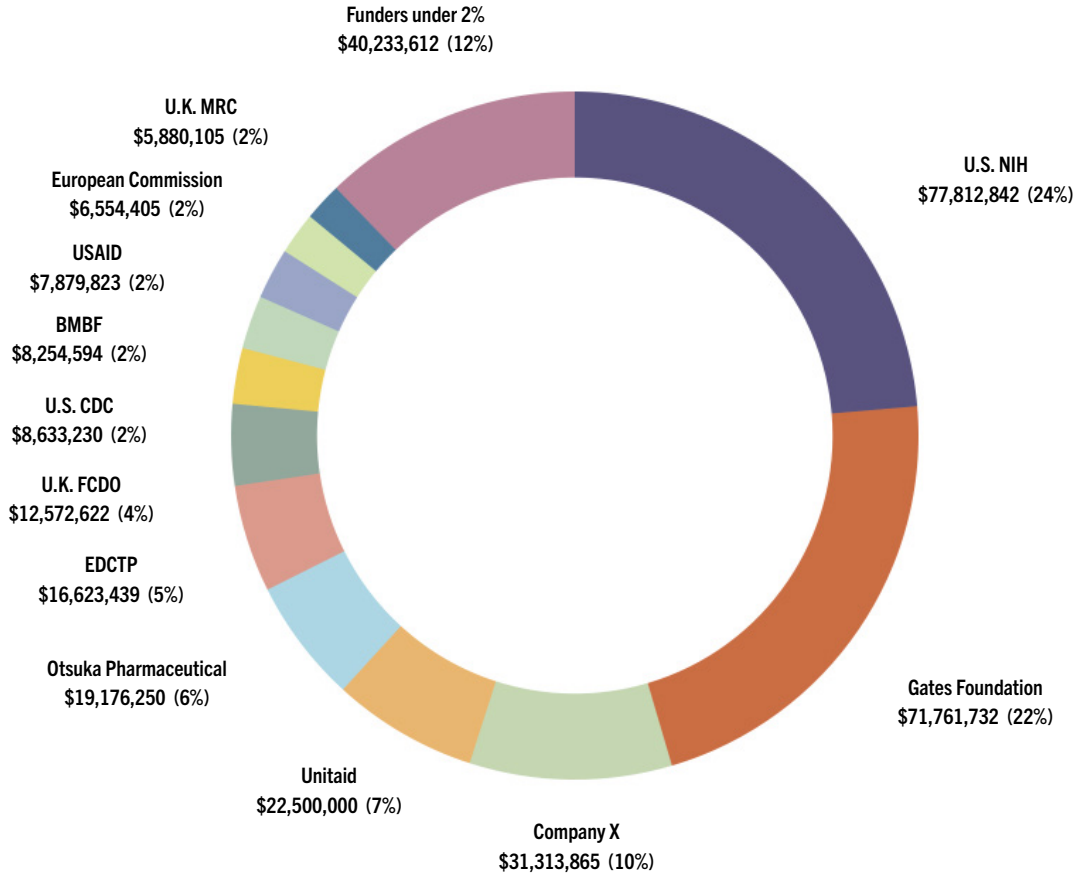
Five other entities invested over $3 million in diagnostics research in 2020: the UK Foreign, Commonwealth and Development Office; Unitaid; the U.S. Centers for Disease Control and Prevention (CDC); QIAGEN; and the European Commission.

Missing from these data: Cepheid, Abbott, and Bruker/Hain Lifescience did not respond to the survey. TAG did not send a survey to SD Biosensor and several other smaller biotech companies now active in TB diagnostics.

Drugs

FIGURE 10

Drugs: $329,196,518



Funders with investments under 2%

Cadila Pharmaceuticals	$3,577,315
Company H	$3,370,000
Australian Department of Foreign Affairs and Trade (DFAT)	$2,578,538
Dutch Ministry of Foreign Affairs (formerly DGIS)	$2,565,466
Merck (known as MSD outside of the U.S. and Canada)	$2,348,989
LegoChem Biosciences	$2,180,070
Company V	$1,851,114
Korea International Cooperation Agency (KOICA)	$1,600,000
Swiss National Science Foundation (SNSF)	$1,553,103
Canadian Institutes of Health Research (CIHR)	$1,502,919
U.S. Department of Defense Congressionally-Directed Medical Research Program (CDMRP)	$1,325,664
Irish Aid	$1,143,500
Company L	$1,040,000
Wellcome Trust	$1,031,206
Macleods Pharmaceuticals	$1,000,000
Swedish Research Council	$985,192
Global Health Innovative Technology Fund (GHIT)	$853,449
Indian Council of Medical Research (ICMR)	$814,664
U.S. Department of Veterans Affairs	$677,167
Korean Ministry of Health and Welfare	$624,820
ANRS | Emerging Infectious Diseases	$612,931
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$595,132
Other funders with investments under $500,000	$6,402,373

"We are in a place where we're celebrating reducing the duration of TB treatment from six months to four months. But ideally by now we should have been in a place where we've narrowed that gap down to a week or five days."

— Rhea Lobo, Affected Communities Board Member (Alt), Stop TB Partnership

Drug research has consistently been the highest funded area of TB research over the past decade, and this trend continued in 2020. Of every dollar spent on TB research in 2020, $0.36 went toward drug R&D.

Yet, despite receiving more funding than any other research area, investment in drug research has remained relatively flat over the past four years. In 2020, a total of $329 million was spent on drug research. Cumulative investments in drug research from 2018 through 2020 totaled $975 million—leaving a seemingly insurmountable funding gap of $5.8 billion needed to reach the Stop TB Partnership's funding target of $6.8 billion for drug research from 2018 to 2022.

Sixty-five discrete entities invested in drug research in 2020, including 43 government agencies, 11 companies, eight philanthropies, and three multilateral organizations. Half of all funding for drug research ($0.50 of every dollar spent) came from public funders, of which 47% came from the NIH. Philanthropies and companies respectively funded $0.22 and $0.20 of every dollar spent on drug research. The remaining $0.07 of every dollar spent came from multilateral organizations.

The top five funders of drug research were relatively diverse, including one public funder (the NIH), one philanthropic funder (the Gates Foundation), two companies (Company X and Otsuka Pharmaceutical), and one multilateral organization (Unitaid).

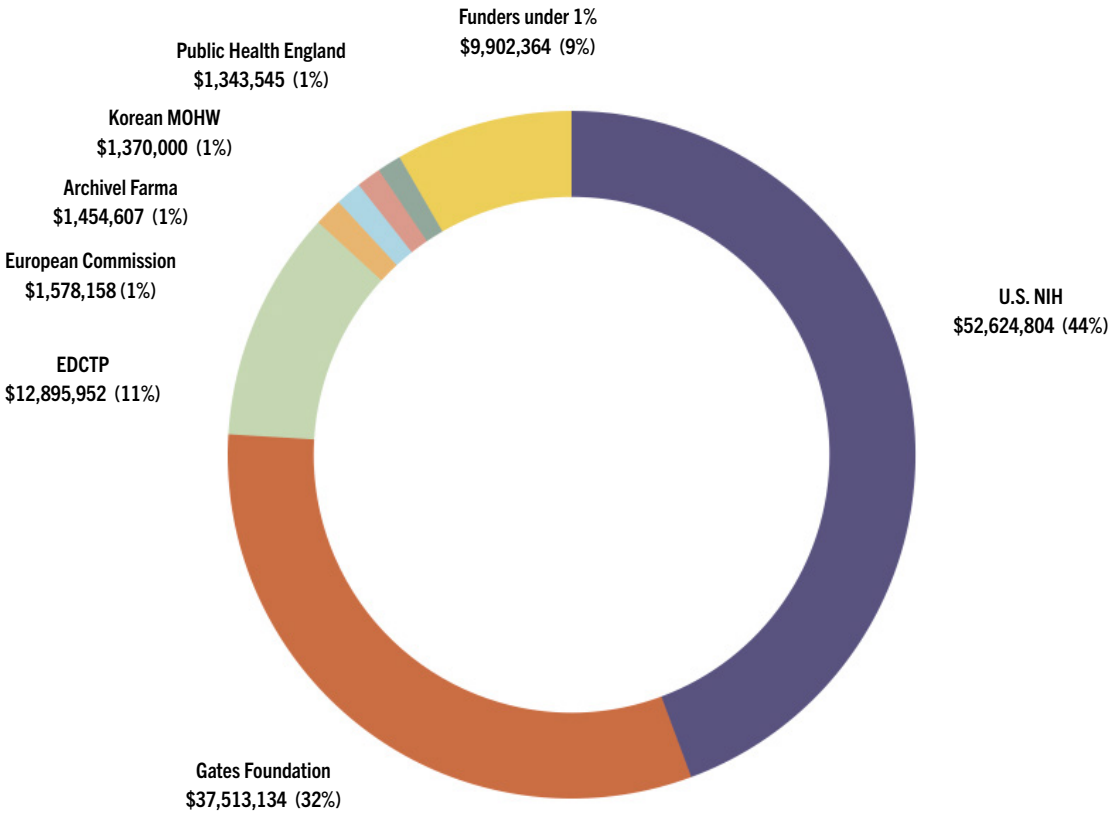
In addition to the top five funders, seven public funders from Europe and the United States invested more than $5 million each in drug research.

