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Commentary: Lessons from the COVID-19 global health response to inform TB case finding

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ABSTRACT

The coronavirus disease 2019 (COVID-19) has emerged as a serious threat to global public health, demanding urgent action and causing unprecedented worldwide change in a short space of time. This disease has devastated economies, infringed on individual freedoms, and taken an unprecedented toll on healthcare systems worldwide. As of 1 April 2020, over a million cases of COVID-19 have been reported in 204 countries and territories, resulting in more than 51,000 deaths. Yet, against the backdrop of the COVID-19 pandemic, lies an older, insidious disease with a much greater mortality. Tuberculosis (TB) is the leading cause of death by a single infectious agent and remains a potent threat to millions of people around the world. We discuss the differences between the two pandemics at present, consider the potential impact of COVID-19 on TB case management, and explore the opportunities that the COVID-19 response presents for advancing TB prevention and control now and in future.

1. Introduction

The coronavirus disease 2019 (COVID-19) has emerged as a serious threat to global public health, demanding urgent action and causing unprecedented worldwide change in a short space of time.[1] This disease has devastated economies, infringed on individual freedoms, and taken an unprecedented toll on healthcare systems worldwide. As of October 09, 2020, about 37 million cases of COVID-19 have been reported in 214 countries and territories, resulting in over a million deaths.[2] Against the backdrop of the COVID-19 pandemic lies an older, insidious disease with very high mortality. As of 2018, tuberculosis (TB) was the leading cause of death by a single infectious agent and remains a potent threat to millions of people around the world, with an estimated 10 million people infected and 1.5 million deaths.[3] With the arrival of COVID-19, many of the highest TB-burden countries are grappling with high case-loads of COVID-19, with severe repercussions on healthcare delivery.[4,5] We discuss the differences between the two pandemics at present, consider the potential impact of COVID-19 on TB case management, and explore the opportunities that the COVID-19 response presents for advancing TB prevention and control now and in future.

Like COVID-19, TB is spread through minute droplets produced through coughing or sneezing.[6,7] Unlike COVID-19, TB is a bacterium which can progress to active disease soon after exposure or persist in a dormant form as latent TB infection.[8] The latter makes containment of TB particularly tricky, as there is currently no reliable test to determine who is most likely to progress to active disease, once infected.[9] Despite decades of research there is no effective TB vaccine, leaving the principles of mitigation for active TB are left to public health measures similar to COVID-19, i.e. identify active cases early and trace their contacts to test for disease. The reproductive number for TB ranges from 0.24 in low-burden settings to 4.3 in high-burden settings,[10] compared to 2–4 for SARS-CoV-2 (the pathogen responsible for COVID-19 disease),

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making SARS-CoV-2 more transmissible across settings.[11] While both diseases spread more often in crowded areas, SARS-CoV-2 has been shown to transmit from both pre-symptomatic and asymptomatic people and is also likely to transmit through fomites, unlike TB (ref). Additionally, the serial interval, the time between symptom onset of an infected person and that of an infected contact, is greater than 4 months in TB,[11] compared to 3–5 days for COVID-19.[12] These differences have necessitated a heightened public health response to the COVID-19 pandemic.

Other similarities between the two pandemics are demonstrated in the way they affect populations. Though TB occurs globally, the majority of morbidity and mortality occurs in low- and middle-income settings, largely due to resource limitations which hamper efforts to contain the disease. Africa and Asia account for 85% of the world's TB numbers, and it is the poorest of the poor who are more heavily affected due to poorer housing, challenges accessing adequate care, and other conditions that hamper the immune system.[3] Although TB outbreaks occur everywhere, available diagnosis and treatment ensure that people in richer countries mostly recover from the disease.[3,13] COVID-19, with its current rate of spread, lack of treatment and natural immunity, is exploiting many of the same health, economic, and social inequities in Brazil, India, UK, South Africa, and the United States, that TB has been doing for centuries.[4,14–16] Even advanced economies in Europe and North America have been hit hard and are grappling with outbreaks that have caused significant morbidity and mortality, as well as major economic and social upheaval.[2,17] The inadequate response to COVID-19 in many countries (e.g. the United States) highlights the need for political leadership with a science-led response, supported by solidarity with historically marginalized populations, and within an adequately funded public health system.[18,19] Worldwide, COVID-19 has exposed gaps in health systems and been instrumental in galvanizing the urgency, political will, action and resources required to aggressively fight the pandemic in some countries. However, there have been documented inequities in how resources have been deployed and to what populations they have been directed.[20,21]

