



**EMORY**  
LIBRARIES &  
INFORMATION  
TECHNOLOGY

**OpenEmory**

## **World Tuberculosis Day 2022: aligning COVID-19 and tuberculosis innovations to save lives and to end tuberculosis**

[Kenneth Castro](#), *Emory University*  
F Ntoumi, *Fdn Congolaise Rech Med*  
JB Nachega, *University of Pittsburgh*  
E Aklillu, *Karolinska Univ Hosp Huddinge*  
J Chakaya, *Kenyatta University*  
I Felker, *Novosibirsk TB Res Inst*  
F Amanullah, *Aga Khan University*  
D Yeboah-Manu, *University of Ghana*  
A Zumla, *UCL*

---

**Journal Title:** LANCET INFECTIOUS DISEASES

**Volume:** Volume 22, Number 4

**Publisher:** ELSEVIER SCI LTD | 2022-04-01, Pages 442-444

**Type of Work:** Article

**Publisher DOI:** 10.1016/S1473-3099(22)00142-6

**Permanent URL:** <https://pid.emory.edu/ark:/25593/vt9gc>

---

Final published version: [http://dx.doi.org/10.1016/S1473-3099\(22\)00142-6](http://dx.doi.org/10.1016/S1473-3099(22)00142-6)

*Accessed December 9, 2022 12:26 AM EST*



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



## World Tuberculosis Day 2022: aligning COVID-19 and tuberculosis innovations to save lives and to end tuberculosis



Flickr/PWRDF

For the past 2 years the world's attention has rightly been focused on COVID-19, the most lethal pandemic seen for over a century that has amplified the enormous global toll of respiratory tract infections. COVID-19 remains the top cause of death from an infectious disease worldwide, shifting tuberculosis to second place.<sup>1</sup> In areas highly endemic with tuberculosis, scarce resources have been moved to the COVID-19 response, which has undermined tuberculosis testing and treatment programmes. The effects of COVID-19 on global tuberculosis control efforts have been catastrophic,<sup>1-3</sup> setting back by several years any progress being made in achieving the WHO End TB Strategy targets by 2030.<sup>4</sup> For the first time since 2015, the annual numbers of tuberculosis deaths have started increasing and more than 1.5 million people died of tuberculosis in 2020.<sup>1</sup> Furthermore, COVID-19 disruptions to health services have impeded diagnosing and treating everyone with active tuberculosis, drug-resistant tuberculosis, multidrug-resistant or extensively drug-resistant tuberculosis, latent tuberculosis, and tuberculosis and HIV co-infection, as well as access to tuberculosis medicines, counselling and follow-up, and lowered treatment adherence.<sup>1,3-7</sup> This impedance in turn promotes the development of multidrug-resistant strains of tuberculosis and increases treatment failure rates, suffering, and death. Thus, in the foreseeable future, tuberculosis will continue to pose multiple challenges and negatively impact on already fragile health systems in countries with a high burden of tuberculosis.

The theme for this year's World Tuberculosis Day is "Invest to End TB. Save Lives". Although this theme is appropriate to refocus attention from COVID-19 to tuberculosis, it is a difficult task to achieve. The call for donors to invest more to end tuberculosis is again sadly familiar, yet essential because strategies for holding governments accountable and that advocate for increased investments have been in place ever since WHO declared tuberculosis a global emergency in 1993.<sup>8</sup> It is unlikely that in light of the poor global economic situation, major financial commitments to global tuberculosis control programmes will be forthcoming. However, while the tuberculosis community awaits

financial commitments, despair can be turned to hope through more creative and innovative ways of health services delivery.

