



Treatment Action Group

[www.treatmentactiongroup.org](http://www.treatmentactiongroup.org)

# **BEDAQUILINE & OTHER PUBLICLY FUNDED INNOVATIONS AS PUBLIC GOODS**

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TREATMENT ACTION GROUP

GRADUATE INSTITUTE WEBINAR

26 MARCH 2020

# RESULTS: OVERALL ESTIMATED PUBLIC VS ORIGINATOR INVESTMENTS IN BEDAQUILINE

(2018 US\$ millions)

	Public	Originator	Ratio of public to originator expenditures*
<b>Clinical trials</b>			
<b>Out of pocket</b>	120-279	76-163	1.6-1.7
<b>Capitalized</b>	142-328	115-280	0.9-1.2
<b>Capitalized and risk-adjusted</b>	312-733	278-695	1.05-1.12
<b>Funding through PRV</b>	300-400	-	-
<b>Orphan drug tax credit</b>	22-36	-	-
<b>Bedaquiline donation program</b>	13-32†	14-77	0.4-0.9
<b>Totals</b>			
<b>Out-of-pocket expenditures</b>	455-747	90-240	3.1-5.0
<b>Capitalized and risk-adjusted expenditures</b>	647-1,201	292-772	1.6-2.2

\*Ranges for ratios are calculated as the bottom of the range for public funding divided by bottom of the range for Janssen funding, and top of the range for public funding divided by top of the range for originator funding.

†Composed of US\$8-27 million through tax deductions for originator and US\$5 million through public funding of administration of the donation programme.

1. <https://www.treatmentactiongroup.org/webinar/public-investments-tb-medicine-bedaquiline-far-exceed-those-of-developer-johnson-johnson/>

# TUBERCULOSIS R&D FUNDING

“Global TB research funding totaled US\$906 million in fiscal year 2018, an increase of US\$134 million from 2017.”

“**Public funders** accounted for most of the US\$134 million increase over 2017 and comprised **more than two-thirds of total TB research spending.**”

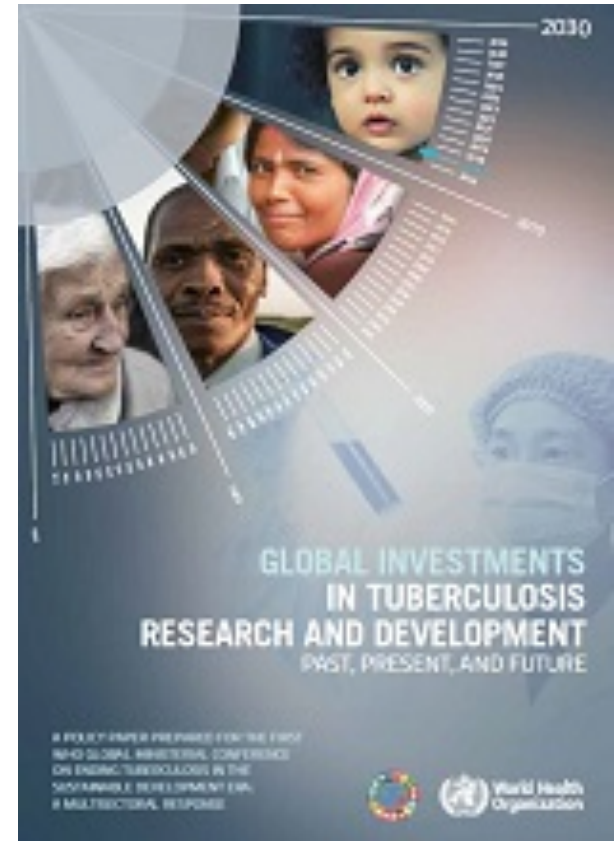
“Private sector funding for TB R&D in 2018 totaled US\$86 million, a number that has remained flat since 2015.”



# PUBLIC GOODS

“**Xpert MTB/RIF** resulted from a combination of resources from industry (Cepheid), public funders (NIH and the US DOD), philanthropic donors (Gates Foundation), academic partners (University of Medicine and Dentistry of New Jersey) and product-development partners (FIND).”

