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The relevance of digital health strategies to support tuberculosis services in the COVID-19 pandemic context

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Tuberculosis (TB) is among the top 10 causes of death in the world and Brazil is part of the top 30 high TB burden countries, with an estimate of 96.000 TB cases in 2019 [1]. Although the treatment for TB is offered free of charge by the Brazilian Public Health System (SUS), the monitoring of these patients is a delicate process, with a considerable abandonment rate of up to 20% in some capitals [2].

As the world comes together to tackle the coronavirus pandemic, health services need to be actively engaged to ensure an effective response, while ensuring that TB services keep running. That is to say that if the pandemic led to a reduction of 25% in expected TB detection in the world for 3 months, it is hoped an increase of 13% in TB deaths, representing 1.4 million additional deaths as a direct consequence of the pandemic [3,4]. TB patients may become severely ill if infected with COVID-19, because their respiratory systems are already compromised.

To overcome the challenge of reducing the TB burden while facing the COVID-19 pandemic, research and innovation may provide equitable access to innovative tools and approaches. Digital technologies can help patients and caregivers to improve the experience in health units and treatment processes, and automate the health information management [5,6]. In the COVID-19 pandemic, specifically, contact between people should be minimized and avoided whenever it is possible, but there must be a commitment to maintain the treatment of patients and ensure the sustainability of TB services.

Some strategies (see Figure) implemented by the Laboratory of Health Intelligence of the Ribeirão Preto Medical School, University of São Paulo, offer support for TB management and care in public services in the State of São Paulo, Brazil. Solutions were created and adapted to address the quick changing scenario after the coronavirus pandemic took place. These strategies include a

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platform to allow the registering and remote follow-up of TB patients through DOTS strategy [7,8], which currently follows 40 patients without any physical contact using mobile devices; the development of a secure interoperability layer and a group of ontologies, which allow the integration of distinct and independent health information systems [9]; a model to predict abandonment [10], which is crucial to avoid the increase in the rate of nonadherence; and an alert system to automatically notify TB services about significantly upcoming changes in COVID-19 situation in their regions, allowing services to get ahead of the situation and prepare adequate responses for TB patients.

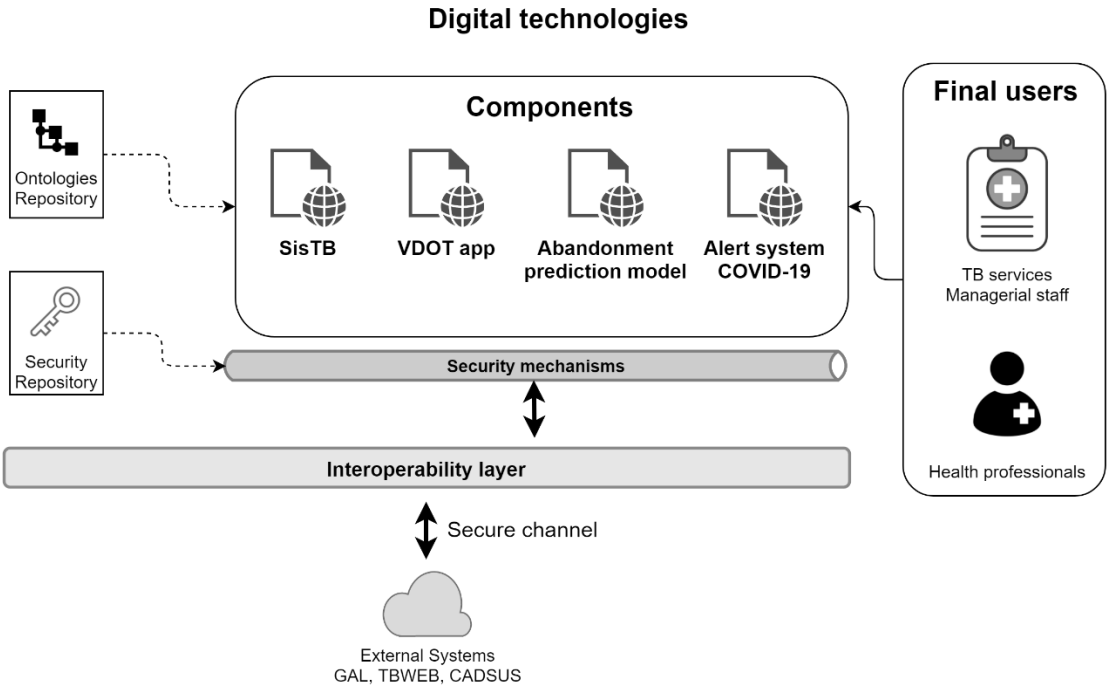

Figure 1. Digital technologies for TB services

Therefore, it is crucial to underpin health professionals and managers in taking quick decisions and to streamline processes in TB services, maintaining the care of TB patients in the scenario defined by the COVID-19. It is a fact that the pandemic context has accelerated the implementation and adoption of these strategies due to its immediate needs, but that will certainly serve as a solid basis to continuously support TB services.

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REFERENCES

1. WHO. Global Tuberculosis Report 2020. 2020.
2. Sousa GJB, Garces TS, Pereira MLD, Moreira TMM, da Silveira GM. Temporal pattern of tuberculosis cure, mortality, and treatment abandonment in Brazilian capitals. Rev. Lat. Am. Enfermagem 2019;27.
3. World Health Organization. Tuberculosis and COVID-19: Considerations for tuberculosis care. World Heal. Organ. [Internet] 2020;1–11. Available from: https://www.who.int/docs/default-source/documents/tuberculosis/infonote-tb-covid-19.pdf
4. Stop TB partnership. The Potential Impact of the Covid-19 Response on Tuberculosis in High-Burden Countries: a Modelling Analysis. Dev. by Stop TB Partnersh. Collab. with Imp. Coll. Avenir Heal. Johns Hopkins Univ. USAID. [Internet] 2020;1–7. Available from: http://www.stoptb.org/assets/documents/news/Modeling Report_1 May 2020_FINAL.pdf
5. World Health Organization. Digital health for the End TB strategy : Progress since 2015 and future perspectives. 2015;1–33.
6. World Health Organization. Digital Health for the End Tb Strategy: an Agenda for Action. Who [Internet] 2015;24. Available from: https://www.who.int/cancer/en/
7. Albano dos Santos LR, Andrade Bernardi F, Prado GCS, Costa Lima V, Crepaldi NY, Marçal MA, et al. The perception of health providers about an artificial intelligence applied to Tuberculosis video-based treatment in Brazil: a protocol proposal. Procedia Comput. Sci. [Internet] 2019;164:595–601. Available from: https://doi.org/10.1016/j.procs.2019.12.225
8. Crepaldi NY, Costa Lima V, Andrade Bernardi F, Albano dos Santos LR, Yamaguti VH, Pellison FC, et al. SISTB: an ecosystem for monitoring TB. Procedia Comput. Sci. [Internet] 2019;164:587–94. Available from: https://doi.org/10.1016/j.procs.2019.12.224
9. Pellison FC, Rijo RPCL, Lima VC, Crepaldi NY, Bernardi FA, Galliez RM, et al. Data Integration in the Brazilian Public Health System for Tuberculosis: Use of the Semantic Web to Establish Interoperability. JMIR Med. Informatics 2020;8.
10. Hokino Yamaguti V, Alves D, Charters Lopes Rijo RP, Brandão Miyoshi NS, Ruffino-Netto A. Development of CART model for prediction of tuberculosis treatment loss to follow up in the state of São Paulo, Brazil: A case–control study. Int. J. Med. Inform. 2020;141.