Missing from these data: the Innovative Medicines Initiative (IMI), a public-private partnership between the European Commission and European pharmaceutical companies, did not respond to the survey. The IMI Antimicrobial Resistance Accelerator program has a budget of more than €480 million to spend on the development of new medicines, with several TB projects, including UNITE4TB, ERA4TB, TRIC-TB, and RespiriTB.[11] This is the second year in a row that IMI projects avoided providing information on their TB spending.

Vaccines

FIGURE 11

Vaccines: $118,682,563



Funders with investments under 1%

International Development Research Center (IDRC)	$964,788
Canadian Institutes of Health Research (CIHR)	$924,923
Indian Council of Medical Research (ICMR)	$843,324
U.K. Medical Research Council (U.K. MRC)	$696,939
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$654,044
Fondation Botnar	$583,866
Wellcome Trust	$554,549
Company G	$525,420
São Paulo Research Foundation	$500,000
Spain Ministry of Science, Innovation and Universities—State Research Agency	$484,679
German Federal Ministry of Education and Research (BMBF)	$484,337
U.S. Department of Veterans Affairs	$334,854
GlaxoSmithKline Biologicals	$291,933
Swedish Research Council	$290,511
U.S. National Science Foundation (NSF)	$256,000
Funders with investments under $250,000	$1,512,197

> "Globally, research on TB prevention needs to be emphasized mainly on prevention and vaccines. We need at least 50 percent of the effort that was put into COVID-19 vaccine development channeled to TB vaccine development, both in terms of funds and political and industry commitment."
>
> — Chandrasekaran Padmapriyadarsini, ICMR-National Institute for Research in Tuberculosis

Financing for TB vaccine research remained relatively flat in 2020 at a total of $118 million. Of every dollar spent on TB research in 2020, only $0.13 went to vaccine R&D. Cumulative expenditure on vaccine research between 2018 and 2020 was $345 million. To reach the $3 billion investment target for vaccine research called for in the Stop TB Partnership's updated Global Plan, an additional $2.7 billion would need to be invested in TB vaccine research over the next two years.

Thirty-nine discrete entities invested in vaccine research in 2020, including 31 public agencies, four companies, and four philanthropies. Of every dollar spent on vaccine research in 2020, $0.65 came from public funders and $0.33 came from philanthropies. Only $0.02 of every dollar spent came from private companies. No multilateral organizations invested in TB vaccine research in 2020.

The three largest funders of vaccine research—the NIH, the Gates Foundation, and the EDCTP—contributed 87% of the total funding. The NIH invested $52 million in vaccine research in 2020, down from $58 million in 2019. The Gates Foundation invested $37 million in vaccine research in 2020, up slightly from $34 million in 2019, while the EDCTP increased its investments in this area from $1.8 million in 2019 to $12.8 million in 2020.

Only four other organizations invested over $1 million in vaccine research in 2020: the European Commission, Archivel Farma, the Korean Ministry of Health and Welfare, and Public Health England.

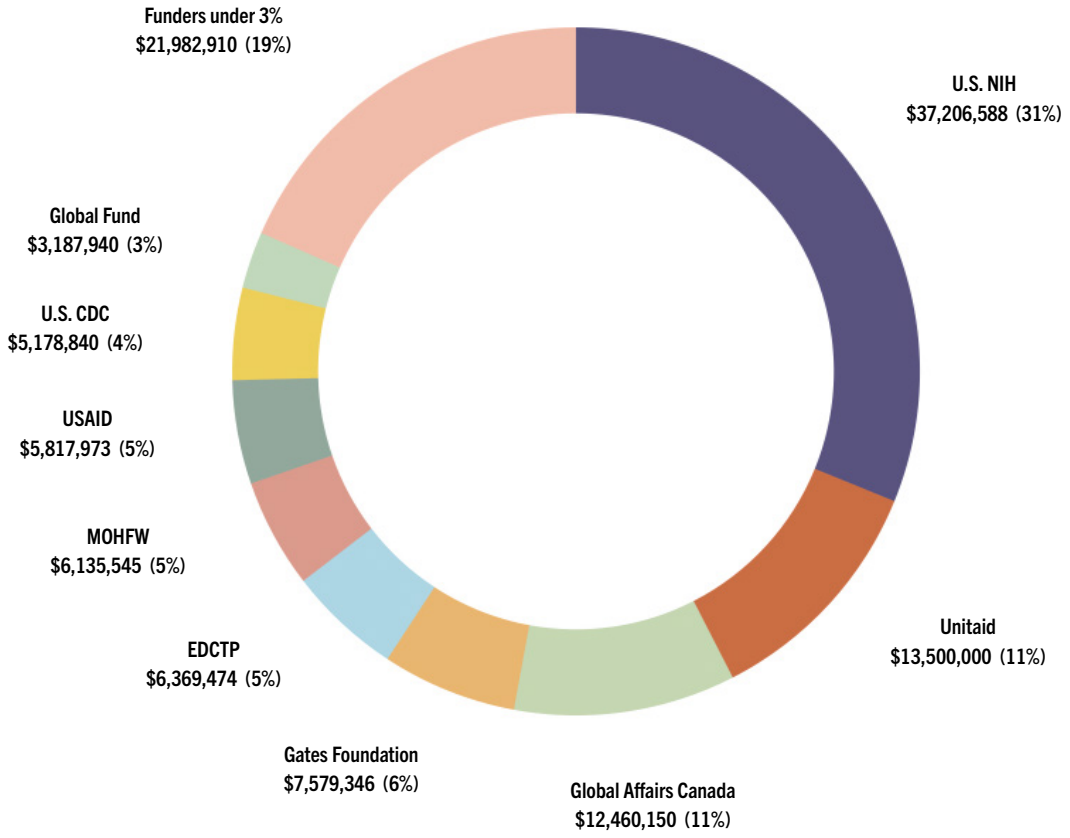
The urgent need for substantially scaled-up financing to develop new vaccines for TB was raised repeatedly during interviews conducted for this report and is examined in greater detail in the discussion section that follows.

Missing from these data: several companies with active TB vaccine development programs did not respond to the survey, including Vakzine Projekt Management, Serum Institute of India, and Quratis. TAG did not send a survey to the HIV Vaccine Trials Network (HVTN) at the NIH, which together with the AIDS Clinical Trials Group and International Maternal Pediatric and Adolescent Clinical Trials Network is preparing to conduct clinical trials of TB vaccines. TAG will survey HVTN in future years.

Operational Research & Epidemiology

FIGURE 12

Operational Research & Epidemiology: $119,418,766



Funders with investments under 3%

U.K. Medical Research Council (U.K. MRC)	$2,378,100
Canadian Institutes of Health Research (CIHR)	$2,003,890
U.K. Foreign, Commonwealth and Development Office (FCDO; formerly DFID)	$1,940,929
Australian Department of Foreign Affairs and Trade (DFAT)	$1,888,215
Australian National Health and Medical Research Council (NHMRC)	$1,669,936
L'Initiative	$1,273,806
U.K. Engineering and Physical Sciences Research Council (EPSRC)	$1,021,575
Brazil Ministry of Health	$986,295
Taiwan Ministry of Health and Welfare	$901,944
TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization	$900,993
U.S. National Science Foundation (NSF)	$841,089
Korean Ministry of Health and Welfare	$789,388
U.K. Economic and Social Research Council (ESRC)	$627,133
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$611,066
Indian Council of Medical Research (ICMR)	$588,628
Other funders with investments under $500,000	$3,559,923

> "The operational research funding component really needs to be higher. [. . .] At the end of the day, efficient, equitable, and quality programs are not going to come without local knowledge about the best way to run them in a certain setting. And I think we are really lagging in that area."
>
> — **Farhana Amanullah, Stop TB Partnership Child and Adolescent TB Working Group**

Financing for operational research and epidemiology declined from $143 million to $119 million in 2020. Of every dollar spent on TB R&D, $0.13 was invested in operational research and epidemiology.

Fifty-five discrete entities invested in operational research and epidemiology, including 42 government agencies, 10 philanthropies, and three multilateral organizations. Of every dollar spent on operational research and epidemiology, $0.79 came from public funders, $0.15 from multilateral organizations, and $0.07 from philanthropies.