“Research to develop **3HP** as a shorter alternative was primarily funded by the CDC TBTC in partnership with the ACTG; the French pharmaceutical company Sanofi provided additional financial and in-kind support.”



3. [https://www.who.int/tb/publications/2017/Global\\_Investments\\_in\\_Tuberculosis\\_Research\\_Investment/en/](https://www.who.int/tb/publications/2017/Global_Investments_in_Tuberculosis_Research_Investment/en/)

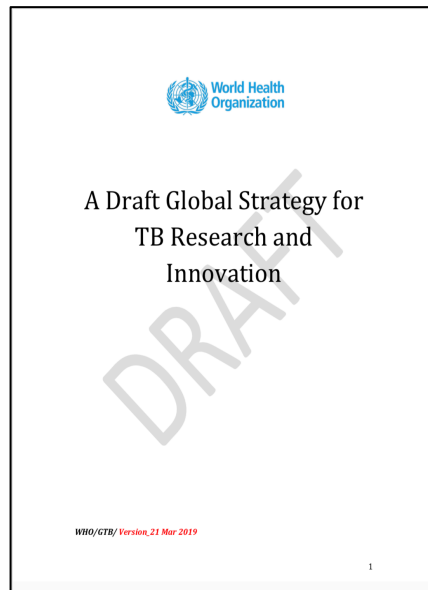
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# “FAIR SHARE” FUNDING TARGETS

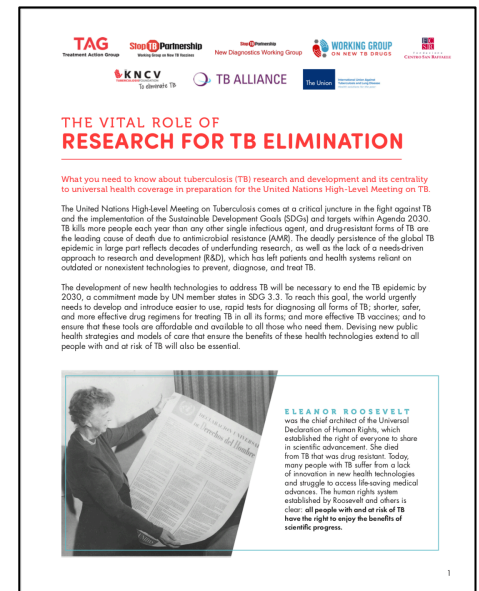
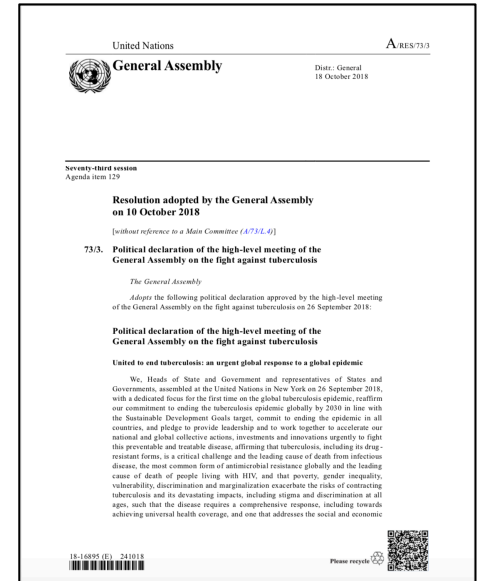
“47. Commit to mobilize sufficient and sustainable financing, with the aim of increasing overall global investments to 2 billion dollars, in order to close the estimated 1.3 billion dollar gap in funding annually for tuberculosis research, ensuring that all countries contribute appropriately to research and development [...]”



“[...] increase[s] TB R&D funding in relation to GDP and gross domestic expenditure on research and development (GERD) on health R&D [...]”

“[...] if each country spent up to or beyond just 0.1% of its annual gross domestic expenditure on research and development (GERD) on TB research, the world would close the annual funding gap of \$1.3 billion.”

