Tuberculosis Research Funding Trends, 2005–2021

Stop TB Partnership

TAG
Treatment Action Group

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 Laia Ruiz Mingote 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
tag@treatmentactiongroup.org

© 2022 by Treatment Action Group

May be copied with attribution for noncommercial use.

Design and layout by Hollander Snow Studio, Inc.
Cover illustration Rose Lam

Tuberculosis Research Funding Trends, 2005–2021

DECEMBER 2022

TREATMENT ACTION GROUP

WRITTEN BY CATHERINE TOMLINSON

EDITED BY MIKE FRICK

Table of Contents

Executive Summary

> "At the 2018 UN High-Level Meeting on TB, world leaders committed to provide $2 billion in TB R&D funding annually by the end of 2022 which would ensure fully funded TB R&D work . . . Governments have failed to step up to the plate and are nowhere near meeting their promise, with R&D funding barely reaching $1 billion in 2021."
>
> —Lucica Ditiu, Stop TB Partnership

Global funding for tuberculosis (TB) research in 2021 totaled USD$1 billion. In the 16 years that Treatment Action Group (TAG) has tracked funding for TB research, this is the first time that annual funding has reached the billion-dollar threshold.

One billion dollars is a symbolic milestone, but also a real, material accomplishment. It means funders spent more money on TB research and development (R&D) than the year before, and much more than in 2005, the first year TAG produced estimates of global TB research spending. However, the distance ahead is greater than the distance travelled.

Commitments by world leaders to scale up financing for TB research to put the world on track to end the TB epidemic by 2030 remain far from met. Member states of the United Nations (UN) pledged in 2015 to end TB as an epidemic by 2030 as part of the Sustainable Development Goals (SDGs).[1] Three years later, governments committed to implement and finance interventions essential to TB elimination at the 2018 UN General Assembly High-Level Meeting on TB. One of the key commitments made at this meeting was to scale up financing for TB research to $2 billion annually—recognizing that currently available tools to combat TB alone will not end the epidemic and that new vaccines, diagnostics, and treatments are essential to meeting this goal.

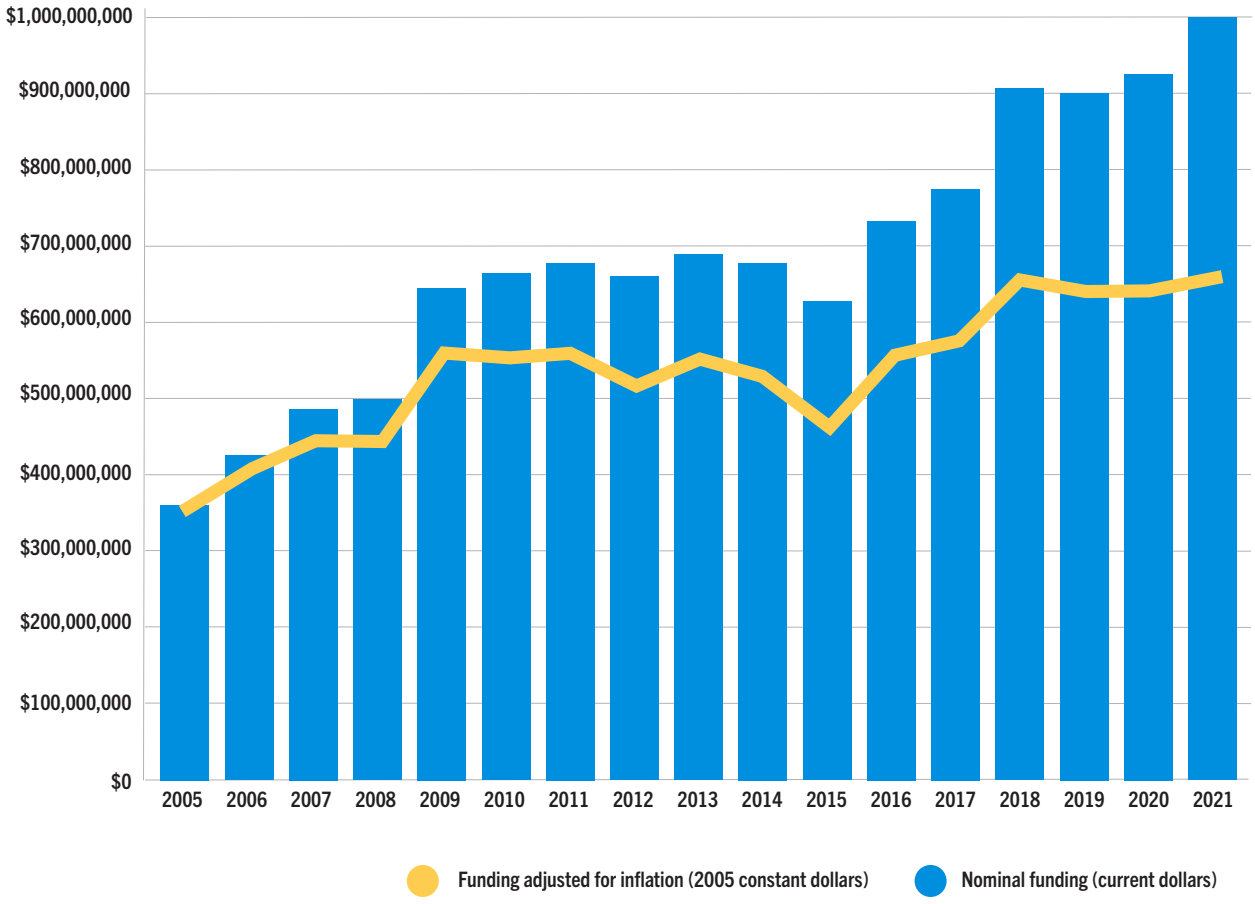
Governments pledged to achieve the $2 billion funding target by "ensuring that all countries contribute appropriately to research and development."[2] When political leaders reconvene in 2023 for the next UN High-Level Meeting on TB to take stock of what has been achieved since 2018 and set new targets for combatting TB, they must face the difficult truth that they have fallen far short of their financing commitments for TB research. Governments will also learn that even larger resource allocations are now needed to meet the SDG target to end TB by 2030, due to years of severe underfinancing, as well as the damage done to TB programs by the COVID-19 pandemic.

This year's report marks the second year of reporting on TB research spending since the start of the COVID-19 pandemic. The good news is that TAG's tracking of TB R&D investments in 2020 and 2021 has not shown a decline in spending due to the reallocation or reprioritization of resources to respond to COVID-19 and its broader impacts.

While COVID-19 may not have visibly reduced TB research funding levels to date, the pandemic devasted global gains in combatting TB. TB deaths rose in 2020 and 2021 for the first time since 2005, as COVID-19 and emergency responses to it hindered access to TB services and, critically, delayed access to diagnosis and life-saving treatment.[3] Pandemic disruptions also delayed critical TB research results and required scientists to stretch already scarce resources to implement COVID-19 safety measures so that research activities could continue throughout the pandemic.[4]

FIGURE 1

Total TB R&D Funding, 2005–2021

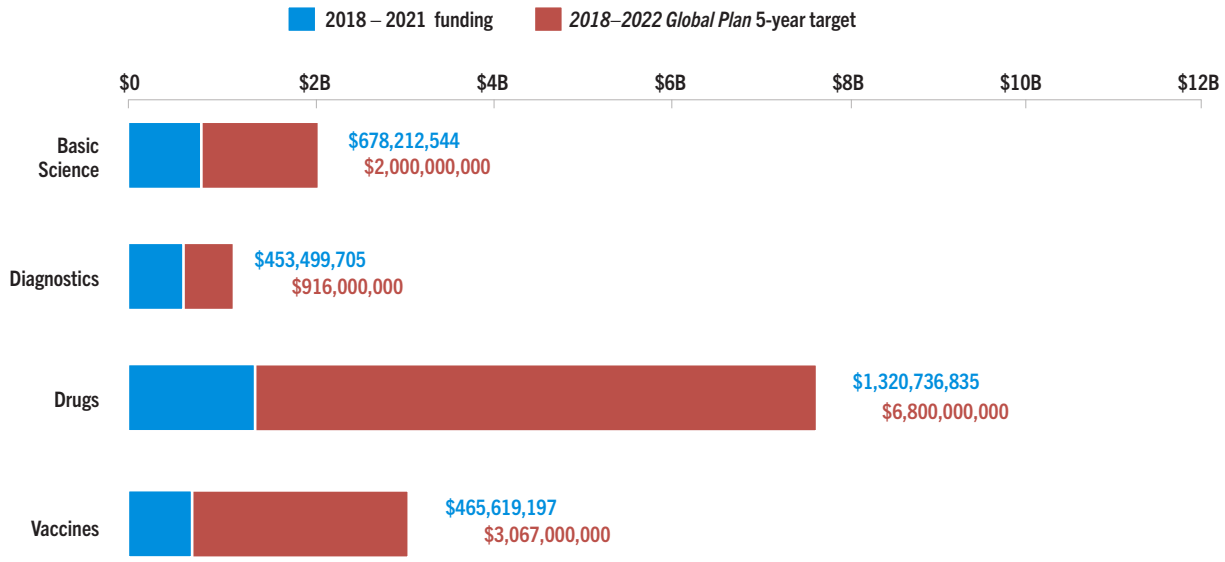


Year	Nominal funding (current dollars)
2005	$358,476,537
2006	$418,928,300
2007	$478,343,421
2008	$494,576,235
2009	$636,979,349
2010	$643,360,390
2011	$675,328,887
2012	$638,783,272
2013	$686,303,295

Year	Nominal funding (current dollars)
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
2021	$1,000,326,531

FIGURE 2

Progress toward *Global Plan* TB Research Funding Targets



While the growth seen in TB research funding in 2021 is a large step in the right direction, the $1 billion spent on TB research is only half of what governments committed to in 2018, and only one-fifth of the resources now required to put the world on track to end TB after years of underinvestment and COVID-19 disruptions. In 2022, the Stop TB Partnership published a detailed investment case outlining the resource needs to eliminate TB as a public health threat by 2030 in its *2023–2030 Global Plan to End TB*. The *2023–2030 Global Plan* calls on funders to mobilize $249.98 billion for the TB response between 2023 and 2030. This amount includes $40.18 billion for TB research—basic science, vaccines, drugs, and diagnostics research—or $5 billion annually.[5] In other words, the annual funding need has more than doubled compared with the UN High-Level Meeting target.

Stop TB Partnership's investment case highlights the steep cost of inaction, as well as the strong societal and economic returns delivered from investing in TB. The *2023–2030 Global Plan* estimates that maintaining the status quo in financing TB responses and research will result in an additional 43 million people falling ill with TB and 6.6 million people dying from TB by 2030, as well as $1 trillion in economic losses resulting from TB morbidity and mortality. Conversely, scaling up financing to reach the *Global Plan* funding targets will deliver an 80% decline in TB cases and a 90% drop in TB deaths by 2030, compared with 2015 levels.

In addition to saving millions of lives, eliminating TB will deliver substantial economic benefits. Every dollar invested in TB research and responses will deliver a $40 return through 2050. For investments by low- and middle-income countries, this return increases to $59.

Achieving the levels of financing called for by the *2023–2030 Global Plan* will not be easy: annual research funding must increase fivefold from $1 billion to $5 billion dollars. This will require that existing funders of TB research give more *and* that a greater diversity of funders invest in TB R&D. It will require countries to step up their TB research investments to meet the fair-share targets and come together to create new innovative financing mechanisms for TB research.

While the $5 billion annual funding target may appear impossible when compared with historical TB research funding levels, its attainability appears eminently realistic when measured against the staggering financial outlays of the COVID-19 response. Governments spent unprecedented

> "If there is an area [of TB] that is very weak, it is funding of research. We need to wake up and ensure that we are allocating resources to research and development. There is no upward cascade [in funding], which means that if we do things the same way and expect different results, then we are not going to achieve the goals of ending TB by 2030."
>
> —Stephen Anguva Shikoli, Kenya Network of TB Champions and Pamoja TB Group

sums on COVID-19 biomedical research during 2020 and 2021, which rapidly delivered life-saving vaccines, diagnostics, and treatments.[6,7] A diversity of philanthropic funders, including organizations not typically involved in the health space, committed large sums of money to COVID-19 in the first few months of the pandemic,[8] and multilateral development banks established new programs to assist countries in their COVID-19 response.[9]

Although this year's report encouragingly shows some new funders investing in TB research, the bulk of available funding depends on the continued investment of a few large organizations. The top two funders of TB research jointly comprised almost half (47%) of overall expenditure, while the top 20 made up 83% of all funds. The remaining 17% of funds came from 141 smaller funders

While COVID-19 rolled back progress made against TB, it also shook up the global health financing space and highlighted the importance of investing in public health, not only to protect lives, but also to promote economic and social stability. COVID-19 reversed global gains in combating extreme poverty.[10] The pandemic severely impeded education access and severely exacerbated food insecurity among already vulnerable populations.[11,12] At the same time, the pandemic generated greater public and political awareness of the importance of investing in public health and health research. This provides an unprecedented opportunity for the TB community to turn attention to the critical need to invest in TB research. Tuberculosis was the leading cause of death by an infectious disease before COVID-19 and is expected to reclaim this undesirable position as the COVID-19 pandemic subsides.

One thing is certain: without new vaccines against TB, the epidemic will not be stopped. Developing and delivering new TB vaccines in the next decade is within grasp—on the precondition that adequate financing is made available without delay for research, development, and rollout.

COVID-19 demonstrated that with enough money and political will, governments can greatly accelerate vaccine development and rollout. Multiple COVID-19 vaccines have been authorized for use, and over a hundred additional COVID-19 vaccine candidates have reached phase I or later trials.[13] By comparison, only one vaccine has ever been approved for TB: the hundred-year-old BCG vaccine, which only provides significant protection to infants and young children. Sixteen TB vaccine candidates are under development, but financing shortages have severely slowed their progress.[14] COVID-19-related investments also delivered important scientific advances on platform technologies, including vaccine and diagnostic technologies, that can be applied to a range of pathogens. Studying the applicability of these platforms for TB may deliver new tools for accelerating product development.

The upcoming 2023 UN High-Level Meeting is a critical opportunity to draw the attention of heads of state and government once again to the ongoing devastation of the TB epidemic. It also provides a rare forum to communicate the exciting potential for new vaccines and other biomedical tools at various stages in the research pipeline to move the needle in eliminating TB with scaled-up financing. Securing adequate financing for TB research is a mammoth challenge—even more so now that many countries are facing fiscal constraints, severe inflation, and currency volatility. But the cost of inaction is simply too high. Investing in TB research now will not only prevent the spread of TB and save lives but also avert the need for even greater spending by future generations.

"I don't think you can separate out the funding for TB research and development from general funding for TB. TB more broadly has been underfunded commensurate to the need. And that flows also to TB research and development. It's dangerously underfunded in the sense of, there's not enough diversity of funders that make large-scale commitments."

—Rohit Malpani, former Unitaid NGO delegation board member

Key findings from this year's report include:

1. Financing for TB research reached $1 billion for the first time ever in 2021. This marks the first observable increase in funding levels after a three-year plateau in which total spending sat at just over $900,000 from 2018 through 2020.

2. The increase in 2021 was mostly driven by greater spending on operational and epidemiological research and diagnostics research. Operational and epidemiological research investments increased by 32% between 2020 and 2021, while diagnostics research spending increased by 16%.

3. Of every dollar spent on TB research in 2021, $0.70 came from public funds, $0.14 came from philanthropic donors, $0.10 came from private sector entities, and $0.06 came from multilateral entities. In 2021, 161 unique entities invested in TB research. Their investments ranged from $354 million to $200.

4. Only two funders—the U.S. National Institutes of Health (U.S. NIH) and the Gates Foundation—invested more than $100 million in TB research in 2021. These two funders jointly contributed 47% of total TB research expenditures.

5. The largest funder of TB research, the U.S. NIH, invested $354 million in 2021, up from $339 million in 2020. The U.S. NIH contributed 51% of all public funds for TB R&D and 68% of funds allocated to basic science research.

6. Public funders spent more on TB research in 2021 than in any other year, jointly spending $698 million—up from $642 million in 2020. This growth was largely due to increased investment by the U.S. NIH and the European Commission, as well as first-time reporting on public contributions to the Antimicrobial Resistance (AMR) Accelerator | Innovative Medicines Initiative.

7. Only three countries met their fair-share targets for TB research financing in 2021 by spending at least 0.1% of their overall R&D expenditures on TB R&D: Ireland, the Philippines, and South Africa. The United States came closer to meeting its fair-share target than in any previous year, reaching 94% of the target, while the United Kingdom achieved 96% of the target.

8. Philanthropic spending on TB research in 2021 remained below the $170 million peak seen in 2013. Twenty-seven philanthropic entities spent a combined $141 million on TB research in 2021. The Gates Foundation contributed 81% of all philanthropic funding.

9. Private-sector spending on TB research remained below the $145 million peak seen in 2011, with a total investment of $102 million in 2021. Among 30 industry groups with reported TB research spending in 2021, only three invested over $10 million: Otsuka Pharmaceutical, Company X, and Oxford Immunotec. The bulk of industry investment went toward product development with drugs and diagnostics research making up 91% of total private sector spending.

"I think this is probably the most exciting time for tuberculosis research . . . Everything is being reimagined when it comes to TB. The big shifts are in TB vaccine research with two new [efficacy] signals. There's also been a lot of excitement for shortened regimens for MDR-TB . . . and for drug-sensitive TB, especially for children."

—Fareed Abdullah, Office of AIDS & TB Research, South African Medical Research Council

10. Spending by multilateral agencies remained slightly below the $62 million peak seen in 2019. Eight multilateral entities invested $59 million in TB research in 2021. Unitaid was the largest multilateral funder, contributing 87% of total multilateral spending.

11. Of every dollar spent on TB research in 2021, $0.35 went to drugs research, $0.17 went to basic science, $0.16 went to operational and epidemiological research, $0.15 went to diagnostics research, $0.12 went to vaccines research, and $0.05 went to research-related infrastructure and unspecified projects.