Unlike for COVID-19, an effective oral treatment regimen is available to treat people with active TB, rendering them non-infectious after less than two weeks of treatment.[22,23] Preventive therapy is also available, and the WHO now recommends its expanded usage beyond people with higher risk.[24–26] Despite the availability of treatment and preventive measures, TB still results in an estimated 1.5 million deaths every year.[3] Although 7 million cases of TB were diagnosed in 2018, an estimated 3 million were undiagnosed, and about 30% of those diagnosed remained untreated.[3]

Despite modest progress in global TB prevention and control efforts over the last two decades, finding millions of TB cases remains a significant challenge. Unless these people are found and successfully treated, onward transmission of TB disease cannot be interrupted, and the centuries-old epidemic will continue unabated. The latest statistics indicate that current efforts are not enough to meet global TB elimination targets by 2030.[3] We also note that the prioritization of resources to fight the COVID-19 pandemic and the increased danger of co-infection with SARS-CoV-2 to those with TB pose additional threats to TB control efforts.[27] As Pai warns, if concerns are not addressed, COVID-19 could substantially reverse gains in TB control and worsen the epidemic in the coming months.[28,29] Early reports from several high-burden settings confirm these concerns.[28,30,31] Recent modelling studies have also quantified excess TB infections and deaths due to COVID-19 disruptions in health services, with an estimated 10–16% increases in current rates.[32–36]

1.1. Potential threats to TB care

In addition to the far-reaching impacts of COVID-19 on global economic, social, financial, political and health systems and the higher risk of poor outcomes for those with TB and other health conditions,[37,38] a lack of comprehensive disaster preparedness will result in specific impacts on TB case-finding and treatment access, outcomes and socio-economic harms in low-resource settings.

1.2. Reduced access to healthcare

In line with World Health Organization recommendations, many countries are implementing directives to limit social contact in a bid to delay transmission and minimize the impact of COVID-19 on healthcare provision. This typically involves compulsory lockdowns, which were also enforced in many high-burden TB countries, restriction of movement and disruption of routine activities. Movement restrictions are likely to interrupt access to health facilities and disrupt delivery of TB services such as community-based active case-finding, contact tracing, sputum transportation and distribution of essential commodities, even as the potential for community transmission increases.[39] Additionally, in many settings, TB patients are required to go to a health centre daily for directly observed therapy, which would be near impossible in a lock-down scenario. Thus, COVID-19 disruptions affect the TB service delivery system more than for most other conditions.[40,41]

These disruptions could also lead to possible drug stock-outs or expiries of laboratory reagents and other supplies.

1.3. Diversion of resources away from TB

Diversion of human resource, funding, and infrastructure towards COVID-19 will mean that routine provision of basic healthcare services is deprioritized. This can be expected to worsen as the intensity of the outbreak overwhelms health systems. Many high-TB burden countries are already showing steep increases in COVID-19 cases,[42] a trend likely to worsen as the pandemic progresses. The need for social distancing within health facilities has also meant limitations to the number of patients who can be seen daily at TB clinics in high-burden settings. In addition to being resource-limited, these countries typically have higher-risk populations and weaker health systems. A serious outbreak could lead to a significant increase in the number of missing TB cases and potentially set back recent progress in TB control.

Increased stigma Stigma and fear of community discrimination associated with COVID-19 may deter access to care for patients with cough symptoms for the foreseeable future. Consequently, one can anticipate delays in care seeking and/or a reduction in the number of people with undiagnosed TB presenting to healthcare facilities. Patients may avoid seeking TB services for fear of contracting COVID-19. Healthcare workers may stigmatize patients with cough for fear of COVID-19, especially in settings where personal protective equipment supply is inadequate. This will worsen the widely documented stigma that many TB patients face, and further delay care-seeking.[43–46]

1.4. Catastrophic economic impacts on those at highest risk

The COVID-19 pandemic has already begun to devastate the global economy, with declines in economic activity around the global transportation of goods and services and widespread unemployment from lockdowns. The effect will be disproportionately borne by the poor who live hand to mouth. With little or no social safety net in many of the countries grappling with TB, HIV and malaria epidemics, further intensification of predisposing factors such as malnutrition, poverty and overcrowding can be expected. These conditions increase the risk of TB transmission leading to a spike in TB cases, further compounding the diagnostic and treatment access constraints already discussed.

