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COMMENT

Tuberculosis — Reaping benefits from COVID-19 in Portugal



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Portugal has managed the first national wave of COVID-19 but now it is now time to turn to other priorities in our Health System. Tuberculosis is our old enemy, while SARS-CoV-2 is the new kid on the block. The slow onset of tuberculosis matches its slow mobilization of resources, in contrast to the speed of SARS-CoV-2. While we are living through a pandemic that, so far, has claimed over 700000 lives worldwide,¹ it is easy to forget that TB claims more than 1.2 million lives every year.²

There is international concern regarding the cycle of lockdown and slow restoration of tuberculosis services, predicting an additional 1.4 million TB deaths between 2020 and 2025, due to delayed diagnosis, interruption or delay of treatment.^{3–6} What can we expect in the next months for tuberculosis incidence in Portugal? The country has been fighting a long war to maintain the incidence under the 20 cases/100.000 inhabitants mark and has a difficult challenge ahead to reach Sustainable Development Goal 3.3 before 2030. It has a unique profile in Western Europe, with an elevated number of cases in natives and a small proportion of cases in foreign-born individuals⁷ and high spatial heterogeneity transmission associated with housing

conditions, unemployment and vulnerable populations.⁸ The COVID-19 threats are clear: disruption of services and supply chains, access to diagnosis and treatment and the already known consequences of the incoming economic crisis that feeds known determinants of tuberculosis and other infectious diseases.^{6,9} It is still not clear if COVID-19 and TB co-infection outcomes are relevant or keep on being heavily influenced by age and other known co-morbidities.¹⁰

Clinical activities related with tuberculosis were not particularly hard hit in Portugal since they were considered a priority in the Portuguese Health System. However, there was some expected disruption in the access to laboratory and imaging investigations, which will almost surely result in some delays in the time from symptoms to proper diagnosis, a known risk factor for outbreaks.¹¹ On the other hand, investigation of presumptive Covid-19 cases can lead to quicker identification of pre-existing TB,¹² although one must keep TB as differential diagnosis amidst overwhelming attention given to Covid-19.

Due to the partial lockdown, we can expect a contrast of influences in TB: increased transmission in home clusters and decreased transmission in social circumstances, particularly social and occupational settings. Respiratory etiquette and social use of masks can break chains of transmission, give the upper hand to the control of this disease and help reduce the impact of delayed diagnosis and maintenance of index case infectiousness.¹³ Stigma associated to mask usage by

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Table 1 Threats and Opportunities in the context of Tuberculosis control in Portugal.

Threats	Opportunities
Disruption of services	Generalized use of masks
Hampered supply chains	Digital transition/telemedicine
TB late presentation	Differential diagnosis of COVID-19
Family cluster increase	Occupational cluster reduction
Unemployment/poverty	Field epidemiology development
Jeopardized international TB programmes	Contact tracing routines

tuberculosis patients or visiting health professionals is also something that will certainly diminish in the next few years.

Crisis also offers a broad set of opportunities. The clearest example is digital transition that has advanced more in two months than in the last two years due to the sheer pressure of physical distancing. DOT monitoring and patient follow-up can benefit from this. The long awaited reform of the tuberculosis dedicated health services could also be favored.

There will be other opportunities, such as the present familiarity with contact tracing among the general population, dedication of public health units to core activities of epidemiologic surveillance and infectious disease control, increasing use of digital technologies (with new developments) for the follow up of patients and the side effects of preventive measures for COVID-19 in pathologies like tuberculosis and influenza. In fact, despite their differences there is much to look forward to in the lessons learnt from SARS-CoV-2 and the accumulated experience with TB.¹⁴ Tuberculosis outpatient centers will certainly take advantage of telemedicine and electronic tools to guarantee improved access. Online meetings and continuous training will also benefit.

Nonetheless, it is clear that we need to keep on prioritizing the vulnerable group multidisciplinary approach: homeless, social housing populations, inmates. Intersectoral collaborations with NGOs continue to prove crucial. Behind Portugal's Universal Health Coverage and TB cost-free treatment, social support and poverty reduction measures are the backbone of a sustainable fight against tuberculosis. It is well known that heterogeneity of epidemiology of the disease favor the targeting of high-risk groups, based on a variety of determinants.¹⁵

Finally, the expertise of field epidemiology and the pursuit of infectious diseases deserve a proper setting and dedicated multidisciplinary teams to face the myriad of enemies, from the well-known tuberculosis to the new zoonotic threats that can endanger, as we are witnessing, our way of living.