12. Investment in basic science research remained below the $178 million peak seen in 2018, at a total of $169 million in 2021. Of every dollar spent on TB basic science research in 2021, $0.95 came from public sources, and $0.05 came from philanthropic entities.

13. Investment in TB diagnostics R&D reached an all-time high at $150 million in 2021. Of every dollar spent on TB diagnostics research, $0.62 came from public entities, $0.22 came from private-sector companies, $0.08 came from philanthropic sources, and $0.08 came from multilateral entities.

14. TB drugs R&D investments increased slightly over 2020 levels to $346 million in 2021. While this represents a new high, financing in this area has remained relatively flat since 2017. Of every dollar spent on drugs research, $0.54 came from public funders, $0.22 came from philanthropic funders, $0.17 came from private sector companies, and $0.06 came from multilateral entities.

15. Expenditure on TB vaccine R&D reached $121 million in 2021. TB vaccines research spending has remained relatively flat since 2019. Of every dollar spent on TB vaccines research, $0.62 came from public funders, $0.31 came from philanthropic funders, and $0.07 came from private-sector companies. No multilateral organizations invested in TB vaccines research in 2021.

16. The gap between available financing and the projected financing needs for TB research is wider for vaccines research than for any other research area—meaning that funding shortfalls are most severe for TB vaccine R&D.

17. Investments in operational and epidemiological research grew by 32% between 2020 and 2021, reaching a new high of $157 million in 2021. Of every dollar spent on epidemiological and operational research, $0.81 came from public funders, $0.16 came from multilateral entities, and $0.03 came from philanthropic sources. The two largest funders of operational and epidemiological research—the U.S. NIH and Unitaid– jointly funded 45% of overall investments in this area.

18. Investments in pediatric-specific TB research fell from $91 million in 2020 to $75 million in 2021. Between these years, pediatric TB research investments also fell from 10% to 8% of overall TB research spending. Of every dollar spent on pediatric TB research, $0.75 came from public funders, $0.21 came from multilateral entities, $0.02 came from philanthropic entities, and $0.02 came from private companies.

The Big Picture

"There's been some good progress of increased funding in a number of TB R&D areas. But when you see how that gets dwarfed by other pathogens, then I think it becomes very clear that it's inadequate funding."

—Bern-Thomas Nyang'wa, Médecins Sans Frontières and TB PRACTECAL trial

Funding for TB research reached $1 billion for the first time in 2021. TB research expenditures increased by 9% between 2020 and 2021, from $915 million to $1 billion. Over the past decade, TB research funding has increased by 48% from $675 million in 2011 to $1 billion in 2021.

While crossing the $1 billion threshold deserves commemoration, overall funding for TB research remains far below the financing levels committed to by governments at the 2018 UN High-Level Meeting on TB, as well as the amounts advocated for in Stop TB Partnership's *2018–22 Global Plan to End TB*.[15]

Country governments committed in the *2018 Political Declaration of the UN High-Level Meeting on TB* "to mobilize sufficient and sustainable financing, with the aim of increasing overall global investments to 2 billion dollars."[16] The next UN High-Level Meeting on TB will convene in September 2023 and will provide a forum to assess progress in meeting the commitments in the *2018 Political Declaration* and recommit to accelerating innovation to end TB. Even as TB research spending reached $1 billion in 2021, this leaves a $1 billion shortfall to achieve the $2 billion annual target.

In the *2018–2022 Global Plan*, Stop TB Partnership set an even more ambitious target for TB research financing: $2.5 billion annually. The larger sum was proposed to make up for prior funding shortfalls. The *2018–2022 Global Plan* called for investments in TB research of $2.5 billion annually to reach a total of $12.8 billion between 2018 and 2022. With only one year left to reach the $12.8 billion target, this goal seems unreachable. Cumulative expenditure on TB research from 2018 to 2021 totaled $3.7 billion—leaving a funding shortfall of $9 billion against *2018–2022 Global Plan* targets.

Based on current trends, the TB R&D funding gap will only widen when new funding targets commence under the Stop TB Partnership's *2023–2030 Global Plan to End TB*.[17] The updated plan,

TABLE 1

Annual Funding versus Annual Funding Targets

RESEARCH AREA	2021 FUNDING	2018–22 *GLOBAL PLAN* ANNUAL TARGET	2023–30 *GLOBAL PLAN* ANNUAL TARGET
Basic Science	$169,296,118	$400,000,000	$800,000,000
Diagnostics	$149,980,565	$183,200,000	$965,000,000
Drugs	$345,692,803	$1,360,000,000	$2,007,500,000
Vaccines	$120,512,790	$613,400,000	$1,250,000,000
Operational Research & Epidemiology	$157,464,738	--	--
Infrastructure/Unspecified	$57,379,517	--	--
Total	$1,000,326,531	$2,556,600,000	$5,022,500,000

developed by the Stop TB Partnership together with a broad range of stakeholders, provides a roadmap together with a detailed costed budget of activities required to put the world on track to achieve the SDG vision of ending the tuberculosis epidemic by 2030.[18,19] In addition to outlining the actions required by national TB programs, the 2023–2030 Global Plan lays out the research investments needed over the next eight years to end TB as a public health concern.

The *2023–2030 Global Plan* calls for significantly expanded investment in TB basic science, drugs, diagnostics, and vaccines research. The plan calls on stakeholders to mobilize $40.18 billion in financing for TB R&D over the next eight years, or $5 billion annually. While this is substantially greater than current funding levels, the far larger investments mobilized in response to COVID-19 demonstrate that realizing this annual target is feasible with renewed collective attention, commitment, and mobilization to curb TB deaths and disease.

"I think the distraction of the pandemic complicated [everything] . . . And again, tuberculosis is lagging behind. Nobody is thinking about prioritizing TB from the little that is available now. They are thinking of prioritizing other things."

—**Leonid Lecca, Partners in Health Peru**

Note on Methodology:

TAG collects the expenditure data in this report through a global survey of TB research funders. TAG surveyed more groups on their TB research investments in 2021 than in any other year. Three-hundred organizations received a request to participate in the survey. Of these groups, 146 returned completed surveys and 24 indicated that they did not invest or were unable to report. From the 146 returned surveys, TAG uncovered TB research investments originating from 161 unique entities. Twenty-nine of the largest 30 funders from 2020 returned responses in 2021 (the exception was Viatris).

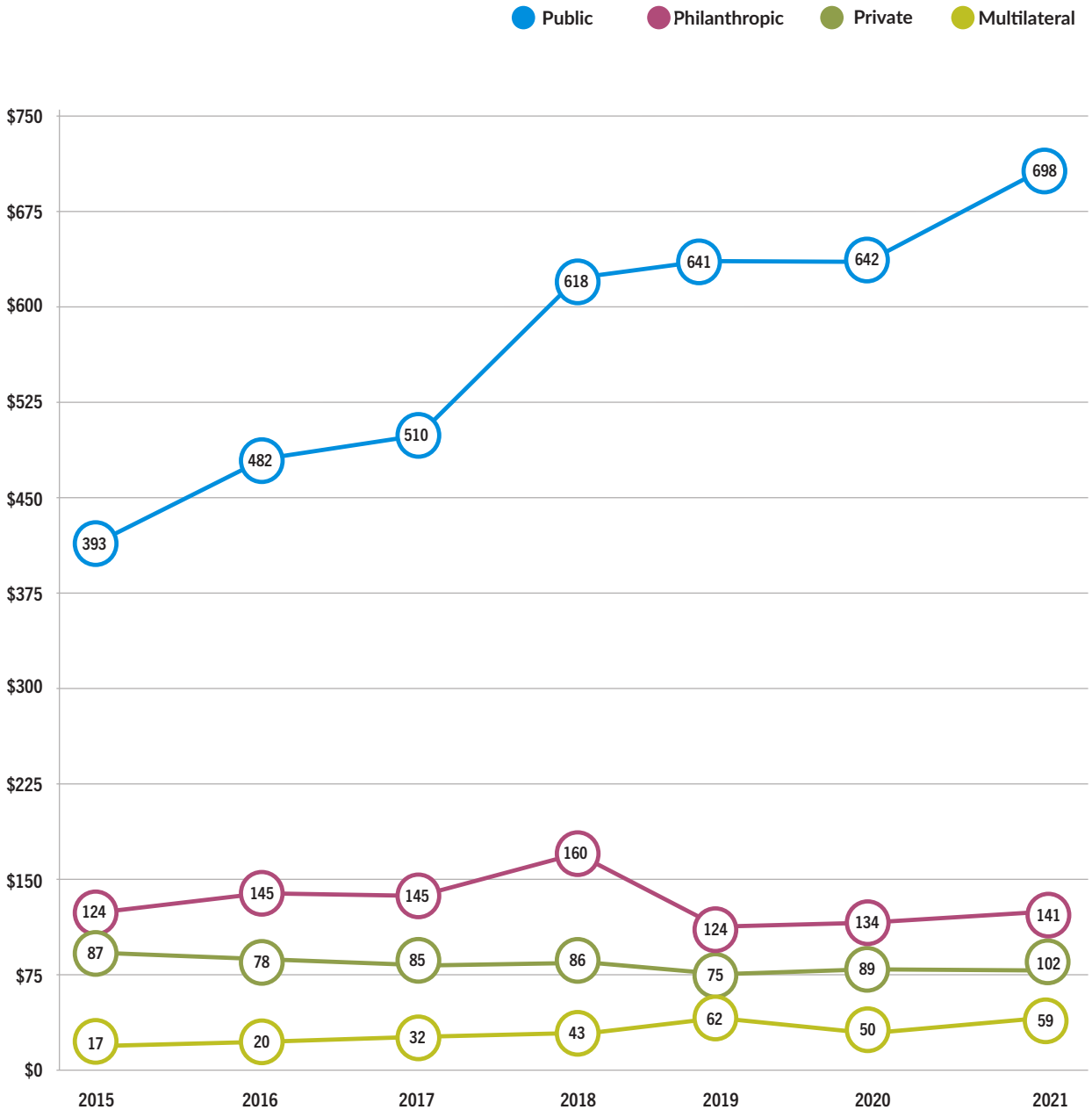
The survey asked recipients to report expenditures on TB research in fiscal year 2021 and to categorize spending into one of six research areas: basic science, diagnostics, drugs, vaccines, operational research and epidemiology, and infrastructure/unspecified projects. Within these categories, surveyed institutions were asked to delineate pediatric TB research spending. See Appendix 1 for a detailed methodology description. In addition to the survey, TAG conducted qualitative interviews with a number of TB survivors, scientists, donors, activists, and implementers to obtain their views on TB research needs and funding trends. Quotations from the interviews appear throughout the report.

"The issue with this [funding] gap is that we're going to continually chase the vaccine and better diagnostics, better drugs. So either we pony up and say: we're gonna fully fund research and take care of this. Or we're going to continually chase TB like we have for the past 100 years."

—**Tina Shah, We Are TB and TB Trials Consortium Community Research Advisors Group**

FIGURE 3

TB R&D Funding by Funder Type, 2015–2021 (in Millions)



Note: Data for years 2005–2014 not shown.

Public-Sector Funding

> "I think in the long run that funding sustainability is only going to come from . . . TB-endemic countries. One of the things that more low-middle-income country governments are tuned into in the aftermath of the COVID-19 pandemic is that they should be less willing to be reliant on high-income countries."
>
> —Rohit Malpani, former Unitaid NGO delegation board member

Public institutions continued to contribute the lion's share of funding for TB research. Of every dollar spent on TB research during 2021, $0.70 came from public funds. Public investments in TB R&D reached a record high of $698 million—up from $642 million in 2020. This increase may signal a return to upward investment levels by public funders after a plateau in public spending between 2019 and 2020.

The allocation of funds across research areas by public funders resembled allocations reported in previous years. No single research area received more than a third of total spend. Of every public dollar spent on TB R&D, $0.27 went toward drugs research, $0.23 went to basic science, $0.18 went to operational and epidemiological research, $0.13 went to diagnostics, $0.11 went to vaccines, and $0.08 went to research-related infrastructure and unspecified projects. Eight percent of public spending across all research areas was dedicated to pediatric-specific research efforts—down slightly from 10 percent in 2020.

In addition to being the largest source of overall funding for TB research, the public sector was the greatest source of financing for each individual research area reviewed. Public funders paid $0.95 of every dollar spent on basic science research, $0.62 of every dollar spent on TB diagnostics and vaccines research, and $0.54 of every dollar spent on drugs research in 2021.

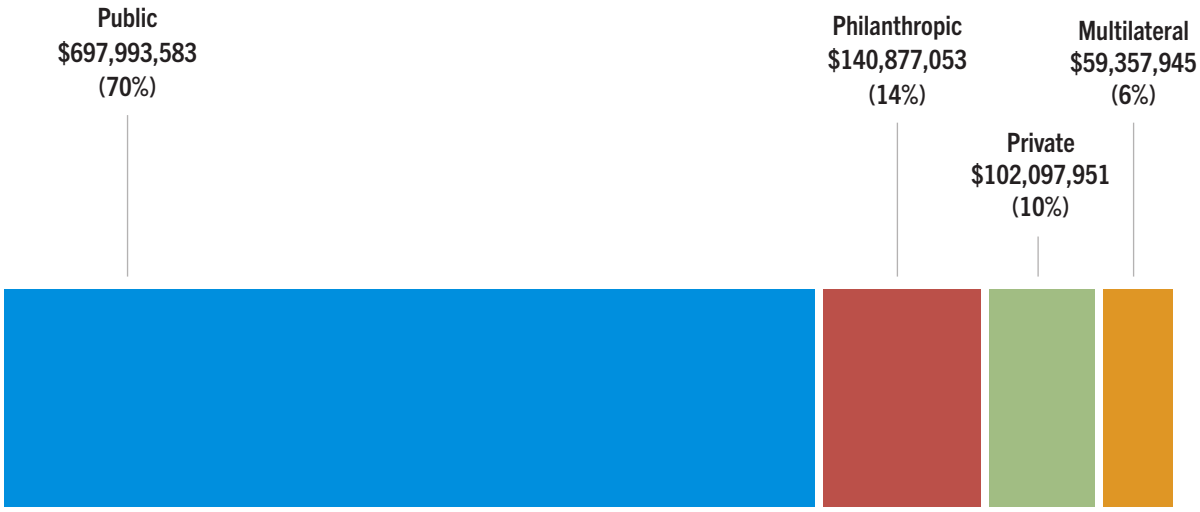
The United States continued to dedicate more money to TB research than any other country. The U.S. government came closer to meeting its fair-share target in 2021 than in previous years, reaching 94% of the target. (See page 14 for a look at how other countries performed against their fair-share targets for financing TB research.)

The United States spent $416 million on TB research in 2021 across six government agencies: the U.S. NIH, the U.S. Agency for International Development (USAID), the U.S. Centers for Disease Control and Prevention (U.S. CDC), the President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. Department of Veterans Affairs, and the U.S. National Science Foundation. Of every dollar spent by the U.S. government, $0.28 went to basic science research, $0.21 went to drugs research, $0.17 went to operational and epidemiological research, $0.13 went to vaccines research, $0.13 went to diagnostics research, and $0.07 went to infrastructure or unspecified projects. Ten percent of spending by the U.S. government across all research areas was allocated toward pediatric-specific research.

The U.S government remained the largest source of funds for TB basic science in 2021, contributing 69% of the overall budget in this area. The U.S. government was also the largest funder of pediatric TB research. The U.S. NIH and USAID accounted for 58% of the overall budget for pediatric TB research in 2021.

FIGURE 4

TB R&D Funding by Funder Type, 2021
Total: $1,000,326,531



Consistent with previous years, the U.S. NIH was the largest individual funder of TB research, contributing $354 million in 2021, up from $339 million in 2020. Spending by the U.S. NIH accounted for 35% of total 2021 funding. Of every dollar spent on TB research by the U.S. NIH, $0.32 went to basic science research, $0.21 went to drugs research, $0.16 went to vaccines research, $0.14 went to operational and epidemiological research, $0.13 went to diagnostics research, and $0.04 went to infrastructure and unspecified projects.

Ninety-two percent of the U.S. NIH's overall TB research investment was allocated to U.S.-based universities, companies, and research institutes (including to the NIH itself and its intramural research programs), while 6% was allocated to entities outside of the United States. The remaining 2% came from spending on TB-specific clinical trials by the International Maternal Pediatric Adolescent AIDS Clinical Trials (IMPAACT) network and the AIDS Clinical Trials Group (ACTG).