4. <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N18/315/53/pdf/N1831553.pdf?OpenElement>
5. [https://www.who.int/tb/features\\_archive/Process-Global-strategy-for-TB-research-innovation/en/](https://www.who.int/tb/features_archive/Process-Global-strategy-for-TB-research-innovation/en/)
6. [https://www.treatmentactiongroup.org/wp-content/uploads/2017/10/TB\\_RD\\_brief\\_2018\\_final3.pdf](https://www.treatmentactiongroup.org/wp-content/uploads/2017/10/TB_RD_brief_2018_final3.pdf)



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

RANK	COUNTRY	2018 FUNDING	ANNUAL FAIR SHARE TARGET	PERCENT OF TARGET MET IN 2018
1	United States	\$371,583,501	\$444,500,000	84%
2	United Kingdom	\$63,795,280	\$40,400,000	158%
3	India	\$30,801,272	\$46,500,000	66%
4	Germany	\$20,812,724	\$99,700,000	21%
5	Canada	\$19,415,757	\$25,300,000	77%
6	South Korea	\$17,081,039	\$64,000,000	27%
7	Australia	\$9,623,743	\$21,200,000	45%
8	The Netherlands	\$6,977,870	\$15,100,000	46%
9	South Africa	\$4,590,284	\$4,600,000	100%
10	Switzerland	\$4,106,442	\$13,400,000	31%
11	Japan	\$3,760,177	\$154,900,000	2%
12	France	\$3,490,334	\$55,400,000	6%
13	Taiwan	\$3,387,595	\$4,369,762	78%
14	Norway	\$3,031,937	\$5,300,000	57%
15	Ireland	\$2,497,629	\$3,300,000	76%
16	The Philippines	\$1,965,376	\$700,000	281%
17	Brazil	\$1,336,420	\$35,000,000	4%
18	Thailand	\$1,306,683	\$4,900,000	27%
19	New Zealand	\$1,295,291	\$1,800,000	72%
20	Denmark	\$1,067,896	\$7,500,000	14%
21	Italy	\$1,064,365	\$27,500,000	4%
22	Finland	\$770,954	\$7,100,000	11%
23	Mexico	\$535,224	\$10,300,000	5%
24	Hong Kong, SAR	\$258,100	\$9,900,000	3%

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

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

# WORLD HEALTH ORGANIZATION RECOMMENDATIONS FOR DR-TB

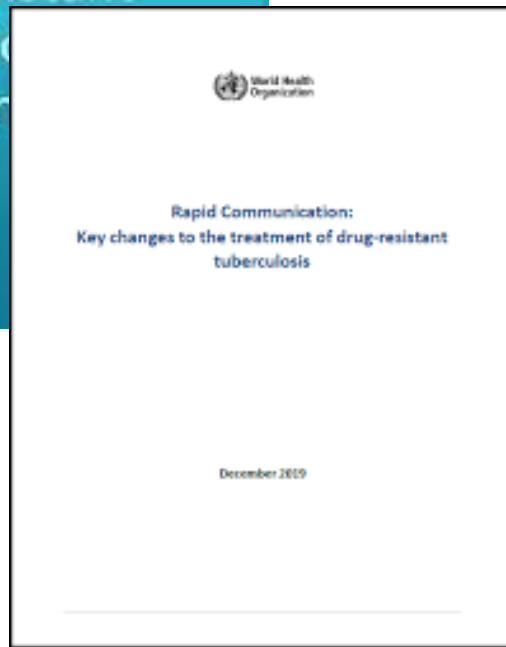


Table 2.1. Grouping of medicines recommended for use in longer MDR-TB regimens<sup>1</sup>

Groups & steps	Medicine	
<b>Group A:</b> Include all three medicines	levofloxacin <i>OR</i>	Lfx
	moxifloxacin	Mfx
	bedaquiline <sup>2,3</sup>	Bdq
	linezolid <sup>4</sup>	Lzd
<b>Group B:</b> Add one or both medicines	clofazimine	Cfz
	cycloserine <i>OR</i>	Cs
	terizidone	Trd
<b>Group C:</b> Add to complete the regimen and when medicines from Groups A and B cannot be used	ethambutol	E
	delamanid <sup>3,5</sup>	Dlm
	pyrazinamide <sup>6</sup>	Z
	imipenem–cilastatin <i>OR</i>	Ip–Cln
	meropenem <sup>7</sup>	Mpm
	amikacin ( <i>OR</i> streptomycin) <sup>8</sup>	Am (S)
	ethionamide <i>OR</i>	Eto
	prothionamide <sup>9</sup>	Pto
	<i>p</i> -aminosalicylic acid <sup>9</sup>	PAS