We already have all the tools required to achieve global tuberculosis control targets,<sup>8-10</sup> and much more can be achieved via new ways of working, innovative strategies, and using existing resources maximally. Over the past 2 years, several promising new developments in approaches to screening, diagnosis, and management for both tuberculosis and COVID-19, if skilfully used, aligned, and synergised, could overcome the negative effects of COVID-19 disruptions in health services for airborne infectious diseases. Several lessons learnt from COVID-19 responses, including innovative new ways of health services working,<sup>3,5-7</sup> also provide a fresh approach to management of respiratory infectious diseases with overlapping clinical symptoms and signs. Several practical steps, using recently updated diagnostics, treatments, patient follow-up, and community care guidelines for both COVID-19 and tuberculosis,<sup>6-10</sup> if immediately taken forward, could have a synergistic, enhancing, and multiplier effect. Thus, COVID-19 programme innovations and adaptations from within the COVID-19 response should be built upon, to enhance access to integrated, patient-centred tuberculosis services (figure).<sup>3,5-7</sup>

The ongoing COVID-19 mass testing and vaccination rollout in wealthy nations are the result of unprecedented financial investments, rapid research and development, collaborative science, and innovation in delivery systems. Diseases that affect wealthier nations receive immediate attention and the required funding is made available quickly. However, the history of tuberculosis, and now COVID-19, is one of scientific and medical advances, accompanied by political failure to invest appropriately in rolling them out to all in need. The issues of inequities in COVID-19 vaccine distribution to Africa and unfulfilled pledges by wealthier nations, highlights that more visionary leadership, coupled with serious investments, are required from national governments to make countries with a high burden of tuberculosis self-reliant. Continued disinvestments in Africa into both tuberculosis and COVID-19 resulting from lack of political will is unacceptable.

Published Online  
March 3, 2022  
[https://doi.org/10.1016/S1473-3099\(22\)00142-6](https://doi.org/10.1016/S1473-3099(22)00142-6)

Priority health services needs in place of the COVID-19 pandemic	Health services alignment and application in place of COVID-19 disruptions	COVID-19 innovations to enhance tuberculosis control activities
<ul style="list-style-type: none"> <li>Aligning health services' diagnostics screening for all causes of airborne respiratory tract infectious diseases including COVID-19, tuberculosis, and other bacterial (including antimicrobial resistance) and viral infections to simultaneously screen, confirm, and initiate patients on disease-specific treatment</li> </ul>	<ul style="list-style-type: none"> <li>Re-establishing and enhancing widespread diagnostic testing to detect all cases of active tuberculosis, DR-tuberculosis, MDR-tuberculosis, and latent tuberculosis using latest diagnostics and sequencing platforms</li> <li>More holistic care through accurate rapid detection of tuberculosis, MDR-tuberculosis, SARS-CoV-2, and bacterial (including antimicrobial resistance) and viral infections</li> <li>Continuity of tuberculosis, DR-tuberculosis, and MDR-tuberculosis testing, case identification, and care, which was interrupted due to the COVID-19 pandemic</li> </ul>	<ul style="list-style-type: none"> <li>Common diagnostic platforms for COVID-19, tuberculosis, and other airborne pathogens using similar hardware (eg, NAAT, GeneXpert, and GenoType MTBDRplus) and using easy to obtain clinical samples to simultaneously detect all pathogens, and antimicrobial resistance</li> <li>Medical imaging (digital chest images with low-cost computer-aided detection)</li> </ul>
<ul style="list-style-type: none"> <li>Improving supply chain, access to essential medications, treatment monitoring, counselling and patient or community education, and digital or remote training platforms</li> </ul>	<ul style="list-style-type: none"> <li>Integrating local tuberculosis and COVID-19 personnel and resources for telephone or video monitoring telehealth into tuberculosis programmes for diagnostic referrals, for counselling for treatment adherence, and to enhance health-care workers' supportive supervision</li> </ul>	<ul style="list-style-type: none"> <li>Virtual care through telehealth or video counselling</li> <li>Mobile health for DOTS and adherence support visits to improve contact tracing and adherence support</li> <li>Aligning joint services to ensure continuity of tuberculosis, DR-tuberculosis, and MDR-tuberculosis testing, case identification, and care in the context of COVID-19</li> </ul>
<ul style="list-style-type: none"> <li>Decentralising tuberculosis health services and developing home-based and community-based care models</li> </ul>	<ul style="list-style-type: none"> <li>Expanding delivery of home-based care with community engagement</li> </ul>	<ul style="list-style-type: none"> <li>COVID-19 lockdowns and social distancing necessitated community-based tuberculosis differentiated service delivery models including home delivery of all essential medications including tuberculosis medications and a shift to use of WHO oral drug regimens</li> </ul>
<ul style="list-style-type: none"> <li>Improved data collection and reporting of new cases, management outcomes, pathogen sequences surveillance, and rapid dissemination</li> </ul>	<ul style="list-style-type: none"> <li>Obtaining quality data and real-time notification of new cases, deaths, and treatment successes at local and national and international levels</li> </ul>	<ul style="list-style-type: none"> <li>Digital innovations using COVID-19 software platforms linked to national and international databases as surveillance tools with real-time data aggregation and analysis to visualise the pandemic and direct the public health response</li> <li>Widespread availability of rapid sequencing platforms</li> </ul>
<ul style="list-style-type: none"> <li>New models of developing new tools and improved access and use of new tools</li> </ul>	<ul style="list-style-type: none"> <li>Collation and dissemination of data on DR, MDR, and XDR <i>Mycobacterium tuberculosis</i> strains</li> <li>Developing and equitably disseminating new rapid diagnostics, therapeutics, and vaccines to high tuberculosis endemic countries and risk groups</li> </ul>	<ul style="list-style-type: none"> <li>Private, public, and multilateral institutions came together in unprecedented ways to develop and distribute new products initiating manufacturing before regulatory approval</li> <li>The rapid development of COVID-19 diagnostics, treatments, and vaccines through mobilisation of resources and advancing new technology, brings hope that current tuberculosis vaccines under development can be advanced more quickly</li> </ul>
<ul style="list-style-type: none"> <li>Increased financial resources through political support and advocacy</li> </ul>	<ul style="list-style-type: none"> <li>Ensuring that research, financing, and service delivery adaptations and innovations within the COVID-19 response inform future efforts to address the global challenges of tuberculosis</li> <li>Generate political will and financial commitments by integrating tuberculosis needs into pandemic investments to regain momentum lost due to the COVID-19 pandemic and to reignite forward progress in achieving global tuberculosis control goals over the next decade.</li> </ul>	<ul style="list-style-type: none"> <li>The acceleration of public-private product-development partnerships in response to COVID-19 and the mobilisation of huge funding investments, rapid development and evaluation of new tools, collection and analysis of data, and media and political attention creates a window of opportunity to also advocate for increased financing for tuberculosis research and services.</li> </ul>