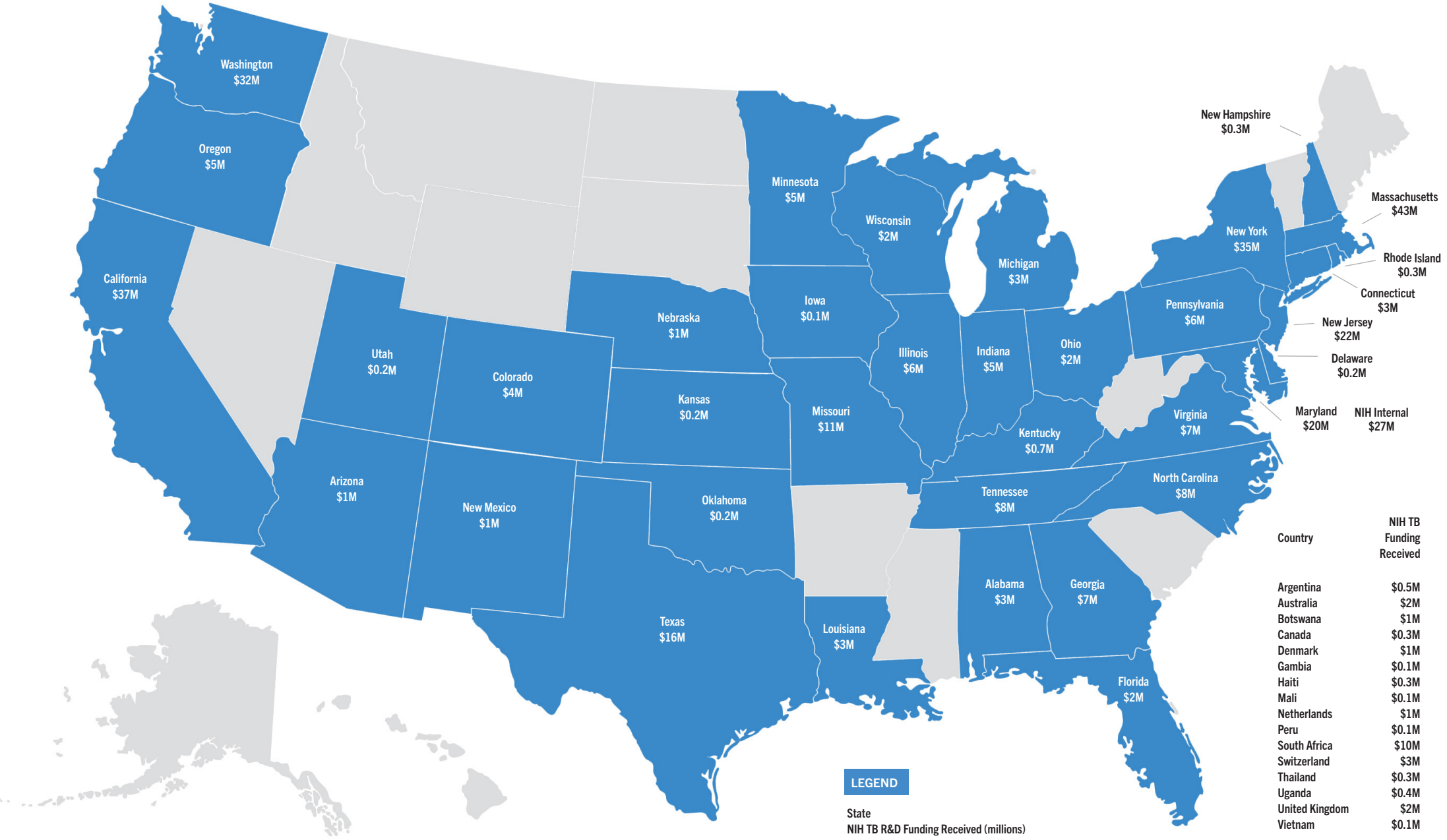
Massachusetts-, California-, New York–, Washington-, New Jersey–, and Maryland-based research institutes, universities, and companies each received over $20 million in TB research funding from the NIH. Texas and Missouri each received over $10 million, while North Carolina-, Tennessee-, Georgia-, and Virginia-based recipients received over $7 million. Of note, 37 of 50 U.S. states, representing all parts of the country, received funding from the U.S. NIH for TB research.

The U.S. NIH-funded IMPAACT and ACTG networks reported spending $1.59 million and $5.17 million on TB studies, respectively. TAG only counts protocol-specific spending on TB studies reported by the ACTG and IMPAACT; these figures do not include U.S. NIH funding allocated to ACTG or IMPAACT network leadership and operations centers, lab centers, statistical cores, or core funding awarded to individual trial sites within these networks.

The AMR Accelerator | Innovative Medicines Initiative (AMR | IMI) was the second-largest public funder of TB research after the U.S. NIH, with an investment of $31 million. AMR | IMI reported

FIGURE 5

Recipients of NIH TB R&D Funding, 2021



Country	NIH TB Funding Received
Argentina	$0.5M
Australia	$2M
Botswana	$1M
Canada	$0.3M
Denmark	$1M
Gambia	$0.1M
Haiti	$0.3M
Mali	$0.1M
Netherlands	$1M
Peru	$0.1M
South Africa	$10M
Switzerland	$3M
Thailand	$0.3M
Uganda	$0.4M
United Kingdom	$2M
Vietnam	$0.1M

its TB research spending to TAG for the first time this year, and its investment contributed significantly to the observed increase in public spending on TB research. (See page 17 for more details on the AMR | IMI's TB research spending.)

Four other public funders invested more than $25 million in TB research during 2021: the European Commission, USAID, the European & Developing Countries Clinical Trial Partnership (EDCTP), and the U.S. CDC. The European Commission and the U.S. CDC's TB research investments grew in 2021 over 2020 investment levels, while the EDCTP's 2021 TB research investments fell below 2020 investment levels. EDCTP funding for TB R&D has varied from year to year, ranging from $24 million in 2018 and 2019 to $51 million in 2020. Fluctuations likely reflect payment schedules, funding calls, and the competitiveness of TB proposals in any given year. USAID funding was down slightly over 2020 levels but is expected to pick up significantly in 2022 when the SMART4TB program opens. With SMART4TB, USAID will invest up to $200 million to building research capacity and evaluating new, transformative approaches to diagnosing, treating, and preventing TB, and in translating research advances into policy and practice, in USAID's 24 priority countries for TB programming.[20] SMART4TB represents one of the single largest investments into TB research by an individual donor agency.

"The funding agencies that fund TB vaccine research . . . they need to make sure that in the contracts that they're signing with companies, that there are some equitable access provisions. . . . The [U.S.] NIH, for example, spends billions of dollars in R&D and can do more to ensure equitable access [to the] products of that funding."

—**Soumya Swaminathan, World Health Organization**

Fair-Share Targets

> "South Africa, Brazil, India, and the Philippines need to step up. This is their population who are suffering . . . India sends a rocket into space, but they can't do adequate research into a disease that is devastating the nation."
>
> —Bern-Thomas Nyang'wa, Médecins Sans Frontières and TB PRACTECAL trial

In the 2018 UN Political Declaration on TB, country governments committed to expand funding for TB research to reach $2 billion annually by "ensuring that all countries contribute appropriately to R&D."[21] The fair-share funding targets provide a metric by which to evaluate countries' financial contributions to TB research. Developed by TAG in consultation with close advocacy partners, the fair-share targets establish specific, country-level benchmarks that governments must meet to make good on their commitment to increasing TB research funding to $2 billion annually.

The fair-share targets seek to promote a unified and fair global response to TB as one of the world's leading causes of death. The targeted investment levels that countries must meet in order to contribute their fair share toward TB research is 0.1% of their overall national expenditure on R&D (gross expenditure on R&D, or GERD). The fair-share targets will need to be revised to account for the new funding targets in the *2023–2030 Global Plan*, as well as any new financing commitments emerging from the 2023 UN High-Level Meeting on TB.

This year TAG changed how fair-share targets are calculated for European Union (EU) member states. Total public funding for TB R&D by EU member states includes spending reported to TAG by national institutions as well as countries' share of spending by EU-level agencies and mechanisms (namely, the European Commission, the EDCTP, and the AMR | IMI). The share of EU-level TB R&D spending attributed to any given member state is equal to that member state's proportional share of the overall EU budget in 2021 ("share in total national contributions").[22] As a result of this change, EU member states listed in Table 2 appear closer to meeting their fair share targets than in previous years' reports. TAG made this change after consulting European advocacy partners on how best to credit EU member states for TB R&D supported by the common EU budget.

TAG has tracked countries' progress in meeting the fair-share targets since 2017. Between 2017 and 2021, only five countries have met their fair-share targets in at least one of the evaluated years: Ireland, the Philippines, New Zealand, South Africa, and the United Kingdom.

During 2021, Ireland, the Philippines, and South Africa met their fair-share targets—with Ireland achieving this target for the first time this year.

- The Philippines invested more in TB research as a percentage of the country's overall expenditure on research than any other country in 2021, directing 3.92% of the country's overall research expenditure to TB R&D. While the Philippines exceeded its fair-share targets, the country's overall research investment as a percentage of its GDP remains low compared with other countries evaluated.[23,24]
- South Africa once again met its fair-share research target in 2021, after a sharp decline in the country's investments in TB research reported in 2020. Drugs research received the largest allocation of resources by research area from the South African government (48%), followed by basic science (37%) and operational and epidemiological research (13%).

TABLE 2

Majority of Countries Did Not Meet TB R&D Fair Share Funding Targets in 2021

Fair Share = spending at least 0.1% of overall R&D expenditures on TB R&D

RANK	COUNTRY	2021 FUNDING	ANNUAL FAIR SHARE TARGET	PERCENT OF TARGET MET IN 2021
1	United States	$416,045,586	$444,500,000	94%
2	Germany*	$42,364,069	$99,700,000	42%
3	United Kingdom	$38,791,419	$40,400,000	96%
4	France*	$31,877,418	$55,400,000	58%
5	India	$23,395,082	$46,500,000	50%
6	South Korea	$19,585,820	$64,000,000	31%
7	Canada	$16,901,263	$25,300,000	67%
8	Australia	$14,278,848	$21,200,000	67%
9	Netherlands*	$12,464,380	$15,100,000	83%
10	Spain*	$8,893,597	$20,799,869	43%
11	Sweden*	$6,870,953	$13,700,000	50%
12	Japan	$6,193,074	$154,900,000	4%
13	Switzerland	$5,890,596	$13,400,000	44%
14	South Africa	$4,818,168	$4,600,000	105%
15	Ireland*	$3,391,982	$3,300,000	103%
16	Brazil	$3,144,645	$35,000,000	9%
17	Denmark*	$2,807,466	$7,500,000	37%
18	Philippines	$2,746,963	$700,000	392%
19	Finland*	$2,331,089	$7,100,000	33%
20	New Zealand	$1,130,047	$1,800,000	63%
21	Norway	$1,066,682	$5,300,000	20%
22	China	$822,581	$305,600,000	0%
23	Thailand	$638,108	$4,900,000	13%

Table includes countries that reported more than $250,000 in TB R&D expenditures to TAG.

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.

* 2021 funding for EU Member States (third column) includes a proportional share of total TB R&D spending by the European Commission mechanisms (EDCTP, EC, AMR | IMI) equal to the member state's "total national contributions" to the general EU budget in FY21. EU-level spending on TB R&D in 2021 equalled $90,943,017. So, for example: Germany's total listed here includes spending by German public agencies ($18,964,431) plus 25.73% (Germany's EU budget share) of $90,943,017.

- Ireland met its fair-share target for the first time in 2021, with an investment of $3.3 million. Half of Ireland's investment in TB research was made through the European Union, calculated as the country's proportional share of EU-level spending. Thirty-five percent of Ireland's 2021 investments were directed to the TB Alliance via Irish Aid, while the remaining 15% was financed by the Irish Health Research Board.

"The big countries where TB and MDR-TB are problems—Russia, China, India, South Africa, Indonesia, Nigeria, and Ethiopia—I would like to see a lot more investment in TB R&D from these countries . . . They have a lot of innovation potential, and I think the potential of the academic institutes, start-ups, as well as established manufacturers in those countries should be used."

—Soumya Swaminathan, World Health Organization

The proportion of reporting countries that met at least half of the fair-share targets increased to 52% (12 of 23) in 2021 from 26% (6 of 23) in 2020. Countries that did not meet their fair-share target but did meet at least half (directing over 0.05% of total research investments toward TB), included Australia, Canada, France, India, the Netherlands, New Zealand, Sweden, the United Kingdom, and the United States.

The progress of BRICS countries (Brazil, Russia, India, China, and South Africa), which jointly account for around half of the world's TB incidence and have strong capacity to invest in and undertake TB research, could not be judged in this report. Based on spending data received, only the performance of Brazil, India, and South Africa against the fair-share targets could be assessed.

- South Africa met its fair-share target in 2021, allocating 0.1% of the country's overall research investments toward TB. Four public entities in South Africa reported TB research expenditures: the South African Department of Science and Innovation (SA DSI), the South African Medical Research Council (SA MRC), South Africa's National Research Foundation (SA NRF), and South Africa's National Health Laboratory Services (SA NHLS). SA NRF and SA NHLS reported on TB research spending to TAG for the first time this year.
- India achieved half of its fair-share target in 2021, investing 0.05% of its overall research spending in TB. TAG aggregated funding reported by public-sector entities in India to two agencies: the Indian Council of Medical Research (ICMR) and the Indian Council of Scientific and Industrial Research. These entities and other survey respondents from India reported on TB research spending by the ICMR, the Indian Ministry of Science and Technology, the Indian Ministry of Health and Family Welfare (MOHFW), and the Indian Department of Atomic Energy.
- Brazil met only 9% of its fair-share target in 2021. Three public entities from Brazil reported on TB research spending in 2021: the Brazilian National Tuberculosis Programme, the São Paulo Research Foundation (FAPESP), and Instituto Butantan. These and other surveyed groups reported on TB research spending by Brazil's Ministry of Health, the Brazilian National Council for Scientific and Technological Development (CNPq), Instituto Butantan, and FAPESP. Sixty-three percent of public spending on TB research in Brazil ($1.9 million) was financed by FAPESP.
- Consistent with previous years, neither Russia's nor China's progress in meeting the fair-share targets could be assessed, as no government agencies in either Russia or China submitted data. The amount listed for China reflects investment reported by one biopharmaceutical company active in TB vaccine research and does not reflect the Chinese government's full investment into TB R&D.

Closer Look: Team Europe's TB Research Investments

The COVID-19 pandemic has renewed the European Union's commitment to a coordinated, well-funded approach to global health security and the Agenda 2030 aim of leaving no one behind.[25] The EU research and innovation program, Horizon Europe, is specifically committed to helping achieve Agenda 2030 and SDG targets.[26,27] The Horizon Europe €95.5 billion (~US$ 112 billion) budget from 2021 through 2027 aims to foster Europe's growth and competitiveness, tackle climate change, and support attainment of the SDGs.

"You would expect, for example, that the European Commission and the EDCTP together would be contributing much more to R&D, and also the countries where TB is a big problem."

—**Soumya Swaminathan, World Health Organization**

Most EU funding for TB research comes from the European Commission's research program, Horizon Europe and its predecessor, Horizon 2020. Horizon Europe funds some TB research directly, through its own work programs.[28] The Horizon funding instruments also help fund the EDCTP and the AMR | IMI.[29] For the EDCTP, the European Commission provides funding to match contributions from participating EU member states. AMR | IMI also receives contributions from European pharmaceutical companies and other life-science organizations and partners.[30]

"From the European funding side, the EDCTP has strengthened their funding both for adult and for pediatric work. A lot of it's been diagnostic and biomarker [research], and that's also looking at the spectrum of TB within the context of child lung health, long-term outcomes, and quality of life."

—**Anneke Hesseling, Desmond Tutu TB Centre**

2021 was the first year the AMR | IMI reported on its TB research spending, from public funds originating from the EU, to TAG. AMR | IMI was the largest European TB research funder in 2021, spending $31 million on TB drugs research. Of every dollar spent on TB research by the AMR | IMI originating from public funds, $0.50 went to Europe-based partners of the UNITE4TB research consortium, $0.40 went to Europe-based partners of the European Regimen Accelerator for Tuberculosis (ERA4TB) consortium, and $0.04 went to Europe-based partners of the Respiri-TB research project. The remaining six percent of AMR | IMI's TB research spend ($1.7 million) supported the Swiss pharmaceutical company BioVersys in its efforts to boost the efficacy of ethionamide in treating TB.

The European Commission (EC) was the second-largest source of funds for TB research from the EU in 2021, with an overall spend of $30 million. While this represents a large increase from the EC's TB research spending levels of $17 million in 2020, it remains below the EC's 2014 investment of $34 million. Of every dollar spent on TB research by the EC during 2021, $0.29 went to drugs research, $0.29 went to basic science research, $0.24 went to diagnostics research, $0.14 went to vaccines research, and $0.03 went to operational and epidemiological research. Two percent of the EC's investments across all research areas were allocated to pediatric-specific research efforts. From 2014 to 2020 (the budget period of Horizon 2020), the EC spent $134 million on TB R&D.

The EDCTP invested $29 million in TB research in 2021, down from $51 million in 2020. Between 2014 and 2020, the EDCTP invested $133 million into TB research. Of every dollar spent by the EDCTP in 2021, $0.38 went to diagnostics research, $0.37 went to drugs research, $0.20 went to vaccines research, and $0.04 went to operational and epidemiological research. Sixteen percent of the EDCTP's investments across all research areas supported pediatric-specific TB research.

Of every dollar spent on TB research by the EC and EDCTP in 2021, $0.72 went to Europe-based recipients and $0.28 went to Africa-based recipients. Academic organizations received half of all EC and EDCTP research spending in 2021. The remainder went to nonprofit organizations (22%), public-sector organizations (12%), private-sector entities (10%) and product development partnerships (6%).

U.K.-based recipients received more research funds for TB R&D from the EDCTP and EC than recipients in any other country ($11 million). South Africa–based recipients received the second-largest allotment of funding from the EDCTP and EC ($9.9 million). Only four other countries received more than $5 million in TB research funding from these two entities in 2021: Italy, Spain, Switzerland, and Germany.

"What the European Union does is to pay 30, 40 institutions to work together and make head-to-head comparisons of these vaccines in order to make progress . . . It is cooperation, which the European Union wants, and competition at the same time. And that, I think, is fundamental: cooperation."

—**Carlos Martín, University of Zaragoza, co-inventor of the MTBVAC vaccine candidate**

Europe: Birthplace of New TB Vaccines?

New effective vaccines against TB are essential to meeting the SDG target to end the TB epidemic by 2030. There is strong potential for new innovative vaccines against TB to be borne of European research efforts and collaborations—but only with scaled-up funding.

There are currently 16 TB vaccine candidates under clinical investigation across the world. Six are in phase III, six in phase II, and four in phase I trials. Among the 16, six are being developed by or in partnership with European research institutions.[31] Despite the potential for a new vaccine to emerge from EU-supported research efforts, TB vaccine research is relatively unprioritized by EU financing mechanisms. During 2021, the EDCTP directed 20% of its TB research investments toward vaccine research, while only 14% of EC spending supported vaccines R&D. Cumulative vaccine research financing from the EDCTP and EC peaked at $21.9 million in 2018 but fell to $10 million in 2021.