8. [https://www.who.int/tb/publications/2018/rapid\\_communications\\_MDR/en/](https://www.who.int/tb/publications/2018/rapid_communications_MDR/en/)

9. <https://www.who.int/tb/publications/2019/consolidated-guidelines-drug-resistant-TB-treatment/en/>

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# TB TREATMENT RESEARCH

Study Name	Duration	For Treatment of	BDQ	DLM	PTD	LZD	CFZ	FQ	PZA	Other(s)
SimpliciTB NCT03338621	4–6 months	DS-TB MDR-TB	X		X			M	X	
Nix-TB NCT02333799	6 months	XDR-TB TI/NR MDR-TB	X		X	X				
ZeNix NCT03086486	6 months	XDR-TB TI/NR MDR-TB	X		X	X				
TB-PRACTECAL NCT02589782	6 months	MDR-TB XDR-TB	X		X	X	(X)	(M)		
BEAT- Tuberculosis NCT04062201 CTRI/2019/01/017 310	6 months	RR-TB	X	X		X	(X)	(L)		
endTB NCT02754765	9 months	MDR-TB	X	X		X	X	M/L	X	
endTB-Q NCT03896685	6-9 months	FQ-R MDR-TB	X	X		X	X			
NEXT NCT02454205	6-9 months		X			X		L	X	Eto or HdH or Tzd
STREAM stage II NCT02409290	6-9 months	MDR-TB	X				X	L	X	HdH; Pto or Kan; +/- Emb
MDR-END NCT02619994	9-12 months	MDR-TB		X		X		L	X	

M = moxifloxacin; L = levofloxacin; Eto = ethionamide; HdH = high dose isoniazid; Pto = prothionamide; Kan = kanamycin; Emb = ethambutol; Tzd = terizidone

# WHAT'S DRIVING THE COST OF DR-TB TREATMENT REGIMENS?

Regimen	Indication	Price Range (2019, US\$)
<b>9-11 mo. standardized shorter regimen</b> Bdq-Lfx-Pto-Cfz-Z-Hh-E (4) / Bdq-Lfx-Cfz-Z-E (6)	MDR-TB	US\$ 763
<b>Modified shorter regimen in use in South Africa</b> Bdq (6)-Lzd (2)-Lfx-Cfz-Z-Hh-E (4) /Lfx-Cfz-Z-E (5)	MDR-TB	US\$ 607
<b>Modified shorter regimens (under OR)</b> Bdq-Dlm-Lfx-Cfz-Lzd (6)	MDR-TB	US\$ 3,122
<b>18-20 mo. regimens</b> Bdq-based	MDR-TB	US\$ 1,000–1,800
<b>18-20 mo. regimens</b> Bdq-Dlm-based	XDR-TB	US\$8,000–12,000
<b>6-9 mo. Nix-TB regimen (under OR)</b> Bdq-Pa-Lzd (6)	XDR-TB TI/NR MDR-TB	US\$ 1,040

Medicine	Current Price* (per patient per month)	Target Price for Generic Versions**
moxifloxacin	US\$ 10	US\$ 4–8
levofloxacin	US\$ 2.50	US\$ 7–17
linezolid (600 mg)	US\$ 13	US \$5–13
clofazimine	US\$ 15	US\$ 4–11
bedaquiline	<b>US\$ 67</b>	US\$ 8–17
delamanid	<b>US\$ 283</b>	US\$ 5–16
pretomanid	<b>US\$ 61</b>	US\$ 5–16

## BEDAQUILINE, DELAMANID, PRETOMANID

\* Lowest GDF price: [http://www.stoptb.org/gdf/drugsupply/drugs\\_available.asp](http://www.stoptb.org/gdf/drugsupply/drugs_available.asp)

