Tuberculosis Research Funding Trends, 2005–2022

Stop TB Partnership

TAG
Treatment Action Group

ACKNOWLEDGMENTS

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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.

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Executive Summary

> "We need governments, and particularly G20 countries, to show the same urgency to develop new TB vaccines and tools that they did during the COVID pandemic. I'm calling on governments to launch a focused TB R&D fundraising campaign to ensure we have the funding needed to roll out a new TB vaccine by the end of 2027 and the other tools needed to ensure we can end TB by 2030."
>
> – Lucica Ditiu, Stop TB Partnership Executive Director

This year, in late September 2023, world leaders gathered in New York City for the second United Nations (UN) High-Level Meeting (HLM) on Tuberculosis (TB). During the 2023 UN HLM on TB, country governments reaffirmed their commitment to end the TB epidemic by 2030 — in line with the Sustainable Development Goals (SDGs) and the Agenda for 2030 — and adopted a political declaration establishing new targets to realize this vision.

The 2023 political declaration replaces the one passed at the first UN HLM on TB in 2018. It arrives in a world much changed by the COVID-19 pandemic, political strife, economic uncertainty, and war and violent conflict. At times, tensions between UN member states appeared to threaten its passage altogether. Yet despite its difficult birth, or perhaps because of it, the declaration does not turn away from the sobering realities of the global TB epidemic. Its first paragraph expresses "deep concern" about missed targets agreed on in 2018, conveys "alarm" about the increases in TB illness and death seen in the wake of COVID-19, and describes drug-resistant TB as a "persistent crisis."[1] To face these challenges, the declaration sets forth new targets for TB diagnosis, treatment, and prevention as well as financing for TB programs and for research and innovation.

Yet refreshed political rhetoric cannot paper over the indisputable fact that the world is far off-track from ending TB by 2030. This airborne disease has taken one billion lives over the past 200 years and remains the leading cause of death globally by an infectious agent.[2] In 2022, 1.3 million people died from tuberculosis and 10.6 million people fell sick with the disease.[3]

Stop TB Partnership's *2023–2030 Global Plan to End TB* forecasts that maintaining this dismal status quo will result in result in an additional 6.6 million TB deaths by 2030.[4] This is a collective loss of human life and potential the world cannot afford. Yet, with substantially expanded financing, the universal implementation of existing tools, and the creation of new ones, TB deaths can be cut by 90% by 2030.

Acknowledging that ending TB by 2030 will require technological advancements and the development of innovative tools and approaches for preventing, diagnosing, and treating TB, UN member states articulated new commitments to accelerating TB science and adopted new funding targets for TB research and development (R&D) at the 2023 UN HLM on TB. International dignitaries and political leaders agreed to increase the annual funding target for TB research to $5 billion by 2027.[5] This is more than double the figure committed to during the 2018 UN HLM on TB ($2 billion annually)[6] and will require a five-fold increase in financing above current levels, as TB research spending currently sits at $1 billion per year.

Supported by the Stop TB Partnership, TAG has monitored TB research investments since 2005, making this report the eighteenth in our series. By tracking changes to TB research funding over time, TAG's monitoring enables advocates and policymakers to evaluate global and country-level progress in meeting TB research funding targets. The data collected for this year's report on TB

R&D funding in fiscal year 2022 also allows us, for the first time, to fully assess progress made against the funding targets set out in the *2018–2022 Global Plan to End TB* and the five years following the 2018 UN HLM on TB.

Our monitoring shows that, as a global community, we have fallen far short of the shared commitments made at the UN level. If countries had invested at least $2 billion into TB R&D each year since 2018, then cumulative TB research spending through 2022 would have reached $10 billion. However, only $4.7 billion was spent on TB research over this period. Put another way, spending over the last five years adds up to less than the new annual investment target.

In addition to monitoring global progress, TAG assesses countries' contributions toward TB research using a framework called "fair share." TAG and partners developed the fair share metric as a tool for evaluating whether countries are contributing their share of required financing for TB R&D. The fair share metric sets minimum financing targets that countries must mutually reach to attain the global TB R&D funding target. It defines country-level targets according to countries' ability to pay, measured in relation to what they already spend on all forms of research and development.

Reaching the $2 billion annual funding target adopted at the 2018 UN HLM on TB required that all countries allocate 0.1% of their gross expenditure on research and development (GERD) to TB R&D. From 2018 to 2022, only six countries met their fair share funding target in at least one of the evaluated years: Ireland, New Zealand, Peru, the Philippines, South Africa, and the United Kingdom. Only Peru met its fair share target in 2022 (although Ireland and the United States came extremely close at 99% and 98%, respectively).

During 2023, TAG and partners updated the fair share targets to reflect the new $5 billion funding goal and changes to R&D spending by countries in recent years. To reach the global goal of $5 billion per year, countries must now expand their contributions to TB R&D from 0.1% of GERD to 0.15% of GERD.[7]

Given that very few countries met their fair share targets in at least one year between 2018 and 2022, the more ambitious, updated funding targets may seem unattainable. Yet, COVID-19 has demonstrated that when there is adequate political will, significant financing can be raised to address a health threat. Money spent on COVID-19 R&D dwarfed the funding targets set for TB, while spending on TB research remains vastly out of step with the burden of disease attributed to TB.

Crucially, TB science stands on the precipice of delivering game-changing new tools to eliminate TB, including new vaccines, whose development to date has been severely delayed by ongoing underinvestment. If funders rise to the occasion and deliver on ambitious new funding targets — while also ensuring that end-stage products are easily available, affordable, and accessible — then ending the TB epidemic by 2030 lies just within reach.

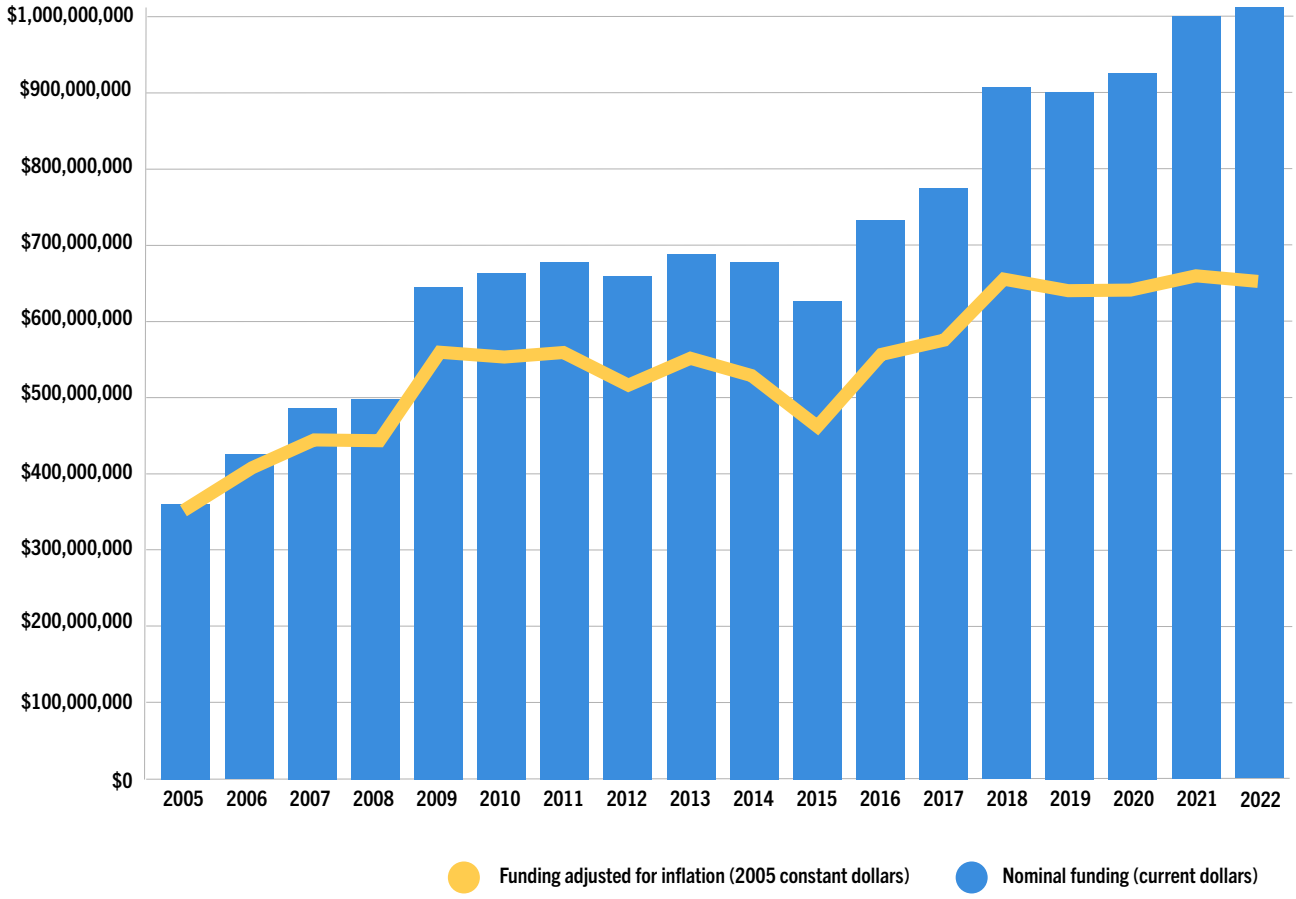
Key Findings from This Year's Report:

1. After reaching $1 billion for the first time in 2021, TB research spending stayed above this level in 2022. Total 2022 funding of $1.034 billion was the highest annual expenditure ever recorded by TAG. However, this is only half of the $2 billion in annual financing committed to by governments at the 2018 UN HLM on TB and one-fifth of the new annual global target.

2. Cumulative spending on TB research for the 2018–2022 period reached $4.7 billion. This amounts to only 37% of the funding target of $12.8 billion called for by the *2018–2022 Global Plan to End TB*. It is less than half of the $10 billion in funding that would have been achieved if governments had met their UN-level commitments to mobilize $2 billion a year.

FIGURE 1

Total TB R&D Funding, 2005–2022



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
2022	$1,034,967,036

3. The gap between targeted financing and actual expenditure was wider for TB vaccines than any other research area. Eighty percent of the vaccine financing target went unfulfilled between 2018 and 2022.

4. Funding for drugs research remained far behind targeted spending levels, with 75% of the 2018–2022 target unmet. Spending on basic science reached 42% of the five-year financing target for this research area. Diagnostics R&D came closer to meeting the 2018–2022 funding target than any other research area, satisfying 65% of its financing target.

5. Public funders contributed 69% of all TB research financing from 2018 to 2022, giving more money than all other sectors combined. Philanthropies, private-sector companies, and multilateral organizations respectively gave 16%, 10%, and 5% of total funding.

6. The U.S. National Institutes of Health (NIH) and the Bill & Melinda Gates Foundation (Gates Foundation) remained the largest funders of TB research in 2022, jointly contributing just over half of all funds. The U.S. NIH and the Gates Foundation each gave more to TB research in 2022 than in any previous year: $377 million and $154 million, respectively.

7. The top 20 funders contributed 87% of all financing for TB research in 2022, while the remaining 13% of funds came from another 153 entities.

8. Spending on pediatric TB research reached $87 million in 2022, below the $91 million peak seen in 2020. Eight percent of overall TB R&D spending was allocated to pediatric-specific research in 2022 — below the 10% advocated for by TAG and partners as commensurate with the burden of TB disease faced by this population.

The Big Picture

> "Research and development must be supported and encouraged, fostering an environment where new tools and treatments can be deployed to reach even the remotest of communities. All of this requires financing on a massive scale. We're calling for an SDG stimulus that increases financing for sustainable development."
>
> – Amina Mohammed, UN Deputy Secretary-General, 2023 UN HLM on TB

> "We now have new and powerful tools that we didn't have five years ago. Rapid diagnostics to test for TB in less than two hours. And effective treatment regimens, including for drug-resistant TB. But there is one important tool that we still need, and that is a new vaccine."
>
> – Tedros Adhanom Ghebreyesus, World Health Organization Director-General, 2023 UN HLM on TB

After reaching $1 billion for the first time ever in 2021, TB R&D investments remained over this threshold for the second consecutive year. Global funding for TB R&D rose slightly (by 3%) over 2021 levels to reach a new high of $1.034 billion in 2022.

From 2018 to 2022, the world spent a total of $4.7 billion on TB research. This amount was far below the $12.8 billion funding goal set in the *2018–2022 Global Plan*. The gap between actual spending and targeted funding over this period was $8.1 billion.

The funding gap was widest for TB vaccines research where only 20% of the 2018–2022 funding target was met. For drugs research, funders satisfied 25% of the funding target, while investments in basic science reached 42% of the target. TB diagnostics R&D came closer to its funding goal than any other research area, with 65% of the financing target achieved.

FIGURE 2

Progress toward *Global Plan* TB Research Funding Targets

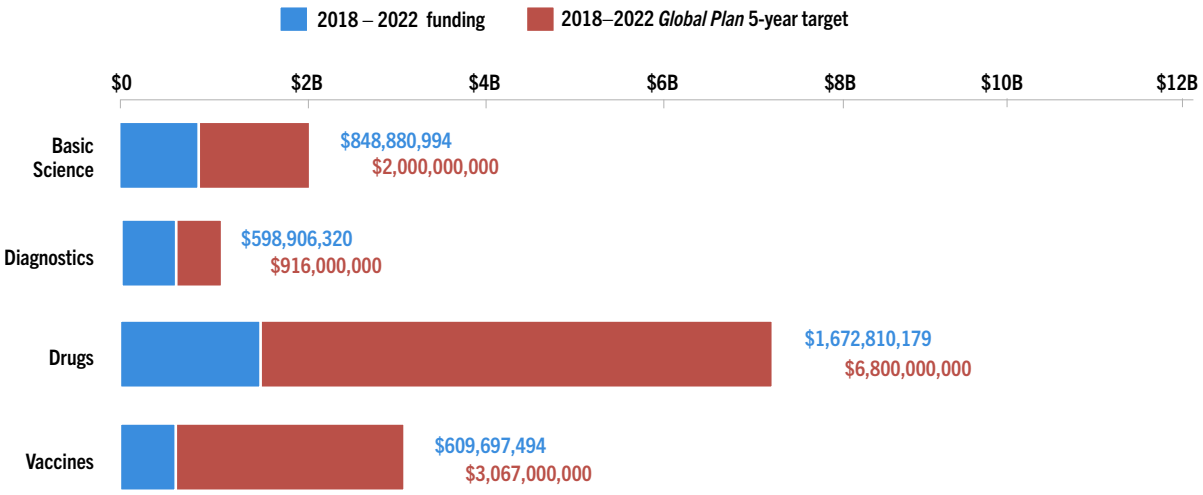


TABLE 1

Annual Funding versus Annual Funding Targets

RESEARCH AREA	2022 FUNDING	2018–22 *GLOBAL PLAN* ANNUAL TARGET	2023–30 *GLOBAL PLAN* ANNUAL TARGET
Basic Science	$170,668,450	$400,000,000	$800,000,000
Diagnostics	$145,406,615	$183,200,000	$965,000,000
Drugs	$352,073,344	$1,360,000,000	$2,007,500,000
Vaccines	$144,078,297	$613,400,000	$1,250,000,000
Operational Research & Epidemiology	$123,036,923	--	--
Infrastructure/Unspecified	$99,703,407	--	--
Total	$1,034,967,036	$2,556,600,000	$5,022,500,000

At $4.7 billion, spending on TB research over the 2018 to 2022 five-year period also remained below the new *annual* TB research funding target of $5 billion. Reaching this new, more ambitious figure will therefore require a five-fold increase in financing over current levels.

Meeting the higher 2023–2030 funding targets will require a more than eight-fold increase above 2022 spending levels for TB vaccines R&D, a six-fold increase for TB drugs and diagnostics R&D, and a four-fold increase in spending on basic science.

Money generated from taxpayers and distributed by public institutions was the largest source of funding for TB research over the last five years. Between 2018 and 2022, 69% of all investments in TB research came from the public sector. The remainder came from a mixture of philanthropic donors (16% of the total), private-sector companies (10%), and multilateral organizations (5%). Meeting the new funding targets will require expanded and sustained investments from all categories of funders.