Philanthropic Funding

> "Like how Bill and Melinda [French] Gates have their foundation, there are other wealthy individuals that have set up their foundations. If we have a good voice at some of these places, we might be able to start to chip away at it. That is how HIV did it—they didn't automatically, overnight get their funding."
>
> —Tina Shah, We Are TB and TB Trials Consortium Community Research Advisors Group

Funding from philanthropies remained the second-largest source of funds for TB research in 2021. Philanthropic donors contributed 14% of all TB research funds, with a total spend of $141 million. While this amount is above the 2020 funding level ($134 million), it remains below the peak of philanthropic spending of $170 million in 2013.

Twenty-seven philanthropic organizations funded TB research in 2021, up from 20 in 2020. Philanthropic organizations that reported for the first time this year, or whose investments were reported by funding partners, include the Cystic Fibrosis Foundation, Fundació Bancaria "La Caixa", and LifeArc, each of which invested over $1 million. Other first-time philanthropic reporters, the Mueller Health Foundation and Open Philanthropies, each invested over $450,000 into TB research.

The Gates Foundation firmly held its position as the largest philanthropic funder and the second-largest overall funder of TB research. The Gates Foundation contributed $0.81 of every dollar spent by philanthropic organizations in 2021 and $0.11 of every general dollar spent on TB research. Of every dollar spent by the Gates Foundation, $0.59 went to drugs research, $0.33 went to vaccines research, $0.06 went to diagnostics research, and $0.02 went to operational and epidemiological research. Of note, the figure reported for the Gates Foundation includes funding for the Gates Medical Research Institute (Gates MRI). The Gates Foundation reported giving $47.8 million to the Gates MRI and estimated that roughly 40% went to support drug development and 60% toward research on TB vaccines.

The Wellcome Trust was the second-largest philanthropic funder of TB research in 2021, contributing 8% of the total philanthropic spend. The Wellcome Trust reported spending $11.8 million on TB R&D in 2021, the first time since 2018 that the charity gave more than $10 million. Of every dollar spent by the Wellcome Trust, $0.52 went to basic science research, $0.26 went to diagnostics research, and $0.21 went to operational and epidemiological research. The Wellcome Trust was the largest philanthropic funder of TB basic science research in 2021, contributing $0.70 of every dollar philanthropic organizations invested in this area.

The only other philanthropic organization to spend more than $5 million on TB research during 2021 was Médecins Sans Frontières (MSF). Reported TB research spending by MSF increased from less than $1 million in 2020 to $6.5 million in 2021. This increase largely reflects first-time reporting by MSF on its spending on the TB PRACTECAL trial. The MSF total also includes spending through Epicentre and on the endTB trial. Money reported as spending by MSF originated from donations to the organization, including from individual givers and the Dutch Postcode Lottery.

Only 1% of philanthropic funding supported pediatric research.

TABLE 3

Top 20 Funders of TB Research, 2021

RANK	FUNDER	FUNDER TYPE	2021 FUNDING	2020 FUNDING
1	U.S. National Institutes of Health (NIH)	P	$354,793,943	$339,250,929
2	Bill & Melinda Gates Foundation	F	$113,449,327	$126,008,832
3	Unitaid	M	$51,429,969	$41,300,000
4	AMR Accelerator/Innovative Medicines Initiative	P	$31,116,653	Did not return survey
5	European Commission	P	$30,537,224	$17,437,697
6	U.S. Agency for International Development (USAID)	P	$30,000,620	$37,386,798
7	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$29,289,139	$51,132,639
8	U.S. Centers for Disease Control and Prevention (CDC)	P	$25,894,931	$19,124,770
9	Otsuka Pharmaceutical	C	$23,701,770	$19,176,250
10	Company X	C	$21,736,349	$31,313,865
11	German Federal Ministry of Education and Research (BMBF)	P	$17,505,028	$15,351,882
12	Indian Council of Medical Research (ICMR)	P	$16,481,610	$14,469,739
13	Oxford Immunotec	C	$12,000,000	$10,749,000
14	Wellcome Trust	F	$11,849,984	$4,499,757
15	U.K. Foreign, Commonwealth and Development Office (FCDO)	P	$11,795,771	$22,574,821
16	U.K. Medical Research Council (U.K. MRC)	P	$11,560,248	$13,872,900
17	Global Affairs Canada	P	$11,167,884	$12,460,150
18	Korean Ministry of Health and Welfare	P	$10,086,394	$7,653,817
19	Australian Department of Foreign Affairs and Trade (DFAT)	P	$8,329,491	$7,045,290
20	U.K. Department of Health and Social Care	P	$7,823,623	$5,813,218

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

Private-Sector Funding

> "How do we ensure that we speed up TB research and development to get the best results from whatever is being developed? Through breaking down the silos between public and private entities [so that] these drugs can be tested in combinations earlier. [It's about] the governance of TB R&D ultimately, and the willingness of all these different entities to do things differently."
>
> —Rohit Malpani, former Unitaid NGO delegation board member

Private-sector companies remained the third-largest source of TB research funds in 2021, once again contributing 10% of overall funding. While the private sector's proportional contribution remained the same as in 2020, overall spending levels by industry increased in 2021. Private-sector companies spent $102 million on TB research during 2021, up from $89 million in 2020. Although higher than the year before, this amount is well below the $145 million peak seen in 2011. When adjusted for inflation, 2011 investments by companies rise to $172 million, which is 68% higher than actual spending in 2021.[32]

Thirty companies reported investments in TB research. Three companies spent more than $10 million and were recognized as top 15 funders: Otsuka Pharmaceutical, Company X, and Oxford Immunotec.

Drugs R&D remained the largest funded research area by industry in 2021; however, the proportion of industry's overall investment directed to drug development declined from 74 to 59 percent between 2020 and 2021. Combined, eight industry investors spent $60 million on drugs research in 2021. Otsuka Pharmaceutical and Company X, respectively, contributed $23.7 and $21.7 million. Macleods, Merck (MSD), and LegoChem Biosciences each spent more than $4 million.

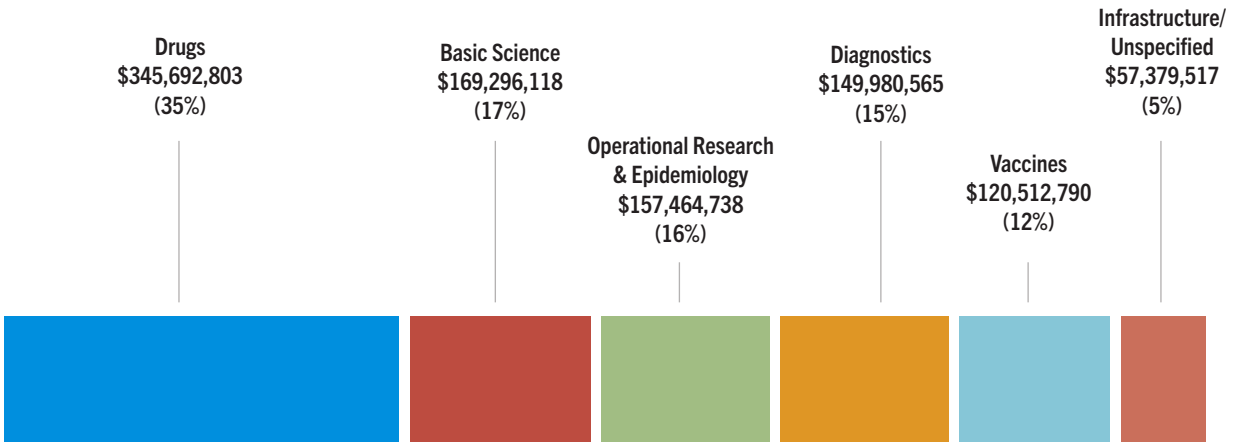
Diagnostics research was the second most funded research area by industry. Industry groups allocated 32% of their overall investments toward TB diagnostics research in 2021, up from 23% in 2020. Sixteen companies invested a total of $32.8 million into this area. The three largest private-sector funders of diagnostics R&D – Oxford Immunotec, KfW Development Bank, and Qure.ai—respectively spent $12 million, $6 million, and $4 million.

Private funders allocated 9% of their overall investments toward TB vaccines research in 2021. Expenditure on TB vaccines R&D by private funders increased to $9 million in 2021, up from $2 million in 2020. While increased industry investment in this area is encouraging, no single company is contributing at the previous levels of GlaxoSmithKline (GSK) when the company was actively supporting the M72/AS01E phase IIb trial. In 2015, GSK alone spent $17.6 million on TB vaccine research.

Higher industry spending on TB vaccine R&D in 2021 may also reflect better reporting to TAG. Biofabri spent more on TB vaccines research than any other company in 2021, investing a total of $4 million. Anhui Zhifei Longcom Biopharmaceutical Co. (Zhifei Longcom), which reported for the first time this year, was the second-largest private-sector funder of TB vaccines R&D, spending $2.9 million. The only other company to invest over a million was Archivel Farma.

FIGURE 6

TB R&D Funding by Research Area, 2021
Total: $1,000,326,531



As a whole, industry allocated less than 1% of its total investments toward basic science and did not contribute to operational research during 2021. Two percent of spending by industry across all research areas was allocated to pediatric research—down from 9 percent in 2021. Only three industry investors spent more than $550,000 on pediatric TB research: Company G, QIAGEN, and Zhifei Longcom. Not every company was able to disaggregate pediatric specific expenditures from larger investment totals reported.

"There have to be pharmaceutical companies [involved], because that is the only way you can develop a product. The most difficult step for a vaccine is going from academia to industry. Industrial clinical development needs to come from our domain, which is the university . . . and go to a place where it is going to be developed in a useable form."

—Carlos Martín, University of Zaragoza, co-inventor of the MTBVAC vaccine candidate

Multilateral Funding

> "If we just rely on governments, we're never going to get to where we need to go. But if we have a combo of private and public, I think that's where we might have that intersection . . . If there's private places that say 'hey, we're ready to support this,' that shows the government that they're getting [support] from other places . . . It's kind of like a chess game."
>
> —Tina Shah, We Are TB and TB Trials Consortium Community Research Advisors Group

Tuberculosis research funding from multilateral organizations rose to $59 million in 2021—up from $50 million in 2020, but below the $62 million reported in 2019. Spending by eight multilateral organizations is captured in this report: five of which reported to TAG directly, while expenditure by three others (the RIGHT Fund, the International Centre for Genetic Engineering and Biotechnology, and the Pan-American Health Organization) was identified in surveys returned by organizations that received money from these institutions. Multilateral organizations were the smallest share of TB research by funder type, contributing only 6% of total funds.

Of every dollar spent by multilateral organizations, $0.43 went toward operational and epidemiological research, $0.35 went to drugs research, and $0.21 went to diagnostics research. Less than one percent of spending by multilateral organizations went to basic science. Multilateral organizations spent no money on vaccines research.

Twenty-seven percent of spending by multilateral organizations across all research areas was allocated to pediatric research, which was almost entirely funded by Unitaid (the source of $0.87 of every multilateral dollar spent in this area). Overall, Unitaid invested $51 million in TB research in 2021, up from $41 million in 2020. Thirty-nine percent of Unitaid's investment was directed to operational and epidemiological research, 38% was spent on drugs research, and the remaining 22% was allocated toward diagnostics research. Thirty-one percent of Unitaid's spending across all research areas was allocated toward pediatric TB research efforts.

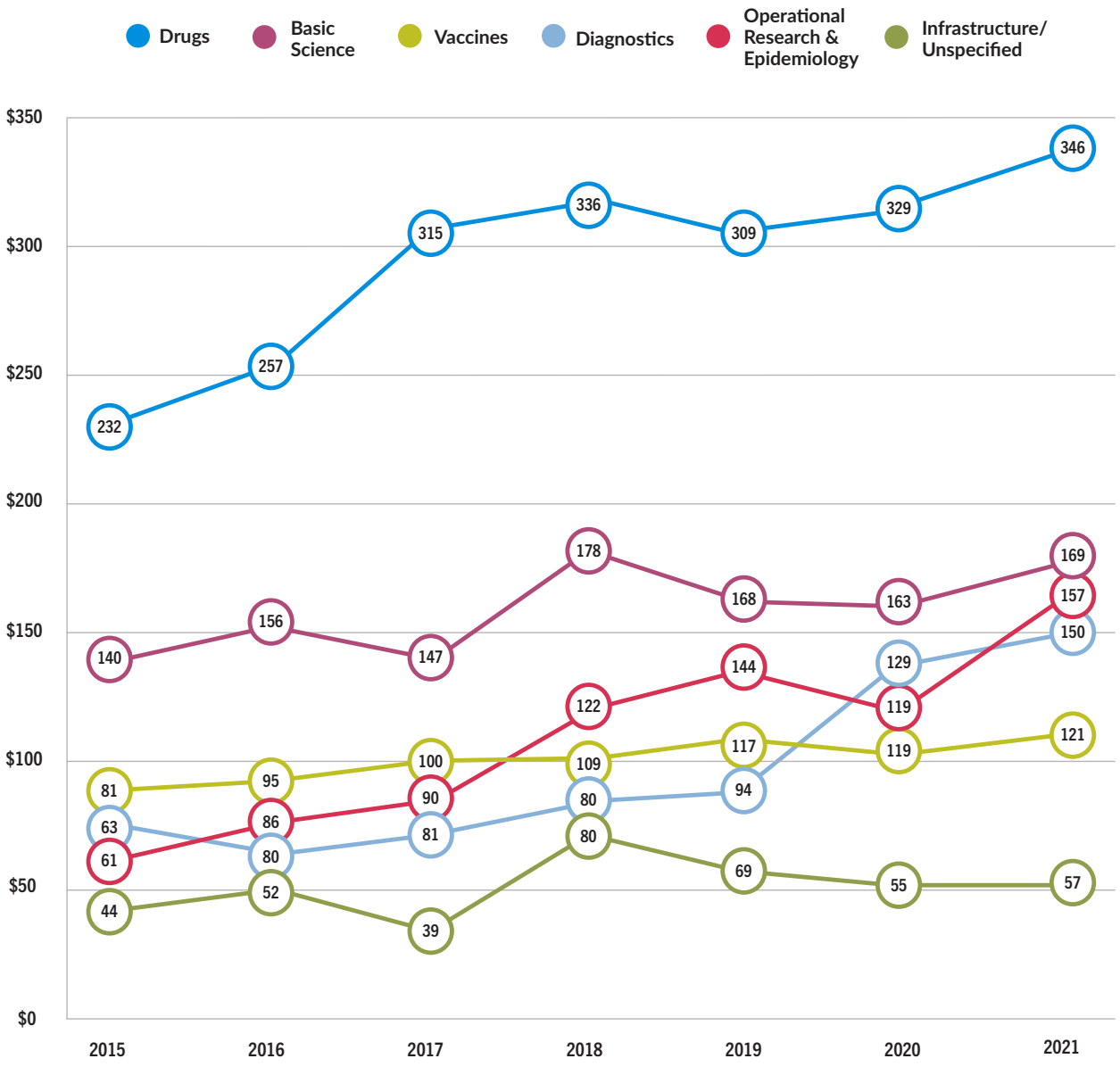
The Global Fund was the second-largest multilateral funder of TB research, spending a total of $3.4 million—similar to 2020 investment levels but below the Global Fund's 2019 investments of $10 million. As in previous years, the Global Fund figure represents spending on interventions classed as 'surveys' in its TB, HIV/TB, resilient and sustainable systems for health (RSSH), and multicomponent grants. The Global Fund noted in email correspondence with TAG that TB research expenditure in 2021 remained lower than pre–COVID-19 funding amounts due to challenges in implementing surveys and operational research during the pandemic and because 2021 is the first year of grant implementation in the current cycle.[33]

TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization, was the third-largest multilateral funder of TB research, investing $1.9 million in 2021—up from $900,000 in 2020. The only other multilateral funder to invest over a $1 million in 2021 was the Global Health Innovative Technology Fund (GHIT), a Japan-based public-private partnership. GHIT spent $1.6 million on TB research—54% of which was allocated to drugs R&D and the remainder (46%) to diagnostics research.

Funding by Research Area

FIGURE 7

TB R&D Funding by Research Area, 2015–2021 (in Millions)

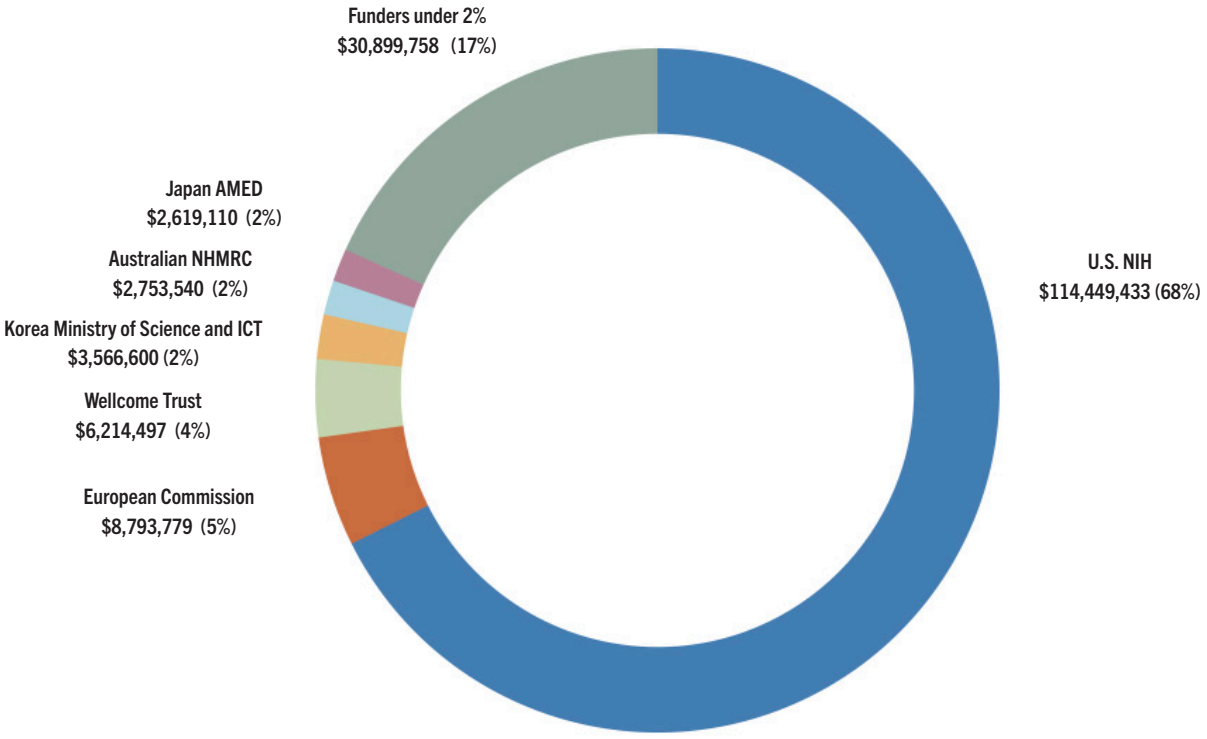


Note: Data for years 2005–2014 not shown.