The largest funder of operational research, the NIH, increased its investments in operational research and epidemiology from $28 million in 2019 to $37 million in 2020. The second largest funder, Unitaid, decreased its investments in the area from $26 million in 2019 to $13.5 million in 2020. Global Affairs Canada maintained its investment of $12 million in 2020 and its position as the third largest funder of operational research and epidemiology.

Five other organizations invested over $5 million in operational research and epidemiology in 2020: the Gates Foundation, the EDCTP, the Indian Ministry of Health and Family Welfare, USAID, and the U.S. CDC.

The World Bank, which invested $11 million in TB operational research and epidemiology in 2019, did not report in 2020. The Global Fund decreased its investments from $10 million in 2019 to $3 million in 2020.

The Stop TB Partnership's updated Global Plan does not include a funding target for operational research and epidemiology, but tracking by TAG shows a total cumulative investment of $385 million in the area between 2018 and 2020.

Missing from these data: The World Bank, which reported spending $11 million on TB operational research in 2019, did not return a survey this year.

Infrastructure and unspecified projects

> "In TB control, the human resources were moved to COVID-19. The laboratory infrastructures, being the only P3 laboratories in the country, were taken for COVID-19 diagnosis. In an emergency, you need to buffer the emergency, but that needs to be for a limited time. We cannot have all the infrastructure built for tuberculosis hijacked because there is another problem."
>
> — **Daniela Cirillo, WHO Collaborating Centre in Tuberculosis Laboratory Strengthening**

Funders spent $55 million on infrastructure and unspecified projects in 2020—down from a peak in spending in this area of $80 million in 2018. Of every dollar spent on TB research in 2020, $0.06 went to infrastructure and unspecified projects.

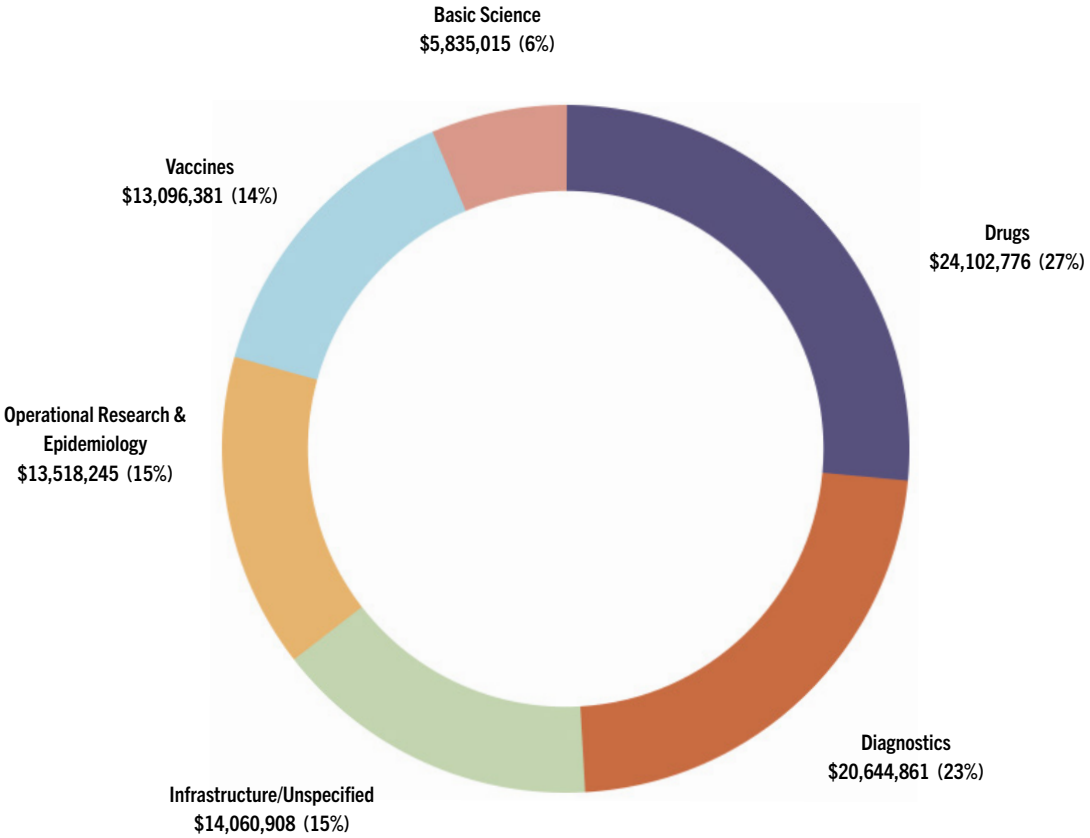
USAID was the largest funder of infrastructure and unspecified, providing nearly half ($23 million) of the overall investment in this area. The second and third largest funders, the Indian Council of Medical Research and the NIH, spent $11 million and $9 million, respectively.

Four other organizations spent over $1 million on infrastructure and unspecified projects in 2020: the French National Institute of Health and Medical Research, the German Federal Ministry of Research and Education, the U.S. CDC, and the EDCTP.

Pediatric TB Research

FIGURE 13

Pediatric TB R&D Funding by Research Area, 2020
Total: $91,258,186



After a big increase in funding for pediatric research in 2017, financing remained relatively flat through 2019. However, financing for pediatric research once again saw an increase in 2020. Pediatric research funding increased by 56 percent to $91 million in 2020 from $58 million in 2019. Investment in pediatric research in 2020 accounted for 10 percent of the total TB research budget. This fraction represents a significant milestone, as it nears the estimated 11–12% share of TB cases that children account for annually.[12]

In the lead-up to the 2018 UN High-Level Meeting on TB, TAG and the Child & Adolescent TB Working Group proposed that 10% of the TB research funding target be devoted to pediatric TB research, "commensurate with the global burden of TB." With spending of $91 million in 2020, funding for pediatric TB research has now reached 10% of actual spending but is still far away from reaching $200 million, which would be 10% of the $2 billion annual funding target.[13]

The Stop TB Partnership's updated Global Plan does not include a funding target for pediatric research, but tracking by TAG has shown that a total of $210 million spent across all research areas between 2018 and 2020 was allocated toward pediatric research efforts, making up 8% of overall spend over the three years.

> "There has to be a financing stream that is specific for children. Pediatric R&D funding has come a long way, but it is still much less than the 12% proportion of the overall TB cases that children are. So, we are still lagging behind in what the children need, despite the fact that it is a whole lot better from what it was before."
>
> — Farhana Amanullah, Stop TB Partnership Child and Adolescent TB Working Group

Financing from public funders accounted for 71 percent of total investment—or $0.71 of every dollar spent on pediatric research. Public-sector funders invested 10 percent of their overall contributions into pediatric research in 2020. After public funders, multilateral organizations were the second largest funder of pediatric research, contributing $0.19 of every dollar spent. Multilateral organizations allocated a greater proportion of their overall financing to pediatric research than any other category of funder—directing 34% of their overall investments toward pediatric research. Nearly all (99.8%) investments in pediatric research by multilateral organizations came from Unitaid.

Companies allocated 9% of their overall expenditure to pediatric research, which accounted for $0.09 of every dollar spent, while philanthropies directed only 1% of their investments toward pediatric research efforts, which accounted for a meager 1 cent of every dollar spent on pediatric research.

Investments in pediatric research were primarily focused on drug and diagnostics research, which respectively received 27% and 23% of overall investments. Vaccine research received 14% of investments in pediatric R&D, whereas basic-science research received only 6% of pediatric-focused investments. Operational research/epidemiology and infrastructure/unspecified projects each received 15% of overall investments categorized as pediatric.

The leading three public funders, USAID, the NIH, and the EDCTP cumulatively financed $0.65 of every dollar spent on pediatric TB research. In terms of ranking:

- USAID moved from the position of the fifth largest funder of pediatric research in 2019, with an overall investment of $4.5 million, to the largest individual funder of pediatric research in 2020, with an investment of $21 million.
- The NIH increased its investment in pediatric TB research from $16 million in 2019 to $20 million in 2020—remaining the second largest financer of pediatric TB research in both years.
- The EDCTP significantly expanded its investments in pediatric TB research between 2019 and 2020, from $1.4 million to $17 million—moving from the ninth to the third largest funder of this area.
- The increased investments from these funders bumped Unitaid from its position as the largest funder of pediatric R&D in 2019 to the fourth largest funder in 2020, although its investments in pediatric research remained stable, seeing a slight increase in 2020.

Only two other funders gave more than $1 million to pediatric research in 2020, Company X (at $6.5 million) and the United Kingdom Medical Research Council (at $1.8 million).