In total, 173 unique entities gave money to TB research in 2022, including 106 public-sector agencies, 35 private-sector companies, 25 philanthropies, and seven multilateral organizations.

Note on Methodology

See Appendix 1 for a detailed methodology description.

TAG collects the expenditure data in this report through a global survey of entities funding and conducting TB research. This year, 315 organizations received a request to participate in the FY 2022 survey, of which 184 returned responses to TAG.

Of the 184 responses received, 146 respondents reported TB research spending during 2022, 32 respondents reported that they did not spend money on TB research in 2022, and six entities declined to participate in the survey.

The survey asked recipients to report expenditures on TB research in fiscal year 2022 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.

Public-Sector Funding

> "Sufficient investment in fundamental research is needed, as well as vaccine research and innovative second-line molecules allowing us to shorten the length of treatments. This is one of the keys of success. France will always answer present when it comes to TB R&D and support to international organizations. This is our history, this is in our DNA, this is our responsibility."
>
> – Aurélien Rousseau, Minister of Health and Prevention, France, 2023 UN HLM on TB

Between 2018 and 2022, public funders gave $3.28 billion to TB R&D. Their investments accounted for 69% of all spending on TB research over the five-year period.

One hundred and six unique public-sector entities contributed a combined $682 million to TB research in 2022. This amount was slightly below the $698 million spent by public funders in 2021.

Of every dollar spent on TB research by public funders in 2022, $0.26 went to drugs research, $0.23 went to basic science, $0.16 went to operational and epidemiological research, $0.13 went to vaccines research, $0.12 went to diagnostics research, and $0.10 went to infrastructure and unspecified research. Eight percent of all public spending supported pediatric-related research efforts.

The U.S. NIH continued to spend far more on TB research than any other funder — public or otherwise. Funding from the U.S. NIH accounted for 36% of overall spending and 55% of all public spending on TB R&D in 2022. The U.S. NIH's investments into TB research have steadily grown over the last five years from $253 million in 2018 to $377 million in 2022. The $377 million spent by the NIH in 2022 represents a new high for the agency.

Of every dollar spent on TB research by the U.S. NIH in 2022, $0.29 supported basic science, $0.20 supported drugs research, $0.18 supported vaccines research, $0.13 supported operational and epidemiological research, $0.12 supported diagnostics research, and $0.09 went to research-related infrastructure and unspecified research. Six percent of spending by the U.S. NIH across all research areas was directed to pediatric TB.

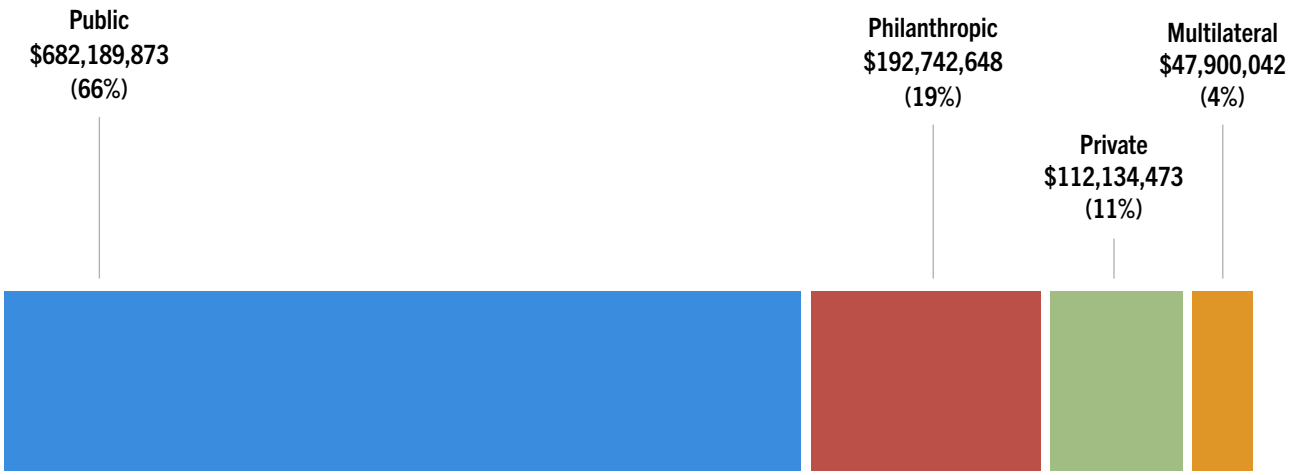
The second-largest public funder of TB research in 2022, USAID, spent $37 million, or one-tenth of what was contributed by the U.S. NIH. Between 2018 and 2022, USAID gave $178 million to TB research.

Of every dollar invested in TB research by USAID in 2022, $0.34 went to drugs research, $0.30 went toward infrastructure and unspecified research, $0.25 went toward operational and epidemiological research, and $0.12 went to diagnostics research. Forty-three percent of USAID spending supported pediatric-inclusive studies or other pediatric-related research.

The AMR Accelerator, which reported on its spending to TAG for the first time in 2021, was the third-largest public funder of TB research in 2022 with an investment of $32 million. The AMR Accelerator is a program of the Innovative Medicines Initiative that seeks to advance the development of drugs to treat and prevent bacterial infections. The Innovative Medicines Initiative is jointly funded by the European Union and the European pharmaceutical industry. Only public investments made by AMR Accelerator were reported to TAG and are included in this report. The AMR Accelerator's investments supported research by the drug development consortiums ERA4TB, UNITE4TB, and RespiriTB, as well as the private company Bioversys.

FIGURE 3

TB R&D Funding by Funder Type, 2022
Total: $1,034,967,036



The European Commission and the European & Developing Countries Clinical Trials Partnership (EDCTP) were respectively the fourth- and sixth-largest public funders of TB research in 2022. Both agencies reported lower TB R&D expenditures in 2022 compared with 2021 levels. The European Commission's spending on TB research declined from $30.5 million in 2021 to $24 million in 2022. The EDCTP's spending declined from $29 million in 2021 to $17.5 million in 2022. Fluctuations in European Commission and EDCTP spending likely reflect the availability of funding calls open to TB and the competitiveness of TB proposals in any given year. In the case of the EDCTP, the year 2022 falls early in the new 10-year funding cycle of the EDCTP III Joint Undertaking, which will marshal €1.6 billion in funding for infectious disease research (€800M of which will come from the EU with the rest raised from partners).[8]

The Indian Council for Medical Research (ICMR) was the fifth-largest funder of TB research in 2022 with an investment of $20 million. ICMR has consistently been one of the top public funders of TB research from 2018 through 2022, with its investments ranging between $14 million and $24 million.

Of every dollar spent on TB research by ICMR in 2022, $0.60 went to research-related infrastructure and unspecified research, $0.23 went to operational and epidemiological research, $0.08 went to diagnostics research, $0.04 went to vaccine research, $0.03 went to drugs research, and $0.03 went to basic science. ICMR's spending on research related infrastructure supported salaries, consumables, and infrastructure at India's National Institute for Research in Tuberculosis.

Four other public funders gave more than $10 million to TB research in 2022: the U.S. Centers for Disease Control and Prevention; the U.K. Foreign, Commonwealth & Development Office; the Korean Ministry of Health and Welfare; and the German Federal Ministry of Education and Research.

TABLE 2

Progress Toward Fair Share Funding Targets in 2022

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

RANK	COUNTRY	2022 FUNDING	FAIR SHARE TARGET	PERCENT OF TARGET MET IN 2022
1	United States	$436,073,634	$444,500,000	98%
2	Germany*	$36,093,374	$99,700,000	36%
3	United Kingdom	$32,682,386	$40,400,000	81%
4	India	$24,162,920	$46,500,000	52%
5	South Korea	$22,853,436	$64,000,000	36%
6	France*	$20,084,103	$55,400,000	36%
7	Australia	$13,894,959	$21,200,000	66%
8	Canada	$13,581,440	$25,300,000	54%
9	Italy*	$10,427,256	$27,500,000	38%
10	Japan	$8,120,185	$154,900,000	5%
11	Spain*	$7,909,472	$20,799,869	38%
12	Sweden*	$5,720,111	$13,700,000	42%
13	Netherlands*	$4,991,442	$15,100,000	33%
14	Switzerland	$4,948,543	$13,400,000	37%
15	Brazil	$4,735,865	$35,000,000	14%
16	South Africa	$4,206,545	$4,600,000	91%
17	Ireland*	$3,269,509	$3,300,000	99%
18	Denmark*	$2,718,640	$7,500,000	36%
19	Belgium*	$2,668,488	$10,900,000	24%
20	Finland*	$2,384,144	$7,100,000	34%
21	New Zealand	$1,397,953	$1,800,000	78%
22	Peru	$1,061,794	$420,000	253%
23	Singapore	$746,036	$8,400,000	9%
24	Malaysia	$738,818	$9,807,000	8%
25	Norway	$688,332	$5,300,000	13%
26	Philippines	$655,254	$700,000	94%

Table includes countries that reported more than $500,000 in TB R&D expenditures to TAG.

* 2022 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 fiscal year 2022.

Fair Share Targets

> "Investment in TB vaccines cannot be left to a handful of funders in low-burden countries. To ensure an equitable say in the TB vaccine research agenda, and to ensure the voices of affected communities are heard, stakeholders in high-TB-burden countries must contribute our fair share for funding for vaccine development."
>
> – Mark Hatherill, Director, South African Tuberculosis Vaccine Initiative, 2023 UN HLM on TB

Together with partners, the Treatment Action Group and Stop TB Partnership introduced the fair share funding targets in 2017 as a metric for setting country-level spending targets and evaluating countries' contributions to global TB research funding needs. The fair share targets set minimum spending levels that countries must mutually achieve to reach global spending goals adopted at the 2018 UN High-Level Meeting and set out in the *2018–2022 Global Plan*.

TAG has measured countries' success in achieving their fair share targets since 2017. This year marks the final year that countries' progress in achieving the fair share targets set for the 2018–2022 period will be measured; starting next year, with data on TB research funding in 2023, TAG will employ an updated fair share target framework (details described below).

The 2018–2022 fair share targets called for countries to allocate 0.1% of their GERD to TB R&D. Using a proportion of GERD spending as a yardstick for evaluating the effectiveness of country-level responses was endorsed by the World Health Organization in its *Global Strategy for TB Research and Innovation*, which includes the following indicator: "At the country level, proportion of gross domestic expenditure on research and development that is allocated to TB research."[9]

Only six countries met their fair share target by investing 0.1% of their GERD spending into TB R&D in at least one year over 2018–2022: Ireland, New Zealand, Peru, the Philippines, South Africa, and the United Kingdom. In 2022, only Peru met its fair share target, while Ireland and the United States each came within an inch of meeting their targets, respectively achieving 99% and 98%. The Philippines and South Africa achieved 94% and 91% of their respective targets in 2022.

As of next year, countries' contributions to TB R&D will be evaluated against the updated fair share targets adopted by TAG, Stop TB Partnership, and advocacy partners in 2023. Greater country-level spending is required to meet the more ambitious $5 billion annual TB R&D funding target set in the *2023–2030 Global Plan* and committed to by countries during the 2023 UN HLM on TB. To contribute their fair share, countries must now allocate a minimum of 0.15% of their GERD to TB research.[10]

Examples of the new country-level spending targets are provided in Appendix 2. The new funding targets are not equivalent to 1.5 times the old financing targets as they are based on updated GERD amounts. Gross global spending on R&D has grown by 40% since the previous fair share targets were set, which was considered in setting the new targets. TAG has published a detailed explanation of the new 0.15% fair share funding targets: *Information note: new fair share funding targets for TB research 0.1% → 0.15%*.[11]

Closer Look: South Korea's Public Investments

> "In order to expedite progress, we should invest more in advancing diagnostic tools and treatment as well as developing upgraded vaccines. As the sixth-largest investor in TB R&D, my country will make ceaseless efforts to yield tangible outcomes in the development of rapid diagnostic technologies and next-generation vaccines."
>
> – Youngmee Jee, Commissioner, Korea Disease Control and Prevention Agency, 2023 UN HLM on TB

Public agencies in South Korea contributed, on average, $18.9 million a year to TB research between 2018 and 2022, making South Korea the sixth-largest financial supporter of TB research by country over this period. In 2022, with an investment of $22.8 million, South Korea moved into the position of fifth-largest TB research funder by country. Only the United States, Germany, the United Kingdom, and India gave more to TB research in this year.

Despite being the fifth-largest country funder in 2022, South Korea achieved only 36% of its fair share target. While the fair share targets seek to provide an equitable framework for measuring countries' contributions to TB R&D, a shortcoming of the metric is that it disadvantages countries with high R&D intensities like South Korea. R&D intensity is measured as the proportion of a country's gross domestic product (GDP) that is spent on R&D.[12] Countries with high R&D intensities outspend most other nations on research as a proportion of GDP. South Korea spent 4.8% of its GDP on R&D in 2020 (the latest year for which data is available). By comparison, GERD spending as a percentage of GDP was 2.62 in Europe and North America in this year.[13]

Twelve public agencies in South Korea supported TB research in 2022. The Ministry of Health and Welfare and the Ministry of Science and ICT, respectively, provided 55% and 27% of all public contributions to TB research. The Korea Disease Control and Prevention Agency (KDCA) provided 6% of financing. The remaining 11% of financing came from the following agencies (in descending order by size of contribution): the Korea International Cooperation Agency (KOICA), the Ministry of SMEs and Startups, the Ministry of Education, the Ministry of Food and Drug Safety, the National Tuberculosis Association, the Ministry of Trade, Industry and Energy, the National Research Foundation, the Association of External Quality Assessment Service, and the Korean Health Industry Development Institute.

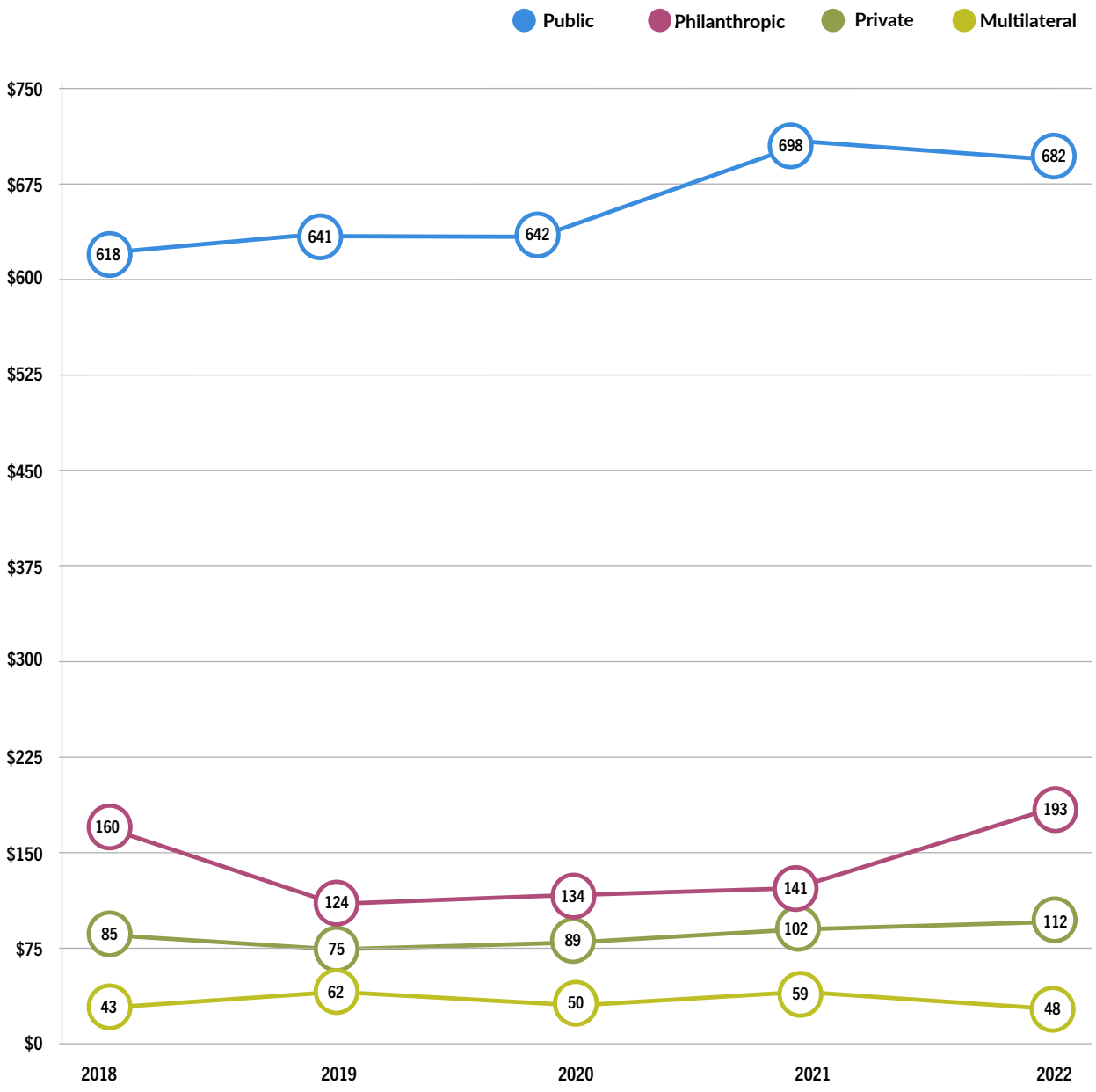
Of every dollar spent on TB research by South Korean public agencies in 2022, $0.70 went toward basic science, $0.19 went toward research infrastructure and unspecified research, $0.05 went toward diagnostics research, $0.03 went toward drugs research, $0.02 went toward vaccines research, and $0.01 went toward operational research.