Basic Science

FIGURE 8

Basic Science: $169,296,118



Funders with investments under 2%

German Federal Ministry of Education and Research (BMBF)	$2,488,790
Korean Ministry of Health and Welfare	$2,311,900
French National Research Agency (ANR)	$2,188,965
Swiss National Science Foundation	$2,099,638
Canadian Institutes of Health Research (CIHR)	$2,075,850
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$1,666,920
U.K. Medical Research Council (U.K. MRC)	$1,613,486
U.S. National Science Foundation (NSF)	$1,539,491
South African Department of Science and Innovation (DSI)	$1,521,422
Swedish Research Council	$1,496,152
German Research Foundation (DFG)	$1,374,586

Fundació Bancaria “La Caixa”	$1,181,060
India Ministry of Science and Technology	$797,952
Carlos III Health Institute	$701,890
Philippines Department of Science and Technology	$680,764
Norwegian Ministry of Education and Research	$572,006
Dutch Research Council (NWO)	$487,966
Korean Ministry of Education	$476,000
Independent Research Fund Denmark	$434,267
Bill & Melinda Gates Foundation	$413,431
U.S. Department of Veterans Affairs	$406,916
Other funders with expenditures <$400,000	$4,370,304

"There has been a gap of two or three years between the end of Horizon 2020 and the new Horizon call, during which it has not been possible to carry out basic research in order to have new [TB vaccine] candidates in preclinical trials . . . We should not forget basic research. In vaccines it is very important to fill the pipeline."

—Carlos Martín, University of Zaragoza, co-inventor of the MTBVAC vaccine candidate

TB basic science research received a total investment of $169 million during 2021. While this amount represents a slight increase (4%) over 2020 funding levels, it remains below the $178 million peak in basic science funding seen in 2018.

Expenditures on TB basic science continue to lag far behind targeted investment goals. The *2018–2022 Global Plan* called on stakeholders to expand funding for TB basic science to $400 million annually, or $2 billion between 2018 and 2022. Total investments in TB basic science between 2018 and 2021 reached $678 million. Closing the funding gap would require investing an additional $1.3 billion in basic science research in 2022.

Funding shortfalls for basic science will likely widen in 2023 when new targets for TB research funding are triggered under the *2023–2030 Global Plan*. The updated plan doubles funding targets for basic science, from $400 to $800 million annually—which is more than four times greater than current investment levels.

Basic science research received 17% of overall financing for TB research in 2021. Sixty-six discrete entities supported TB basic science, and four percent of overall investments in this area were allocated toward pediatric-specific research.

Public funders continued to contribute the bulk of financing for basic science in 2021: $0.95 of every dollar spent came from public sources. Philanthropic entities contributed the remaining $0.05. Expenditures by private-sector companies and multilateral entities accounted for less than 1% of spending in this area.

The U.S. NIH remained the largest funder of TB basic science research in 2021, accounting for 68% of overall spending. The second- and third-largest funders of TB basic science were the European Commission and the Wellcome Trust, which respectively contributed 5% and 4% of the total. The Wellcome Trust's investment in basic science grew from $1.2 million in 2020 to $6 million in 2021. The Japan Agency for Medical Research and Development (AMED) increased its spending on basic science to $2.6 million in 2021 from $1.9 million in 2020 (but this is only half as much as the $5.3 million AMED reported in 2019).

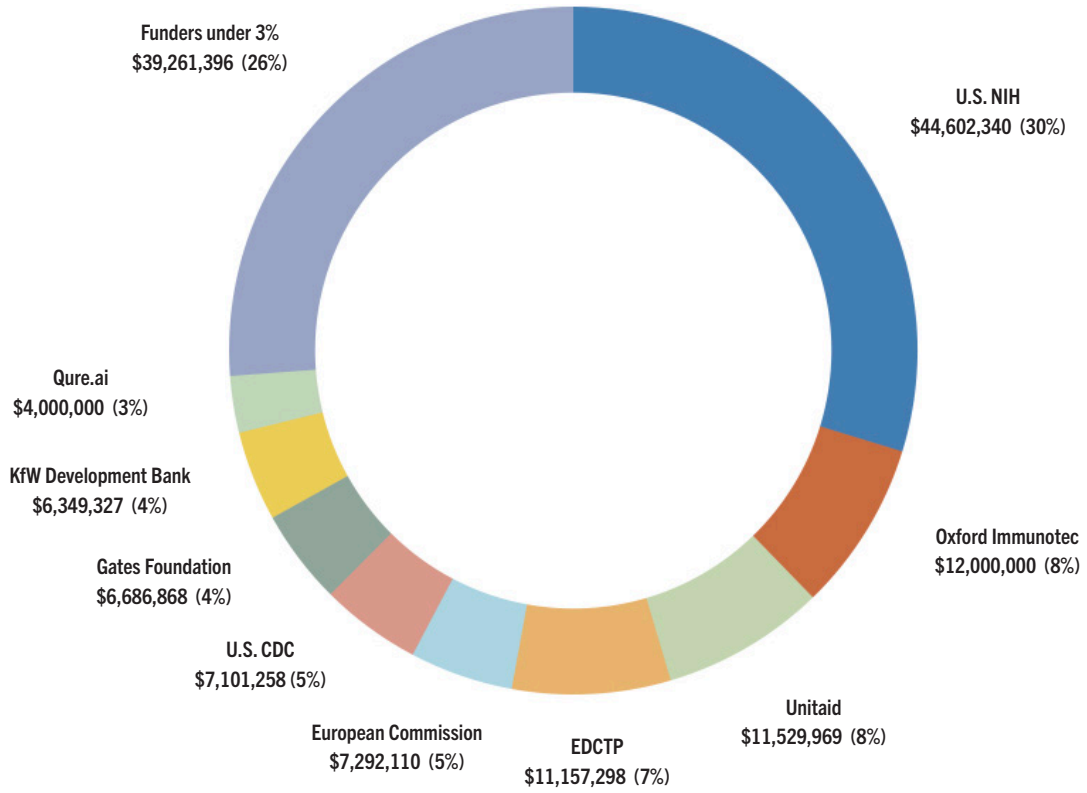
Seven public entities in South Korea invested in TB basic science during 2021: the Ministry of Science and ICT, the Ministry of Health and Welfare, the Ministry of Education, the National Research Foundation, the Health Industry Development Institute, the Institute of Tuberculosis, and the Ministry of SMEs and Startups. Their investments summed to $6.8 million.

Missing from these data: TAG received surveys from all major known funders of TB basic science research that have participated in previous reports. If readers know of TB basic science funders not included here, they may share those suggestions with TAG (tbrdtracking@treatmentactiongroup.org) for inclusion in future reports.

Diagnostics

FIGURE 9

Diagnostics: $149,980,565



Funders with investments under 3%

Wellcome Trust	$3,116,327
Korean Ministry of Health and Welfare	$2,986,000
Netherlands Enterprise Agency	$2,980,960
Australian Department of Foreign Affairs and Trade (DFAT)	$2,816,490
Fujifilm Corporation	$2,200,000
QIAGEN	$2,174,977
Swiss Agency for Development and Cooperation (SDC)	$1,908,939
Molbio Diagnostics	$1,829,000
Innovate UK (UKRI)	$1,805,589
U.S. Agency for International Development (USAID)	$1,779,885
U.K. Medical Research Council (U.K. MRC)	$1,271,944
BATM	$1,253,925
Anhui Zhifei Longcom Biopharmaceutical Co.	$1,233,152
U.K. Engineering and Physical Sciences Research Council (EPSRC)	$1,087,160
LifeArc	$1,027,727
Company Y	$989,000
German Federal Ministry of Education and Research (BMBF)	$948,689
Australian National Health and Medical Research Council (NHMRC)	$834,558
Global Health Innovative Technology Fund (GHIT)	$759,702
Hefei National High-Tech Industry Development Zone	$748,448
Company F	$675,000
Korean Ministry of SMEs and Startups	$625,000
Open Philanthropy	$460,000
Swedish Research Council	$439,638
Philippines Department of Science and Technology	$411,973
Other funders with expenditures <$400,000	$2,897,312

"What's lesser known to the public is the incredible work that's been going on with diagnostics . . . I'm quite optimistic that over the next five to 10 years there will be a new diagnostic finger prick test [and] there will be diagnostics for [different] subgroups of TB."

—Fareed Abdullah, Office of AIDS & TB Research, South African Medical Research Council

Investment in TB diagnostics research maintained its upward trend in 2021, reaching an all-time high of $150 million and further closing the gap between actual and targeted annual investments. Spending on TB diagnostics research grew by 16% between 2020 and 2021.

The *2018–2022 Global Plan* calls on global stakeholders to invest $183 million into TB diagnostics R&D annually in order to attain a total investment of $916 million from 2018 to 2022. Cumulative investments in TB diagnostics research from 2018 to 2021 reached $453 million, just shy of half of the five-year target. With only one year left to meet the *2018–2022 Global Plan* targets, a shortfall of $462 million remains.

Funding shortfalls for diagnostics R&D will likely grow in 2023, when new financing targets are triggered. The *2023–2030 Global Plan* calls for stakeholders to spend $965 million on TB diagnostics research annually—which is more than six times greater than current funding levels.

Sixty-eight discrete entities invested in TB diagnostics research in 2021. Fifteen percent of overall TB research expenditure in 2021 was allocated to diagnostics research, and 12% of TB diagnostics research investments went to pediatric research efforts.

Public funders remained the largest source of TB diagnostics research funding, accounting for almost two-thirds of overall spend. Of every dollar spent on diagnostics research in 2021, $0.62 came from public entities, $0.22 from private-sector companies, $0.08 from philanthropic sources, and $0.08 from multilateral entities.

The U.S. NIH was the largest funder of TB diagnostics research in 2021, contributing 30% of the total. Oxford Immunotec was the second largest funder, with 8% of the total ($12 million). Unitaid and the EDCTP, the third- and fourth-largest funders, each contributed $11 million. The European Commission and the U.S. CDC, the fifth- and sixth-largest funders, each contributed $7 million.

Notably, Unitaid's support for diagnostics research increased from $5.3 million in 2020 to $11 million in 2021. In 2022, Unitaid announced plans for a further investment of $30 million to accelerate the development and introduction of new TB diagnostics and diagnostic approaches. This funding, which will be split between the Liverpool School of Tropical Medicine and FIND, will be spent between 2022 and 2026.[34]

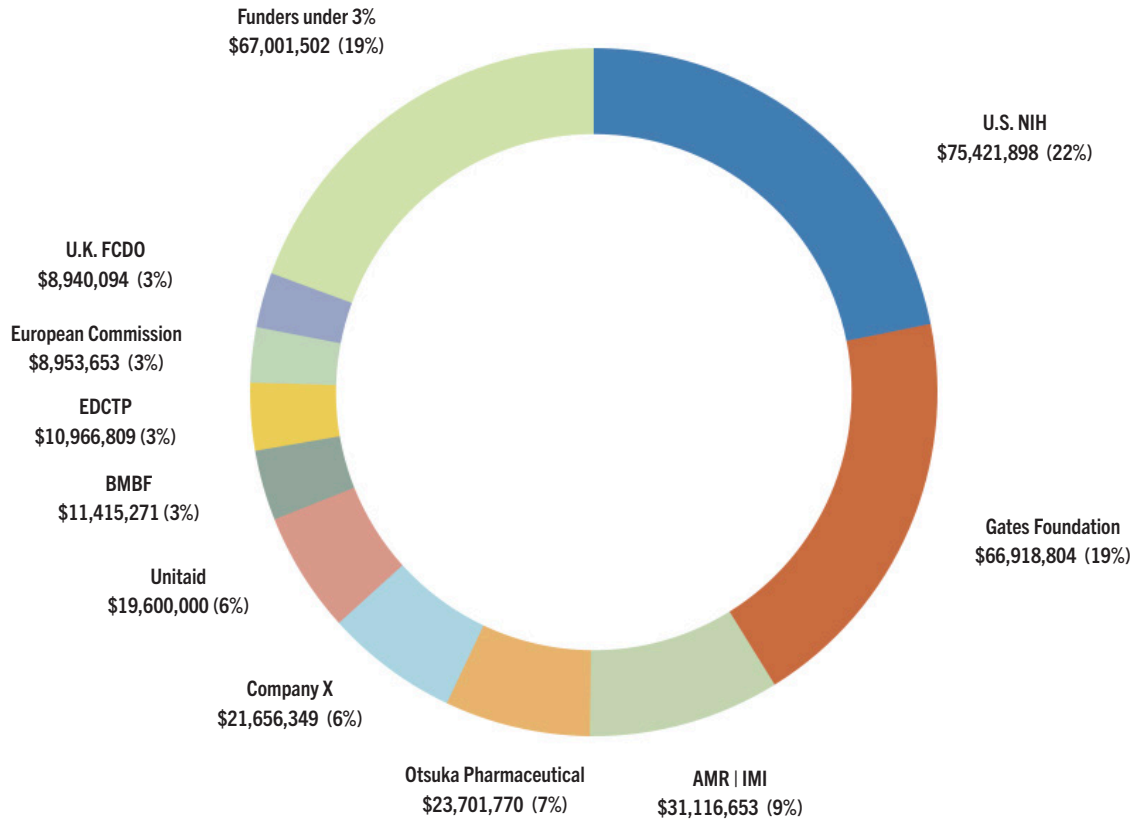
The second- and third-largest private sector funders of TB diagnostics research in 2021, after Oxford Immunotec, were KfW Development Bank and Qure.ai, who respectively spent $6 million and $4 million. Two other companies reported expenditures over $2 million: Fujifilm Corporation and QIAGEN. Molbio Diagnostics, BATM, and Zhifei Longcom each invested over $1 million in this area.

Missing from these data: Cepheid and Abbott/Alere did not respond to TAG's survey. Delft Imaging responded that while the company invests in TB research, specifically in the field of screening, it does not track this as a standalone investment and is unable to report on 2021 TB spending.

Drugs

FIGURE 10

Drugs: $345,692,803



Funders with investments under 3%

U.S. Agency for International Development (USAID)	$8,400,000
Médecins Sans Frontières (MSF)	$6,281,087
Macleods Pharmaceuticals	$5,000,000
U.K. Medical Research Council (U.K. MRC)	$4,397,075
U.S. Centers for Disease Control and Prevention (CDC)	$4,298,169
Merck (known as MSD outside of the U.S. and Canada)	$4,167,797
LegoChem Biosciences	$4,056,980
Netherlands Enterprise Agency	$3,501,772
Australian Department of Foreign Affairs and Trade (DFAT)	$2,816,490
Cystic Fibrosis Foundation	$2,092,492
French Ministry of Research and Higher Education	$1,723,274
French National Research Agency (ANR)	$1,582,719
Swiss National Science Foundation	$1,431,491
South African Department of Science and Innovation (DSI)	$1,314,747
Swedish Research Council	$1,304,908

Company V	$1,253,237
Irish Aid	$1,182,948
Canadian Institutes of Health Research (CIHR)	$1,082,827
Korean Ministry of Health and Welfare	$1,052,400
South African Medical Research Council	$948,092
Global Health Innovative Technology Fund (GHIT)	$888,073
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$864,282
Academy of Finland	$757,775
Indian Council of Medical Research (ICMR)	$730,506
U.S. Department of Veterans Affairs	$605,126
Fundació Bancaria “La Caixa”	$544,455
Mueller Health Foundation	$497,480
Individual donors to TB Alliance	$436,743
Other funders with expenditures <$400,000	$3,788,556

"While in TB we are thinking about two or three new drugs [as advances], in other diseases we would be thinking of about 20, 30. And yet, despite all of it, I think [drugs] is the area where we are trying harder."

—Leonid Lecca, Partners in Health Peru

Tuberculosis drugs research received a total investment of $346 million in 2021. While this represents a slight increase (5%) over 2020 levels and a new overall high, TB drugs R&D financing has remained relatively flat since 2017.

Expenditure on TB drugs R&D in 2021 continued to lag far below the investment target in the *2018–2022 Global Plan*. The Global Plan calls on stakeholders to expand TB drugs research to $1.36 billion annually, to reach a total of $6.8 billion between 2018 and 2022. The cumulative investment in this area from 2018 to 2021 was $1.3 billion, meaning an additional $5.5 billion must be spent in 2022 to close the funding gap.

The financing gap for TB drugs R&D is projected to widen in 2023, when new funding targets commence. The *2023–2030 Global Plan* calls on global stakeholders to invest $2 billion annually into research supporting the development of new TB medicines and drug regimens—which is more than five times greater than current investment levels.

Research related to the discovery, development, and optimization of TB medicines and regimens continued to receive more funding than any other research area in 2021. Thirty-five percent of the overall TB research expenditures was directed to drugs research, and 62 discrete entities invested in this area. Five percent of TB drugs R&D financing was allocated toward pediatric-specific research.