Despite not being able to predict the future, the anticipation of these different threats and opportunities (Table 1) might also help to shape health services and guide clinical, epidemiological and preventive measures. There is a chance

that the particular setting of Portugal might help strike a decisive blow in tuberculosis transmission.

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References

- Roser M, Richie H, Ortiz-Ospina E, Hasell J. <https://ourworldindata.org/covid-deaths#what-is-the-total-number-of-confirmed-deaths>, 2020 [Accessed 12 August 2020].
- World Health Organization. <https://www.who.int/tb/publications/global-report/en/>, 2020 [Accessed 12 August 2020].
- STOP TB Partnership. <http://www.stoptb.org/assets/documents/news/Modeling%20Report.1%20May%202020.FINAL.pdf>, 2020 [Accessed 12 August 2020].
- Togun T, Kampmann B, Stoker NG, Lipman M. Anticipating the impact of the COVID-19 pandemic on TB patients and TB control programmes. *Ann Clin Microbiol Antimicrob.* 2020;19(1):1–6, <http://dx.doi.org/10.1186/s12941-020-00363-1>.
- Hogan AB, Jewell BL, Sherrard-Smith E, Vesga JF, Watson OJ, Whittaker C, et al. Potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria in low-income and middle-income countries: a modelling study. *Lancet Glob Health.* 2020;8(9):E1132–41, [http://dx.doi.org/10.1016/S2214-109X\(20\)30288-6](http://dx.doi.org/10.1016/S2214-109X(20)30288-6).
- Buonsenso D, Iodice F, Biala JS, Goletti D. COVID-19 effects on Tuberculosis care in Sierra Leone. *Pulmonology.* 2020, <http://dx.doi.org/10.1016/j.pulmoe.2020.05.013>.
- Paulino J, Martins A, Machado M, Gomes M, Gaio AR, Duarte R. Tuberculosis in native-and foreign-born populations in Portugal. *Int J Tuberc Lung Dis.* 2016;20(3):357–62, <http://dx.doi.org/10.5588/ijtld.15.0430>.
- Couceiro L, Santana P, Nunes C. Pulmonary tuberculosis and risk factors in Portugal: a spatial analysis. *Int J Tuberc Lung Dis.* 2011;15(11):1445–55, <http://dx.doi.org/10.5588/ijtld.15.0430>.
- Suhrcke M, Stuckler D, Suk JE, Desai M, Senek M, McKee M, et al. The impact of economic crises on communicable disease transmission and control: a systematic review of the evidence. *PLoS One.* 2011;6(6), <http://dx.doi.org/10.1371/journal.pone.0020724>.
- Motta I, Centis R, D'Ambrosio L, et al. Tuberculosis, COVID-19 and migrants: preliminary analysis of deaths occurring in 69 patients from two cohorts. *Pulmonology.* 2020;26(4):233–40, <http://dx.doi.org/10.1016/j.pulmoe.2020.05.002>.
- Mitruka K, Oeltmann JE, Ijaz K, Haddad MB. Tuberculosis outbreak investigations in the United States, 2002–2008. *Emerg Infect Dis.* 2011;17(3):425–31, <http://dx.doi.org/10.3201/eid1703.101550>.
- Tadolini M, García-García J, Blanc F, Borisov S, Goletti D, Motta I, et al. On tuberculosis and COVID-19 co-infection. *Europ Respir J.* 2020;56(2):2002328, <http://dx.doi.org/10.1183/13993003.02328-2020>.

13. Mathema B, Andrews JR, Cohen T, Borgdorff MW, Behr M, Glynn JR, et al. Drivers of tuberculosis transmission. *J Infect Dis.* 2017;216 Suppl. 6:S644–53, <http://dx.doi.org/10.1093/infdis/jix354>.
14. Dara M, Sotgiu G, Reichler M, Chiang CY, Chee CBE, Migliori GB. New diseases and old threats: lessons from tuberculosis for the COVID-19 response. *Int J Tuberc Lung Dis.* 2020;24, <http://dx.doi.org/10.5588/ijtld.20.0151>.
15. Trauer JM, Dodd PJ, Gomes MGM, Gomez GB, Houben RMGJ, McBryde ES, et al. The Importance of Heterogeneity to the Epidemiology of Tuberculosis. *Clin Infect Dis.* 2019;69(1):159–66, <http://dx.doi.org/10.1093/cid/ciy938>.