The year 2020 ended on a high note for pediatric TB research, with the release of positive results from the SHINE trial demonstrating that children with non-severe TB can be cured in four months instead of six.[14] The SHINE trial was funded by the U.K. Medical Research Council, the U.K. Foreign, Commonwealth and Development Office, and the Wellcome Trust.

"I think the SHINE Trial showed that we need pediatric-focused studies looking at all sorts of things, not just safety and dosing," said Jennifer Furin from the Sentinel Project on Pediatric Drug-Resistant Tuberculosis. She added "I would like to see more funding go into building pediatric research capacity to do trials that are focused on diagnosis and shorter regimens for kids with non-severe disease." Farhana Amanullah of the Stop TB Partnership's Child and Adolescent TB Working Group echoed this excitement about treatment shortening for children and pointed to the unmet need to address TB among older children and adolescents. "One of the glaring gaps is the relative neglect of research among adolescents and young adults," said Amanullah. She added "We see a significant TB burden in adolescents who have unique needs, are likely to not complete treatment, to develop drug-resistant forms, and have poorer outcomes. That area really needs more focused R&D."

While the SHINE trial represents a bright spot for meeting the needs of children with TB, there is still a long way to go toward centering children and adolescents in the TB research agenda. As an example of enduring gaps, Furin pointed to the exclusion of children from a large treatment-shortening trial in adults and adolescents, which also published results in 2020.[15] "One of the big TB research wins, I think, is the ACTG 5349/TBTC Study 31, which showed that a four-month treatment regimen that contains moxifloxacin and rifapentine is as effective as a six-month regimen. But you know who's left out of that? Children," said Furin. Trials conducted exclusively among children such as SHINE are one thing; it is another to open larger adult studies to pediatric participation. "I think some of the lessons we can learn from the HIV world are in the inclusion of children in trials and developing pediatric formulations, how they have tackled earlier inclusion of children—that can definitely be applied to TB," offered Amanullah.

Missing from these data: for the second year in a row, the NIH-funded International Maternal Pediatric Adolescent AIDS Clinical Trials network (IMPAACT), which spent $2.6 million on pediatric TB research in 2018, did not return a survey.

Pediatric TB research resource tracking methodology

The survey TAG sends to funders asks recipients to delineate support for pediatric research within any expenditures assigned to one of the six core research areas tracked by the report. TAG further identifies research related to pediatric TB by conducting a keyword search of titles and abstracts contained in returned surveys. We use the following search terms: pediatric, paediatric, infant, child, kid, adolescent, teen, natal, pregnant, and pregnancy. This methodology generates a reasonable estimate of pediatric TB research spending, but it does not necessarily capture research that informs the development of pediatric health technologies without studying TB infection or disease in children directly. Additionally, some funders cannot disaggregate pediatric research funding from overall expenditures. Funders supporting studies that include people of all ages can rarely specify the proportion of funds devoted to children. TAG encourages all funders to develop ways of disaggregating pediatric TB research spending to enable more accurate resource tracking in this area.

TABLE 3

Pediatric TB R&D Funders by Rank, 2020

2020 RANK	FUNDER	FUNDER TYPE	2020 FUNDING	PERCENTAGE
1	U.S. Agency for International Development (USAID)	P	$21,079,988	23%
2	U.S. National Institutes of Health (NIH)	P	$20,940,411	23%
3	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$17,463,318	19%
4	Unitaid	M	$16,900,000	19%
5	Company X	C	$6,500,000	7%
6	U.K. Medical Research Council (U.K. MRC)	P	$1,858,595	2%
7	QIAGEN	C	$971,845	1%
8	Brazil Ministry of Health	P	$971,691	1%
9	Wellcome Trust	F	$888,476	1%
10	Cadila Pharmaceuticals	C	$505,977	<1%
11	São Paulo Research Foundation	P	$500,000	<1%
12	L'Initiative	P	$467,365	<1%
13	Grand Challenges Canada	P	$403,106	<1%
14	ANRS | Emerging Infectious Diseases	P	$355,063	<1%
15	Australian National Health and Medical Research Council (NHMRC)	P	$247,647	<1%
16	Bouisson Bertrand Institute	F	$175,235	<1%
17	U.K. Engineering and Physical Sciences Research Council (EPSRC)	P	$148,654	<1%
18	South African Medical Research Council	P	$124,071	<1%
19	Ministry of Health of the Republic of Belarus	P	$107,558	<1%
20	German Federal Ministry of Education and Research (BMBF)	P	$101,054	<1%
21	Instituto Butantan	P	$100,000	<1%
22	Indian Council of Medical Research (ICMR)	P	$80,280	<1%
23	National Research Council of Thailand	P	$64,419	<1%
24	Tata Trusts	F	$61,891	<1%
25	Innovate UK	P	$54,645	<1%
26	Taiwan Ministry of Health and Welfare	P	$54,336	<1%
	Other funders with expenditures < $50,000		$132,561	<1%
	Total		$91,258,186	

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector R&D Agency

Discussion

> "The lesson that was clearly learned from COVID-19 is that if you put enough money on the table and if you put enough brains around the table, you can achieve something in a short time. The impossible became possible."
>
> — Daniela Cirillo, WHO Collaborating Centre in Tuberculosis Laboratory Strengthening

COVID-19 has changed our understanding of what is possible

The scale of financing committed toward advancing research and development of new health technologies to prevent, diagnose, and treat COVID-19, and the rapid pace of COVID-19 innovation, has altered our shared understanding of what is achievable—both in terms of the extent of financing that can be raised to respond to a public health threat, and with regard to the pace at which new health technologies can be developed when financing is not a barrier to their progress.

Seen with fresh eyes, interviewees noted that previously entrenched slow timelines for TB R&D may be overcome if some of the momentum, energy, and—most importantly—political will and financing generated in response to COVID-19 can be harnessed for TB.

"The lesson that was clearly learned from COVID-19 is that if you put enough money on the table and if you put enough brains around the table, you can achieve something in a short time. The impossible became possible," offered Daniela Cirillo from the WHO Collaborating Centre in Tuberculosis Laboratory Strengthening. The Stop TB Partnership Child & Adolescent TB Working Group's Farhana Amanullah reiterated the importance of this achievement, stating that "COVID-19 was a huge eye-opener because, I mean, vaccine development, which people thought, 'Oh, 10 years minimum', but countries invested in it, and it happened."

Stop TB Partnership alternate board member Rhea Lobo told TAG: "One thing that gives me hope is the fact that for COVID-19, in one year there has been so much scientific progress that has been made. I feel like we need to build on that, and we need to be inspired by it and use learnings from it." "Seeing some of that innovation from COVID-19 brought into the TB space would be very, very exciting, and I think very doable," added Jennifer Furin from the Sentinel Project on Pediatric Drug-Resistant Tuberculosis. "Who would have thought in a year, you could have a vaccine for a disease we'd never even heard of?" asked Furin, adding, "if we're not inspired by how quickly research happened in the COVID-19 space, then we all should hang up our hats and call it a day."

While the scale of financing and pace of scientific progress for COVID-19 has altered our understanding of the possible, it also—by comparison—lays bare the persistent neglect of TB. "TB research funding is in one word, pathetic. In another word, ridiculous. And now it's getting even worse because we see how much money is being poured into COVID-19 R&D," said TBpeople's Timur Abdullaev. "People will always say, 'Well, there's limited resources for public health', but there aren't, and COVID-19 showed that. You can make the pie much, much bigger in terms of the money that we are willing to invest in health and disease," said Furin. "We were willing to make the pie very, very big for COVID-19, and so the proportion of that pie that goes to TB dropped off dramatically. I think we should be very, very concerned about that," she added.

TB research funding targets are too low

TB activists and researchers have long advocated for an increase in TB research funding to reach a minimum of $2 billion per year. In 2018, countries committed to meet this target at the UN High-Level Meeting on TB, but still the target remains more than half unmet. Yet, in the first 11 months of

the COVID-19 pandemic, governments invested $104 million toward research and development of COVID-19 vaccines and therapeutics.[16] This is 52 times more than the unmet $2 billion investment target for TB.

"The $2 billion ask at the UN High-Level Meeting, everybody knew was really not nearly enough, and yet the sense was, how could you ask for $10 or $20 billion when the current funding is a billion?" explained David Lewinsohn from the Stop TB Partnership Working Group on New TB Vaccines. "The $2 billion target is kind of a pathetic amount of money, in the big scheme of things. I think that was really highlighted to me from our response to COVID-19, which was phenomenal," added Lewinsohn.

"It's disappointing to see the low levels of funding for TB continue, particularly in the context of COVID-19, both where we know that there's been a tremendous impact on TB services from COVID-19, but also where we now have a direct juxtaposition that shows the kind of funding that can be mobilized for an airborne infectious disease that affects people around the world," stressed Furin.