Public investors remained the largest source of funds for TB drugs research in 2021, contributing just over half of overall financing. Of every dollar spent on drugs R&D, $0.54 came from public funders, $0.22 from philanthropic funders, $0.17 from private-sector companies, and $0.06 from multilateral entities.

The U.S. NIH continued to spend more on TB drug R&D than any other entity in 2021, contributing $75 million, or 22% of the total. The Gates Foundation, the second-largest funder, contributed 19% ($66 million) of total financing for this research area. Of every dollar spent on drugs research by the Gates Foundation, $0.31 went to the Global Alliance for TB Drug Development, $0.29 went to the Gates Medical Research Institute, $0.12 went to Otsuka Pharmaceutical, and $0.06 went to Evotech. The remaining $0.22 was spent across 26 grants to different research institutes, initiatives, universities, and companies.

AMR | IMI, which reported spending for the first time this year, was the third-largest funder of TB drugs research in 2021, contributing 9% ($31 million) of the total. AMR | IMI is a public-private partnership between the European Commission and European pharmaceutical companies. The reported expenditure by AMR | IMI only includes the public-sector side of its overall spending. TAG made efforts to obtain details on private-sector expenditures on TB research, including industry contributions to AMR | IMI, from companies directly. Industry investments in TB research are reported under company names or pseudonyms (when companies requested anonymity as a condition for reporting).

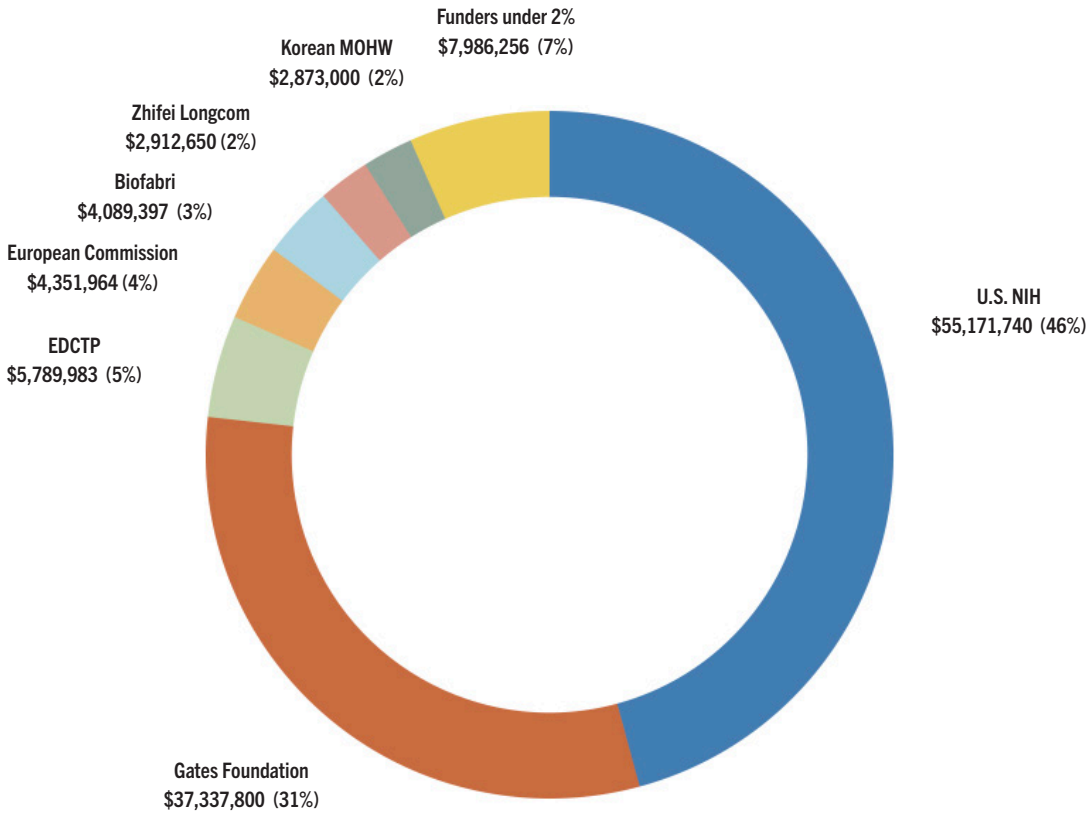
Two private-sector companies, Otsuka Pharmaceutical and Company X, were the fourth- and fifth-largest funders of TB drugs research in 2021—spending $23 and $21 million, respectively. Three other entities spent over $10 million: Unitaid, the German Federal Ministry of Education and Research (BMBF), and the EDCTP.

Missing from these data: Viatris, GlaxoSmithKline, and Qurient, all companies that have active TB drug development projects underway, did not respond to TAG's survey.

Vaccines

FIGURE 11

Vaccines: $120,512,790



Funders with investments under 2%

Indian Council of Medical Research (ICMR)	$1,197,025
Archivel Farma	$1,188,871
U.K. Medical Research Council (U.K. MRC)	$841,871
Japan Agency for Medical Research and Development (AMED)	$805,501
Company G	$720,040
Instituto Butantan	$600,000

Irish Health Research Board (HRB)	$332,724
U.S. Department of Veterans Affairs	$330,186
French Ministry of Research and Higher Education	$316,440
São Paulo Research Foundation (FAPESP)	$288,622
Canadian Institutes of Health Research (CIHR)	$224,912
Other funders with expenditures <$200,00	$1,140,064

Tuberculosis vaccine research received a total investment of $121 million in 2021. While this represents a slight (2%) increase over 2020 levels, funding for TB vaccines research has remained relatively flat since 2019.

Investments in TB vaccines R&D remain far below the target in the *2018–2022 Global Plan*, which advocates for annual investments of $613 million into TB vaccines research to reach a total of $3 billion from 2018 to 2022. Cumulative investments from 2018 to 2021 add up to $465 million. This leaves an additional $2.6 billion required in 2022 to close the funding gap.

"As community members we feel like we've not done a lot when it comes to TB vaccines. It's high time that the world leaders and scientists come together to ensure that we are putting in [more resources]."

—Stephen Anguva Shikoli, Kenya Network of TB Champions and Pamoja TB Group

As with other research areas, the funding gap for TB vaccines will likely widen in 2023, when new funding targets for research are triggered. The *2023–2030 Global Plan* increases the annual target for TB vaccines R&D from $613 million to $1.25 billion—which is 10 times greater than current funding levels.

Twelve percent of overall TB research expenditures in 2021 were allocated toward vaccines research. Thirty-two discrete entities invested in TB vaccines research in 2021. Five percent of expenditure on vaccines research was pediatric focused.

The public sector remained the largest source of funding for TB vaccines research. Of every dollar spent on TB vaccines R&D in 2021, $0.62 came from public funders, $0.31 came from philanthropic funders, and $0.07 came from private-sector companies. No multilateral organizations invested in TB vaccines research in 2021.

The U.S. NIH was the largest funder of TB vaccines R&D in 2021, contributing 46% ($55 million) of the total. The Gates Foundation was the second largest, providing 31% ($37 million) of total spend. Seventy-seven percent of the Gates Foundation's investment in TB vaccines research in 2021 went to the Gates Medical Research Institute, a wholly owned subsidiary of the Gates Foundation that is supporting clinical trials of BCG revaccination and the M72/AS01E vaccine candidate. The remaining 23% of Gates Foundation funding for TB vaccines was spent across 22 grants to different research institutes, initiatives, universities, and companies.

In addition to the U.S. NIH, three other public funders contributed more than 2% of the total: the EDCTP, the European Commission, and the Korean Ministry of Health and Welfare.

Two private-sector companies accounted more than 2% of overall spending on TB vaccines R&D. Biofabri and Zhifei Longcom, the Spain- and China-based biopharmaceutical companies, respectively contributed 3% ($4 million) and 2% ($2.9 million).

Only two other entities spent over $1 million on TB vaccines research in 2021: the Indian Council of Medical Research and Archivel Farma.

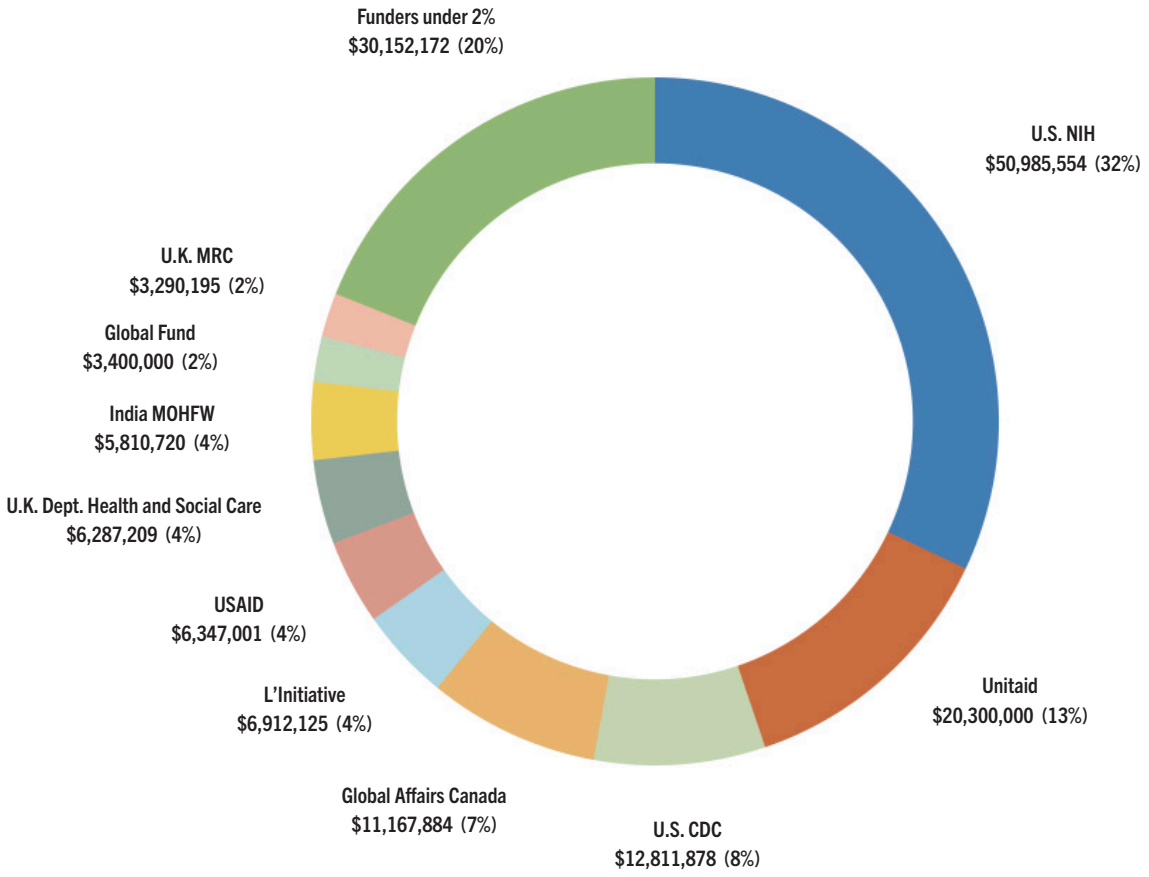
Missing from these data: several companies with active TB vaccine development programs did not respond to the survey, including BioNTech, Moderna, Quratis, Serum Institute of India, and Vakzine Projekt Management. The European Investment Bank, which has committed loans to support vaccine R&D by Vakzine Projekt Management and Serum Institute of India, and Public Health England, which invested over $1 million toward TB research in 2020, also did not respond.[35]

TAG did not send a survey to the HIV Vaccine Trials Network (HVTN) at the NIH, which together with the ACTG and IMPAACT is preparing to conduct clinical trials of TB vaccines. TAG will survey HVTN in future years.

Operational Research & Epidemiology

FIGURE 12

Operational Research & Epidemiology: $157,464,738



Funders with investments under 2%

U.K. Foreign, Commonwealth and Development Office (FCDO)	$2,794,820
Australian Department of Foreign Affairs and Trade (DFAT)	$2,696,511
Wellcome Trust	$2,486,111
President's Emergency Plan for AIDS Relief (PEPFAR)	$2,474,373
Canadian Institutes of Health Research (CIHR)	$2,274,805
Bill & Melinda Gates Foundation	$1,754,349
TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization	$1,681,886
Philippines Department of Science and Technology	$1,522,289
São Paulo Research Foundation (FAPESP)	$1,374,731
European and Developing Countries Clinical Trials Partnership (EDCTP)	$1,120,803
Indian Council of Medical Research (ICMR)	$1,040,548
Australia Department of Health and Aged Care	$1,019,930
European Commission	$930,232
Taiwan Ministry of Health and Welfare	$895,391
Australian National Health and Medical Research Council (NHMRC)	$843,911
German Federal Ministry of Education and Research (BMBF)	$514,750
Korean Ministry of Health and Welfare	$465,000
Swedish Research Council	$452,556
National Research Council of Thailand	$447,416
Brazil Ministry of Health	$433,351
Other funders with expenditures <$400,000	$2,928,410

"If you're doing R&D and it is not reaching people, then we need to incorporate funding in research and development for what a new tool is going to look like after [it's] developed. We have this shorter regimen; what does that look like to implement in populations that we know need it? Even if we develop a vaccine in the next five years, are we allocating resources to get ready to actually vaccinate?"

—Tina Shah, We Are TB and TB Trials Consortium Community Research Advisors Group

The largest increase in financing by research area was seen in TB operational and epidemiological research. Investment in this area grew by 32% between 2020 and 2021, from $119 million to $157 million. Of every dollar spent on TB research in 2021, $0.16 went to operational and epidemiological research—up from $0.13 of every dollar in 2020. Sixty-eight discrete entities invested in operational and epidemiological research in 2021.

Of every dollar spent on TB operational and epidemiological research, $0.81 came from public funders, $0.16 came from multilateral entities, and $0.03 came from philanthropic sources. The two largest funders of operational and epidemiological research—the U.S. NIH and Unitaid—together funded 45% of overall investments in operational and epidemiological research in 2021. Two other entities contributed more than $10 million to operational and epidemiological research: the U.S. CDC and Global Affairs Canada.

The growth in operational and epidemiological research spending was driven by increased investments by leading funders of this research area between 2020 and 2021:

- The U.S. NIH increased its investment from $37 million to $50 million.
- Unitaid increased its investment from $13 million to $20 million.
- The U.S. CDC increased its investment from $5 million to $12.8 million.
- France's L'Initiative increased its investment from $1 million to $6.9 million.
- The U.K. Department of Health and Social Care increased its investment from $4.9 million to $6.2 million.
- Global Affairs Canada retained its investment of $11 million.[36]

Nine percent of overall spending on operational and epidemiological research was focused on pediatric-specific research.

Correction: Investments by the U.K. Department of Health and Social Care (U.K. DHSC) have previously been reported in this series as investments by the U.K. National Institute of Health Research (NIHR). The U.K. DHSC reported investments of $1.6 million in TB operational and epidemiological research during 2019. Last year, the U.K. DHSC did not report its spending to TAG. The U.K. DHSC renewed reporting on its TB research investments and supplied data missing from 2020. During 2020, the U.K. DHSC spent $5.8 million on TB research, of which $4.9 million was allocated to operational and epidemiological research.

Infrastructure and Unspecified

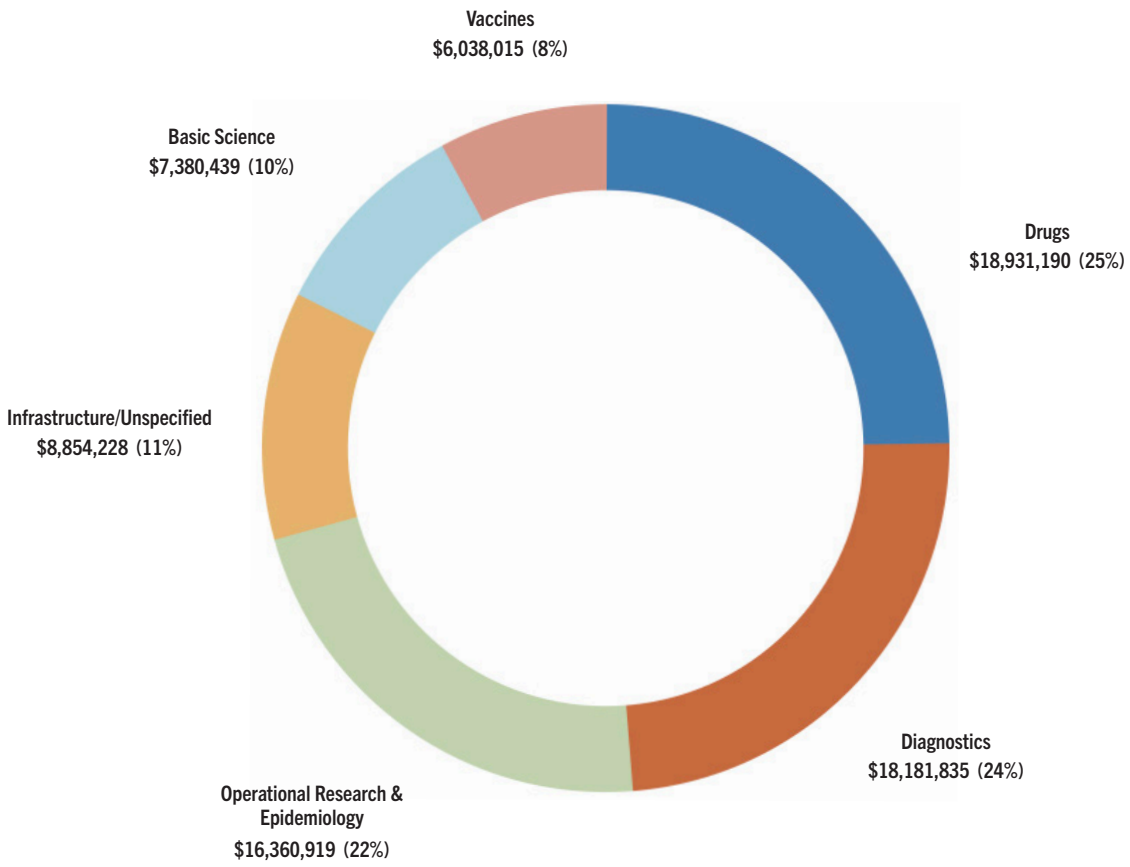
> "If you want to do research in a high number of places, you need to invest in those places so that they actually have well-functioning healthcare systems . . . [and] the reality is that you do research as a research team, and therefore, investment is [needed for] developing research teams [and] developing collaborations."
>
> —Bern-Thomas Nyang'wa, Médecins Sans Frontières and TB PRACTECAL trial

TB-related infrastructure and unspecified research investments received a total investment of $57 million in 2021, accounting for 5% of total spending. Twenty-nine discrete entities invested in research-related infrastructure and unspecified research during 2021. The three largest funders of this area—the U.S. NIH, USAID, and the Indian Council of Medical Research (ICMR)—jointly contributed 72% of the total. Infrastructure spending by the U.S. NIH and USAID included investments in efforts to build research capacity in high-burden TB countries through supporting researcher trainings and networks, as well as investments in research-related infrastructure. ICMR expenditures in this area were allocated toward supporting scientific laboratories, researcher salaries, and research consortiums.