The RIGHT Foundation, a South Korea–based public-private partnership established in 2018, also contributed to TB research in 2022. TAG has reported on the RIGHT Foundation's TB research spending since 2020. The RIGHT Foundation gave $1.6 million to TB research in 2022, which is equivalent to the Foundation's combined 2020 and 2021 contributions.

Of every dollar spent by the RIGHT Foundation in 2022, $0.56 went to basic science research, $0.37 went to diagnostics research, and $0.07 went to drugs research. Twenty-one percent of the RIGHT Foundation's spending across all research areas supported pediatric-focused efforts. The RIGHT Foundation made investments in the Institut Pasteur Korea, as well as three South Korean biotechnology companies: Standigm, SD Biosensor, and Bioneer.

FIGURE 4

TB R&D Funding by Funder Type, 2018–2022 (in Millions)



Note: Data for years 2005–2017 not shown.

Philanthropic Funding

Philanthropic funders gave more to TB research in 2022 than in any previous year. Philanthropic spending reached $193 million in 2022, up from $141 million in 2021. The growth in philanthropic investments was driven by increased spending by the Gates Foundation and the Wellcome Trust (though the figures reported here do not yet reflect any of the historic $550 million joint investment these two charities announced in July 2023 to underwrite a phase III trial of the TB vaccine candidate M72/AS01E).[14]

Twenty-five philanthropic funders invested in TB research in 2022, with investments ranging from several thousand dollars to $154 million. Of every dollar invested by philanthropic funders in 2022, $0.43 went to drugs R&D, $0.28 went to vaccines R&D, $0.10 went to research-related infrastructure and unspecified research, $0.09 went to diagnostics R&D, $0.06 went to basic science, and $0.04 went to operational and epidemiological research. Seven percent of philanthropic contributions across all research areas supported pediatric-specific R&D.

The Gates Foundation remained unchallenged in its position as the largest philanthropic funder of TB research in 2022. Spending by the Gates Foundation rose from $113 million in 2021 to $154 million in 2022, topping the Foundation's previous peak of $148 million seen in 2013. Half of all the Gates Foundation's 2022 spending supported activities at the Gates Medical Research Institute (Gates MRI). Fifty-nine percent of funding given to the Gates MRI by the Gates Foundation supported vaccines R&D, while the remaining 41% supported drugs research.

Of every dollar spent by the Gates Foundation on TB research in 2022, $0.49 went to drugs research, $0.36 went to vaccines research, $0.09 went to diagnostics research, $0.03 went to operational and epidemiological research, $0.02 went to basic science, and $0.01 went to research related infrastructure. The Gates Foundation allocated 7% of its overall spending to pediatric-specific efforts (most of this can be attributed to a clinical trial of BCG revaccination in South African adolescents).

The second-largest philanthropic funder, the Wellcome Trust, significantly increased its TB research spending to $26 million in 2022. This is more than double what Wellcome contributed in 2021 ($12 million) and almost equivalent to Wellcome's cumulative investments from 2018 through 2021.

Of every dollar spent by Wellcome on TB R&D in 2022, $0.64 went to research-related infrastructure and unspecified research, $0.25 went to basic science, $0.06 went to drugs research, $0.03 went to diagnostics research, and $0.02 went to operational and epidemiological research. Five percent of Wellcome's spending across all research areas supported pediatric-specific efforts. Wellcome's investments in infrastructure supported the Africa Health Research Institute and the Malawi Liverpool Wellcome Programme.

The third-largest philanthropic funder of TB research in 2022 was Médecins Sans Frontières (MSF). MSF invested $5.6 million in TB research in 2022 — $4 million of which supported the groundbreaking TB-PRACTECAL trial.

Only two other philanthropic funders gave more than $1 million to TB research in 2022: LifeArc and Open Philanthropy.

Philanthropic funders cumulatively gave $751 million to TB research between 2018 and 2022. This accounted for 16% of all money spent on TB research over the five-year period.

TABLE 3

Top 20 Funders of TB Research, 2022

RANK	FUNDER	FUNDER TYPE	2022 FUNDING	2021 FUNDING
1	U.S. National Institutes of Health (U.S. NIH)	P	$376,925,735	$354,793,943
2	Bill & Melinda Gates Foundation	F	$154,020,527	$113,449,327
3	Unitaid	M	$40,200,000	$51,429,969
4	U.S. Agency for International Development (USAID)	P	$37,435,817	$30,000,620
5	Company X	C	$37,151,321	$21,736,349
6	AMR Accelerator/Innovative Medicines Initiative	P	$32,475,079	$31,116,653
7	Otsuka Pharmaceutical	C	$27,643,679	$23,701,770
8	Wellcome	F	$26,452,024	$11,849,984
9	European Commission	P	$23,928,183	$30,537,224
10	Indian Council of Medical Research (ICMR)	P	$20,411,604	$16,481,610
11	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$17,516,947	$29,289,139
12	U.S. Centers for Disease Control and Prevention (U.S. CDC)	P	$17,420,159	$25,894,931
13	Anhui Zhifei Longcom Biopharmaceutical Co.	C	$15,766,810	$4,145,802
14	U.K. Foreign, Commonwealth & Development Office (FCDO)	P	$14,868,102	$11,795,771
15	Korea Ministry of Health and Welfare	P	$12,610,681	$10,086,394
16	German Federal Ministry of Education and Research (BMBF)	P	$11,513,871	$17,505,028
17	Oxford Immunotec	C	$11,200,000	$12,000,000
18	Global Affairs Canada	P	$8,457,130	$11,167,884
19	U.K. Medical Research Council (U.K. MRC)	P	$7,999,909	$11,560,248
20	KfW Development Bank with BMBF	P	$6,927,358	$6,349,327

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

Private-Sector Funding

> "With equity as a core principle, countries need to jointly harness the power of new technologies and bolster innovation [. . .] The transfer of technology, especially to lower- and middle-income countries, as well as fostering public-private sector synergies to expand access to TB care, are our collective moral obligation."
>
> – Teodoro Herbosa, Health Secretary, Philippines, 2023 UN HLM on TB

While private-sector spending on TB R&D steadily increased from 2018 to 2022 — from $85 million to $112 million — it still sits below peak spending of $145 million seen in 2011.

Thirty-five companies contributed to TB research in 2022, with their contributions ranging from $2,000 to $37 million. Of every dollar spent by private-sector companies in 2022, $0.63 went to drugs research, $0.24 went to diagnostics research, $0.09 went to infrastructure and unspecified research, $0.03 went to vaccines research, and $0.01 supported basic science. Three percent of all spending by industry was directed toward pediatric-specific research. No private-sector companies supported operational or epidemiological research in 2022.

Company X spent more on TB research in 2022 than any other private company. Company X, whose annual investments ranged between $32 million and $21 million from 2018 through 2021, increased its spending to $37 million in 2022. Otsuka Pharmaceuticals was the second-largest industry funder of TB research in 2022. From 2018 to 2022, Otsuka Pharmaceuticals' annual spending fluctuated between $15 million and $28 million. In 2022, the company invested $27 million into TB research.

All of Company X and Otsuka Pharmaceuticals' spending — which accounted for 57% of all private-sector funding for TB R&D in 2022 — was directed toward TB drug development. Company X directed 5% of its investment toward pediatric-related research, while Otsuka Pharmaceuticals did not indicate the share of its spending that went toward pediatric R&D.

Anhui Zhifei Longcom Biopharmaceutical Co., Ltd. (Zhifei Longcom) emerged as the third-largest private-sector funder of TB research in 2022. Zhifei Longcom reported on its TB R&D investments to TAG for the first time in 2021. In 2022, Zhifei Longcom spent $15.7 million on TB R&D — up from $4 million in 2021. Of every dollar spent by Zhifei Longcom in 2022, $0.64 went to research-related infrastructure, $0.27 went to vaccines research, and $0.10 went to diagnostics research.

The only other company that spent more than $10 million on TB research in 2022 was Oxford Immunotec. Oxford Immunotec has directed over $10 million a year toward TB diagnostics R&D since 2020, when it first began reporting to TAG. In 2022, the company spent $11.2 million on TB R&D.

Between 2018 and 2022, private funders cumulatively spent $464 million, which accounted for 10% of total TB research spending over the five-year period.

Multilateral Funding

> "The Africa Group expresses its concerns that no new vaccines for the prevention of tuberculosis have been licensed in 100 years, which hampers the global effort of achieving the target to eliminate this epidemic by 2030. We believe that it is important to fast-track research, regulatory approval, and clinical trials for tuberculosis vaccine development."
>
> – Nabil Ammar, Minister for Foreign Affairs, Migration and Tunisians Abroad, on behalf of the Africa Group, 2023 UN HLM on TB

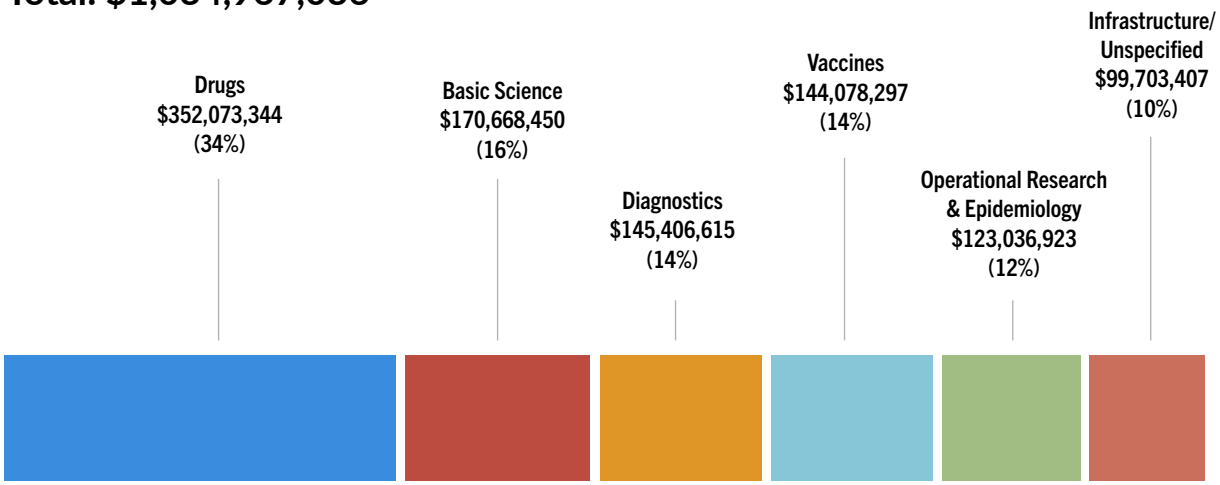
In 2022, multilateral organizations spent $48 million on TB research in 2022, below their peak investment level of $62 million, seen in 2019. Seven multilateral entities invested in TB research in 2022 (listed in descending order by contribution): Unitaid; the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund); the RIGHT Foundation; the Global Health Innovative Technology Fund (GHIT); TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization; the Pan American Health Organization; and Stop TB Partnership (UNOPS).

Of every dollar given to TB R&D by multilateral organizations in 2022, $0.42 went to drugs R&D, $0.38 went to diagnostics R&D, $0.18 went to operational and epidemiological research, and $0.02 went to basic science. No multilateral organizations invested in TB vaccines R&D in 2022.

Unitaid gave more to TB R&D in 2022 than any other multilateral organization, despite a drop in the entity's spending from $51 million in 2021 to $40 million in 2022. Unitaid's investment accounted for 84% of all spending on TB R&D by multilateral organizations.

FIGURE 5

TB R&D Funding by Research Area, 2022
Total: $1,034,967,036



Of every dollar spent by Unitaid on TB research in 2022, $0.49 went toward drugs research, $0.42 went to diagnostics research, and $0.09 went to operational and epidemiological research. Forty percent of Unitaid's spending across all research areas supported pediatric-related research.

The second-largest multilateral funder of TB R&D in 2022 was the Global Fund, with an investment of $4 million. Funding from the Global Fund has fallen from over $10 million in 2018 and 2019 to just over $3 million in 2020 and 2021. In 2022, the Global Fund's spending increased slightly to $4 million. As in previous years, the Global Fund figure represents expenditures on interventions classed as 'surveys' in its TB, HIV/TB, resilient and sustainable systems for health, and multicomponent grants. Countries should continue to make use of Global Fund resources to support TB operational research and surveys in the next grant cycle (GC7).

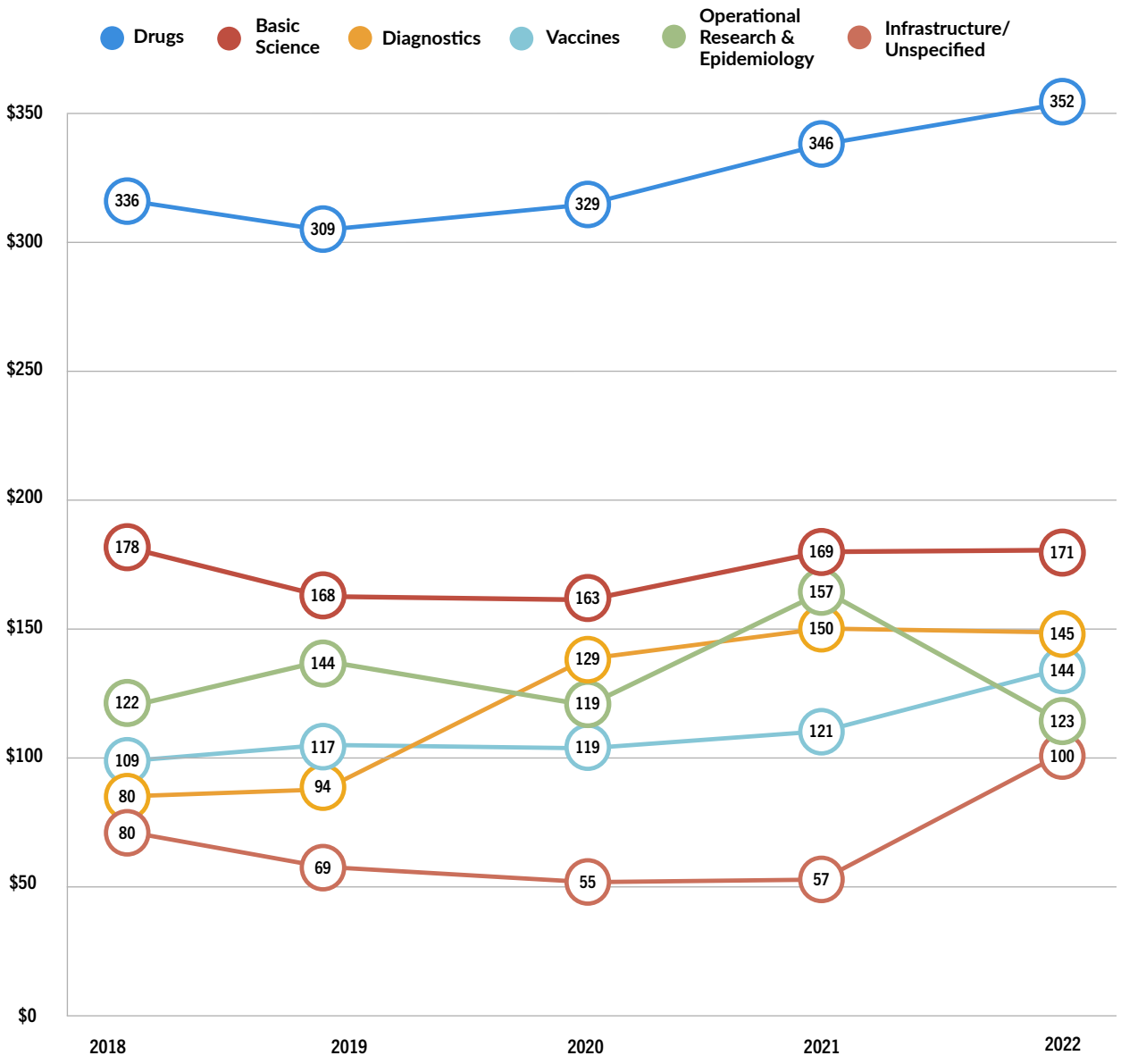
The RIGHT Foundation was the third-largest multilateral funder of TB research in 2022. In 2022, the RIGHT Foundation spent $1.6 million, which is its highest reported investment to date (TAG began reporting on the RIGHT Foundation's spending in 2020.) Of every dollar spent by the RIGHT Foundation in 2022, $0.56 went to basic science, $0.37 went to diagnostics research, and $0.07 went to drugs research.