Sara Suliman from the University of California San Francisco Division of Experimental Medicine echoed this frustration, stating: "TB funding on its own is not nearly close to where it needs to be, considering that it's the second top pathogen."

"TB research funding is in one word, pathetic. In another word, ridiculous. And now it's getting even worse because we see how much money is being poured into COVID-19 R&D."

— **Timur Abdullaev, TBpeople**

"TB funding on its own is not nearly close to where it needs to be, considering that it's the second top pathogen."

— **Sara Suliman, University of California, San Francisco Division of Experimental Medicine**

"If you have a disease that affects rich people, there's no end of funding that will pour into it and no stone that will be left unturned and no innovation that will be left behind, whereas if you have a disease that is largely seen as a disease of poor people, you can forget it, you'll have to make do with a 100-year-old vaccine."

— **Jennifer Furin, The Sentinel Project on Pediatric Drug-Resistant Tuberculosis**

But if we are aiming too low, why can these targets not even be met?

Given the modesty of the TB funding targets, the ongoing failure of global funders to meet even these low targets reflects the deep inequity in the global response to health challenges faced by poor communities versus wealthy ones. The result of this inequity manifests in the tools available to treat diseases—where health systems and health care providers have an array of effective options for the management of some diseases but must make do with substandard or non-existent tools for others.

"If you have a disease that affects rich people, there's no end of funding that will pour into it and no stone that will be left unturned and no innovation that will be left behind, whereas if you have a disease that is largely seen as a disease of poor people, you can forget it, you'll have to make do with a 100-year-old vaccine," lamented Furin.

"We are asking for $2 billion a year for all our TB R&D, which is an extremely modest ask," said Lobo, adding that "if we're unable to even achieve a decent percentage of that, it's just not acceptable and I feel like the reason the world is not investing in TB R&D is because it's affecting the developing world."

The Africa Health Research Institute's Willem Hanekom reflected, "I don't want to say that some of the COVID-19

money should be coming our way, but in terms of TB vaccines, I think there is gross inequity: the result of TB being a disease of the socioeconomically dispossessed." "The kinds of resources and efforts that have been thrown into COVID-19 should also be thrown into TB," asserted Hanekom.

"In terms of vaccines, I think there is gross inequity: the result of TB being a disease of the socioeconomically dispossessed. The kinds of resources and efforts that have been thrown into COVID-19 should also be thrown into TB."

— Willem Hanekom, Africa Health Research Institute

How can we mobilize more funding for TB research?

Translating funding commitments into actual disbursements and generating even larger commitments to advance research are essential to put the world on track to meet its target to end TB by 2030. Yet, one critical impediment to the realization of the $2 billion funding target is the lack of accountability mechanisms to ensure governments uphold their commitments. "There was never an accountability mechanism built in," explained Furin. Cirillo added, "around the table they all commit and then, unfortunately, not all countries keep their word or move from words to action."

Several interviewees highlighted the need for community engagement and advocacy to hold countries accountable to meet their commitments. "The benefit to the world for increased funding for TB is enormous. And so, the question is, why not? Why haven't we done this? I have come to value how important advocacy is as a part of that," Lewinsohn reflected. He added, "In HIV, having this cohort of really highly educated, highly engaged advocates really made all the difference. And it's the thing that TB really lacks. Really seeing TB garner the kind of resources that it deserves requires a lot more advocacy and political will."

"The benefit to the world for increased funding for TB is enormous. And so, the question is, why not? Why haven't we done this? I have come to value how important advocacy is as a part of that."

— David Lewinsohn, Stop TB Partnership Working Group on New TB Vaccines

While scaled-up advocacy is critically needed to turn the world's attention to TB, advocates face daunting systemic barriers, including a global biomedical system designed to prioritize profit-making over public benefit and a dearth of financial resources to support their own work.

"Resources are needed to empower communities. People in academia, people in other sectors are well equipped in terms of resources, to be able to actively participate, even when there is no funding for them to be engaged. But for communities, most of them are challenged funding wise", explained Austin Arinze Obiefuna from the Afro Global Alliance. Abdullaev reiterated the funding challenges faced by communities, adding, "if we want to have meaningful community engagement, there has to be support going into it. That's really what's missing in TB." "It's the duty of the government and of other stakeholders to make sure that communities can participate," stated Abdullaev.

While supporting and strengthening community engagement and mobilization is essential to building societal and political resolve to combat TB, momentum and awareness around COVID-19 provide a strong case for expanding TB R&D financing. "People will be able to turn the momentum of COVID-19 and say, 'Hey, other pandemics need to be reacted to and treated this way with this level of urgency'," contended

Francesca Conradie from the Clinical HIV Research Unit at the University of Witwatersrand.

New vaccines against TB are urgently needed

Despite TB's massive public health and societal toll, only one vaccine is currently available against TB. This vaccine, BCG, passed its 100-year birthday this year. New TB vaccines are critical to ending the TB epidemic. New vaccines are needed to prevent TB infections, protect against TB disease and death, and prevent disease recurrence. While a number of TB vaccine candidates are in phase II and III trials, the development and testing of these candidates has been slow and plagued by funding shortages.

In stark comparison to the single 100-year-old vaccine available against TB, a centuries-old pathogen and leading infectious disease killer, over 20 new vaccines have been developed and authorized against COVID-19 in the past year, while many more are in late stages of development.[17] The breakneck speed at which COVID-19 vaccines have been developed has principally been enabled by the vast sums of public resources invested in their development.

"Look at COVID-19: we just easily had COVID-19 vaccines in a fairly short time, because of very strong political commitment for it," noted Obiefuna. "I understand the complexity of a TB vaccine is not the same as COVID-19, but it's been remarkable how many innovations have occurred around the COVID-19 space in a really short period of time," reflected Conradie, adding, "What's enabled that to occur has essentially been money. I think that the same enormous funding should be applied with equal vigor to TB vaccines."

"We have dozens of vaccines for COVID, and what do we have for TB? You can't react to that without using some hard language. The problem is, again, money," said Abdullaev. "I think there's definitely opportunity for more TB vaccine candidates to be in the early clinical trials space for evaluation. There are preciously few trials and candidates in the clinical space," reflected Hanekom.

In contrast to COVID-19, financing shortfalls for TB vaccine R&D have impeded the identification of new vaccine candidates, delayed clinical trials, and contributed to lingering manufacturing challenges. "Every step of the way, there are examples of where additional resources would help us advance this field. What's holding us back is money and resources," explained Hanekom.

Recognizing the barrier to vaccine development posed by funding shortages, a coalition of global TB stakeholders including TB survivors, advocates, and scientists called on governments to increase annual investments into TB vaccine research to $1 billion annually during the October 2021 G20 Joint Finance & Health Ministers Meeting.[18]

"I understand the complexity of a TB vaccine is not the same as COVID-19, but it's been remarkable how many innovations have occurred around the COVID-19 space in a really short period of time. What's enabled that to occur has essentially been money."

—Francesca Conradie, University of The Witwatersrand Clinical HIV Research Unit

"With the current level of funding, do I expect a vaccine coming up anytime soon? At least something at the effectiveness that COVID-19 vaccines are showing? No. And it would be stupid to expect anything otherwise, because you can't get a Ferrari when you only have the money that you can buy a bike."

— Timur Abdullaev, TBpeople.

Conclusion

Funding for TB research remained stable in 2020, avoiding the feared decline due to diversion of funds toward COVID-19. Yet, despite staying stable, funding levels for TB research remained below half of the $2 billion annual financing target committed to by governments at the 2018 UN High-Level Meeting on TB.

The chronic underfunding of TB research and slow pace of TB health technology development is now starkly contrasted by countries' unprecedented investments to advance COVID-19 R&D, which enabled the rapid development of COVID-19 health technologies—including an array of new vaccines, diagnostics, and, more recently, therapeutics.

The COVID-19 response has changed our comprehension of what is both conceivable and doable in the public health research space. It has provided a blueprint for how critical research can be rapidly advanced while also leaving clear lessons and warnings about the need for the inclusion of access conditionalities on public investments to maximize the public health impact of new innovations and ensure poor communities and countries are not excluded from their benefits, as is currently occurring for COVID-19 vaccines.

COVID-19 has given the public and political leaders an unprecedented crash course on public health, infectious disease, health technology financing, and biomedical R&D and manufacturing. This new knowledge and awareness should be harnessed to catalyze efforts to end TB. The world now knows what can be gained from expanded investment in public health research, making the ongoing neglect of TB research unconscionable and indefensible. Governments, industry, and other funders must be held accountable for their commitments to expand research investments to end TB.

Endnotes

1. World Health Organization. Global Tuberculosis Report 2021. Geneva: World Health Organization; 2021. https://www.who.int/publications/i/item/9789240037021.