\*\* Target price ranges are based on the estimated costs of active and inactive pharmaceutical ingredients, formulation, packaging, and a cost-plus model, which includes a reasonable profit margin: <https://doi.org/10.1093/jac/dkw522>

Slide adapted from presentation by Christophe Perrin, MSF



# EVIDENCE-BASED ADVOCACY

J Antimicrob Chemother 2017; 72: 1243–1252  
doi:10.1093/jac/dkw522 Advance Access publication 10 January 2017

Journal of  
Antimicrobial  
Chemotherapy

## Estimated generic prices for novel treatments for drug-resistant tuberculosis

Dzintars Gotham<sup>1\*</sup>, Joseph Fortunak<sup>2</sup>, Anton Pozniak<sup>3</sup>, Saye Khoo<sup>4</sup>, Graham Cooke<sup>5</sup>,  
Frederick E. Nytko III<sup>2</sup> and Andrew Hill<sup>3</sup>



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## OPEN LETTER TO J&J REGARDING AFFORDABLE ACCESS TO BEDAQUILINE

17 September 2018

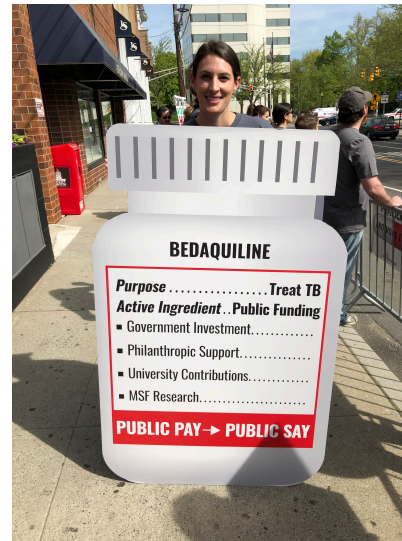
Dr Paul Stoffels  
Vice Chair of the Executive Committee and Chief Scientific Officer  
Johnson & Johnson Global Public Health  
1 Johnson & Johnson Plaza  
New Brunswick, NJ 08933, USA

MSF Access Campaign  
Briefing Document  
FEBRUARY 2019



## Grounds for Opposing Patent Application for Bedaquiline Formulation in India

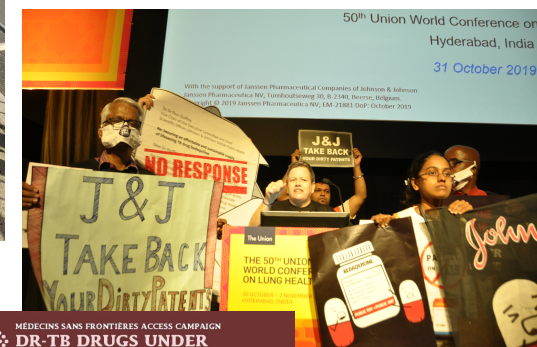
10. <https://doi.org/10.1093/jac/dkw522>
11. <https://msfaccess.org/open-letter-jj-calling-affordable-access-critical-tb-drug-bedaquiline>
12. <http://www.treatmentactiongroup.org/content/reality-check-price-of-bedaquiline>
13. <https://www.msfaccess.org/msf-launches-global-campaign-urging-johnson-johnson-reduce-price-life-saving-tb-drug>
14. <https://www.msfaccess.org/making-the-switch>
15. <https://www.msfaccess.org/sites/default/files/2019-10/IssueBrief UTM 6th Ed FINAL web.pdf>



**MAKE THE SWITCH!**  
**TREAT PEOPLE WITH BETTER**  
**DR-TB DRUGS NOW!**



**TB DRUG BEDAQUILINE**  
**FOR \$1 A DAY**  
**#NOMORETEARS**



MEDECINS SANS FRONTIERES ACCESS CAMPAIGN  
**DR-TB DRUGS UNDER THE MICROSCOPE**  
6th EDITION

**5 URGENT A**  
● Link to the new DR-TB  
● Make bedaquiline and  
● Documenting public health

MSF Access Campaign  
Technical Brief  
SEPTEMBER 2019  
(UPDATED OCTOBER 2019)