Pediatrics

FIGURE 13

Pediatric TB R&D Funding by Research Area, 2021
Total: $75,746,626



Investments in pediatric-specific TB research fell from $91 million in 2020 to $75 million in 2021. Between these years, pediatric TB research investments also fell from 10% to 8% of overall TB research spending. TAG has previously advocated for 10% of TB research funds to be directed toward pediatric-specific research, noting that TB in children accounts for 10% of the global TB burden.[37]

Public funds for pediatric TB research fell from $65 million in 2020 to $56 million in 2021. Despite this drop, public funders continued to contribute the bulk of funds for pediatric TB research: $0.75 of every dollar spent. Public funders allocated 8% of their total TB research investments toward pediatric-focused research.

Multilateral entities remained the second largest funder of pediatric TB research in 2021, providing $0.21 of every dollar spent. Investments by multilateral organizations in pediatric TB research dropped from $16.9 million in 2020 to $15.7 million in 2021. Twenty-seven percent of overall TB research investments by multilateral entities were directed to pediatric-related efforts. Unitaid's investment of $15.7 million in this area accounted for more than 99% of total spending by

"The biggest risk of disease progression and the most severe disease occurs in young children, who usually are not diagnosed . . . The biggest priority for pediatric TB is better diagnostics. If you can't diagnose, you can't put kids on treatment. We need a better, simple, more reliable saliva or finger prick test for kids."

—Anneke Hesseling, Desmond Tutu TB Centre

multilateral entities on pediatric TB R&D. Unitaid allocated 30% of its overall expenditure on TB research toward pediatric-related efforts.

In 2021, private-sector companies only contributed $0.02 of every dollar spent on pediatric TB research, down from $0.09 in 2020. Industry spending on pediatric TB research fell from $7.9 million in 2020 to $1.8 million in 2021. Two percent of overall TB research spending by industry was allocated toward pediatric-specific R&D. Company X, which drove private-sector investment in 2020, with a $6.5 million investment in this area, did not delineate the share of its overall spending that went toward pediatric-specific projects. Only three companies reported investing more than $500,000 in pediatric TB research in 2021: Company G, QIAGEN, and Zhifei Longcom.

Philanthropic giving to pediatric TB research remained low at $1.5 million, and 70% of this amount came from a single entity: the Wellcome Trust. Philanthropic organizations directed a dismal 1% of their overall TB R&D investments toward pediatric-focused research. This equated to $0.02 of every dollar spent on pediatric TB research in 2021.

Pediatric drugs, diagnostics, and operational and epidemiological research received the bulk of pediatric-focused TB research funds during 2021. Of every dollar spent on pediatric TB research, $0.25 was allocated to drugs research, $0.24 was allocated to diagnostics research, $0.22 was allocated to operational and epidemiological research, $0.10 was allocated to basic science research, and $0.08 was allocated to vaccines research. The remaining $0.11 went to infrastructure and unspecified research projects.

The U.S. NIH and USAID remained the two largest funders of pediatric TB research in 2021, together contributing 58% of funding in this area. Unitaid was the third-largest funder with 21% of the total. The EDCTP, which was the third-largest funder of pediatric TB research in 2020, was the fourth-largest in 2021. The EDCTP's investments declined from $17 million in 2020 to $4.8 million in 2021.

The Philippines Department of Science and Technology, which did not return a survey to TAG in 2020, was the sixth-largest funder of pediatric TB research in 2021, with investments of $1.3 million.

Missing from these data: For the first time since TAG began collecting pediatric TB R&D funding data, Company X did not report the pediatric share of its total spending. Company X spent $6.5 million on pediatric TB R&D in 2020.

TABLE 4

Top 15 Pediatric TB R&D Funders, 2021

RANK	FUNDER	FUNDER TYPE	2021 FUNDING	PERCENTAGE
1	U.S. National Institutes of Health (NIH)	P	$25,767,652	34%
2	U.S. Agency for International Development (USAID)	P	$18,099,885	24%
3	Unitaid	M	$15,700,000	21%
4	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$4,803,652	6%
5	U.K. Medical Research Council (U.K. MRC)	P	$2,114,102	3%
6	Philippines Department of Science and Technology	P	$1,336,887	2%
7	Wellcome Trust	F	$1,064,667	1%
8	Company G	C	$720,040	1%
9	European Commission	P	$706,634	1%
10	Instituto Butantan	P	$600,000	1%
11	Australian National Health and Medical Research Council (NHMRC)	P	$580,228	1%
12	QIAGEN	C	$574,754	1%
13	Anhui Zhifei Longcom Biopharmaceutical Co.	C	$553,549	1%
14	L'Initiative	P	$528,727	1%
15	French Ministry of Research and Higher Education	P	$500,768	1%
	Other funders with expenditures <$500,000		$2,095,082	3%
	Total		$75,746,626	

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

Discussion

"A strong and focused TB R&D fundraising campaign is the only realistic approach to get the needed $5 billion annually called for in the *Global Plan to End TB 2023–2030*. We should not accept anything less than a TB vaccine to be rolled out globally to ensure we end TB by 2030—we know that it is possible."

—Lucica Ditiu, Stop TB Partnership

"Civil society's advocacy, that role that we saw for HIV, and then we saw also for COVID . . . I think that kind of momentum we need for TB as well. So that there is a continuous, unrelenting advocacy coming from many different groups and corners of the world, including people affected by TB."

—Soumya Swaminathan, World Health Organization

Funding for TB research exceeded $1 billion in 2021. While this is a significant achievement that has never before been accomplished, years of underfinancing, combined with the damage wrought on the TB response by COVID-19, means that far greater investment is now needed to end TB by 2030.

At current financing levels, the SDG target to end the TB epidemic by 2030 will not be met. TB will continue to devastate communities as we move toward the second half of the twenty-first century. The good news is that scientific progress already underway offers real hope for curbing the epidemic by 2030. Meeting this target, however, will require drastically scaled-up financing to expedite research and deliver new tools to stop TB, especially new vaccines and diagnostics.

Stop TB Partnership has costed the research activities required to put the world on track to end the TB epidemic by 2030. To achieve this SDG target, funding for TB research must be scaled up to $5 billion annually between 2023 and 2030—or five times more than current spending levels.

While meeting the $5 billion target may appear unattainable when compared with current and historical TB research funding levels, a closer look at this year's data reveals opportunities for mobilizing more funds. Philanthropic funders, private-sector companies, and multilateral organizations all spent less in 2021 than they have in previous years:

- Philanthropic organizations contributed $141 million to TB research in 2021, below their 2013 investment levels of $170 million—equivalent to $192 million when adjusted for inflation.[38]
- Private-sector entities spent $102 million on TB research on 2021, far below their 2011 spending levels of $145 million—equivalent to $172 million when adjusted to inflation.[39]
- Multilateral organizations contributed $59 million in 2021, below their peak investment of $62 million in 2019, equivalent to $64 million when adjusted for inflation.[40]

Historical funding figures alone show that philanthropic funders, private-sector companies, and multilateral entities can all contribute more toward TB research than they did in in 2021.

Financing from philanthropic donors and multilateral organizations remains overly dependent on large contributions from a small number of funders, with a concerning short trail of smaller donors. The Gates Foundation contributed 81% of all philanthropic funds for TB research in 2021, while Unitaid contributed 87% of all spending by multilateral organizations.

At the same time, far too few private-sector companies are spending far too little on TB research, which impedes the translation of scientific progress into new product availability. Only three companies invested more than $10 million in TB R&D in 2021. Cumulative spending on TB vaccine research by private companies remained below $10 million, despite several promising vaccine candidates ready for late-stage clinical trials. This stubborn lack of funding for TB vaccine R&D imperils the potential of one or more of these candidates to help end the TB epidemic.

While public investment in TB research reached a new record in 2021, it remained far below what could be achieved if all UN member states contributed their fair share to TB research (0.1% of overall R&D expenditures). Only three countries met their fair-share targets in 2021.

Delivering and rolling out new biomedical tools, including vaccines and diagnostics, that are essential to ending the TB epidemic by 2030 will require immediate, collective, and multi-sectoral action. It will depend on existing funders giving more, and on reducing the high dependency of TB research financing on the continued giving of a small number of funders. It will require countries at all levels of income and TB burden to contribute their fair share toward TB research.

In addition to growing financial contributions from traditional funders of TB research, ending the TB epidemic by 2030 will require creating new mechanisms that deploy innovative financing tools and strategies. Solutions might include ear marked micro-levies (similar to the airline ticket levies used in France to generate funds to support Unitaid) and mechanisms for generating and pooling funds across donors. Corporate social responsibility budgets, including from corporations and businesses in countries with a high TB burden, and other non-traditional sources of TB research financing will need to be tapped.

Reaching the $5 billion annual financing target for TB research is not impossible, but its attainment will require redoubling advocacy efforts to broadly convey the urgent need and unprecedented opportunity for investing in TB research that has the potential to bring forward transformative new tools, ones capable of curbing TB infections and deaths. With more funding, it is possible for TB research to reach this higher plane of possibility.

The 2023 UN High-Level Meeting on TB provides a unique forum for governments and other stakeholders to confront the staggering gap between aspiration and reality and, in doing so, recommit to ending TB through innovation.

"I think the big question is, do we need more funding mechanisms or just more money through the current mechanisms?"

—**Fareed Abdullah, Office of AIDS & TB Research at the South African Medical Research Council**

"You have this new constellation of research and development funders . . . The United States has announced ARPA-H. [There's] the European Union's HERA and the World Bank's Financial Intermediary Fund. That's where the center of gravity is for R&D funding, and so there's going to have to be a case made to fit TB within the remit of what those different agencies are doing."

—**Rohit Malpani, former Unitaid NGO delegation board member**

"As we all know, TB is an airborne disease. That means nobody's immune. I breathe, you breathe. That means if I'm at risk, you're at risk. The risk is higher when you don't have diagnostic tools, when you don't have vaccines . . . I believe if we have new innovations, if we have new tools, if we have [a] new vaccine, then we will be able to reduce delays in diagnosis and TB deaths around the world."

—**Stephen Anguva Shikoli, Kenya Network of TB Champions and Pamoja TB Group**

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. Respondents report expenditures according to how their fiscal year is defined, so the funding reported here does not align with calendar year 2021 perfectly.

TAG surveyed 300 organizations for this year's report, more than in any other year, and received 170 surveys in return. From these 170 surveys, we identified 161 institutions funding TB research in 2021. Twenty-four organizations that returned surveys indicated that they did not invest or were unable to report.

Organizations report funding in local currencies, which TAG converts into U.S. dollars using the average annual 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 2021, 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 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 10 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 2022 and was asked to reflect on the state of TB research and funding for it. TAG recorded and transcribed each phone interview, pulled quotations from the transcripts, and selected the excerpts that appear 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 multiple languages, and 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, 29 of the top 30 funders in fiscal year 2021 participated in the survey (the exception was Viatris).

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

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 146 organizations around the world that participated in this year's survey.

TB stakeholders interviewed by TAG

1. Anneke Hesseling, Director, Desmond Tutu TB Centre, Stellenbosch University
2. Bern-Thomas Nyang'wa, Medical Director, Médecins Sans Frontières, and Chief Investigator, TB PRACTECAL trial
3. Carlos Martín, Professor of Microbiology, Faculty of Medicine, University of Zaragoza, and co-inventor of the MTBVAC vaccine candidate
4. Fareed Abdullah, Director, Office of AIDS & TB Research at the South African Medical Research Council
5. Leonid Lecca, Executive Director, Partners in Health Peru
6. Lucica Ditiu, Executive Director, Stop TB Partnership
7. Rohit Malpani, former Unitaid NGO delegation board member
8. Stephen Anguva Shikoli, National Coordinator, Kenya Network of TB Champions and Director, Pamoja TB Group
9. Soumya Swaminathan, Chief Scientist, World Health Organization (at the time of interview)
10. Tina Shah, PharmD, member of We Are TB and the TB Trials Consortium Community Research Advisors Group

Appendix 2: TB R&D Funders by Rank

TB R&D Funders by Rank, 2021

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
1	U.S. National Institutes of Health (NIH)	P	$354,793,943	$114,449,433	$44,602,340	$75,421,898	$55,171,740	$50,985,554	$14,162,978
2	Bill & Melinda Gates Foundation	F	$113,449,327	$413,431	$6,686,868	$66,918,804	$37,337,800	$1,754,349	$338,076
3	Unitaid	M	$51,429,969	$0	$11,529,969	$19,600,000	$0	$20,300,000	$0
4	AMR Accelerator/Innovative Medicines Initiative	P	$31,116,653	$0	$0	$31,116,653	$0	$0	$0
5	European Commission	P	$30,537,224	$8,793,779	$7,292,110	$8,953,653	$4,351,964	$930,232	$215,486
6	U.S. Agency for International Development (USAID)	P	$30,000,620	$0	$1,779,885	$8,400,000	$0	$6,347,001	$13,473,734
7	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$29,289,139	$0	$11,157,298	$10,966,809	$5,789,983	$1,120,803	$254,246
8	U.S. Centers for Disease Control and Prevention (CDC)	P	$25,894,931	$0	$7,101,258	$4,298,169	$0	$12,811,878	$1,683,626
9	Otsuka Pharmaceutical	C	$23,701,770	$0	$0	$23,701,770	$0	$0	$0
10	Company X	C	$21,736,349	$0	$80,000	$21,656,349	$0	$0	$0
11	German Federal Ministry of Education and Research (BMBF)	P	$17,505,028	$2,488,790	$948,689	$11,415,271	$106,465	$514,750	$2,031,062
12	Indian Council of Medical Research (ICMR)	P	$16,481,610	$87,729	$224,446	$730,506	$1,197,025	$1,040,548	$13,201,356
13	Oxford Immunotec	C	$12,000,000	$0	$12,000,000	$0	$0	$0	$0
14	Wellcome Trust	F	$11,849,984	$6,214,497	$3,116,327	$33,049	$0	$2,486,111	$0
15	U.K. Foreign, Commonwealth and Development Office (FCDO)	P	$11,795,771	$0	$0	$8,940,094	$0	$2,794,820	$60,857
16	U.K. Medical Research Council (U.K. MRC)	P	$11,560,248	$1,613,486	$1,271,944	$4,397,075	$841,871	$3,290,195	$145,677
17	Global Affairs Canada	P	$11,167,884	$0	$0	$0	$0	$11,167,884	$0
18	Korean Ministry of Health and Welfare	P	$10,086,394	$2,311,900	$2,986,000	$1,052,400	$2,873,000	$465,000	$398,094
19	Australian Department of Foreign Affairs and Trade (DFAT)	P	$8,329,491	$0	$2,816,490	$2,816,490	$0	$2,696,511	$0
20	U.K. Department of Health and Social Care	P	$7,823,623	$0	$0	$0	$0	$7,823,623	$0
21	Korea Ministry of Science, ICT and Future Planning	P	$7,110,000	$3,566,000	$178,000	$144,000	$0	$0	$3,222,000
22	L'Initiative	P	$6,912,125	$0	$0	$0	$0	$6,912,125	$0
23	Médecins Sans Frontières (MSF)	F	$6,534,414	$0	$169,322	$6,281,087	$0	$84,005	$0
24	Netherlands Enterprise Agency	P	$6,482,732	$0	$2,980,960	$3,501,772	$0	$0	$0
25	KfW Development Bank	C	$6,349,327	$0	$6,349,327	$0	$0	$0	$0
26	Indian Ministry of Health and Family Welfare (MOHFW)	P	$5,913,248	$0	$0	$0	$0	$5,810,720	$102,529
27	Canadian Institutes of Health Research (CIHR)	P	$5,658,395	$2,075,850	$0	$1,082,827	$224,912	$2,274,805	$0
28	Macleods Pharmaceuticals	C	$5,000,000	$0	$0	$5,000,000	$0	$0	$0
29	Australian National Health and Medical Research Council (NHMRC)	P	$4,822,761	$2,753,540	$834,558	$273,760	$116,991	$843,911	$0
30	French Ministry of Research and Higher Education	P	$4,814,772	$209,078	$79,339	$1,723,274	$316,440	$17,839	$2,468,803
31	Merck (known as MSD outside of the U.S. and Canada)	C	$4,167,797	$0	$0	$4,167,797	$0	$0	$0
32	Anhui Zhifei Longcom Biopharmaceutical Co.	C	$4,145,802	$0	$1,233,152	$0	$2,912,650	$0	$0
33	Biofabri	C	$4,089,397	$0	$0	$0	$4,089,397	$0	$0
34	LegoChem Biosciences	C	$4,056,980	$0	$0	$4,056,980	$0	$0	$0