1.5. TB care lessons and opportunities in the COVID-19 era

Despite the challenge that the COVID-19 pandemic poses to TB control, several opportunities exist which must be leveraged to mitigate threats and save lives. These include:

1.6. Resource availability and political priority

The COVID-19 pandemic has galvanized public health actions at global and country levels. Many countries, including those with limited health budgets, have made resources and infrastructure available at record speed in response to or in anticipation of a COVID-19 outbreak. The search for a vaccine and treatment for the virus is advancing at an extraordinary speed. The response has sometimes resulted in collaborations between governments, donors, private sector, non-government organizations, private citizens and other stakeholders. Global and national public health efforts are receiving a multisectoral response. This is an opportunity to also reiterate the TB agenda on national levels but will be challenging during the crisis.

1.7. Galvanizing action to address the social determinants of health

The pandemic has highlighted historic inequities in health access, especially for marginalized populations, which have been the fault lines of infectious disease transmission for centuries. Now, perhaps more than ever, lies the need to pragmatically address these social determinants of health, including poverty, economic, social and gender inequity, and malnutrition. Indeed, the COVID-19 response could enable countries to build resilient and equitable health systems and address the social determinants of health in tangible ways, and thus achieve a double dividend for epidemic control for TB, COVID-19, and future pandemics.

1.8. Mitigating the impact on health services

Even though, by definition, the emergency response to a pandemic requires prioritization above routine activities, vertical programming must be avoided where possible and care must be taken to avoid disabling other essential services. The West Africa Ebola epidemic of 2014, for example, led to widespread disruption of healthcare services including immunization services and a corresponding increase in under-five and maternal mortality in Liberia, Sierra Leone and Guinea.[9,47] Similar outcomes can be avoided using several strategies including contextualized country plans, fundraising and sustained advocacy, trained and appropriately resourced health worker work force, personal protective equipment, critical care capacity, diagnostic laboratories, and resilient supply chain management systems.[28,48,49]

1.9. Opportunities to integrate COVID-19 services with other essential services

The similarities in COVID-19 and TB symptoms, particularly cough and fever, present an opportunity for service integration. Identifying active TB disease amongst COVID-19 patients and vice versa will be imperative to reduce severity of disease. Integration of testing will also improve TB case-finding. Cepheid received US FDA emergency use authorization in March 2020 for its new Xpert® Xpress COVID-19 diagnostic that can be processed on the GeneXpert platforms. This could fill a crucial diagnostic need, especially in low and middle-income countries (LMICs), many of which have an extensive network of GeneXpert machines for TB. In the same vein, the emergency infrastructure set up for the purpose of responding to the COVID pandemic can be absorbed by TB programs when the present pandemic has been quelled.

1.10. The role of public health communication in shaping public discourse and global action

Several studies have identified contributory factors for TB underdiagnosis, including stigma, poor disease knowledge and perception of healthcare services on the patient level, and lack of resources and poor knowledge of TB guidelines at the provider level.[43,50–52] To mitigate these, technological solutions such as e-health and telemedicine have been successfully employed in new and innovative ways. Large scale mass media campaigns have been launched and social media have been exploited in some settings to quell misinformation and educate the public, emphasizing trusted scientific sources, although this has been the reverse in some countries. There are lessons to be carried forward in TB elimination, such as the innovative use of telehealth, text messaging and use of social media as well as the engagement of celebrities, journalists and popular news sources for the mass proliferation of correct information and to unite people experiencing the challenges of social distancing. As it could be challenging to disseminate correct public health information through social media, there is a need to develop and deploy more scientifically based behaviour change communication.

COVID-19 has disproportionately affected marginalized populations in high-income countries to date, and its continuous spread within LMICs presents a real and present concern to vulnerable populations, even more so for those in high-TB burden countries. The COVID-19 response to date has demonstrated that, with the right amount of political will, prioritization and investments, it is possible for the international community to mobilize resources, accelerate scientific discovery, and deploy new public health tools to fight a pandemic. These same strategies can thus be employed for TB. Given that most people who develop TB can be cured with timely diagnosis and correct treatment, a moral imperative exists to once and for all end the significant yet needless morbidity and mortality resulting from TB.[53] The momentum in global attention, investment and priority to public health must be galvanized to end TB and other health threats for all people around the world.

> *"In the rush to return back to normal, use this time to consider which parts of normal are worth rushing back to"*. - Lawrence H. Gerstein, Ph.D

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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