Only one other multilateral organization spent more than $1 million on TB research in 2022: the Japan-based GHIT Fund.

Between 2018 and 2022, multilateral organizations invested $261 million in TB research, which accounted for 5% of all TB research spending over the five-year period.

FIGURE 6

TB R&D Funding by Research Area, 2018–2022 (in Millions)



Note: Data for years 2005–2017 not shown.

Closer Look: European Investment Bank

> "The EU has been investing for a longtime in TB research, including in drug development. And we have just reinforced our programs for innovation and improved access to antimicrobial medical countermeasures, including studies for tuberculosis."
>
> – Chris Fearne, Deputy Prime Minister and Minister for Health of Malta, on behalf of the European Union, 2023 UN HLM on TB

Investment and development banks have not traditionally been a major source of financing for TB R&D, as they were for COVID-19,[15] but they are increasingly recognized as an important partner in supporting research capacity and manufacturing infrastructures and in managing the types of financial risks inherent to health research and product development. The involvement of development banks in global health research is likely to grow, as UN-member states recently committed in the TB HLM political declaration "to work towards the increase of funding from [...] financing institutions such as the World Bank and the Regional Development Banks, and private sector and innovative financing mechanisms."[16]

This spotlight focuses on the European Investment Bank (EIB), which is not listed as a funder in this report but has had prior involvement in TB research. The EIB is poised to play a greater role in coming years: it has joined the World Health Organization TB Vaccine Accelerator Council "to catalyze high-level commitment, engagement, and alignment among funders, global agencies, governments, and communities, to identify and overcome the major barriers to tuberculosis vaccine development," and Dr. Werner Hoyer, EIB president, is on the Accelerator Council's Principals Group.[17,18]

How does the EIB work?

The EIB is the lending arm of the European Union. It works closely with other EU institutions to foster European integration, promote the development of the EU, and support EU development aid and cooperation policies around the world — though 90% of its funding is directed toward EU member states.[19] Where other EU agencies, such as Horizon programs, may provide grant funding for research, the EIB provides loans, guarantees, equity investments, and advisory services.[20] The EIB has provided total financing of more than €42 billion for healthcare-related projects around the world since it started investing in the sector in 1997. Due to COVID-19, financing has been considerably higher in recent years than it was before the pandemic. In 2022, for instance, the EIB provided €5.1 billion for health and life sciences projects.[21] HERA Invest and EIB Global, described below, are two mechanisms that could be relevant to supporting TB vaccine R&D.

What is the EU's HERA Invest program, and why is it relevant to TB?

In July 2023, the EU's Health Emergency Preparedness and Response (HERA) department created HERA Invest, a €100 million top-up to the InvestEU programme with a mandate to support R&D on priority cross-border health threats, financed by the EU4Health program.[22,23] While the HERA mandate is "cross-border," EU officials have made clear that their priority is major cross-border threats within the EU. Under HERA Invest, the EIB will provide venture loans covering up to 50% of total project costs to small and mid-sized companies; individual financing typically starts at €7.5

million. Health projects supported under this program can include early- and late-phase clinical trials and should address innovations for unmet medical needs including development of vaccines, therapeutics, diagnostics, med-tech, and digital health solutions. Projects should target one of the three priorities identified by HERA:

- Pathogens with pandemic or epidemic potential
- Chemical, biological, radiological, and nuclear threats originating from accidental or deliberate release
- Antimicrobial resistance

As TB falls within the scope of health threats financed by HERA Invest, financing from the investment mechanism could legitimately be used to support TB vaccine research. However, to date, HERA has not singled out TB vaccine research as a specific priority.

What is EIB Global?

EIB Global, set up in 2022, is a branch of the EIB and the main financing arm of Team Europe; it was established to address global challenges related to climate, health, and development. EIB Global finances climate action, economic growth, and development outside the EU, guided by the targets of the Paris Agreement on climate change and the SDGs.[24] EIB Global has made around 10 significant vaccine-related investments since 2000, though none obviously involve TB.[25]

What are some examples of previous EIB support for TB research?

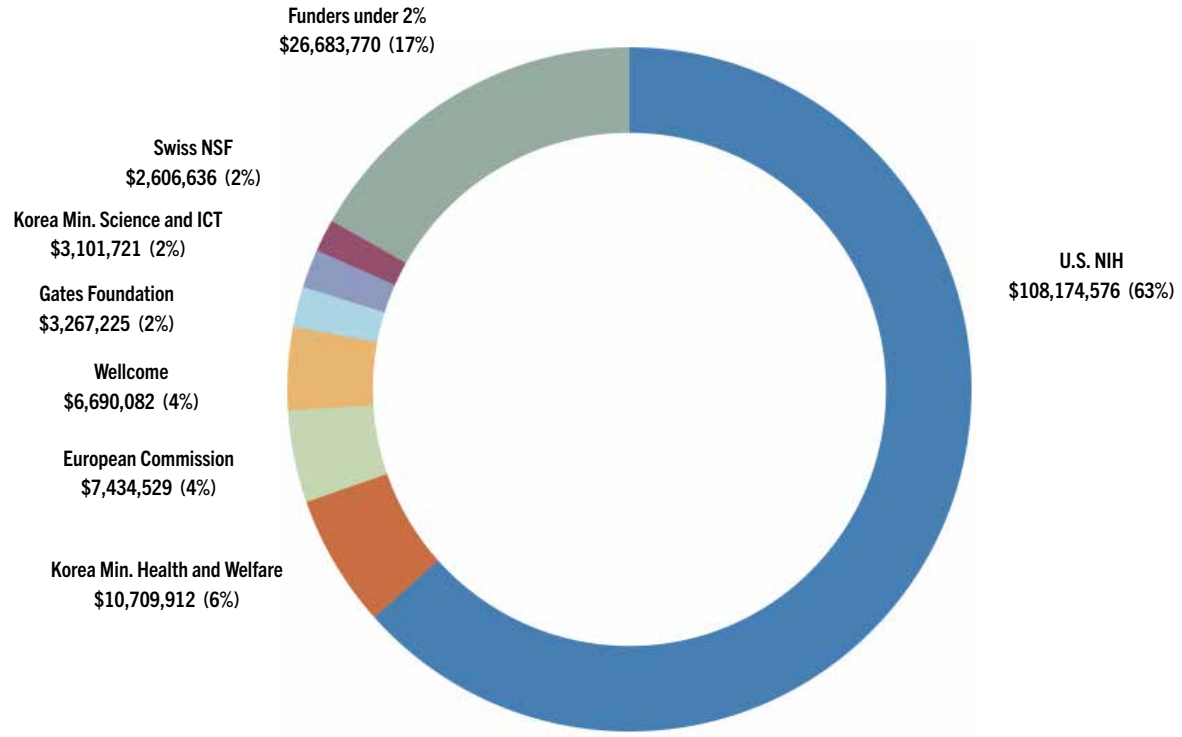
- In March 2023, EIB and Afreximbank, the pan-African multilateral financial institution, agreed to each provide €100 million to update and expand public healthcare facilities and enhance production of safe, affordable, and effective medicines across sub-Saharan Africa. This project is designed to unlock investment to scale up production of medicines essential to tackle diseases such as cancer, HIV, malaria, and TB.
- In 2021, EIB provided €20 million to support Swiss company Bioversys's work on antimicrobial resistance, in particular TB and nosocomial infections.
- In 2020, EIB provided a €30 million loan (for a €90 million project) to Vakzine Projekt Management to support R&D to develop a new TB vaccine for infants as well as work on broadly neutralizing antibodies for prevention and treatment of HIV.[26] The TB part of the project supports R&D — including clinical trials and capital expenditure — to develop VPM1002, a TB vaccine candidate first developed at the Max Planck Institute of Infection Biology in Germany and licensed to Vakzine Projekt Management. In 2012, Vakzine Projekt Management (now named Serum Life Science Europe) signed an exclusive sublicense with Serum Institute of India for the further development and manufacture of VPM1002. The financing structure of the EIB agreement consists of a contingent loan where the repayment is due only if market authorization is achieved; if the trials do not reach the primary endpoint, the loan is written off. The EIB loan complements funding from the EDCTP for an ongoing phase III study that is evaluating the efficacy and safety of VPM1002 compared with BCG in nearly 7,000 infants in five African countries.[27]

TAG and partners welcome the possibility of increased EIB financing of TB vaccine R&D and will continue to work for increased transparency regarding TB vaccine-related developments among EU agencies.

Basic Science

FIGURE 7

Basic Science: $170,668,450



Other funders with investments under 2%

Australian National Health and Medical Research Council	$2,547,653
U.S. National Science Foundation (NSF)	$2,401,122
Canadian Institutes of Health Research (CIHR)	$1,685,356
French National Research Agency (ANR)	$1,587,721
Japan Agency for Medical Research and Development (AMED)	$1,541,378
U.K. Medical Research Council (U.K. MRC)	$1,461,757
German Federal Ministry of Education and Research (BMBF)	$1,457,293
Project Africa GRADIENT (Glaxosmithkline and Novartis)	$1,435,601
Korea Disease Control and Prevention Agency (KDCA)	$1,179,345
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$1,155,860
Swedish Research Council	$945,805

RIGHT Foundation	$900,000
Independent Research Fund Denmark	$838,921
India Ministry of Science and Technology	$836,368
South Africa Department of Science and Innovation	$756,849
South Africa Medical Research Council	$675,826
Swedish Heart-Lung Foundation	$661,898
Korea Ministry of Education	$567,046
Indian Council of Medical Research (ICMR)	$531,304
Singapore National Medical Research Council	$531,017
Marsden Fund	$460,747
Other funders with expenditures < $400,000	$4,524,903

Between 2018 and 2022, total investments in TB basic science research reached $848 million. This is less than half (42%) the funding target set for this research area in the *2018–2022 Global Plan*, which advocated for $400 million in annual financing for TB basic science to reach a total of $2 billion over the five-year period.

In 2022, funders spent $171 million on TB basic science — similar to 2021 spending levels ($169 million) but below the peak investment of $178 million seen in 2018.

Without a major increase in basic science investments, the gap between real and targeted funding levels will grow in 2023. The *2023–2030 Global Plan* advocates for $800 million in annual spending on TB basic science research — or more than four times what was spent in 2022.

Spending on basic science accounted for eighteen percent of all TB research spending from 2018 to 2022. In 2022, sixteen percent of all TB R&D spending went to basic science. Seventy-four discrete entities supported basic science research in this year, 60 of which were public entities.

Public funders continued to contribute the lion's share of resources for basic science: $0.92 cents of every dollar spent. Philanthropic funders gave $0.07 of every dollar spent, while companies and multilateral organizations together provided only $0.02.

The U.S. NIH remained the largest funder of TB basic science research in 2022, providing 63% of the total. The U.S. NIH spent $108 million on TB basic science in 2022, down slightly from $114 million in 2021. The U.S. NIH's basic science spending was distributed over 239 grants ranging from $7,000 to $1.8 million, with an average grant size of $450,000.

The Korean Ministry of Health and Welfare (MOHW) became the second-largest funder of TB basic science research in 2022, contributing 6% of the total. The Korean MOHW's spending on TB basic science increased to $10.7 million in 2022 from $3 million in 2021. Seven public entities from Korea invested in basic science research in 2022 (see *Closer Look: South Korea's Public Investments*). The total amount spent by these seven government agencies was $16 million, accounting for 9% of funding in this area.

The third- and fourth-largest funders of TB basic science in 2022, the European Commission and Wellcome, each provided 4% of total spending with respective investments of $7.4 million and $6.7 million.

Only two other funders, the Gates Foundation and the Korean Ministry of Science and ICT, invested more than $3 million in TB basic science research in 2022. Three additional funders — the Swiss National Science Foundation, the Australian National Health and Medical Research Council, and the U.S. National Science Foundation — spent more than $2 million.

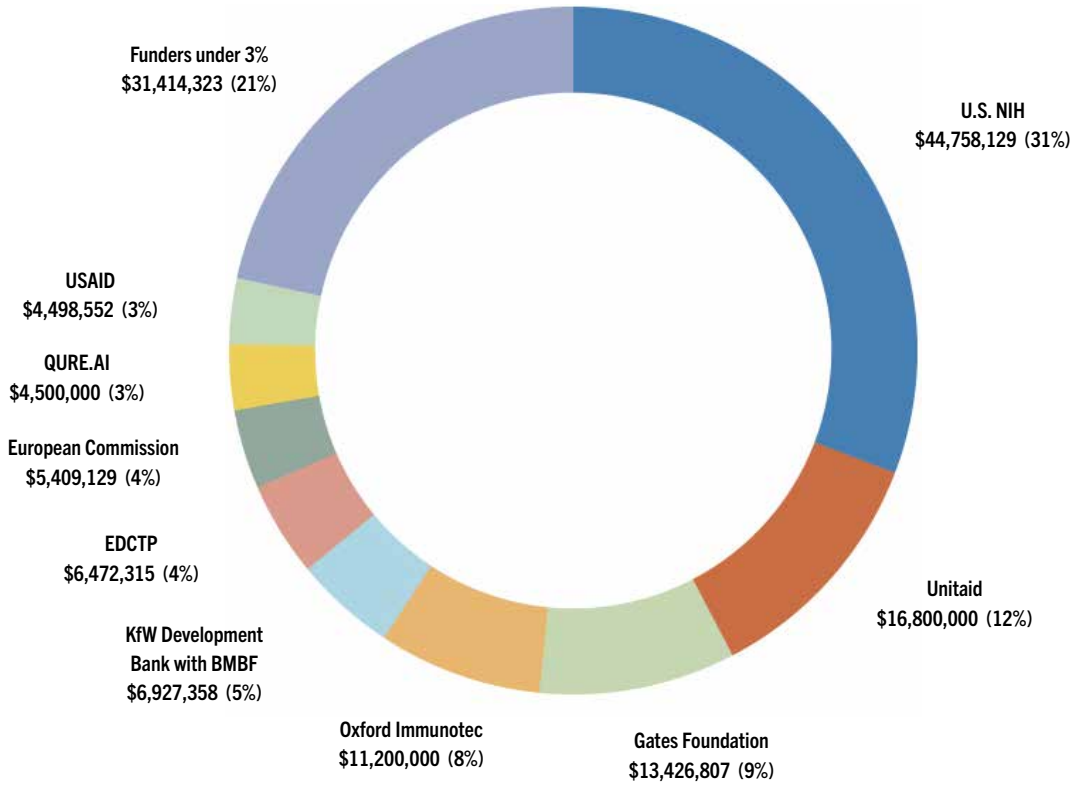
Missing from these data

Institut Pasteur Paris, which spent $141,923 on TB basic science research in 2021, responded that it was unable to participate in the survey in 2022.