2. kENUP Foundation (Press Release). Governments spent at least €93bn on COVID-19 vaccines and therapeutics during the last 11 months. 2021 January 11. https://www.businesswire.com/news/home/20210110005098/en/Governments-Spent-at-Least-%E2%82%AC93bn-on-COVID-19-Vaccines-and-Therapeutics-During-the-Last-11-Months. Accessed 2021 November 2. Euros converted to U.S. dollars using July 1, 2020, average exchange rate of £1 = $1.12.

3. World Health Organization. Global Tuberculosis Report 2020. Geneva: World Health Organization; 2020. https://www.who.int/publications/i/item/9789240013131.

4. TAG converts local currencies into U.S. dollars using the interbank exchange rates published by the OANDA Corporation from July 1st of each year. On July 1, 2020: 1 ZAR = 0.05767 USD. On July 1, 2017: 1 ZAR = 0.07656 USD.

5. The European & Developing Countries Clinical Trial Partnership and the Amsterdam Institute for Global Health & Development. Global roadmap for research and development of tuberculosis vaccines. Amsterdam: EDCTP and aighd; 2021 April 20. http://www.edctp.org/publication/global-roadmap-for-research-and-development-of-tuberculosis-vaccines/.

6. Gates Medical Research Institute (Press Release). First-of-its-kind global collaboration launched to develop transformative treatment regimens for tuberculosis. 2020 February 27. https://www.gatesmri.org/news/first-of-its-kind-global-collaboration-launched-to-develop-transformative-treatment-regimens-for-tuberculosis. Accessed 2021 November 2.

7. Frick M. The 2021 tuberculosis vaccine pipeline. New York: Treatment Action Group; 2021. https://www.treatmentactiongroup.org/resources/pipeline-report/2021-pipeline-report/.

8. Unitaid. Audited financial statements for the year ended 31 December 2020 (cited 2021 October 20). https://unitaid.org/assets/Unitaid-Audited-Financial-Report-for-the-year-ended-31-December-2020.pdf.

9. World Health Organization. Global strategy for tuberculosis research and innovation. Geneva: World Health Organization; 2020. https://www.who.int/publications/i/item/9789240010024.

10. Lovinger E. From fair share to fair shot. New York: Treatment Action Group; 2020 March. https://www.treatmentactiongroup.org/wp-content/uploads/2020/04/tb_rd_funding_opps_4_10_20.pdf.

11. Innovative Medicines Initiative. AMR Accelerator [Internet]. https://amr-accelerator.eu/. Accessed 2021 November 3.

12. World Health Organization. Global Tuberculosis Report 2021.

13. Treatment Action Group and Child & Adolescent TB Working Group. Research priorities for pediatric tuberculosis. New York: Treatment Action Group; 2018. https://www.treatmentactiongroup.org/publication/research-priorities-for-pediatric-tuberculosis/.

14. Wobudeya E. Shorter treatment for minimal tuberculosis in children: main findings from the SHINE trial [LB-2056-24]: OA-39 The Union/CDC late-breaker session on TB. Presented at: 51st Union World Conference on Lung Health; 2020 October 24; virtual.

15. Dorman SE, Nahid P, Kurbatova EV, et al. Four-month rifapentine regimens with or without moxifloxacin for tuberculosis. N Engl J Med. 2021;384(18):1705–18. doi: 10.1056/NEJMoa2033400.

16. kENUP Foundation. Governments Spent €93bn on COVID-19 Vaccines and Therapeutics.

17. Zimmer C, Corum J, Wee SL. Coronavirus vaccine tracker. New York Times [Internet] (cited 2021 October 25). https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html.

18. TB Vax ARM (Open Letter). Fulfil promises to invest in new TB vaccines to save millions of lives. 2021 October 29 (cited 2021 November 4). https://newtbvaccines.org/wp-content/uploads/TB-Vax-ARM-Open-Letter-to-G20.pdf.

Appendix 1: Methodology

TAG tracks global funding for TB R&D by surveying public, private, philanthropic, and multilateral organizations with known or potential investments in TB research. The survey asks recipients to report expenditures on TB research in a given fiscal year and to categorize spending by six research areas: basic science, diagnostics, drugs, vaccines, operational research, and infrastructure/unspecified projects. Institutions are encouraged to report spending by individual projects but may aggregate expenditures by research area. Within these categories, the survey asks recipients to indicate any funding for pediatric TB research (see box). Respondents report expenditures according to how their fiscal year is defined, so the funding reported here does not align with calendar year 2020 perfectly.

TAG surveyed 198 organizations for this year's report and received 148 surveys in return. This return rate of 75% is higher than the 69% rate last year. From these 148 surveys, we identified 148 institutions funding TB research in 2020. Twenty-three organizations that returned surveys reported no money on TB R&D in 2020, and five groups declined to participate.

Organizations report funding in local currencies, which TAG converts into U.S. dollars using the July 1, 2020, interbank exchange rates published by the OANDA Corporation. All dollar figures in the report are published as U.S. dollars unless otherwise noted and are rounded to the nearest dollar. Dollar figures represent disbursements (i.e., the actual transfer of funds) made in 2020, rather than commitments, pledges, or allocations for future years. The survey is designed to capture direct expenditures on TB research and so does not necessarily reflect indirect funding through salaries, overhead, or infrastructure that is not TB specific.

TAG assiduously reviews each returned survey for completeness, taking care to avoid double-counting awards reported by more than one funder. Many organizations fund some research projects while receiving outside money for others. To minimize the risk of double counting, the survey asks recipients to note whether spending represents one of three categories: funding given to others, funding received from others, or self-funded research. Any awards listed on more than one survey enter our database as reported by the original source funder. For projects supported by more than one organization, we ask funders to report only their share of the project.

In addition to the survey, TAG conducted 12 qualitative interviews with scientists, donors, activists, policymakers, and members of TB-affected communities (see box). Each interviewee received an embargoed copy of preliminary survey findings in September 2021 with a list of open-ended questions and was asked to reflect on the state of TB research and funding for it. TAG interviewed 11 individuals over the phone; one person submitted answers in writing. TAG recorded and transcribed each phone interview and pulled quotations from the transcripts, grouped these into common themes, and selected the excerpts that appear within and alongside the text of this report. In some places, we edited quotations for length or clarity.

Limitations to the Data

The comprehensiveness of the data in this report depends on the proportion of institutions funding TB research that participate in the survey. This proportion cannot be calculated since the true number of TB research funders worldwide is unknown. TAG makes a considerable effort to ensure a wide survey reach and yield. The survey is available in six languages (English, French, Spanish, Russian, Chinese, and Portuguese). TAG routinely updates the survey frame by adding new organizations, most of which do not have known investments in TB R&D but either fund health research generally or have a record of investing in related diseases. Finally, TAG makes a particular effort to encourage the continued participation of the 30 largest funders from the previous year's report. The high degree of concentration of TB research funding means that the

top 30 donors typically comprise over 90% of total spending, and the composition of this group has remained remarkably stable over time. This year, 28 of the top 30 funders in fiscal year 2019 participated in the survey (the exceptions were the World Bank and the U.K. National Institute for Health Research).

A number of funders with known investments did not return surveys this year or submitted information after the deadline. These groups are noted in the sections of the report that describe funding by research area. TAG received no information from entities in Russia, China, and the Philippines.

TAG encourages any funder not listed here to participate in future report rounds. Funders may reach out to TAG at tbrdtracking@treatmentactiongroup.org with information or corrections to share. Any corrections submitted to TAG will enter print in next year's publication.

This report would not be possible without considerable effort by the dozens of funding officers and administrative staff who fill out the survey each year. TAG is grateful to the 148 organizations around the world that participated in this year's survey.