Figure: Advancing COVID-19 innovations to end tuberculosis

DOTS=directly observed therapy short course. DR-tuberculosis=drug-resistant tuberculosis. MDR-tuberculosis=multidrug-resistant tuberculosis. NAAT=nucleic acid amplification test. XDR=extensively drug-resistant.

Countries that are highly endemic for tuberculosis have all the experience and knowledge on social, economic, and operational determinants that drive the tuberculosis epidemic. There is an urgent need for countries that are highly endemic with tuberculosis

to move away from donor dependency and invest in resilient and sustainable health systems. This would provide reassurance to all tuberculosis stakeholders in this unprecedented COVID-19 era of uncertainty. Tuberculosis-endemic countries should focus on

revamping health services, recalibrating them, and making the health sector more inclusive of all other WHO-declared global emergencies. The time is also now ripe for countries endemic with tuberculosis to build goodwill on the current global attention on COVID-19 to better address existing tuberculosis care models, One Health approaches to prevent future zoonotic pandemics and the burgeoning problem of global antimicrobial resistance.

KGC declares salary support to serve as US Agency for International Development (USAID) senior tuberculosis scientific advisor through an intergovernmental personnel act award between Emory University and USAID. AZ, FN, and DY-M acknowledge support from the EU-EDCTP funded PANDORA-ID-NET, CANTAM-3, and EACCR-3 programmes. AZ is in receipt of a UK National Institute for Health Research Senior Investigator Award. JBN acknowledges support from the US National Institutes of Health (NIH) Fogarty International Center (grants 1R25TW011217-01, 1R21TW011706-01, and 1D43TW010937-01A1) and NIH National Institute of Allergy and Infectious Diseases (grant U01 AI096299). All other authors declare no competing interests. All authors have a specialist interest in global epidemics of COVID-19, tuberculosis, and HIV. The views expressed in this editorial are entirely those of the authors and do not reflect the views of their respective institutions.