Diagnostics

FIGURE 8

Diagnostics: $145,406,615



Other funders with investments under 3%

Company E	$3,149,920
Australian Department of Foreign Affairs and Trade (DFAT)	$2,605,155
German Federal Ministry of Education and Research (BMBF)	$2,209,299
QIAGEN	$2,127,401
U.K. Foreign, Commonwealth & Development Office (FCDO)	$1,855,095
Molbio Diagnostics	$1,765,236
LifeArc	$1,678,163
Indian Council of Medical Research (ICMR)	$1,539,248
Anhui Zhifei Longcom Biopharmaceutical Co.,Ltd.	$1,516,396
Company Y	$1,402,000
Wellcome	$904,417
Global Health Innovative Technology Fund (GHIT)	$903,243

U.K. Medical Research Council (U.K. MRC)	$878,008
Swedish Research Council	$639,848
RIGHT Foundation	$600,954
Company F	$581,576
Korea Ministry of Health and Welfare	$546,923
Korea Ministry of SMEs and Startups	$540,298
Japan Agency for Medical Research and Development (AMED)	$512,338
Infervision Medical Technology	$510,000
South Africa Department of Science and Innovation	$462,198
India Health Fund / Tata Trusts	$421,225
Other funders with expenditures <$400,000	$4,065,383

Investments in TB diagnostics research during 2022 equaled $145 million — down from $150 million in 2021. Between 2018 and 2022, funders spent $598 million on research and development of TB diagnostics. While this figure falls below the goal of $916 million advocated for in the *2018–2022 Global Plan*, the gap between real and targeted investments was smaller for diagnostics than any other research area. Sixty-five percent of the *2018–2022 Global Plan* investment target for TB diagnostics was achieved.

The *2023–2030 Global Plan* sets a more ambitious funding target for TB diagnostics R&D of $965 million per year — which is more than six times larger than 2022 investment levels.

Fourteen percent of TB research spending in 2022 was directed toward diagnostics R&D. Fifty-seven cents of every dollar invested in this area came from public entities, $0.19 came from companies, $0.13 came from multisector organizations, and $0.12 came from philanthropic funders. Eighty-one discrete entities invested in TB diagnostics research in 2022, including 45 public entities, 22 companies, 11 philanthropies, and three multilateral organizations.

The U.S. NIH maintained its position as the largest funder of TB diagnostics R&D in 2022 with an overall investment of $44 million — accounting for 31% of the total. The U.S. NIH's investments in TB diagnostics R&D were allocated across 69 grants ranging from $9,000 to $3.9 million, with a mean investment of $649,000.

Unitaid moved from the third to the second-largest funder of TB diagnostics R&D by increasing its spending from $11.5 million in 2021 to $16.8 million in 2022.

The Gates Foundation, which increased its investment in TB diagnostics R&D from $6.7 million in 2021 to $13.4 million in 2022, moved from the seventh to the third-largest funder of this research area. Forty-one percent of the Gates Foundation's investments in diagnostics research in 2022 supported research efforts at LumiraDx. The remaining 59% of funds were spent across eight grants ranging from $284,000 to $2 million.

Oxford Immunotec, the fourth-largest funder of TB diagnostics research, invested $11 million in 2022. Since Oxford Immunotec began reporting to TAG in 2020, it has consistently spent over $10 million annually on TB diagnostics R&D — making it the largest private-sector funder of this research area. Qure.ai, the second-largest private sector supporter of TB diagnostics research, spent $4.5 million. Only five other companies spent over $1 million.

EDCTP spending on TB diagnostics research has declined from $14 million in 2020 to $11 million in 2021 to $6 million in 2022. The European Commission allocated $5.4 million to this research area in 2022, an amount around halfway between what it spent in 2020 ($3 million) and 2021 ($7 million).

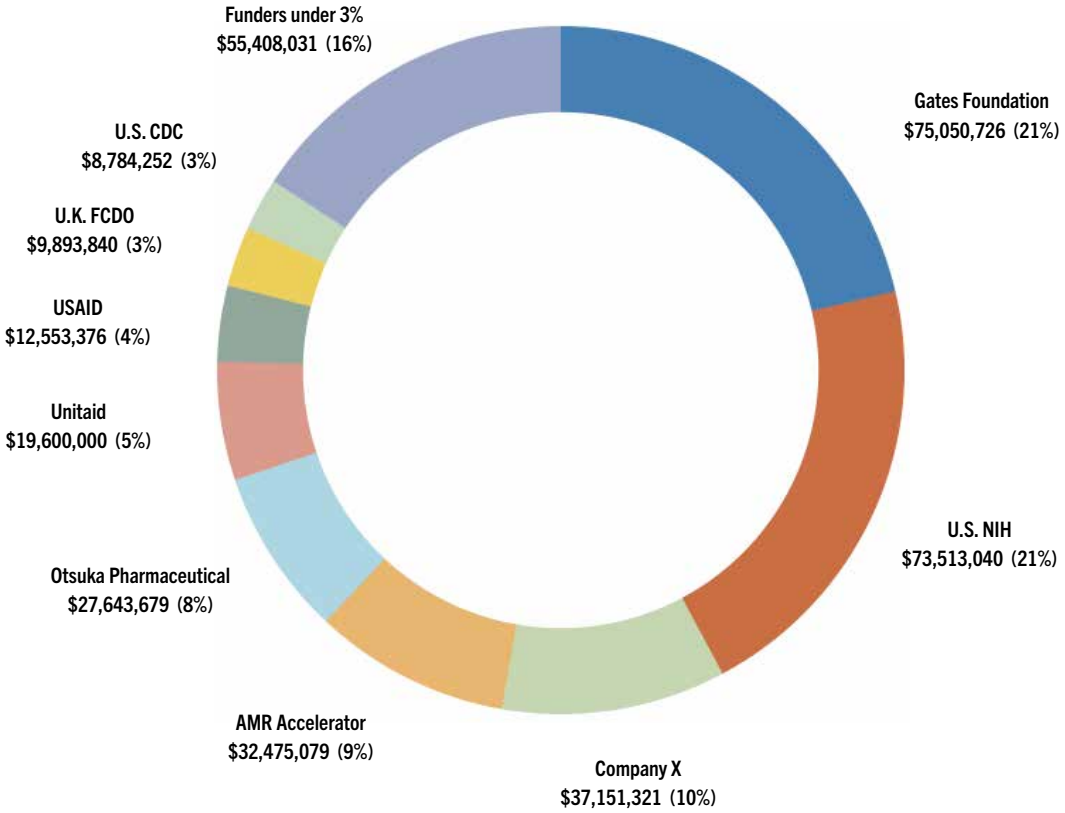
Missing from these data

Cepheid and Roche did not respond to TAG's survey. Abbott and Delft Imaging responded that, while they are investing in TB research, they are unable to share details of their investments.

Drugs

FIGURE 9

Drugs: $352,073,344



Other funders with investments under 3%

European Commission	$6,225,373
German Federal Ministry of Education and Research (BMBF)	$5,931,098
European and Developing Countries Clinical Trials Partnership (EDCTP)	$5,476,956
Médecins Sans Frontières	$5,404,127
U.K. Medical Research Council (U.K. MRC)	$2,718,895
Australian Department of Foreign Affairs and Trade (DFAT)	$2,605,155
LegoChem Biosciences	$1,890,091
French National Research Agency (ANR)	$1,597,609
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$1,490,632
Wellcome	$1,486,164
Swedish Research Council	$1,448,377
Swiss National Science Foundation	$1,437,625
Anhui Zhifei Longcom Biopharmaceutical Co.,Ltd.	$1,056,823
Academy of Finland	$1,053,580
Irish Aid	$1,053,580

Macleods Pharmaceuticals	$1,000,000
Dutch Ministry of Foreign Affairs	$967,186
Canadian Institutes of Health Research (CIHR)	$955,766
Australian National Health and Medical Research Council	$944,728
Merck	$904,463
Peru Ministry of Health	$866,443
Korea International Cooperation Agency (KOICA)	$720,000
U.S. Department of Veterans Affairs	$692,635
Indian Council of Medical Research (ICMR)	$684,717
South Africa Medical Research Council	$675,484
Cadila Pharmaceuticals	$576,661
Mueller Health Foundation	$545,945
South Africa Department of Science and Innovation	$499,233
Japan Agency for Medical Research and Development (AMED)	$492,043
New Zealand Health Research Council	$412,268
Other funders with expenditures <$400,000	$3,594,374

Between 2018 and 2022, 35% of total TB research spending was allocated toward drugs research, reaching a total of $1.67 billion. While drugs research received more funding than any other research area, spending remained far below the $6.8 billion funding target set in the *2018–2022 Global Plan* — leaving a funding gap of $5.13 billion.

The *2023–2030 Global Plan* calls for a $2 billion annual investment in TB drugs R&D, which is more than what donors spent over the five-year period from 2018 to 2022.

While global spending remains far below funding targets, funders spent more on TB drugs research in 2022 than in any preceding year. Spending on TB drugs R&D is also far higher than spending in any other research area, with 34% of every dollar spent on TB research in 2022 directed toward drugs R&D. No other research area received more than 20% of total funds.

Sixty-four discrete entities invested in TB drugs research in 2022, including 44 public entities, nine companies, seven philanthropies, and four multilateral organizations. The origin of investment by funder type resembled previous years. Of every dollar spent on TB drugs research in 2022, $0.51 came from public funders, $0.24 came from philanthropic funders, $0.20 came from companies, and $0.06 came from multilateral organizations.

The U.S. NIH and the Gates Foundation were the largest funders of drugs research from 2018 through 2022 — jointly contributing just over 40% of funds. In 2022, the Gates Foundation was the largest funder of TB drugs research with an investment of $75 million, followed closely behind by the U.S. NIH with $73 million.

Of every dollar spent on TB drugs R&D by the Gates Foundation in 2022, $0.41 supported the Gates MRI, $0.26 supported the TB Alliance, and $0.06 supported Evotec. The remaining $0.27 of every dollar spent ($20 million) was distributed across 28 grants ranging from $121,000 to $1.6 million. The U.S. NIH's TB drug research investments supported 121 grants ranging from $25,000 to $3.24 million.

The third-largest funder of TB drugs research in 2022 was Company X, a private-sector company that reports to TAG anonymously. Company X maintained annual investments of around $30 million into TB drugs research from 2018 through 2020. After a decline in 2021, when expenditures fell to $22 million, Company X's investments in TB drugs research grew to $37 million in 2022.

The fourth-largest funder of TB drugs research in 2022 was the AMR Accelerator. This is the second year that the AMR Accelerator has reported on its investments to TAG; the AMR Accelerator invested $31 million and $32 million in TB drugs research in 2021 and 2022, respectively. Of every dollar spent by the AMR Accelerator in 2022, $0.48 went to ERA4TB, $0.43 went to UNITE4TB, $0.05 went to Bioversys, and $0.03 went to RespiriTB.

Otsuka Pharmaceuticals was the fifth-largest funder in TB drugs research in 2022. Otsuka Pharmaceuticals invested $28 million in TB research in 2018, but its investments fell to $15 million in 2019. The company's investments have steadily increased since then, reaching $28 million again in 2022.

Unitaid, the sixth-largest funder of TB drugs R&D in 2022, maintained its investment of $19.6 million. Unitaid's drugs research investments included investments in improving TB prevention treatment (including long-acting formulations of preventive treatments), developing shorter and better treatments for drug-resistant TB, and improving evidence and formulations for treatment and prevention of drug-resistant TB in kids. During 2022, Unitaid gave $9.2 million to the Aurum Institute–led IMPAACT4TB project, $6 million to the University of Liverpool-led LONGEVITY project, $3.3 million to Partners in Health for the endTB project, and $1.1 million to Stellenbosch University for the BENEFIT Kids project.

USAID, the seventh-largest funder, was the only other entity that invested more than $10 million in TB drugs research in 2022. USAID's spending in this area included around $2 million for TB therapeutics research undertaken by the SMART4TB consortium led by Johns Hopkins University.

Only six other funders invested more than $5 million in TB drugs R&D in 2022: the U.K. Foreign, Commonwealth & Development Office; the U.S. Centers for Disease Control and Prevention; the European Commission; the German Federal Ministry of Education and Research (BMBF); EDCTP; and MSF. Four million dollars of MSF's investment supported the TB-PRACTECAL trial, which demonstrated the effectiveness of shorter, all-oral treatment regimens in treating drug-resistant TB.

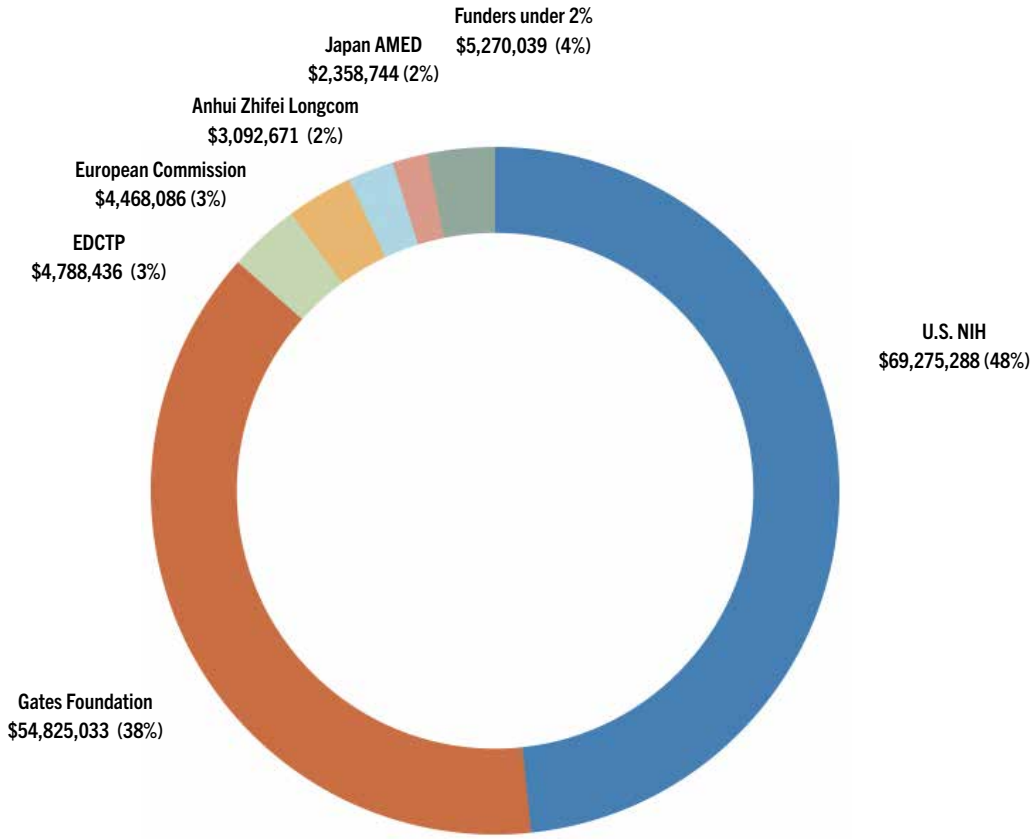
Missing from these data

Viatris, GlaxoSmithKline, and Qurient, companies that have active TB drug development projects underway, did not respond to TAG's survey. The European Federation of Pharmaceutical Industries and Associations did not respond to our survey request or provide details of any funding given to the AMR Accelerator by European pharmaceutical companies. Therefore, only the AMR Accelerator's investments into TB R&D from funds originating public sources are included in this report.