TB stakeholders interviewed by TAG

1. Timur Abdullaev, Board Member of TBpeople
2. Farhana Amanullah, Chair of the Stop TB Partnership's Child and Adolescent TB Working Group
3. Daniela Cirillo, Director of the WHO Collaborating Centre in Tuberculosis Laboratory Strengthening and Co-Chair of Stop TB Partnership's New Diagnostic Working Group
4. Francesca Conradie, Deputy Director at the University of The Witwatersrand Clinical HIV Research Unit
5. Jennifer Furin, Director of Capacity Building at The Sentinel Project on Pediatric Drug-Resistant Tuberculosis

6 Willem Hanekom, Executive Director of the Africa Health Research Institute

7. David Lewinsohn, Chair of Stop TB Partnership Working Group on New TB Vaccines
8. Rhea Lobo, Affected Communities Board Member (Alt), Stop TB Partnership
9. Michael Makanga, Executive Director of the European and Developing Countries Clinical Trials Partnership
10. Austin Arinze Obiefuna, Executive Director of the Afro Global Alliance
11. Chandrasekaran Padmapriyadarsini, Director of the ICMR-National Institute for Research in Tuberculosis
12. Sara Suliman, Assistant Professor In-Residence at the University of California, San Francisco Division of Experimental Medicine

Notes

Appendix 2: TB R&D Funders by Rank

TB R&D Funders by Rank, 2020

2020 RANK	FUNDER	FUNDER TYPE	TOTAL
1	U.S. National Institutes of Health (NIH)	P	$339,250,929
2	Bill & Melinda Gates Foundation	F	$126,008,832
3	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$51,132,639
4	Unitaid	M	$41,300,000
5	U.S. Agency for International Development (USAID)	P	$37,386,798
6	Company X	C	$31,313,865
7	U.K. Foreign, Commonwealth and Development Office (FCDO; formerly DFID)	P	$22,574,821
8	Otsuka Pharmaceutical	C	$19,176,250
9	U.S. Centers for Disease Control and Prevention (CDC)	P	$19,124,770
10	European Commission	P	$17,437,697
11	German Federal Ministry of Education and Research (BMBF)	P	$15,351,882
12	Indian Council of Medical Research (ICMR)	P	$14,469,739
13	U.K. Medical Research Council (U.K. MRC)	P	$13,872,900
14	Global Affairs Canada	P	$12,460,150
15	Oxford Immunotec	C	$10,749,000
16	Korean Ministry of Health and Welfare	P	$7,653,817
17	Australian Department of Foreign Affairs and Trade (DFAT)	P	$7,045,290
18	Indian Ministry of Health and Family Welfare (MOHFW)	P	$6,285,976
19	Canadian Institutes of Health Research (CIHR)	P	$6,048,850
20	Australian National Health and Medical Research Council (NHMRC)	P	$5,760,144
21	U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	P	$4,855,651
22	Korean Ministry of Science and ICT	P	$4,566,592
23	Wellcome Trust	F	$4,499,757
24	Swiss National Science Foundation (SNSF)	P	$4,265,844
25	QIAGEN	C	$3,937,176
26	Cadila Pharmaceuticals	C	$3,577,315
27	Company H	C	$3,420,000
28	Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)	M	$3,187,940
29	Brazil Ministry of Health	P	$3,126,864
30	Dutch Ministry of Foreign Affairs (formerly DGIS)	P	$3,123,658
31	U.K. Engineering and Physical Sciences Research Council (EPSRC)	P	$3,018,227
32	Global Health Innovative Technology Fund (GHIT)	M	$2,956,535
33	Swedish Research Council	P	$2,664,660
34	French National Institute of Health & Medical Research (INSERM)	P	$2,447,910

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector Agency;

BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
$120,880,923	$40,729,502	$77,812,842	$52,624,804	$37,206,588	$9,996,270
$89,807	$8,341,439	$71,761,732	$37,513,134	$7,579,346	$723,374
$14,051	$14,125,305	$16,623,439	$12,895,952	$6,369,474	$1,104,418
$0	$5,300,000	$22,500,000	$0	$13,500,000	$0
$0	$0	$7,879,823	$0	$5,817,973	$23,689,002
$0	$0	$31,313,865	$0	$0	$0
$0	$8,061,269	$12,572,622	$0	$1,940,929	$0
$0	$0	$19,176,250	$0	$0	$0
$0	$4,017,924	$8,633,230	$0	$5,178,840	$1,294,776
$5,683,002	$3,330,312	$6,554,405	$1,578,158	$0	$291,821
$2,551,897	$1,508,888	$8,254,594	$484,337	$182,844	$2,369,322
$402,805	$210,947	$814,664	$843,324	$588,628	$11,609,370
$3,575,518	$1,342,238	$5,880,105	$696,939	$2,378,100	$0
$0	$0	$0	$0	$12,460,150	$0
$0	$10,749,000	$0	$0	$0	$0
$1,928,609	$2,428,500	$624,820	$1,370,000	$789,388	$512,500
$0	$2,578,538	$2,578,538	$0	$1,888,215	$0
$18,474	$20,847	$0	$12,208	$6,135,545	$98,902
$1,573,141	$43,977	$1,502,919	$924,923	$2,003,890	$0
$2,783,468	$873,480	$433,260	$0	$1,669,936	$0
$2,628,081	$367,328	$595,132	$654,044	$611,066	$0
$4,031,000	$350,000	$185,592	$0	$0	$0
$1,287,078	$1,609,256	$1,031,206	$554,549	$17,668	$0
$2,495,292	$117,139	$1,553,103	$0	$100,310	$0
$0	$3,937,176	$0	$0	$0	$0
$0	$0	$3,577,315	$0	$0	$0
$0	$0	$3,370,000	$0	$0	$50,000
$0	$0	$0	$0	$3,187,940	$0
$0	$2,132,071	$8,498	$0	$986,295	$0
$0	$558,192	$2,565,466	$0	$0	$0
$92,446	$1,526,917	$184,892	$0	$1,021,575	$192,398
$0	$2,103,087	$853,449	$0	$0	$0
$764,266	$160,635	$985,192	$290,511	$464,057	$0
$0	$0	$0	$0	$0	$2,447,910

Appendix 2

TB R&D Funders by Rank, 2020 (continued)

2020 RANK	FUNDER	FUNDER TYPE	TOTAL
35	Merck (known as MSD outside of the U.S. and Canada)	C	$2,348,989
36	Japan Agency for Medical Research and Development (AMED)	P	$2,298,802
37	French National Research Agency (ANR)	P	$2,267,128
38	Fujifilm Corporation	C	$2,200,000
39	LegoChem Biosciences	C	$2,180,070
40	U.S. Department of Defense Congressionally-Directed Medical Research Program (CDMRP)	P	$1,945,959
41	Company V	C	$1,851,114
42	German Research Foundation (DFG)	P	$1,785,284
43	U.S. National Science Foundation (NSF)	P	$1,635,221
44	Korea International Cooperation Agency (KOICA)	P	$1,600,000
45	Company Y Total	C	$1,591,794
46	U.S. Department of Veterans Affairs	P	$1,548,271
47	Indian Ministry of Science and Technology	P	$1,493,570
48	Archivel Farma	C	$1,454,607
49	Public Health England	P	$1,343,545
50	Molbio	C	$1,321,000
51	L'Initiative	P	$1,273,806
52	International Development Research Center (IDRC)	P	$1,273,711
53	Swiss Agency for Development and Cooperation	P	$1,242,375
54	Irish Aid	P	$1,143,500
55	ANRS | Emerging Infectious Diseases	P	$1,116,216
56	RIGHT Fund	M	$1,085,493
57	Norwegian Ministry of Education and Research	P	$1,044,795
58	Company L	C	$1,040,000
59	South African Medical Research Council	P	$1,022,689
60	New Zealand Health Research Council	P	$1,003,392
61	Macleods Pharmaceuticals	C	$1,000,000
62	Taiwan Ministry of Health and Welfare	P	$931,944
63	Swedish Heart-Lung Foundation	F	$904,197
64	TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization	M	$900,993
65	National Research Council of Thailand	P	$890,432
66	Korean Ministry of SMEs and Startups	P	$829,260
67	Colombian Ministry of Science, Technology and Innovation (MINCIENCIAS)	P	$741,226
68	Innovate UK	P	$696,826
69	Médecins Sans Frontières (MSF)	F	$676,691

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector Agency;

BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
$0	$0	$2,348,989	$0	$0	$0
$1,915,538	$286,752	$0	$96,512	$0	$0
$1,811,490	$0	$455,638	$0	$0	$0
$0	$2,200,000	$0	$0	$0	$0
$0	$0	$2,180,070	$0	$0	$0
$465,370	$0	$1,325,664	$154,925	$0	$0
$0	$0	$1,851,114	$0	$0	$0
$1,785,284	$0	$0	$0	$0	$0
$488,132	$50,000	$0	$256,000	$841,089	$0
$0	$0	$1,600,000	$0	$0	$0
$0	$1,591,794	$0	$0	$0	$0
$536,250	$0	$677,167	$334,854	$0	$0
$571,576	$346,064	$483,369	$0	$92,561	$0
$0	$0	$0	$1,454,607	$0	$0
$0	$0	$0	$1,343,545	$0	$0
$0	$1,321,000	$0	$0	$0	$0
$0	$0	$0	$0	$1,273,806	$0
$0	$308,923	$0	$964,788	$0	$0
$0	$1,242,375	$0	$0	$0	$0
$0	$0	$1,143,500	$0	$0	$0
$29,016	$474,269	$612,931	$0	$0	$0
$0	$1,085,493	$0	$0	$0	$0
$864,778	$0	$129,100	$50,917	$0	$0
$0	$0	$1,040,000	$0	$0	$0
$234,262	$0	$304,658	$57,670	$293,458	$132,641
$385,552	$80,329	$257,034	$53,552	$226,925	$0
$0	$0	$1,000,000	$0	$0	$0
$30,000	$0	$0	$0	$901,944	$0
$322,555	$35,697	$492,400	$0	$53,545	$0
$0	$0	$0	$0	$900,993	$0
$49,351	$41,964	$426,791	$0	$372,325	$0
$250,000	$579,260	$0	$0	$0	$0
$35,996	$0	$0	$0	$75,577	$629,653
$0	$573,218	$123,609	$0	$0	$0
$0	$47,440	$450,951	$0	$17,299	$161,000