## MAKING THE SWITCH

Saving More Lives with Optimal Treatment for Drug-Resistant TB

### INTRODUCTION

Drug-resistant tuberculosis (DR-TB) is the most difficult form of TB to treat, with a mortality rate of 50–90%. The previously recommended treatment regimen used by most countries had been long treatment duration (up to two years) and high toxicity. In 2012, the World Health Organization (WHO) guidelines designated bedaquiline as a core component of treatment regimens for rifampicin-resistant and multidrug-resistant TB (MDR-TB). As a result, more people are being treated with bedaquiline. Among learners to bedaquiline, affordability is a major concern, as the global donation program set up by the drug's sponsor, Johnson & Johnson, ends in March 2019.

### THE PRICE OF BEDAQUILINE (AND ITS EVOLUTION)

**Pre-donation program:** (Janssen initially established a tiered pricing structure for bedaquiline. The price for a six-month course of bedaquiline was different for low, middle, and high-income countries (\$3900, \$3,000, and \$30,000, respectively).

**Donation program:** In 2014, to facilitate the switch of bedaquiline, Janssen and the U.S. Agency for International Development (USAID) set up a temporary global donation program. Under this donation program, most countries eligible to receive funding from the Global Fund could procure bedaquiline for free, via the Global Fund facility (GFI). The program initially covered 20,000 treatment courses, of which were delivered by July 2014. USAID and Janssen then made an additional 20,000 courses available until March 2019 for when those 30,000 courses are dispensed, whichever come first.

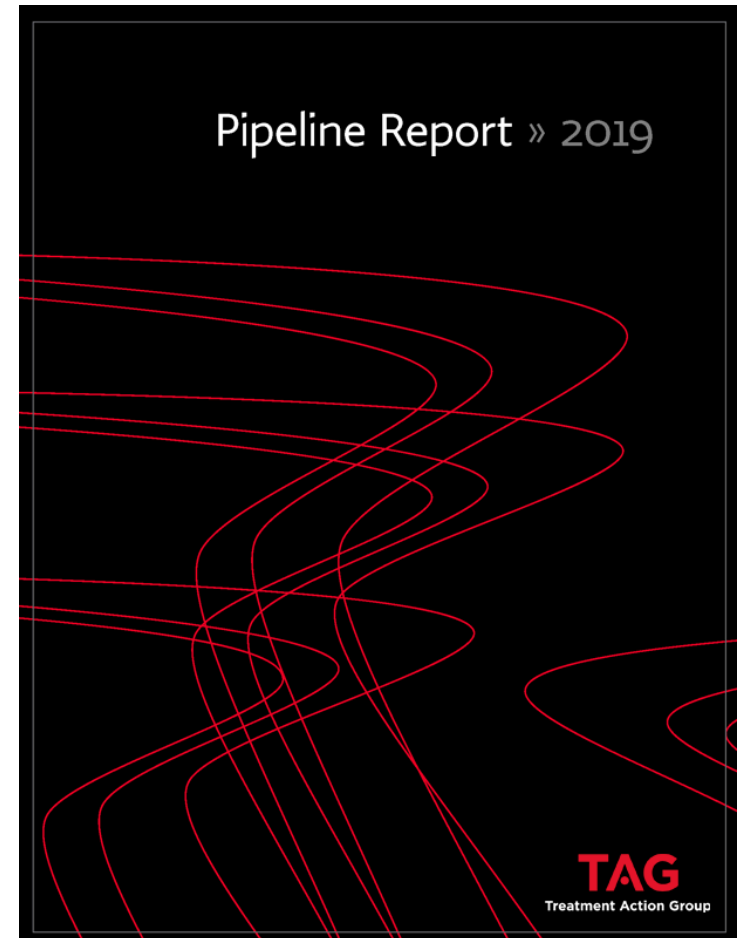
**Background:** The price of bedaquiline is of various concern in the post-donation era. There is a growing demand for bedaquiline that is stimulated by the latest WHO treatment guidelines, which reflect the substantial body of evidence that suggests that people who receive bedaquiline have higher rates of treatment success and lower rates of death than people who do not receive bedaquiline. In July 2018, following its announced switch to bedaquiline-based, injection-free regimens for all people with MDR-TB, the South African Department of Health announced that it had negotiated with Janssen a price reduction of bedaquiline to \$400 per six-month course (\$67 per patient per month). Any