Vaccines

FIGURE 10

Vaccines: $144,078,297



Other funders with investments under 2%

Indian Council of Medical Research (ICMR)	$729,292
U.K. Medical Research Council (U.K. MRC)	$658,318
Australian National Health and Medical Research Council	$354,112
Netherlands Ministry of Health, Welfare and Sport	$341,370
Swiss National Science Foundation	$338,592
São Paulo Research Foundation (FAPESP)	$309,188
Irish Health Research Board	$296,859

South Africa Medical Research Council	$295,402
Korea Ministry of Health and Welfare	$292,308
U.S. Department of Veterans Affairs	$264,086
U.S. National Science Foundation (NSF)	$256,000
Chile National Research and Development Agency (ANID)	$212,043
Canadian Institutes of Health Research (CIHR)	$206,406
Other funders with expenditures <$200,000	$716,062

While TB vaccine R&D funding reached a new high in 2022 at a total of $144 million, spending remained far below the *2018–2022 Global Plan's* annual investment target of $613 million. Cumulative investments in TB vaccine research from 2018 to 2022 were $609 million — only 20% of the *Global Plan's* $3 billion target. The updated *2023–2030 Global Plan* calls for annual investments of $1.25 billion in TB vaccine research, or more than eight times what was invested in 2022.

The U.S. NIH and the Gates Foundation remained the largest funders of TB vaccines research in 2022 by an overwhelming margin, jointly accounting for 86% of total spending. Since 2019, the U.S. NIH has contributed almost half of all money spent on TB vaccine research, while the Gates Foundation has contributed around a third of the total.

Both the U.S. NIH and the Gates Foundation increased their spending on TB vaccines R&D in 2022, resulting in the observed spending boost. Spending by the U.S. NIH increased to $69 million in 2022 from $55 million in 2021 while the Gates Foundation increased its spending to $55 million in 2022 from $37 million in 2021.

The U.S. NIH distributed its $69 million investment across 69 grants ranging from $42,000 to $9.2 million, with an average grant size of $1 million. The largest U.S. NIH grants for vaccine R&D went to the Immune Mechanisms of Protection Against Mycobacterium tuberculosis Centers (IMPAc-TB) program. Grants supporting IMPAc-TB included one grant of $9.2 million to Harvard University and four grants totaling $19 million to Seattle Children's Hospital.

The Gates Foundation allocated 82% ($45 million) of its vaccines research investment to Gates MRI. The remainder was invested across 18 grants ranging from $10,000 to $3.4 million. Eighty-six percent of vaccine research funding given to the Gates MRI by the Gates Foundation was directed toward research on the M72/AS01E TB vaccine candidate, while the remainder went toward a clinical trial evaluating BCG revaccination.

EDCTP and the European Commission were the third- and fourth-largest funders of TB vaccines research in 2022 with respective investments of $4.8 million and $4.5 million. The only other entities that invested over a million dollars in TB vaccines R&D in 2022 were Zhifei Longcom and the Japan Agency for Medical Research and Development.

Twenty-nine discrete entities invested in TB vaccines research in 2022, including 25 public entities, three private-sector companies, and one philanthropic funder. No multilateral organizations invested in TB vaccines research in 2022.

Only three companies reported investments in TB vaccines R&D in 2022. Zhifei Longcom, which reported to TAG for the first time in 2021, once again reported a $3 million investment in this area. The other two companies, Japan BCG Laboratory and Company Q, each spent under $100,000. Biofabri, which reported spending $4 million on TB vaccines research in 2021, did not report investments from the company's own funds in 2022 but did report receiving money from other donors that report to TAG.

Missing from these data

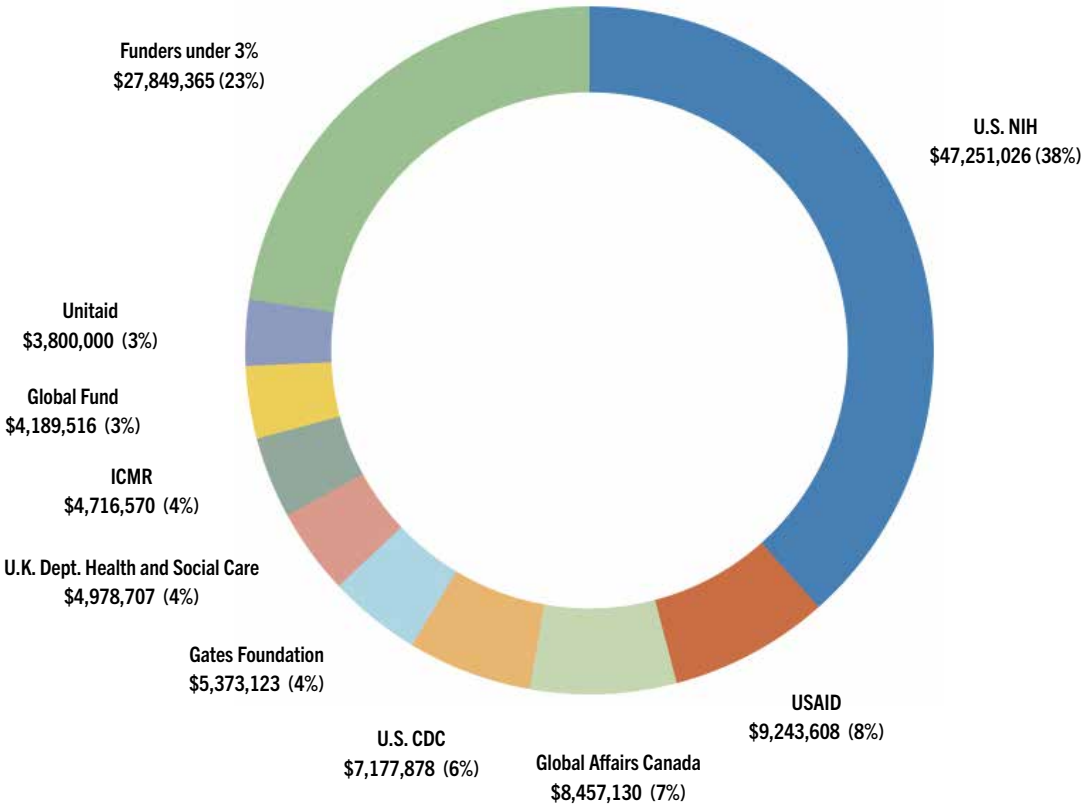
Several companies with active TB vaccine development programs did not respond to the survey, including the Serum Institute of India, Vakzine Projekt Management (Serum Life Science Europe), BioNTech, Archivel Farma, and Quratis. Moderna responded that they did not have reportable efforts for 2022.

The EIB, which has committed loans to support vaccine R&D, reported that they did not make any TB investments in 2022 and do not usually participate in topic-specific surveys (see "Closer Look: European Investment Bank" for more detail).

Operational Research and Epidemiology

FIGURE 11

Operational Research & Epidemiology: $123,036,923



Other funders with investments under 3%

U.K. Foreign, Commonwealth & Development Office (FCDO)	$3,062,693
L'Initiative	$2,505,987
India Ministry of Health and Family Welfare (MOHFW)	$2,326,635
U.K. Medical Research Council (U.K. MRC)	$2,166,297
São Paulo Research Foundation (FAPESP)	$1,879,241
Australian Department of Health and Aged Care	$1,505,680
Canadian Institutes of Health Research (CIHR)	$1,451,787
Australian Department of Foreign Affairs and Trade (DFAT)	$1,418,682
Australian National Health and Medical Research Council	$1,200,413
Open Philanthropy	$1,016,599
Brazilian Ministry of Health	$1,014,960
European and Developing Countries Clinical Trials Partnership (EDCTP)	$779,240
Taiwan Ministry of Health and Welfare	$663,420
Italian Ministry of Health	$637,416
Malaysia Ministry of Health	$636,936
Wellcome	$493,155
TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization	$451,257
Swiss National Science Foundation	$437,219
Public Health Agency of Catalonia (ASPCAT)	$402,685
Other funders with expenditures <$400,000	$3,799,064

From 2018 through 2022, funders invested $666 million in operational and epidemiological research. This accounted for 14% of all TB research spending over the five-year period.

Spending on this research area decreased from the $157 million peak seen in 2021 to $123 million in 2022. This decline was due to reduced investments by several large funders from 2021 spending levels.

Sixty-five discrete entities invested in operational and epidemiological research in 2022, including 50 public-sector agencies, 11 philanthropic organizations, and four multilateral organizations. No companies invested in this research area in 2022.

The U.S. NIH remained the largest funder of TB operational and epidemiological research in 2022 with an investment of $47 million across 131 awards. This accounted for 38% of all money directed toward this area of research in 2022. The $47 million the U.S. NIH spent in 2022 is slightly below the $51 million reported in 2021, but well above the $21 million spent in 2018.

Aside from the U.S. NIH, no other funder gave over $10 million to operational and epidemiological research. USAID, which did not report any relevant spending in 2021 but was a large contributor to this research area in previous years, was the second-largest funder in 2022. USAID's renewed investment in TB operational and epidemiological research accounted for 8% of total investments and totaled $9.2 million.

Several large funders of operational research and epidemiology decreased their contributions in 2022, following the surge in funding seen in 2021. The largest change in financing was made by Unitaid. From 2018 through 2021, Unitaid consistently contributed over 10% of total TB operational and epidemiological research funding, with its investments in this area reaching a high of $26 million in 2019. However, in 2022, Unitaid only contributed 3% of total operational and epidemiological research funding, with an investment of $3.8 million. Other funders decreased their spending on TB operational and epidemiologic research from 2021 levels but remained top funders of this research area:

- Global Affairs Canada decreased its investment from $11 million in 2021 to $8.4 million in 2022.
- The U.S. Centers for Disease Control and Prevention decreased its investment from $12.8 million to $7 million.
- France's L'Initiative decreased its investment from $6.9 million to $2.5 million.
- India's Ministry of Health and Family Welfare decreased its investment from $5.8 million to $2.3 million.

The decline in spending on operational and epidemiological research by some funders was partially offset by increases from others:

- The Gates Foundation increased its spending from $1.7 million in 2021 to $5.3 million in 2022, although its spending on TB operational and epidemiological remained below investments seen over 2018–2020.
- ICMR increased its spending from $1 million in 2021 to $4.7 million in 2022.

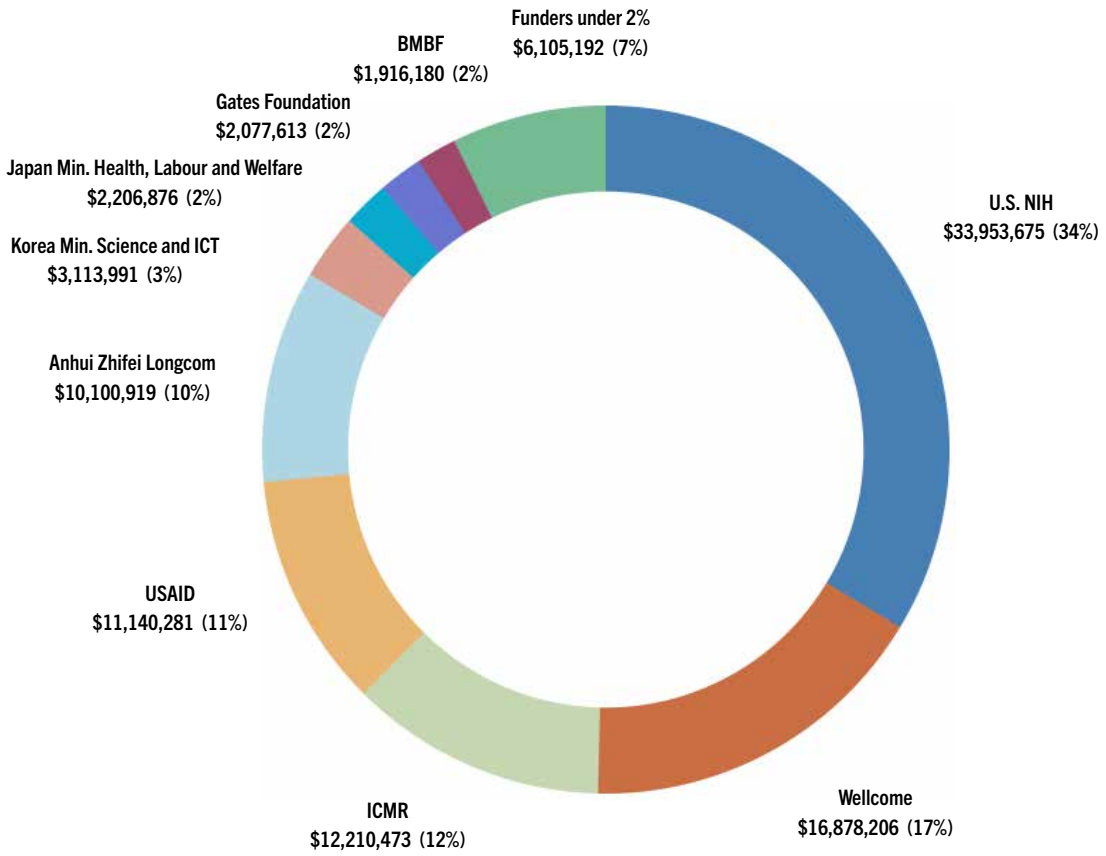
Missing from these data

PEPFAR, which reported spending $2.5 million on operational and epidemiological research in 2021, did not respond to TAG's survey this year.

Infrastructure and Unspecified Projects

FIGURE 12

Infrastructure/Unspecified: $99,703,407



Other funders with investments under 2%

U.S. Centers for Disease Control and Prevention (U.S. CDC)	$1,458,029
Korea Ministry of Health and Welfare	$907,692
São Paulo Research Foundation (FAPESP)	$685,410
U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	$425,157

Japan Agency for Medical Research and Development (AMED)	$413,546
European Commission	$391,066
EA Funds	$300,000
India Ministry of Health and Family Welfare (MOHFW)	$285,403
Other funders with expenditures <$200,000	$1,238,888

Spending on research-related infrastructure and TB research that could not be categorized into another research area (uncategorized projects) reached an all-time high in 2022 at $99 million. Between 2018 and 2022, total spending on infrastructure and other uncategorized research equaled $361 million and accounted for 8% of all TB research expenditures.

The largest supporter of TB research infrastructure and unspecified research in 2022 was the U.S. NIH, which more than doubled its investment in this area between 2021 and 2022, from $14 million to $34 million. This accounted for 34% of all spending on this research area in 2022.

The second-largest supporter of TB research infrastructure and unspecified research was Wellcome. Although Wellcome did not report any spending in this area in 2021, it invested $17 million in TB research infrastructure and unspecified research in 2022. This investment accounted for 17% of all spending in this research area.

Three other funders contributed more than $10 million: ICMR, USAID, and Zhifei Longcom. Together, the top five funders of TB research infrastructure and unspecified research contributed 85% of all spending in this area. The remaining 15% came from smaller investments by 26 other funders.

The U.S. NIH's investments in infrastructure and unspecified research were spent across 82 awards. Three grants supported intramural research at the NIH, while the remainder went to universities and external organizations. Investments made by the NIH into its own research included a $12 million investment into the NIAID Global Collaborative for TB Research and Development, a $2.6 million investment into the NIH's Tuberculosis Imaging Program, and a $1 million investment into the NIH's International Tuberculosis Clinical Research Program.

A large share of NIH spending on research infrastructure came from a new program established in 2022 called the Tuberculosis Research Advancement Centers (TRACs). NIAID awarded funding to establish six TRACs located at universities across the United States. The goal of the TRAC program is to nurture the next generation of TB scientists by providing mentoring, training, scientific leadership, and funding support to both new investigators and established researchers looking to enter the TB field.[28] The six TRACs are located at Emory University, Johns Hopkins University, Texas Biomedical Research Institute, the University of Washington, Weill Cornell Medical College (with Rockefeller University and Memorial Sloan Kettering), and the University of California, San Francisco (with University of California, Berkeley).