Appendix 2

TB R&D Funders by Rank, 2020 (continued)

2020 RANK	FUNDER	FUNDER TYPE	TOTAL
70	U.K. Economic and Social Research Council (ESRC)	P	$627,133
71	Korean Ministry of Education	P	$616,105
72	Academy of Finland	P	$596,857
73	Fondation Botnar	F	$583,866
74	Company G	C	$525,420
75	São Paulo Research Foundation	P	$500,000
76	U.S. Food and Drug Administration (FDA)	P	$499,999
77	Irish Health Research Board	P	$497,009
78	Spain Ministry of Science, Innovation and Universities—State Research Agency	P	$484,679
79	Marsden Fund	P	$449,720
80	Doris Duke Charitable Foundation	F	$429,000
81	Norwegian Ministry of Health and Care Services	P	$421,899
82	Grand Challenges Canada	P	$403,106
83	Spain Ministry of Health	P	$392,987
84	Damien Foundation	F	$358,056
85	Sequella	C	$355,000
86	Netherlands Organization for Health Research and Development (ZonMw)	P	$336,845
87	South African Department of Science and Innovation	P	$328,520
88	Danish International Development Agency	P	$301,135
89	GlaxoSmithKline Biologicals	C	$291,933
90	India Health Fund	F	$289,763
91	Korean Ministry of Land, Infrastructure and Transport	P	$285,000
92	Industry donors to Foundation for Neglected Disease Research	C	$272,290
93	BATM	C	$260,607
94	Netherlands Ministry of Health, Welfare and Sport	P	$236,834
95	Japan BCG Laboratory	C	$199,056
96	Peru National Fund for Scientific, Technological Development and Technological Innovation (Fondecyt)	P	$188,850
97	Bouisson Bertrand Institute	F	$175,235
98	Individual donors to TB Alliance	F	$148,003
99	Korean Rural Development Administration	P	$120,000
100	Institute for Health Science Research Germans Trias i Pujol (IGTP)	P	$114,528
101	Company J	C	$111,755
102	Center for Biomedical Research Network/Respiratory Diseases (CIBERES)	P	$110,036
103	Paraguay National Council for Science and Technology (CONACYT)	P	$108,320
104	Ministry of Health of the Republic of Belarus	P	$107,558

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector Agency

BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
$0	$0	$0	$0	$627,133	$0
$508,675	$50,000	$12,430	$45,000	$0	$0
$561,601	$0	$35,257	$0	$0	$0
$0	$0	$0	$583,866	$0	$0
$0	$0	$0	$525,420	$0	$0
$0	$0	$0	$500,000	$0	$0
$0	$0	$499,999	$0	$0	$0
$0	$0	$303,509	$193,500	$0	$0
$0	$0	$0	$484,679	$0	$0
$355,543	$0	$63,122	$31,054	$0	$0
$220,000	$0	$55,000	$0	$154,000	$0
$146,038	$0	$275,861	$0	$0	$0
$0	$403,106	$0	$0	$0	$0
$0	$0	$0	$0	$392,987	$0
$0	$273,844	$0	$0	$84,212	$0
$0	$0	$355,000	$0	$0	$0
$0	$0	$161,494	$0	$175,351	$0
$133,664	$194,856	$0	$0	$0	$0
$0	$0	$0	$0	$301,135	$0
$0	$0	$0	$291,933	$0	$0
$0	$199,373	$0	$0	$90,390	$0
$0	$285,000	$0	$0	$0	$0
$0	$0	$272,290	$0	$0	$0
$0	$260,607	$0	$0	$0	$0
$0	$0	$0	$236,834	$0	$0
$27,840	$0	$0	$171,216	$0	$0
$24,005	$87,294	$0	$0	$77,550	$0
$0	$175,235	$0	$0	$0	$0
$0	$0	$148,003	$0	$0	$0
$0	$0	$120,000	$0	$0	$0
$114,528	$0	$0	$0	$0	$0
$0	$111,755	$0	$0	$0	$0
$110,036	$0	$0	$0	$0	$0
$0	$108,320	$0	$0	$0	$0
$0	$12,000	$24,592	$0	$70,966	$0

Appendix 2

TB R&D Funders by Rank, 2020 (continued)

2020 RANK	FUNDER	FUNDER TYPE	TOTAL
105	Institut Pasteur	F	$101,560
106	Danish Council for Independent Research	P	$100,942
107	Instituto Butantan	P	$100,000
108	Public Health Agency of Canada	P	$99,681
109	Korea Foundation For International Healthcare (KOFIH)	P	$93,375
110	Japan Science and Technology Agency	P	$92,800
111	Norwegian Agency for Development Cooperation (NORAD)	P	$91,229
112	LG Chem	C	$83,000
113	SD Biosensor	C	$83,000
114	Stop TB Partnership (UNOPS)	M	$73,667
115	Spain Ministry of Economic Affairs and Digital Transformation	P	$73,365
116	Fundació Bancaria "La Caixa"	F	$71,187
117	U.K. National Centre for the 3Rs (NC3Rs)	P	$70,803
118	Chulalongkorn University	P	$69,595
119	Spanish Society of Pulmonology and Thoracic Surgery	F	$64,562
120	Tata Trusts	F	$61,891
121	Taiwan Ministry of Science and Technology	P	$60,000
122	Korean Institute of Tuberculosis	P	$52,290
123	Eiken Chemical Co.	C	$46,400
124	India Ministry of Science and Technology	P	$41,222
125	Indo-French Centre for the Promotion of Advanced Research	P	$34,917
126	Carlos III Health Institute	P	$32,061
127	U.K. Natural Environment Research Council (NERC)	P	$30,815
128	Peru National Institute of Health	P	$25,705
129	J. Craig Venter Institute	F	$25,000
130	Catalan Government/Agència de Gestió d'Ajuts Universitaris i de Recerca	P	$24,998
131	Korea Atomic Energy Research Institute	P	$24,900
132	Argentina Ministry of Health	P	$21,315
	Organizations with investments < $20,000		$112,403
	TOTAL		$915,325,165

C = Corporation/Private Sector; F = Foundation/Philanthropy; M = Multilateral; P = Public-Sector Agency

BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
$96,959	$0	$4,602	$0	$0	$0
$0	$0	$0	$100,942	$0	$0
$0	$0	$0	$100,000	$0	$0
$0	$0	$0	$0	$99,681	$0
$0	$93,375	$0	$0	$0	$0
$0	$0	$0	$92,800	$0	$0
$0	$40,279	$0	$50,950	$0	$0
$0	$83,000	$0	$0	$0	$0
$0	$83,000	$0	$0	$0	$0
$0	$0	$73,667	$0	$0	$0
$73,365	$0	$0	$0	$0	$0
$71,187	$0	$0	$0	$0	$0
$41,837	$0	$28,966	$0	$0	$0
$0	$0	$12,580	$0	$57,015	$0
$0	$0	$20,211	$0	$44,351	$0
$61,891	$0	$0	$0	$0	$0
$0	$0	$0	$60,000	$0	$0
$52,290	$0	$0	$0	$0	$0
$0	$46,400	$0	$0	$0	$0
$41,222	$0	$0	$0	$0	$0
$34,917	$0	$0	$0	$0	$0
$19,710	$0	$0	$0	$12,351	$0
$0	$0	$0	$0	$30,815	$0
$25,705	$0	$0	$0	$0	$0
$0	$25,000	$0	$0	$0	$0
$24,998	$0	$0	$0	$0	$0
$0	$24,900	$0	$0	$0	$0
$0	$0	$0	$0	$21,315	$0
$11,759	$45,294	$0	$4,116	$51,234	$0
$163,332,777	$129,391,183	$329,196,518	$118,682,563	$119,418,766	$55,303,357

Treatment Action Group
90 Broad St, Suite 2503
New York, NY 10004 USA
Tel 1.212.253.7922
Fax 1.212.253.7923

tag@treatmentactiongroup.org
www.treatmentactiongroup.org

TAG
Treatment Action Group