**Francine Ntoumi, Jean B Nachege, Eleni Aklillu, Jeremiah Chakaya, Irina Felker, Farhana Amanullah, Dorothy Yeboah-Manu, Kenneth G Castro, \*Alimuddin Zumla**  
[a.zumla@ucl.ac.uk](mailto:a.zumla@ucl.ac.uk)

Foundation Congolaise pour la Recherche Médicale, Brazzaville, Republic of Congo (FN); Institute for Tropical Medicine, University of Tübingen, Tübingen, Germany (FN); Department of Epidemiology (JBN) and Department of Infectious Diseases and Microbiology (JBN), University of Pittsburgh Graduate School of Public Health, Pittsburgh, PA, USA; Division of Infectious Diseases, Stellenbosch University Faculty of Medicine and Health Sciences, Cape Town, South Africa (JBN); Department of Epidemiology (JBN) and Department of International Health (JBN), Johns Hopkins Bloomberg School of Public Health, MD, USA; Division of Clinical Pharmacology, Department of Laboratory

Medicine, Karolinska Institutet, Karolinska University Hospital-Huddinge, Stockholm, Sweden (EA); Department of Medicine, Therapeutics, Dermatology, and Psychiatry, Kenyatta University, Nairobi, Kenya (JC); Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, UK (JC); Scientific Department, Novosibirsk Tuberculosis Research Institute, Novosibirsk, Russia (IF); Department of Pediatrics, The Indus Hospital and Health Network and the Aga Khan University, Karachi, Pakistan (FA); Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, Ghana (DY-M); Rollins School of Public Health, School of Medicine, Emory Tuberculosis Center, Emory University, Atlanta, GA, USA (KGC); Division of Infection and Immunity, Centre for Clinical Microbiology, University College London, and NIHR Biomedical Research Centre, University College London Hospitals NHS Foundation Trust, London, UK (AZ)

- 1 WHO. Global tuberculosis report 2021. 2021 <https://www.who.int/publications/i/item/9789240037021> (accessed Jan 18, 2022).
- 2 Wu Z, Chen J, Xia Z, et al. Impact of the COVID-19 pandemic on the detection of TB in Shanghai, China. *Int J Tuberc Lung Dis* 2020; **24**: 1122–24.
- 3 Pai M, Kasaeva T, Swaminathan S. Covid-19's devastating effect on tuberculosis care – a path to recovery. *N Engl J Med* 2022; published online Jan 5. <https://doi.org/10.1056/NEJMp2118145>.
- 4 WHO. The End TB strategy. Global strategy and targets for tuberculosis prevention, care and control after. 2015. <https://www.who.int/teams/global-tuberculosis-programme/the-end-tb-strategy> (accessed Feb 24, 2022).
- 5 Hopewell PC, Reichman LB, Castro KG. Parallels and mutual lessons in tuberculosis and covid-19 transmission, prevention, and control. *Emerg Infect Dis* 2021; **27**: 681–86.
- 6 Chapman HJ, Veras-Estévez BA. Lessons learned during the COVID-19 pandemic to strengthen tb infection control: a rapid review. *Glob Health Sci Pract* 2021; **9**: 964–77.
- 7 Ruhwald M, Carmona S, Pai M. Learning from COVID-19 to reimagine tuberculosis diagnosis. *Lancet Microbe* 2021; **2**: e169–70.
- 8 Marais BJ, Raviglione MC, Donald PR, et al. Scale-up of services and research priorities for diagnosis, management, and control of tuberculosis: a call to action. *Lancet* 2010; **375**: 2179–91.
- 9 Treatment Action Group. 2021 Pipeline Report. 2021. <https://www.treatmentactiongroup.org/resources/pipeline-report/2021-pipeline-report/> - (accessed Jan 21, 2022).
- 10 United States Agency for International Development and Stop TB Partnership. Implementation of simultaneous diagnostic testing for COVID-19 and TB in high TB burden countries. Geneva: Stop TB Partnership, 2021