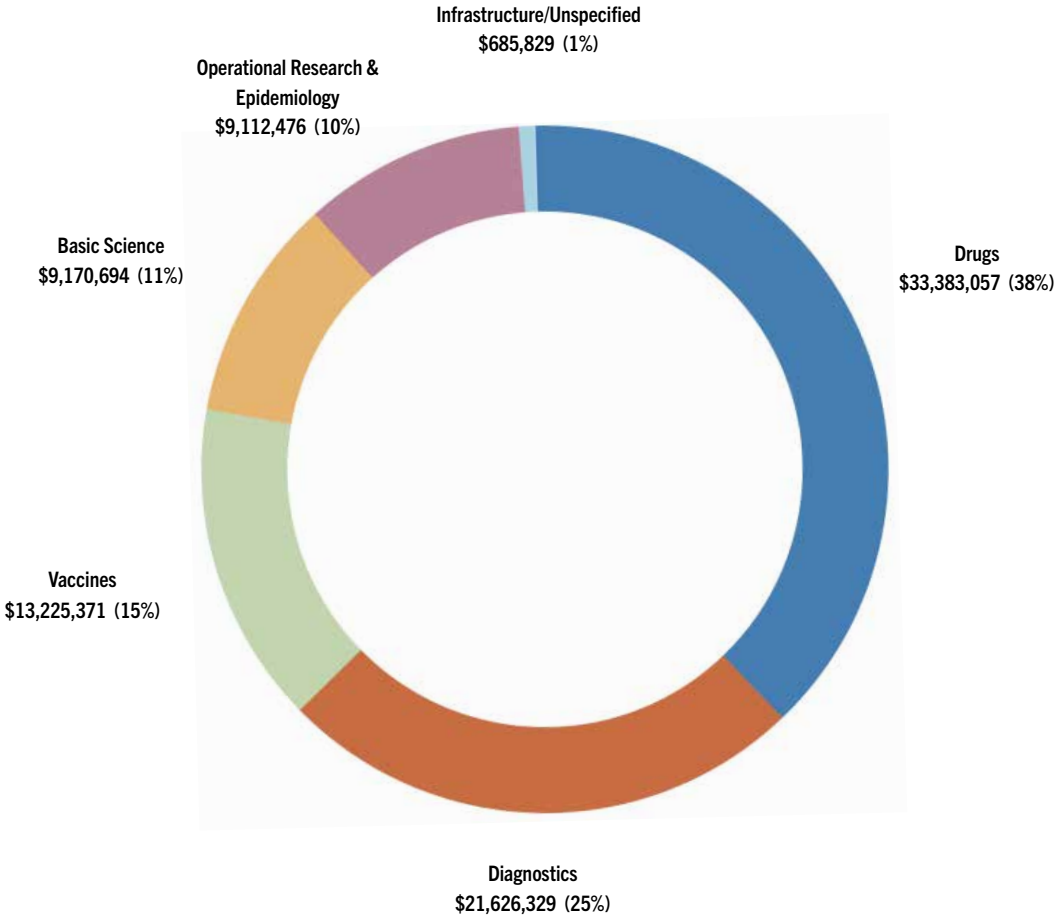
Wellcome's investments in TB-research infrastructure include an $8 million investment into the Africa Health Research Institute given via the University College London and a $6.6 million investment into the Malawi Liverpool Wellcome Programme given via the Liverpool School of Tropical Medicine. The remaining $2 million invested by Wellcome was spent across four grants.

The ICMR's $12 million investment supported India's National Institute for Research in Tuberculosis. USAID's investment of $11 million was spent across 14 grants, including an investment of $5.9 million into the SMART4TB consortium given via Johns Hopkins University.

Pediatric TB Research

FIGURE 13

Pediatric TB R&D Funding by Research Area, 2022
Total: $87,203,757



Since 2018, annual investments in pediatric research have fluctuated between $58 million and $91 million. TAG has previously advocated for 10% of total TB research spending to be directed toward pediatrics, commensurate with the burden of disease experienced by children. This target was only met in 2020, when investments in pediatric TB research peaked at $91 million. In 2022, only 8% of total TB research spending ($87 million) was directed toward pediatric-focused research efforts.

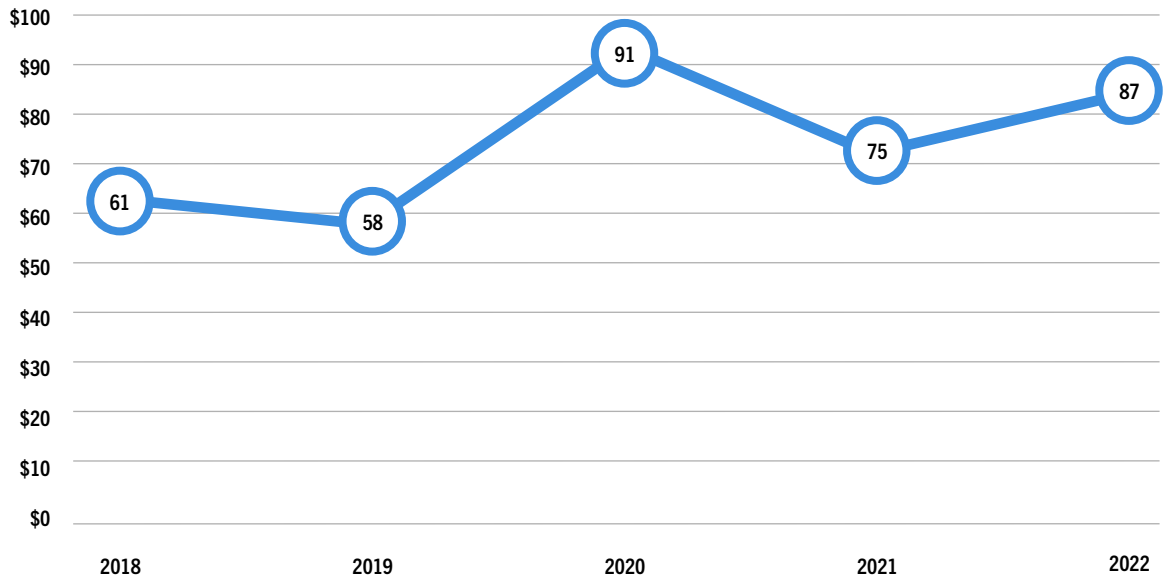
Of every dollar invested into pediatric research in 2022, $0.38 went to drugs research, $0.25 went to diagnostics research, $0.15 went to vaccines research, $0.11 went to basic science research, $0.10 went to operational and epidemiological research, and $0.01 went to research-related infrastructure.

Forty unique entities invested in pediatric research in 2022, including 26 public institutions, six philanthropic organizations, five companies, and three multilateral institutions.

Public funding remained the largest source of pediatric research support in 2022, making up 63% of the total. Multilateral and philanthropic funders, respectively, contributed 19% and 14% of pediatric research funds, while companies contributed only 4%.

FIGURE 14

Pediatric TB R&D Funding, 2018–2022 (in Millions)



Multilateral entities directed a larger proportion of their total investments toward pediatric research than any other type of funder. This trend was driven by Unitaid's investments in pediatric research. Thirty-four percent of spending by multilateral entities supported pediatric research efforts. Public entities and philanthropic funders respectively directed 8% and 7% of all TB research spending to pediatric research, while companies only directed 3% of their investments toward pediatric TB R&D.

The U.S. NIH was the largest funder of pediatric research in 2022 with an investment of $23 million. Only three other funders—Unitaid, USAID, and the Gates Foundation — invested over $10 million. Expenditures by the top four funders of pediatric TB research accounted for 76% of all spending.

Unitaid was the second-largest funder of pediatric TB research in 2022 with a $16 million investment. This accounted for 98% of all funds invested by multilateral entities into pediatric research in 2022. Unitaid has consistently given over $15 million annually to pediatric TB research since 2019.

USAID, the third-largest funder of pediatric research in 2022, invested $15.9 million. This was below USAID's 2020 and 2021 investment levels of $21 and $18 million, respectively.

The Gates Foundation substantially increased its support for pediatric research in 2022 with its $11 million investment. Most of this went to support the phase IIb trial of BCG revaccination in adolescents run by the Gates MRI (the trial has been running for several years, but the Gates Foundation did not disaggregate its funding to Gates MRI at this level of detail until this year.)

Only one other entity contributed more than $5 million to pediatric research in 2022: the EDCTP.

Company X, which has historically been the largest industry funder of pediatric TB research, resumed reporting on its pediatric research investments in 2022 following an interruption in its pediatric reporting in 2021. Company X spent $1.9 million on pediatric research in 2022, which was below the $6 million it spent in 2018, 2019, and 2020.

TABLE 4

Top 15 Pediatric TB R&D Funders, 2022

RANK	FUNDER	FUNDER TYPE	2022 FUNDING
1	U.S. National Institutes of Health (U.S. NIH)	P	$23,219,071
2	Unitaid	M	$16,100,000
3	U.S. Agency for International Development (USAID)	P	$15,944,620
4	Bill & Melinda Gates Foundation	F	$11,199,999
5	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$6,022,933
6	Australian Department of Foreign Affairs and Trade (DFAT)	P	$2,605,155
7	Company X	C	$1,900,000
8	Wellcome	F	$1,278,397
9	U.S. Centers for Disease Control and Prevention (U.S. CDC)	P	$1,250,000
10	Australian National Health and Medical Research Council	P	$1,034,594
11	Brazilian Ministry of Health	P	$1,014,960
12	U.K. Medical Research Council (U.K. MRC)	P	$913,477
13	Qure.ai	C	$750,000
14	L'Initiative	P	$470,905
15	South Africa Medical Research Council	P	$452,247
	Other funders with expenditures <$450,000		$3,047,399
	Total		$87,203,757

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

Discussion

> "Adequate investment [in innovation] by the public sector is crucial if governments are to fulfill their obligations on the right to health [. . .] Equitable access to benefits of research is also fundamental with need prioritized above the ability to pay."
>
> – Dennis Francis, President of the General Assembly, 2023 UN HLM on TB (NB: second sentence repeated twice for emphasis)

> "We must ensure that all people affected by TB are reached by equitable, inclusive, gender responsive, rights-based, and human-centered TB prevention, diagnosis, treatment, and care. This includes access to benefits of research and innovation."
>
> – Loyce Pace, Assistant Secretary, Office of Global Affairs, U.S. Department of Health & Human Services, 2023 UN HLM on TB

The global community has fallen far short of the promises made in 2018 to expand TB research funding to $2 billion annually. Greater investment is now urgently needed to advance research and development of new technologies to end TB.

While TAG and partners welcome the new, higher funding target for TB R&D adopted at the 2023 UN HLM on TB, it is concerning to see the political declaration present this figure as a ceiling to reach rather than a minimum threshold to overcome. Instead of conveying urgency, the political declaration is almost lackadaisical in calling for "reaching 5 billion United States dollars a year by 2027."[29] A number meant to set an annual expectation has morphed into a five-year aspiration.

Following years of severe underfunding, immediate corrective action is needed if the international community is serious about ending TB by 2030. Reaching the $5 billion annual target must be prioritized, even amidst other pressing challenges facing the world today. As one of humanity's longest lasting and most prolific killers, TB deserves far more political attention and financing than it currently attracts.

To meet the $5 billion funding target, governments must mutually direct 0.15% of their overall spending on all forms of R&D toward TB R&D while fostering greater collaboration — with each other and with funders from other sectors.

Governments should direct their TB research budgets to tackle the highest-priority research questions. By working together to co-fund and advance joint research priorities, such as major late-stage trials of TB vaccines, governments can propel the development and delivery of game-changing technologies — as seen for COVID-19. Governments should also use their investments to incentivize greater spending from other actors by, for example, seeking matching contributions or continuing to facilitate product-development and public-private partnerships. Public funders also incentivize private investment through their support of basic science and early-stage research, which advances fundamental knowledge of TB infection and disease and provides opportunities for industry to pursue further product development and commercialization.

Critically, incentivizing industry investments must not be pursued at the expense of the affordability and accessibility of health technologies. The incredibly high burden of TB, and its recognition by the UN as a concern shared by all states, provides governments with ample cause to explore approaches to innovation that prioritize equitable access to research outputs from the very beginning.

Just as the political declaration frames health as "a precondition for, and an outcome and indicator of the social, economic, and environmental dimensions of sustainable development,"[30] so too is access to innovation both intrinsic to research itself and also a measure of its success. The political declaration acknowledges as much in recognizing that "the fulfilment of the right to health in the context of tuberculosis is closely linked to the right to enjoy and share the benefits of scientific progress and its applications."[31] This statement is immediately followed by a note of concern that "access to tuberculosis services and to the benefits of research and innovation such as quality, safe, efficacious and affordable tuberculosis diagnostics and treatment, remains challenging, especially for developing countries."[32]

As the main source of financing for TB research, public funders hold significant power to establish pro-access norms necessary to ensure the affordability and accessibility of tangible TB research benefits — such as new drugs, diagnostics, and vaccines — and intangible benefits — such as access to knowledge, information, and data. Governments committed to promote access to innovation in the political declaration by promising to support "existing initiatives and incentive mechanisms that separate the cost of investment in research and development from the price and volume of sales" and to encourage "open innovation approaches, voluntary licensing, and technology transfer on mutually agreed terms."[33]

As the primary source of TB R&D funding, governments hold considerable clout to compel collaboration and knowledge sharing to propel research efforts forward and to ensure that research secrecy and silos do not delay the delivery of new tools. Exercising this clout is necessary to maximize returns on public investment and unlock the full potential of TB research — an objective the political declaration expressed in two distinct places:

- "[…] acknowledge the importance of global collaboration and increased investment to fast-track progress and ensure equitable access and maximal return on public investment in scientific progress."[34]
- "[. . .] maximize the potential of innovation to end tuberculosis by 2030, including through international cooperation as well as financing, encouraging greater collaboration between the scientific research and innovation community and tuberculosis stakeholders."[35]

The political declaration recognizes the urgency of sparking faster, more equitable scientific progress in stating "reaching the 2030 global tuberculosis targets requires, *inter alia*, technological breakthroughs by 2025."[36] Yet to date, governments have not fully employed the tools available to them to promote public interest, which has resulted in the delayed delivery and inaccessibility and unaffordability of many critical tools to combat TB, including diagnostics and drugs.

Advocates and communities affected by TB have a vital role to play in ensuring that the promises made by their governments in the new political declaration are more than simply words on paper. At the country-level, advocates can monitor their country's success in meeting its fair share funding target, push for greater financing for TB R&D, and advocate for the adoption of policies and use of regulations that facilitate research collaboration and require safeguards for equitable and affordable health technology access.

Eliminating TB by 2030 lies within reach, but governments and other actors must reach beyond efforts made to date. Realizing the ambitious and historic vision of ending the centuries' long TB epidemic this decade will require an urgent and united global response. Governments and other actors must jointly prioritize and finance TB research at a level that is commensurate with the disease's enormous costs — past, present, and future — and communities must hold them accountable for doing so. By investing in TB research and ensuring access to its benefits: Yes! We can end TB.

Appendix 1: Methodology

TAG tracks global funding for TB R&D by surveying public, private, philanthropic, and multilateral organizations with known or possible 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 epidemiology, and infrastructure/unspecified projects. Institutions are encouraged to report spending by individual projects but may aggregate expenditures by research area. Within these categories, the survey asks recipients to indicate any funding for pediatric TB research (see box). Respondents report expenditures according to how their fiscal year is defined, so the funding reported here does not align with calendar year 2022 perfectly.

TAG surveyed 315 organizations for this year's report, more than in any other year, and received 184 responses. Of these 184 responses, 146 institutions returned surveys reporting TB research spending in 2022, 32 reported that they did not spend any money on TB research, and six declined to participate. From returned surveys, TAG identified 173 unique entities that gave money to TB research in 2022.

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 2022, 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.

Note on Pediatric Methodology

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

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 total investment.

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 funders typically comprise over 90% of total spending, and the composition of this group has remained remarkably stable over time. This year, all 30 of the top 30 funders in fiscal year 2021 participated in the survey.

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 government agencies in 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 hundreds of funding officers and administrative staff who fill out the survey each year. TAG is grateful to the 184 organizations around the world that responded to this year's survey.

Appendix 2: New Fair Share Targets

New 0.15% Fair Share Targets: Select Examples

COUNTRY	0.15% FAIR SHARE TARGET
United States	$1,209,019,500
European Union*	$706,095,690
Japan	$265,442,184
Germany	$229,848,390
South Korea	$179,425,934
United Kingdom	$135,141,551
France	$115,428,470
India	$88,082,100
Italy	$61,409,810
Brazil	$54,473,250
Canada	$51,678,755
Spain	$41,324,967
Netherlands	$37,621,472
Australia	$36,085,950
Sweden	$31,461,153
Switzerland	$29,838,551
Denmark	$16,028,201
Finland	$13,588,908
Norway	$12,867,956
Ireland	$8,494,199
South Africa	$7,721,810
New Zealand	$4,816,424
Philippines	$1,726,350

* The EU fair share target includes spending by EU member states.
Note: TAG will begin tracking spending against 0.15% fair share targets in FY2023.