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

Appendix 2

TB R&D Funders by Rank, 2021 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
35	Qure.ai	C	$4,000,000	$0	$4,000,000	$0	$0	$0	$0
36	Swiss National Science Foundation	P	$3,981,657	$2,099,638	$134,103	$1,431,491	$0	$143,581	$172,844
37	Swedish Research Council	P	$3,787,985	$1,496,152	$439,638	$1,304,908	$94,731	$452,556	$0
38	French National Research Agency (ANR)	P	$3,771,684	$2,188,965	$0	$1,582,719	$0	$0	$0
39	Japan Agency for Medical Research and Development (AMED)	P	$3,706,172	$2,619,110	$281,561	$0	$805,501	$0	$0
40	Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)	M	$3,400,000	$0	$0	$0	$0	$3,400,000	$0
41	South African Department of Science and Innovation (DSI)	P	$3,268,318	$1,521,422	$67,454	$1,314,747	$0	$364,695	$0
42	U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	P	$3,257,301	$1,666,920	$103,155	$864,282	$34,385	$34,385	$554,174
43	Philippines Department of Science and Technology	P	$2,615,026	$680,764	$411,973	$0	$0	$1,522,289	$0
44	President's Emergency Plan for AIDS Relief (PEPFAR)	P	$2,474,373	$0	$0	$0	$0	$2,474,373	$0
45	Innovate UK (UKRI)	P	$2,270,414	$0	$1,805,589	$361,826	$0	$103,000	$0
46	Fujifilm Corporation	C	$2,200,000	$0	$2,200,000	$0	$0	$0	$0
47	QIAGEN	C	$2,174,977	$0	$2,174,977	$0	$0	$0	$0
48	Cystic Fibrosis Foundation	F	$2,092,492	$0	$0	$2,092,492	$0	$0	$0
49	São Paulo Research Foundation (FAPESP)	P	$1,995,199	$106,154	$25,855	$197,631	$288,622	$1,374,731	$2,206
50	TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization Health Organization	M	$1,954,323	$0	$0	$0	$0	$1,681,886	$272,437
51	Japan Ministry of Health, Labour and Welfare	P	$1,942,651	$0	$0	$0	$0	$4,556	$1,938,095
52	Swiss Agency for Development and Cooperation (SDC)	P	$1,908,939	$0	$1,908,939	$0	$0	$0	$0
53	Molbio Diagnostics	C	$1,829,000	$0	$1,829,000	$0	$0	$0	$0
54	Fundació Bancaria "La Caixa"	F	$1,725,515	$1,181,060	$0	$544,455	$0	$0	$0
55	U.K. Engineering and Physical Sciences Research Council (EPSRC)	P	$1,715,348	$34,385	$1,087,160	$275,080	$0	$104,037	$214,686
56	Global Health Innovative Technology Fund (GHIT)	M	$1,647,776	$0	$759,702	$888,073	$0	$0	$0
57	U.S. National Science Foundation (NSF)	P	$1,539,491	$1,539,491	$0	$0	$0	$0	$0
58	South African Medical Research Council	P	$1,478,814	$221,250	$0	$948,092	$68,490	$240,981	$0
59	German Research Foundation (DFG)	P	$1,459,403	$1,374,586	$0	$0	$84,817	$0	$0
60	U.S. Department of Veterans Affairs	P	$1,342,228	$406,916	$0	$605,126	$330,186	$0	$0
61	BATM	C	$1,253,925	$0	$1,253,925	$0	$0	$0	$0
62	Company V	C	$1,253,237	$0	$0	$1,253,237	$0	$0	$0
63	Archivel Farma	C	$1,188,871	$0	$0	$0	$1,188,871	$0	$0
64	Irish Aid	P	$1,182,948	$0	$0	$1,182,948	$0	$0	$0
65	Australia Department of Health and Aged Care	P	$1,126,596	$0	$0	$106,666	$0	$1,019,930	$0
66	LifeArc	F	$1,027,727	$0	$1,027,727	$0	$0	$0	$0
67	India Ministry of Science and Technology	P	$997,183	$797,952	$45,984	$122,450	$0	$30,796	$0
68	Company Y	C	$989,000	$0	$989,000	$0	$0	$0	$0

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

Appendix 2

TB R&D Funders by Rank, 2021 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
69	Taiwan Ministry of Health and Welfare	P	$925,391	$30,000	$0	$0	$0	$895,391	$0
70	New Zealand Health Research Council	P	$882,431	$47,666	$44,186	$376,948	$17,675	$113,182	$282,773
71	Swedish Heart-Lung Foundation	F	$787,354	$311,663	$116,553	$300,862	$0	$58,277	$0
72	Norwegian Ministry of Education and Research	P	$786,087	$572,006	$0	$214,081	$0	$0	$0
73	Academy of Finland	P	$757,775	$0	$0	$757,775	$0	$0	$0
74	Hefei National High-Tech Industry Development Zone	P	$748,448	$0	$748,448	$0	$0	$0	$0
75	Company G	C	$720,040	$0	$0	$0	$720,040	$0	$0
76	Carlos III Health Institute	P	$701,890	$701,890	$0	$0	$0	$0	$0
77	Korean Ministry of SMEs and Startups	P	$700,000	$75,000	$625,000	$0	$0	$0	$0
78	Company F	C	$675,000	$0	$675,000	$0	$0	$0	$0
79	Korean Ministry of Education	P	$671,000	$476,000	$26,000	$0	$149,000	$0	$20,000
80	National Research Council of Thailand	P	$616,894	$161,426	$8,052	$0	$0	$447,416	$0
81	Instituto Butantan	P	$600,000	$0	$0	$0	$600,000	$0	$0
82	The RIGHT Fund	M	$539,590	$0	$237,532	$302,058	$0	$0	$0
83	Irish Health Research Board (HRB)	P	$517,494	$0	$0	$184,770	$332,724	$0	$0
84	Mueller Health Foundation	F	$497,480	$0	$0	$497,480	$0	$0	$0
85	Brazil Ministry of Health	P	$497,336	$0	$0	$0	$0	$433,351	$63,985
86	Dutch Research Council (NWO)	P	$487,966	$487,966	$0	$0	$0	$0	$0
87	Open Philanthropy	F	$460,000	$0	$460,000	$0	$0	$0	$0
88	Individual donors to TB Alliance	F	$436,743	$0	$0	$436,743	$0	$0	$0
89	Independent Research Fund Denmark	P	$434,267	$434,267	$0	$0	$0	$0	$0
90	Fondation Mérieux	F	$357,739	$0	$157,083	$0	$0	$0	$200,656
91	National Research Foundation of Korea (NRF)	P	$357,459	$229,163	$0	$0	$128,296	$0	$0
92	Korean Health Industry Development Institute (KHIDI)	P	$335,669	$152,775	$52,380	$95,594	$0	$34,920	$0
93	Danish International Development Agency (DANIDA)	P	$317,887	$0	$0	$0	$0	$317,887	$0
94	U.K. Natural Environment Research Council (NERC)	P	$289,688	$34,385	$0	$0	$0	$255,303	$0
95	Tampere Tuberculosis Foundation	F	$282,725	$282,725	$0	$0	$0	$0	$0
96	Doris Duke Charitable Foundation	F	$282,335	$265,835	$0	$0	$0	$16,500	$0
97	Norwegian Ministry of Health and Care Services	P	$280,596	$280,596	$0	$0	$0	$0	$0
98	Sequella	C	$270,000	$0	$0	$270,000	$0	$0	$0
99	Netherlands Ministry of Health	P	$259,929	$82,357	$0	$0	$0	$177,572	$0
100	Marsden Fund	P	$247,617	$247,617	$0	$0	$0	$0	$0
101	Pan American Health Organization	M	$223,287	$0	$0	$15,000	$0	$208,287	$0
102	Bouisson Bertrand Institute	F	$216,403	$0	$216,403	$0	$0	$0	$0
103	Mexico National Council on Science and Technology (CONACYT)	P	$207,276	$207,276	$0	$0	$0	$0	$0
104	Japan Society for the Promotion of Science	P	$200,191	$135,040	$31,983	$0	$0	$33,168	$0

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

Appendix 2

TB R&D Funders by Rank, 2021 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	INFRASTRUCTURE/ UNSPECIFIED
105	Korea Rural Development Administration	P	$194,000	$0	$0	$0	$0	$0	$194,000
106	Chile National Research and Development Agency (ANID)	P	$146,434	$146,434	$0	$0	$0	$0	$0
107	Japan BCG Laboratory	C	$145,336	$18,224	$0	$0	$127,112	$0	$0
108	Spain Ministry of Science, Innovation and Universities—State Research Agency	P	$143,250	$0	$0	$0	$143,250	$0	$0
109	Institut Pasteur Paris	F	$141,923	$141,923	$0	$0	$0	$0	$0
110	Foundation for Neglected Disease Research, India	F	$136,737	$0	$0	$136,737	$0	$0	$0
111	Individual donors to the Foundation for Medical Research, Mumbai	F	$135,160	$0	$135,160	$0	$0	$0	$0
112	Colombian Ministry of Science, Technology and Innovation (MINCIENCIAS)	P	$133,332	$66,666	$0	$0	$0	$66,666	$0
113	Korean Institute of Tuberculosis	P	$127,022	$83,372	$0	$0	$43,650	$0	$0
114	Philippines Commission on Higher Education (CHED)	P	$125,263	$125,263	$0	$0	$0	$0	$0
115	Damien Foundation	F	$123,962	$0	$101,730	$0	$0	$22,233	$0
116	e-ASIA Joint Research Program	P	$121,431	$0	$121,431	$0	$0	$0	$0
117	Paraguay National Council for Science and Technology (CONACYT)	P	$120,000	$80,000	$0	$0	$0	$40,000	$0
118	Research Institute of Tuberculosis/Japan Anti-Tuberculosis Association	P	$118,752	$0	$0	$0	$0	$0	$118,752
119	Stop TB Partnership (UNOPS)	M	$118,000	$0	$0	$118,000	$0	$0	$0
	Organizations with expenditures < $100,000		$1,557,661	$506,304	$259,600	$260,044	$25,200	$456,542	$49,970
	TOTAL		$1,000,326,531	$169,296,118	$149,980,565	$345,692,803	$120,512,790	$157,464,738	$57,379,517

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

Endnotes

1. United Nations. Sustainable Development Goal 3 [Internet]. n.d. (cited 2022 October 16). https://sdgs.un.org/goals/goal3.

2. United Nations. Political declaration of the UN General Assembly High-Level Meeting on the fight against tuberculosis. New York: United Nations; 2018. https://cdn.who.int/media/docs/default-source/documents/tuberculosis/political-declaration-un-general-assembly-tb-tuberculosis77cd7a27-7e8d-4fbb-9729-a5dbd505798f.pdf?sfvrsn=4f4090dc_1&download=true.

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

4. Nyang'wa BT, LaHood AN, Mitnick CD, Guglielmetti L. TB research requires strong protections, innovation, and increased funding in response to COVID-19. Trials. 2021 May 29;22(1):371. https://doi.org/10.1186/s13063-021-05331-4.

5. Stop TB Partnership. Global plan to end TB 2023-2030. Geneva: Stop TB Partnership; 2022. https://www.stoptb.org/global-plan-to-end-tb/global-plan-to-end-tb-2023-2030.

6. Knowledge Portal on Innovation and Access to Medicines. COVID-19 vaccine R&D investments [Internet]. 2021 July 8 (cited 2022 October 16). https://www.knowledgeportalia.org/covid-19-vaccine-r-d-funding.

7. kENUP Foundation [Press Release]. Governments spent at least €93bn on COVID-19 vaccines and therapeutics during the last 11 months. 2021 January 11 (cited 2021 November 2). https://www.businesswire.com/news/home/20210110005098/en/GovernmentsSpent-at-Least-%E2%82%AC93bn-on-COVID-19-Vaccines-and-Therapeutics-During-the-Last-11-Months.

8. Organisation for Economic Co-operation and Development (OECD). OECD DAC survey on providers' responses to COVID-19: Private philanthropic foundations. Paris: OECD; 2020. https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/OECD-DAC-survey-on-foundations-immediate-response-to-COVID19.pdf.

9. Organisation for Economic Co-operation and Development (OECD). DAC working party on development finance statistics: COVID-19 survey main findings. Paris: OECD; 2020. https://one.oecd.org/document/DCD/DAC/STAT(2020)35/en/pdf.

10. World Bank. Poverty and shared prosperity 2022: Correcting course. Washington, D.C.: World Bank; 2022. doi:10.1596/978-1-4648-1893-6.

11. FSIN and Global Network Against Food Crises. Global report on food crises 2021. Rome: FSIN; 2021. https://www.fsinplatform.org/sites/default/files/resources/ files/GRFC2021.pdf.

12. World Bank [Press Release]. Learning losses from COVID-19 could cost this generation of students close to $17 trillion in lifetime earnings. 2021 December 6 (cited 2022 October 31). https://www.worldbank.org/en/news/press-release/2021/12/06/learning-losses-from-covid-19-could-cost-this-generation-of-students-close-to-17-trillion-in-lifetime-earnings.

13. Zimmer C, Corum J, Wee SL, Kristoffersen M. Coronavirus vaccine tracker [Internet]. New York Times. 2022 August 31 (cited 2022 October 12). https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html.

14. Frick M. The Tuberculosis Vaccines Pipeline Report. New York: Treatment Action Group; 2022. https://www.treatmentactiongroup.org/resources/pipeline-report/2022-pipeline-report/.

15. Stop TB Partnership. Global plan to end TB 2018-2022. Geneva: Stop TB Partnership; 2019. https://www.stoptb.org/sites/default/files/gpr_2018-2022_digital.pdf.

16. United Nations. Political declaration of the UN High-Level Meeting on tuberculosis.

17. Stop TB Partnership. Global plan to end TB 2023-2030.

18. United Nations. Sustainable Development Goal 3.

19. Stop TB Partnership. Global plan to end TB 2023-2030.

20. USAID [Press Release]. USAID announce up to $200 million for research to combat tuberculosis. 2022 August 4 (cited 2022 November 1). https://www.usaid.gov/news-information/press-releases/aug-04-2022-usaid-announces-200-million-research-combat-tuberculosis.

21. United Nations. Political declaration of the UN High-Level Meeting on tuberculosis.

22. European Union. Definitive adoption (EU, Euratom) 2021/417 of the European Union's general budget for the financial year 2021. Official Journal of the European Union: L Series (legislation). 93.1. 2021 March 17. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2021.093.01.0001.01.ENG.

23. World Bank. Research and development expenditure (% of GDP) [Internet]. 2022 June (cited 2022 October 8). https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.

24. Philippines Department of Science and Technology. Record breaking increase in R&D: DOST launches S&T statistics [Internet]. 2021 November 18 (cited 2022 October 4). https://www.dost.gov.ph/knowledge-resources/news/72-2021-news/2548-record-breaking-increase-in-r-d-dost-launches-s-t-statistics.html.

25. United Nations. Universal values: leave no one behind [Internet]. n.d. (cited 2022 October 4). https://unsdg.un.org/2030-agenda/universal-values/leave-no-one-behind

26. European Commission [Press Release]. Horizon Europe: The most ambitious EU research & innovation programme ever. 2021 May 4 (cited 2022 October 14). https://data.europa.eu/doi/10.2777/202859.

27. European Commission. Global Europe: The Neighbourhood, development and international cooperation instrument [Internet]. 2021 June 9 (cited 2022 October 17). https://international-partnerships.ec.europa.eu/funding/funding-instruments/global-europe-neighbourhood-development-and-international-cooperation-instrument_en.

28. European Commission. Horizon Europe Work Programme 2021–2022. Brussels: European Commission; 2022. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-4-health_horizon-2021-2022_en.pdf

29. European & Developing Countries Clinical Trials Partnership (EDCTP). Frequently asked questions: Global health EDCTP3 joint undertaking [Internet]. n.d. (cited 2022 October 16). http://www.edctp.org/frequently-asked-questions-global-health-edctp3-joint-undertaking/.

30. Innovative Medicines Initiative. The IMI funding model [Internet]. n.d. (cited 2022 October 10). https://www.imi.europa.eu/about-imi/imi-funding-model.

31. Treatment Action Group. European commitments to TB R&D investments: Promises made to be broken? New York: Treatment Action Group; 2022. https://www.treatmentactiongroup.org/publication/european-commitments-to-tb-rd-investments-promises-made-to-be-broken/.

32. U.S. Bureau of Labor Statistics. CPI inflation calculator [Internet]. n.d. (cited 2022 October 28). https://data.bls.gov/cgi-bin/cpicalc.pl?cost1=144%2C972.00&year1=201101&year2=202101.

33. Yassin, Mohammed (The Global Fund, Geneva, Switzerland). Email with: Catherine Tomlinson (Treatment Action Group, New York, NY). 2022 August 15.

34. Unitaid [Press Release]. Unitaid launches major new investment to increase tuberculosis detection and find the missing millions. 2022 September 6 (cited 2022 October 8). https://Unitaid.org/news-blog/Unitaid-launches-major-new-investment-to-increase-tuberculosis-detection-and-find-the-missing-millions/#en.

35. European Investment Bank [Press Release]. EUR30 million EIB backing to accelerate tuberculosis vaccine development in Africa. 2020 August 27 (cited 2022 October 17). https://www.eib.org/en/press/all/2020-226-eur-30-million-eib-backing-to-accelerate-tuberculosis-vaccine-development-in-africa

36. Government of Canada. Project profile TB REACH: Supporting innovation in detection and care for tuberculosis [Internet]. n.d. (cited 2022 October 17). https://w05.international.gc.ca/projectbrowser-banqueprojets/projectprojet/details/d000920001

37. 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/.

38. U.S. Bureau of Labor Statistics. CPI inflation calculator.

39. Ibid.

40. Ibid.

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

Stop TB Partnership

TAG
Treatment Action Group