

Tuberculosis and diabetes: invest for impact

Tuberculosis and diabetes:

Diabetes is associated with about twice the risk of tuberculosis (TB) disease (1) and a higher risk of multidrug-resistant TB (2). People with both TB and diabetes are twice as likely to die during TB treatment and have twice the risk of TB relapse after treatment completion (3). In 2021, about 370 000 new episodes of TB were estimated to be attributable to diabetes (4), and, in 2019, just over 15% of people with TB globally were estimated to have diabetes (5) as compared with 9.3% in the general adult population (aged 20–79 years) (6). Thus, about 1.6 million people with TB and diabetes require coordinated care and follow-up to optimize the management of both conditions.

The prevalence of diabetes is projected to increase globally by 50% between 2019 and 2045, with a median increase of 99% (interquartile range, 69–151%) in countries with a high burden of TB (6). To respond to the increasing burden of TB and diabetes, people-centred services are required to meet the needs and preferences of affected persons as far as possible, and to minimize the time and financial costs incurred by the end user for accessing services. Programmes should therefore work together to define and reorient models of care to ensure the provision of integrated services, preferably at the same time and location and as close as possible to people in need of the services.

Target audience of the brief:

Ministries of health, national programme managers or relevant departments responsible for TB and/or noncommunicable diseases, primary health care, policy-makers and relevant stakeholders in countries that prioritize TB and diabetes.



Examples of models of care for integrated TB and diabetes services:

“One stop shop”: In this model of care, testing for and management of diabetes in people with TB and/or screening, testing (or collection of samples) and management of TB in people with diabetes are provided at the same time and in the same location and by the same health-care worker. This approach can be provided in a primary care facility. It promotes people-centred care and may improve access to care. In this model, appropriate measures for TB infection prevention and control are essential.

Purpose of the brief:

To provide practical information on planning for the introduction and scaling-up of integrated TB and diabetes services.



Co-located TB and diabetes services: In this model, separate service providers are located in the same or adjacent premises, such as in an outpatient department. Co-located models of care may reduce travel to distant facilities and facilitate greater integration between services. Close collaboration among the different service providers is essential to minimize waiting time between appointments, to reduce the number of times a person must attend to receive care for TB and diabetes, to reduce out-of-pocket costs and to enable integrated patient health records.

Planning integrated services:

People with TB and diabetes require coordinated care and follow-up to optimize the management of both conditions. Therefore, the integration of services should be guided by a vision of the goal (people-centred care and improved treatment outcomes for the two diseases) and a good understanding of the context and of the barriers to service delivery. Furthermore, programmes should define models of care that enable delivery of integrated services.



Separate service delivery: In this approach people with TB may be screened for diabetes symptoms in a TB clinic and referred for diabetes testing and initiation of treatment as needed, at a clinic providing diabetes care. Similarly, people with diabetes may be screened for TB symptoms in a diabetes clinic and referred for TB diagnosis and treatment as required. Such models of care are relatively simple to introduce at a low cost to health services, with the available human resources. This is the least integrated model and may be associated with loss to follow-up and high out-of-pocket expenditure.

Delivery of integrated services for people with TB and those with diabetes:

Integration of TB and diabetes services requires collaboration among health programmes and inclusion of diabetes- and TB-specific interventions in the service package for people with each disease. Actions to be considered when planning such integration are listed below.

- **Governance and accountability:** Establish a joint coordinating mechanism and include relevant stakeholders, including civil society and affected communities, in planning, implementation and monitoring of the services.
- **Analysis of burden and access to services:** Assess the joint epidemiological burden of TB and diabetes, determine access to services and the financial burden for people with TB and diabetes and map existing services, including infrastructure, human resources, medicines and technologies for TB and diabetes.
- **Planning and resource mobilization:** Update and harmonize national strategic plans and national guidelines for TB and diabetes, reorient the model of care, secure resources, and align them.
- **Define required competence:** Define the roles and responsibilities of health workers (multidisciplinary team) and service supervisors, identify the required competencies, and plan training accordingly.
- **Strengthen capacity:** Train and deploy staff in screening, testing, and managing the two conditions, and in drug management, mentoring, joint supervision and monitoring and evaluation according to their terms of reference.
- **Orient health facility managers:** District coordinators and supply chain managers in the integrated services package in order to deliver high-quality, coordinated care and ensure the continuity of supplies.
- **Ensure the availability of tools, consumables, equipment and medicines:** Ensure the availability of standard operating procedures, algorithms, laboratory network and job aids for sample transportation, screening and diagnostic tests, medicines, and equipment for TB and diabetes management.
- **Treatment support:** Consider the needs and costs incurred due to having a comorbidity, such as for transport, and provide health education and community support.
- **Strengthen monitoring and evaluation and operational research:**
 - » Include indicators and adjust and align tools for data collection and procurement supply management.
 - » Integrate diabetes and TB into monitoring and evaluation activities of the two programmes, including supervisory visits, mentoring, periodic meetings, and programme review.
 - » Conduct operational research to test the effectiveness, feasibility, acceptability, and cost of models of collaboration.