<https://vimeo.com/362527270>

# DEVELOPMENT HISTORIES/ NARRATIVES FOLLOW THE MONEY + PIPELINE

- US DAIDS research networks (ACTG, IMPAACT, HVTN)
- US CDC TB Trials Consortium (TBTC)
- EU PanACEA Consortium
- Product Development Partnerships (TB Alliance, FIND, IAVI)
- Gates Medical Research Institute
- European Regimen Accelerator for Tuberculosis
- BRICS TB Research Network





#### Funding Opportunities Specific to COVID-19

NOT-AI-20-030	Notice of Special Interest (NOSI) regarding the Availability of Urgent Competitive Revisions for Research on the 2019 Novel Coronavirus (2019-nCoV)	National Institute of Allergy and Infectious Diseases (NIAID)  National Institute of General Medical Sciences (NIGMS)
NOT-HL-20-757	Notice of Special Interest (NOSI): Availability of Administrative Supplements and Revision Supplements on Coronavirus Disease 2019 (COVID-19)	National Heart, Lung, and Blood Institute (NHLBI)
NOT-DA-20-047	Notice of Special Interest (NOSI) regarding the Availability of Administrative Supplements and Urgent Competitive Revisions for Research on the 2019 Novel Coronavirus	National Institute on Drug Abuse (NIDA)

#### Opinion

## Drug Companies Will Make a Killing From Coronavirus

Unless we fix the system, American taxpayers will get gouged on a vaccine they paid to produce.

**By Mariana Mazzucato and Azzi Momenghalibaf**

Ms. Mazzucato is a professor at University College London and the author of "The Value of Everything." Ms. Momenghalibaf is a senior program officer at the Open Society Public Health Program.

Press release | 6 March 2020 | Brussels

## COVID-19: Commission steps up research funding and selects 17 projects in vaccine development, treatment and diagnostics

### Bill & Melinda Gates Foundation, Wellcome, and Mastercard Launch Initiative to Speed Development and Access to Therapies for COVID-19

COVID-19 Therapeutics Accelerator will coordinate R&D efforts and remove barriers to drug development and scale-up to address the epidemic

17. [https://grants.nih.gov/grants/natural\\_disasters/corona-virus.htm](https://grants.nih.gov/grants/natural_disasters/corona-virus.htm)
18. <https://www.nytimes.com/2020/03/18/opinion/coronavirus-vaccine-cost.html>
19. [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_386](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_386)
20. <https://www.gatesfoundation.org/Media-Center/Press-Releases/2020/03/COVID-19-Therapeutics-Accelerator>

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# SAVE THE DATE

Friday, 3 April 2020

9am New York/ 3pm Geneva & Cape Town/ 6:30pm Delhi

<https://zoom.us/j/755611338>

## **Webinar on Xpert test pricing for COVID-19, TB, HIV, HCV and STIs**

This week Cepheid announced FDA emergency use authorization of a rapid, cartridge-based test for SARS-CoV-2, the virus that causes COVID-19. The COVID-19 test (Xpert Xpress SARS-CoV-2) can be run on GeneXpert platforms, thousands of which are already in place in L/MICs.

**By pricing these tests at US\$20 each, Cepheid is profiteering during a pandemic with dangerous consequences for countries with vulnerable populations and health systems.**

Join us to learn more about GeneXpert testing, the evidence base for why these tests should be priced at \$5, and the “Time for \$5” campaign.

Quantifying public investments can **support evidence-based advocacy initiatives** and contribute to debates concerning:

- (1) the price of medicines and other innovations,
- (2) the role of the public sector in pharmaceutical, diagnostics, and vaccines research and development (R&D), and
- (3) the costs of bringing innovations to market.

Our analysis provides a methodology that may be adapted to estimate public investments in other innovations.

**THANK YOU!**

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