**Title: Ending two pandemics: a plea on World TB Day**

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**Contribution**

TW conceived, designed, and wrote this manuscript. LEC, PM, KAM, and SBS revised and contributed to the writing of this manuscript.

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All authors declare no conflicts of interest

**Comment for World TB Day March 24 2020**

We are facing an unprecedented pandemic. One quarter of the world’s population is infected and, by 2021, it is predicted that 10 million people will have fallen ill, three million will not have been diagnosed or reached care, and over one million – predominately the most vulnerable – will die.1

This pandemic is not COVID-19 but tuberculosis (TB). On World TB Day, it is vital to compare and contrast the Covid-19 and TB pandemics to ensure that, while we focus on the former, we do not forget the latter.

A pandemic is defined as a disease that spreads over a whole country or the whole world. TB and COVID-19 are both pandemics that exhibit ongoing, sustained community transmission across continents. Indeed, no country is TB free and this is very likely to soon be the case for COVID-19.

There are striking similarities between the two pandemics. Both cause major infection-related morbidity and mortality around the world. TB was the leading cause of death from an infectious disease worldwide in 2018, killing 1.2 million people.1 COVID-19 has infected over 225,000 people and caused over 9000 deaths in the first quarter of 2020 alone.2 Both COVID-19 and TB can present with respiratory symptoms and it is likely that diagnosis and treatment of people with TB, or TB and Covid-19 co-infection, may be compromised during the COVID-19 pandemic. Older people and those with comorbidities are at greater risk of severe disease and adverse outcomes for both.3,4 And, as we are discovering for COVID-19, both diseases lead to significant social impact including stigma, discrimination, and isolation; and economic impact from country productivity losses and catastrophic costs to individuals and households.5

There are also stark differences. While TB is a slow-pandemic and has accompanied humankind for millennia,6 the coronavirus (SARS-CoV-2) which causes COVID-19 is new and spreading rapidly around the world. TB has been labelled a pandemic multiple times over the past three centuries, whereas this is the first COVID-19 pandemic. Children have less severe COVID-19 whereas 1.1 million children had TB disease in 2019 of whom 200,000 died.1 The vast majority of cases and deaths from TB occur in low- and middle-income countries, while high-income countries have low rates.1 In contrast, Europe became the second epicentre of COVID-19 after China, which may partially explain why COVID-19 will probably mobilise more global resources and person-power in a year than TB has in decades. However, underprepared and vulnerable countries in sub-Saharan Africa and the Americas may soon see significant rises in COVID-19 cases and deaths, which must be acted upon now to avoid catastrophe.7

There remain many unknowns. The clinical and epidemiological interaction of COVID-19 with TB (with or without HIV) is likely to be highly complex. Simply put, TB transmission may rise due to increased respiratory symptoms associated with COVID-19 or decline due to self-isolation and quarantine. There is increasing recognition of the importance of long-term lung damage in people following TB disease8 and it is likely that such patients are at increased risk of critical disease and death from COVID-19; the million people treated for TB who have residual lung damage may be at a higher risk of severe disease. Because of extreme health systems’ pressures, patients may have a poorer response to treatment or decreased availability of services and access to treatment. TB disproportionately affects men and boys more than women and girls.9 Early data show more men are dying from COVID-19, potentially due to sex-based immunological or gendered differences, such as smoking.10 The association between COVID-19 and poverty is also uncertain but, as more data becomes available, we will know more accurately the differential effects of COVID-19 according to socioeconomic position. Undoubtedly, COVID-19, like TB, will be associated with the medical poverty trap, in which poorer people have a higher likelihood of infection, disease, and adverse outcomes. Moreover, unemployed populations, informal or “zero hour contract” workers, will experience further impoverishment, which increases TB risk.5

Amidst the expanding COVID-19 pandemic, our plea on World TB Day is that we do not forget the TB pandemic; still the biggest infectious diseases killer. We need to continue to mobilise funding for research for better TB diagnostics, vaccine development, novel therapeutics, equitable access to care and innovative social protection interventions for TB-affected households.5 We should drastically increase and sustain investment in health systems responsive to the needs of the poor and resilient to the threat of infections, especially those that are air-borne and require isolation facilities. We need to continue to inform, advocate for, and empower local communities and to lobby governments and policymakers, to ensure that TB, as well as COVID-19, remain high on the global agenda. The lesson we have been taught from one pandemic to another is to be proactive, long-sighted, plan ahead, and to not become complacent.

World TB Day is on March 24 2020: it’s time to end TB.

**References**

1. World Health Organization (WHO). *World Health Organisation Global Tuberculosis Report 2019*. (2019).

2. Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). Available at: https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6.

3. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus disease (COVID-19) - China, 2020. *China CDC Wkly.* **2**, 113–122 (2020).

4. Negin, J., Abimbola, S. & Marais, B. J. Tuberculosis among older adults - time to take notice. *Int. J. Infect. Dis.* **32**, 135–137 (2015).

5. Wingfield, T., Tovar, M. A., Datta, S., Saunders, M. J. & Evans, C. A. Addressing social determinants to end tuberculosis. *Lancet* **391**, 1129–1132 (2018).

6. Saleem, A. & Azher, M. The next Pandemic - Tuberculosis: The oldest disease of mankind rising one more time. *Br. J. Med. Pract.* **6**, (2013).

7. Gilbert, M. *et al.* Preparedness and vulnerability of African countries against importations of COVID-19: a modelling study. *Lancet Infect. Dis.* **6736**, 1–7 (2020).

8. Meghji, J. *et al.* Patient outcomes associated with post-tuberculosis lung damage in Malawi: a prospective cohort study. *Thorax* **75**, 1–10 (2020).

9. Horton, K. C., MacPherson, P., Houben, R. M. G. J., White, R. G. & Corbett, E. L. Sex Differences in Tuberculosis Burden and Notifications in Low- and Middle-Income Countries: A Systematic Review and Meta-analysis. *PLOS Med.* **13**, e1002119 (2016).

10. Wenham, C., Smith, J., Morgan, R. & Group, W. Comment COVID-19: the gendered impacts of the outbreak. *Lancet* **395**, 846–848 (2020).