Estimate the number of people with TB and with diabetes who will need to be screened and treated for costing:

- Use national data on TB and diabetes to determine the numbers of people to be screened for each disease, in accordance with national guidelines.
- To estimate the number of TB cases attributed to diabetes in high TB burden countries, use the WHO data on the following link <https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022/uhc-tb-determinants/6-3-tb-determinants>.

Examples of indicators to monitor implementation:

Examples of indicators that may be adopted are listed below.

The first, second, fourth and fifth may be used for setting targets and for measuring progress towards targets for the detection and co-management of TB and diabetes. The targets should be country-specific and should be set in consultation with stakeholders:

- percentage of people diagnosed with diabetes according to WHO recommendations who are screened for TB;
- percentage of people diagnosed with a new episode of TB, who are tested for diabetes according to WHO recommendations or who already have known diabetes status;
- percentage of people diagnosed with a new episode of TB, who are confirmed to have diabetes, out of those whose diabetes status was assessed (through diabetes testing and asking about known diabetes status);
- percentage of people living with diagnosed diabetes and TB (rifampicin susceptible or unknown) with a treatment outcome in each of the following categories out of those diagnosed with diabetes and TB (rifampicin-susceptible or unknown): success (cured + treatment completed); treatment failed; died: lost to follow-up; not evaluated; and
- percentage of people diagnosed with diabetes and a new episode of TB who have good control of glycaemia.

Minimum medicines and equipment for diabetes management in primary care:

Equipment	Medicines
<ul style="list-style-type: none"> • blood pressure measuring device • laboratory or point-of-care plasma glucose tests • laboratory or point-of-care HbA1c tests 	<ul style="list-style-type: none"> • metformin • sulfonylurea • human insulin

References:

1. Hayashi S, Chandramohan D. Risk of active tuberculosis among people with diabetes mellitus: systematic review and meta-analysis. *Trop Med Int Health*. 2018;23(10):1058–70. doi:10.1111/tmi.13133.
2. Liu Q, Li W, Xue M, Chen Y, Du X, Wang C et al. Diabetes mellitus and the risk of multidrug resistant tuberculosis: a meta-analysis. *Sci Rep*. 2017;7(1):1090. doi:10.1038/s41598-017-01213-5.
3. Huangfu P, Ugarte-Gil C, Golub J, Pearson F, Critchley J. The effects of diabetes on tuberculosis treatment outcomes: an updated systematic review and meta-analysis. *Int J Tuberc Lung Dis*. 2019;23(7):783–96. doi:10.5588/ijtld.18.0433.
4. Global tuberculosis report 2022. Geneva: World Health Organization; 2022 (<https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2022>, accessed 22 May 2023).
5. Noubiap JJ, Nansseu JR, Nyaga UF, Nkeck JR, Endomba FT, Kaze AD et al. Global prevalence of diabetes in active tuberculosis: a systematic review and meta-analysis of data from 2·3 million patients with tuberculosis. *Lancet Glob Health*. 2019;7(4):e448–60. doi:10.1016/S2214-109X(18)30487-X.
6. IDF Diabetes Atlas. Ninth edition. Brussels: International Diabetes Federation; 2019 (https://www.diabetesatlas.org/upload/resources/material/20200302_133351_IDFATLAS9e-final-web.pdf).

Further reading:

Framework for collaborative action on tuberculosis and comorbidities. Geneva: World Health Organization; 2022 (<https://www.who.int/publications/i/item/9789240055056>, accessed 25 April 2023).

First-ever global coverage targets for diabetes adopted at the 75th World Health Assembly. 28 May 2022. Geneva: World Health Organization; 2022 (<https://www.who.int/news-room/feature-stories/detail/first-ever-global-coverage-targets-for-diabetes-adopted-at-the-75-th-world-health-assembly>, accessed 25 April 2023).

Guidance for national strategic planning for tuberculosis. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO (<https://www.who.int/publications/i/item/9789240052055>, accessed 21 July 2023).

HEARTS - D, Diagnosis and Management of Type 2 Diabetes. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/who-ucn-ncd-20.1>, accessed 1 June 2023).

Implementing the end TB strategy: the essentials, 2022 update. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO. (<https://www.who.int/publications/i/item/9789240065093>, accessed 21 July 2023).

Integrating the prevention and control of noncommunicable diseases in HIV/AIDS, tuberculosis, and sexual and reproductive health programmes: implementation guidance. Geneva: World Health Organization; 2023 (<https://apps.who.int/iris/handle/10665/366691>, accessed 25 April 2023).

Noncommunicable diseases data portal (website). Geneva: World Health Organization; 2023 (<https://ncd-uat.adapptlabs.com/>, accessed 25 April 2023).

Noncommunicable diseases facility-based monitoring guidance. Geneva: World Health Organization; 2022 (<https://www.who.int/publications/i/item/9789240057067>, accessed 25 April 2023).

WHO package of essential noncommunicable (PEN) disease interventions for primary health care. Geneva: World Health Organization; 2020 (<https://www.who.int/publications/i/item/9789240009226>, accessed 25 April 2023).

World Health Organization

20 Avenue Appia
1211 Geneva 27

Tuberculosis and diabetes: invest for impact. Information note

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