Appendix 3: TB R&D Funders by Rank

TB R&D Funders by Rank, 2022

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	INFRASTRUCTURE/ UNSPECIFIED	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	PEDIATRICS
1	U.S. National Institutes of Health (U.S. NIH)	P	$376,925,735	$108,174,576	$33,953,675	$44,758,129	$73,513,040	$69,275,288	$47,251,026	$23,219,071
2	Bill & Melinda Gates Foundation	F	$154,020,527	$3,267,225	$2,077,613	$13,426,807	$75,050,726	$54,825,033	$5,373,123	$11,199,999
3	Unitaid	M	$40,200,000	$0	$0	$16,800,000	$19,600,000	$0	$3,800,000	$16,100,000
4	U.S. Agency for International Development (USAID)	P	$37,435,817	$0	$11,140,281	$4,498,552	$12,553,376	$0	$9,243,608	$15,944,620
5	Company X	C	$37,151,321	$0	$0	$0	$37,151,321	$0	$0	$1,900,000
6	AMR Accelerator/Innovative Medicines Initiative	P	$32,475,079	$0	$0	$0	$32,475,079	$0	$0	$0
7	Otsuka Pharmaceutical	C	$27,643,679	$0	$0	$0	$27,643,679	$0	$0	$0
8	Wellcome Trust	F	$26,452,024	$6,690,082	$16,878,206	$904,417	$1,486,164	$0	$493,155	$1,278,397
9	European Commission	P	$23,928,183	$7,434,529	$391,066	$5,409,129	$6,225,373	$4,468,086	$0	$0
10	Indian Council of Medical Research (ICMR)	P	$20,411,604	$531,304	$12,210,473	$1,539,248	$684,717	$729,292	$4,716,570	$0
11	European and Developing Countries Clinical Trials Partnership (EDCTP)	P	$17,516,947	$0	$0	$6,472,315	$5,476,956	$4,788,436	$779,240	$6,022,933
12	U.S. Centers for Disease Control and Prevention (U.S. CDC)	P	$17,420,159	$0	$1,458,029	$0	$8,784,252	$0	$7,177,878	$1,250,000
13	Anhui Zhifei Longcom Biopharmaceutical Co.,Ltd.	C	$15,766,810	$0	$10,100,919	$1,516,396	$1,056,823	$3,092,671	$0	$0
14	U.K. Foreign, Commonwealth & Development Office (FCDO)	P	$14,868,102	$0	$56,474	$1,855,095	$9,893,840	$0	$3,062,693	$0
15	Korea Ministry of Health and Welfare	P	$12,610,681	$10,709,912	$907,692	$546,923	$0	$292,308	$153,846	$0
16	German Federal Ministry of Education and Research (BMBF)	P	$11,513,871	$1,457,293	$1,916,180	$2,209,299	$5,931,098	$0	$0	$0
17	Oxford Immunotec	C	$11,200,000	$0	$0	$11,200,000	$0	$0	$0	$0
18	Global Affairs Canada	P	$8,457,130	$0	$0	$0	$0	$0	$8,457,130	$0
19	U.K. Medical Research Council (U.K. MRC)	P	$7,999,909	$1,461,757	$116,634	$878,008	$2,718,895	$658,318	$2,166,297	$913,477
20	KfW Development Bank with BMBF	P	$6,927,358	$0	$0	$6,927,358	$0	$0	$0	$0
21	Australian Department of Foreign Affairs and Trade (DFAT)	P	$6,628,992	$0	$0	$2,605,155	$2,605,155	$0	$1,418,682	$2,605,155
22	Korea Ministry of Science and ICT	P	$6,227,775	$3,101,721	$3,113,991	$12,064	$0	$0	$0	$0
23	Médecins Sans Frontières	F	$5,630,070	$0	$0	$182,867	$5,404,127	$0	$43,075	$0
24	Australian National Health and Medical Research Council	P	$5,390,256	$2,547,653	$0	$343,349	$944,728	$354,112	$1,200,413	$1,034,594
25	Japan Agency for Medical Research and Development (AMED)	P	$5,318,049	$1,541,378	$413,546	$512,338	$492,043	$2,358,744	$0	$153,165
26	U.K. Department of Health and Social Care	P	$5,289,748	$0	$0	$74,359	$236,683	$0	$4,978,707	$216,526
27	Swiss National Science Foundation	P	$4,948,543	$2,606,636	$0	$128,470	$1,437,625	$338,592	$437,219	$0
28	Canadian Institutes of Health Research (CIHR)	P	$4,613,823	$1,685,356	$0	$314,508	$955,766	$206,406	$1,451,787	$0
29	Qure.ai	C	$4,500,000	$0	$0	$4,500,000	$0	$0	$0	$750,000
30	Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)	M	$4,189,516	$0	$0	$0	$0	$0	$4,189,516	$0
31	Swedish Research Council	P	$3,450,761	$945,805	$0	$639,848	$1,448,377	$80,607	$336,124	$148,763
32	U.K. Biotechnology and Biological Sciences Research Council (BBSRC)	P	$3,318,908	$1,155,860	$425,157	$185,423	$1,490,632	$30,918	$30,918	$0
33	French National Research Agency (ANR)	P	$3,317,379	$1,587,721	$0	$0	$1,597,609	$132,049	$0	$0
34	São Paulo Research Foundation (FAPESP)	P	$3,243,348	$28,715	$685,410	$33,695	$307,099	$309,188	$1,879,241	$143,618

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

Appendix 3

TB R&D Funders by Rank, 2022 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	INFRASTRUCTURE/ UNSPECIFIED	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	PEDIATRICS
35	Company E	C	$3,149,920	$0	$0	$3,149,920	$0	$0	$0	$0
36	U.S. National Science Foundation (NSF)	P	$3,133,952	$2,401,122	$0	$300,509	$0	$256,000	$176,321	$0
37	India Ministry of Health and Family Welfare (MOHFW)	P	$2,734,408	$10,189	$285,403	$112,180	$0	$0	$2,326,635	$0
38	L'Initiative	P	$2,505,987	$0	$0	$0	$0	$0	$2,505,987	$470,905
39	Japan Ministry of Health, Labour and Welfare	P	$2,439,396	$0	$2,206,876	$0	$0	$0	$232,520	$0
40	South Africa Department of Science and Innovation	P	$2,132,445	$756,849	$0	$462,198	$499,233	$28,000	$386,164	$277,433
41	QIAGEN	C	$2,127,401	$0	$0	$2,127,401	$0	$0	$0	$198,189
42	South Africa Medical Research Council	P	$2,071,042	$675,826	$36,459	$12,228	$675,484	$295,402	$375,643	$452,247
43	LegoChem Biosciences	C	$1,890,091	$0	$0	$0	$1,890,091	$0	$0	$0
44	Australian Department of Health and Aged Care	P	$1,875,712	$0	$0	$0	$370,032	$0	$1,505,680	$0
45	Molbio Diagnostics	C	$1,765,236	$0	$0	$1,765,236	$0	$0	$0	$0
46	LifeArc	F	$1,678,163	$0	$0	$1,678,163	$0	$0	$0	$0
47	RIGHT Foundation	M	$1,607,022	$900,000	$0	$600,954	$106,068	$0	$0	$331,944
48	Project Africa GRADIENT (Glaxosmithkline and Novartis)	C	$1,435,601	$1,435,601	$0	$0	$0	$0	$0	$0
49	Company Y	C	$1,402,000	$0	$0	$1,402,000	$0	$0	$0	$0
50	Brazilian Ministry of Health	P	$1,392,516	$0	$127,034	$250,522	$0	$0	$1,014,960	$1,014,960
51	Korea Disease Control and Prevention Agency (KDCA)	P	$1,387,146	$1,179,345	$145,720	$62,081	$0	$0	$0	$0
52	Global Health Innovative Technology Fund (GHIT)	M	$1,160,078	$139,687	$0	$903,243	$117,149	$0	$0	$0
53	U.S. Department of Veterans Affairs	P	$1,157,971	$201,250	$0	$0	$692,635	$264,086	$0	$0
54	Open Philanthropy	F	$1,101,360	$84,761	$0	$0	$0	$0	$1,016,599	$0
55	Academy of Finland	P	$1,053,580	$0	$0	$0	$1,053,580	$0	$0	$0
56	Irish Aid	P	$1,053,580	$0	$0	$0	$1,053,580	$0	$0	$0
57	Macleods Pharmaceuticals	C	$1,000,000	$0	$0	$0	$1,000,000	$0	$0	$0
58	Swedish Heart-Lung Foundation	F	$987,326	$661,898	$0	$59,505	$216,335	$0	$49,588	$0
59	Dutch Ministry of Foreign Affairs	P	$967,186	$0	$0	$0	$967,186	$0	$0	$0
60	India Ministry of Science and Technology	P	$964,110	$836,368	$0	$0	$127,742	$0	$0	$0
61	New Zealand Health Research Council	P	$937,207	$289,922	$0	$45,531	$412,268	$0	$189,486	$0
62	Merck	C	$904,463	$0	$0	$0	$904,463	$0	$0	$0
63	Peru Ministry of Health	P	$866,443	$0	$0	$0	$866,443	$0	$0	$0
64	Independent Research Fund Denmark	P	$838,921	$838,921	$0	$0	$0	$0	$0	$430,828
65	Taiwan Ministry of Health and Welfare	P	$764,254	$100,834	$0	$0	$0	$0	$663,420	$100,834
66	Malaysia Ministry of Health	P	$738,818	$80,500	$0	$21,383	$0	$0	$636,936	$0
67	Korea International Cooperation Agency (KOICA)	P	$720,000	$0	$0	$0	$720,000	$0	$0	$0
68	Korea Ministry of SMEs and Startups	P	$706,682	$166,385	$0	$540,298	$0	$0	$0	$0

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

Appendix 3

TB R&D Funders by Rank, 2022 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	INFRASTRUCTURE/ UNSPECIFIED	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	PEDIATRICS
69	Italian Ministry of Health	P	$637,416	$0	$0	$0	$0	$0	$637,416	$0
70	Irish Health Research Board	P	$611,861	$156,203	$0	$0	$158,799	$296,859	$0	$0
71	TDR (the Special Programme for Research and Training in Tropical Diseases), hosted by the World Health Organization Health Organization	M	$603,425	$0	$152,168	$0	$0	$0	$451,257	$17,119
72	Company F	C	$581,576	$0	$0	$581,576	$0	$0	$0	$0
73	Cadila Pharmaceuticals	C	$576,661	$0	$0	$0	$576,661	$0	$0	$361,994
74	Korea Ministry of Education	P	$567,046	$567,046	$0	$0	$0	$0	$0	$0
75	Philippines Department of Science and Technology	P	$564,143	$188,490	$80,845	$67,543	$11,499	$0	$215,767	$89,626
76	U.K. Engineering and Physical Sciences Research Council (EPSRC)	P	$556,529	$123,673	$0	$154,591	$278,264	$0	$0	$0
77	Mueller Health Foundation	F	$545,945	$0	$0	$0	$545,945	$0	$0	$0
78	Singapore National Medical Research Council	P	$531,017	$531,017	$0	$0	$0	$0	$0	$0
79	Norwegian Ministry of Education and Research	P	$511,190	$280,142	$0	$0	$231,048	$0	$0	$0
80	Infervision Medical Technology	C	$510,000	$0	$0	$510,000	$0	$0	$0	$0
81	Carlos III Health Institute	P	$503,389	$174,688	$0	$151,700	$0	$119,055	$57,947	$162,236
82	India Health Fund / Tata Trusts	F	$471,492	$0	$50,267	$421,225	$0	$0	$0	$0
83	Marsden Fund	P	$460,747	$460,747	$0	$0	$0	$0	$0	$0
84	Fondation Mérieux	F	$452,385	$0	$182,921	$269,464	$0	$0	$0	$41,904
85	Public Health Agency of Catalonia (ASPCAT)	P	$402,685	$0	$0	$0	$0	$0	$402,685	$0
86	French Ministry of Research and Higher Education	P	$393,306	$0	$0	$45,360	$347,946	$0	$0	$101,854
87	National Research Council of Thailand	P	$378,283	$114,191	$0	$94,832	$165,863	$0	$3,397	$0
88	Netherlands Ministry of Health, Welfare and Sport	P	$369,622	$0	$0	$0	$0	$341,370	$28,252	$0
89	Ministry of Health of the Republic of Belarus	P	$368,130	$0	$0	$0	$0	$0	$368,130	$0
90	International Development Research Center	P	$324,046	$0	$0	$324,046	$0	$0	$0	$0
91	Foundation for Neglected Disease Research, India	F	$321,479	$0	$0	$0	$321,479	$0	$0	$0
92	Chile National Research and Development Agency (ANID)	P	$312,108	$68,417	$0	$0	$31,648	$212,043	$0	$0
93	EA Funds	F	$300,000	$0	$300,000	$0	$0	$0	$0	$0
94	Danish International Development Agency (DANIDA)	P	$283,042	$0	$0	$0	$0	$0	$283,042	$0
95	Tampere Tuberculosis Foundation	F	$275,090	$275,090	$0	$0	$0	$0	$0	$0
96	Innovate UK (UKRI)	P	$266,261	$0	$0	$142,377	$123,885	$0	$0	$24,669
97	U.K. Natural Environment Research Council (NERC)	P	$260,481	$30,918	$0	$0	$0	$0	$229,563	$0
98	Korea Ministry of Food and Drug Safety	P	$253,846	$253,846	$0	$0	$0	$0	$0	$0
99	National University of Singapore	P	$215,019	$215,019	$0	$0	$0	$0	$0	$0
100	Sequella	C	$190,000	$0	$0	$0	$190,000	$0	$0	$0
101	Dutch Research Council	P	$180,383	$180,383	$0	$0	$0	$0	$0	$0
102	Korean National Tuberculosis Association (KNTA)	P	$170,698	$51,993	$34,895	$3,104	$3,104	$77,602	$0	$0
103	Fundació Bancaria "La Caixa"	F	$161,637	$161,637	$0	$0	$0	$0	$0	$0

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

Appendix 3

TB R&D Funders by Rank, 2022 (continued)

RANK	FUNDER	FUNDER TYPE	TOTAL	BASIC SCIENCE	INFRASTRUCTURE/ UNSPECIFIED	DIAGNOSTICS	DRUGS	VACCINES	OPERATIONAL RESEARCH	PEDIATRICS
104	Italy National Institute for Insurance against Accidents at Work (INAIL)	P	$158,037	$0	$0	$158,037	$0	$0	$0	$0
105	Public Health Agency of Canada (PHAC)	P	$143,387	$13,455	$0	$0	$19,221	$0	$110,712	$13,455
106	Colombia Ministry of Science, Technology and Innovation (MINCIENCIAS)	P	$133,332	$66,666	$0	$0	$0	$0	$66,666	$0
107	U.K. National Center for the 3Rs (NC3Rs)	P	$122,447	$122,447	$0	$0	$0	$0	$0	$0
108	Korea Ministry of Trade, Industry and Energy	P	$115,385	$0	$115,385	$0	$0	$0	$0	$0
109	Japan Society for the Promotion of Science	P	$110,509	$80,641	$0	$7,965	$0	$0	$21,903	$996
110	Norwegian Ministry of Health and Care Services	P	$107,410	$107,410	$0	$0	$0	$0	$0	$0
111	Research Institute of Tuberculosis/Japan Anti-Tuberculosis Association	P	$103,278	$0	$103,278	$0	$0	$0	$0	$0
112	Instituto Butantan	P	$100,000	$0	$0	$0	$0	$100,000	$0	$0
	Organizations with expenditures < $100,000		$2,120,191	$757,351	$36,809	$507,690	$230,510	$147,831	$440,002	$232,246
	TOTAL		$1,034,967,036	$170,668,450	$99,703,407	$145,406,615	$352,073,344	$144,078,297	$123,036,923	$87,203,757

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

Endnotes

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