National Institute for Public Health
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Ministry of Health, Welfare and Sport

Roadmap for delivery of integrated tuberculosis services for vulnerable populations in Portugal

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EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

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List of abbreviations

CDP	Centros de Diagnóstico Pneumológico (Outpatient TB Centres)
CXR	Chest X-ray
ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EU	European Union
HIV	Human immunodeficiency virus
IGRA	Interferon gamma release assay
MoH	Ministry of Health
MDR-TB	Multidrug-resistant tuberculosis
NGO	Non-governmental organisations
NTP	National Tuberculosis Programme
OST	Opioid substitution therapy
PLHIV	People living with HIV
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (National Institute for Public Health and the Environment)
SICAD	Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências (General Directorate for Intervention on Addictive Behaviours and Dependencies)
SVIG-TB	Sistema de Vigilância de Tuberculose (TB surveillance system)
TB	Tuberculosis
TBI	Tuberculosis infection
TPT	Tuberculosis preventive treatment
WHO	World Health Organisation

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Executive summary

Portugal is among the six countries with the highest incidence for tuberculosis (TB) in the European Union (EU). The latest estimate of TB incidence for 2020 was 16 per 100,000 population. The notification rates steadily decreased from 2002 onwards, halted in the period 2016 to 2019, and decreased again in 2020 during the COVID-19 pandemic. The proportion of TB patients belonging to vulnerable populations such as people living with HIV (PLHIV), migrants, people who are homeless, people who use alcohol and/or drugs (including intravenously) and people currently or formerly working in stone quarries has been increasing in recent years.

Vulnerable groups, which had more limited access to TB care than other groups during 2020, have higher risk for TB infection and disease, as well as poorer treatment outcomes. The National Tuberculosis Programme (NTP) in Portugal recognised that non-governmental organisations (NGOs), which are crucial in the care for vulnerable populations, provide an opportunity to strengthen TB care. A roadmap for how to integrate TB care into other care provided for vulnerable populations has been drafted accordingly. The overall purpose of the roadmap is to achieve the End TB Strategy targets and a sustained decrease of TB incidence in the country, as well as protect the most vulnerable people in society.

This roadmap contains six sections.

The 'Introduction' explains the rational for this guideline and the development process to draft it.

The second section 'Epidemiology and tuberculosis services' contains a description of the current TB situation in Portugal and in vulnerable populations. It further includes a description of TB services.

The third section 'Current challenges' describes the main current challenges:

1. TB occurs relatively more in vulnerable and hard-to-reach populations and these populations have longer diagnostic delay and poorer treatment outcomes compared to the general population.
2. Coverage of TB care for vulnerable populations is not sufficiently systematic across the care pathway. In addition, the current focus is on TB disease, with opportunities to prevent TB through diagnosis and treatment of tuberculosis infection (TBI) not optimally used.
3. Data use for decision making and developing targeted interventions for vulnerable populations, especially at the sub-national level, is sub-optimal.
4. There is insufficient funding and continuity of funding to sustain longer term TB care activities in vulnerable populations.
5. Fragmented staffing at the national level prevents a concentrated effort to coordinate and implement targeted interventions for vulnerable populations.

The fourth section 'Theoretical framework for the roadmap' describes the framework for the roadmap, which focuses on people-centred care and person- and provider-initiated TB pathways. The section further indicates where NGOs have currently a role, and where their role could be expanded.

The fifth section 'Roadmap: key actions to improve integrated tuberculosis services for vulnerable populations' contains the key actions NTP and its stakeholders could consider

taking to integrate systematically TB services into other services for vulnerable populations in Portugal:

1. Expand on and strengthen existing comprehensive service delivery for vulnerable populations.
2. Include TB care in the comprehensive services for vulnerable populations and involve influential people to ensure effective implementation.
3. Analyse systematically TB data at local levels to identify gaps in TB care services and to develop interventions addressing these in cooperation with local authorities.
4. Advocate for longer and sustained funding and explore alternative/easier funding options.
5. Appoint a dedicated officer and a steering committee for TB in vulnerable populations to oversee and monitor implementation of the roadmap.

An overarching possible key action is to use lessons learnt from the COVID-19 experience to promote TB literacy among vulnerable populations, professionals working with vulnerable populations and health care professionals.

The final section 'Roadmap: milestones and monitoring' describes the monitoring of implementation of the roadmap with milestones.

Several annexes provide additional details on the vulnerable populations covered in the roadmap.

1. Introduction

This roadmap provides guidance to the National Tuberculosis (TB) Programme (NTP) and its stakeholders on how to integrate TB services for vulnerable populations that are often hard-to-reach with other services provided to these populations. In the context of this roadmap, vulnerable populations include people living with HIV (PLHIV), migrants, people who are homeless, people who use alcohol and/or drugs (including intravenously) and people currently or formerly working in stone quarries.

1.1. Rational for the roadmap

TB notifications rates in Portugal halved in the period 2000 to 2015, from 43 per 100,000 in 2000 to 21 per 100,000 in 2015. However, this reduction came almost to a stop as notification rates from 2016 to 2019 ranged between 18 and 19 per 100,000. Although 2020 saw a further reduction, it is uncertain if this is a real reduction in TB or a COVID-19-related reduction because of (i) less and delayed health care seeking and/or (ii) a temporarily interruption of health services [1]. The slowdown of decreasing notification rates and the increasing proportion of TB in vulnerable populations combined with opportunities resulting from the COVID-19 pandemic, e.g. more familiarity with contact investigation and wearing face masks than prior to the pandemic [1], provide an excellent opportunity to act now and contribute to the End TB targets for the country. The roadmap targets vulnerable populations because they have more limited access to TB care than other groups, have higher risk for TB infection and disease, as well as poorer treatment outcomes. The NTP recognised that non-governmental organisations (NGOs), which are crucial in the care for vulnerable populations, provide an opportunity to strengthen TB care.

The overall purpose of the roadmap is to achieve the End TB Strategy targets and a sustained decrease of TB incidence in the country, as well as protect the most vulnerable people in society.

1.2. Target audience for the roadmap

The main target audience for the roadmap is the NTP and its stakeholders, which include government officials at all levels from relevant departments such as the Directorate General of Health and the priority disease programmes on TB, HIV and viral hepatitis, High Commission on Migration and occupational health services; public health professionals; and non-governmental organisations (NGOs) providing services for the vulnerable populations. In addition, clinical health care professionals, staff of social care services and others may also benefit from the roadmap.

1.3. Development process of the roadmap

In the second half of 2021, an assessment of TB care for vulnerable populations was conducted with the aim to develop a roadmap for integrated TB services for such populations. The development of this roadmap occurred through a consultative process that involved the NTP convening two stakeholder meetings. The first meeting was held in September 2021 and attended by representatives from the Directorate General of Health, government organisations dealing with prisons and migration, health care programmes such as HIV, viral hepatitis and TB, NGOs and a consultant. At the meeting, governmental and non-governmental stakeholders presented on the services they provide for vulnerable populations, and how they link specific vulnerable populations to TB care. The consultant visited individual stakeholders, mostly NGOs, after the meeting

which provided further input for the draft of the roadmap. At the second stakeholder meeting in November 2021, the consultant presented the draft of the roadmap to the stakeholders and asked them for comments and suggestions for improvement. This feedback was then incorporated into the roadmap, which was finalised in January 2022.

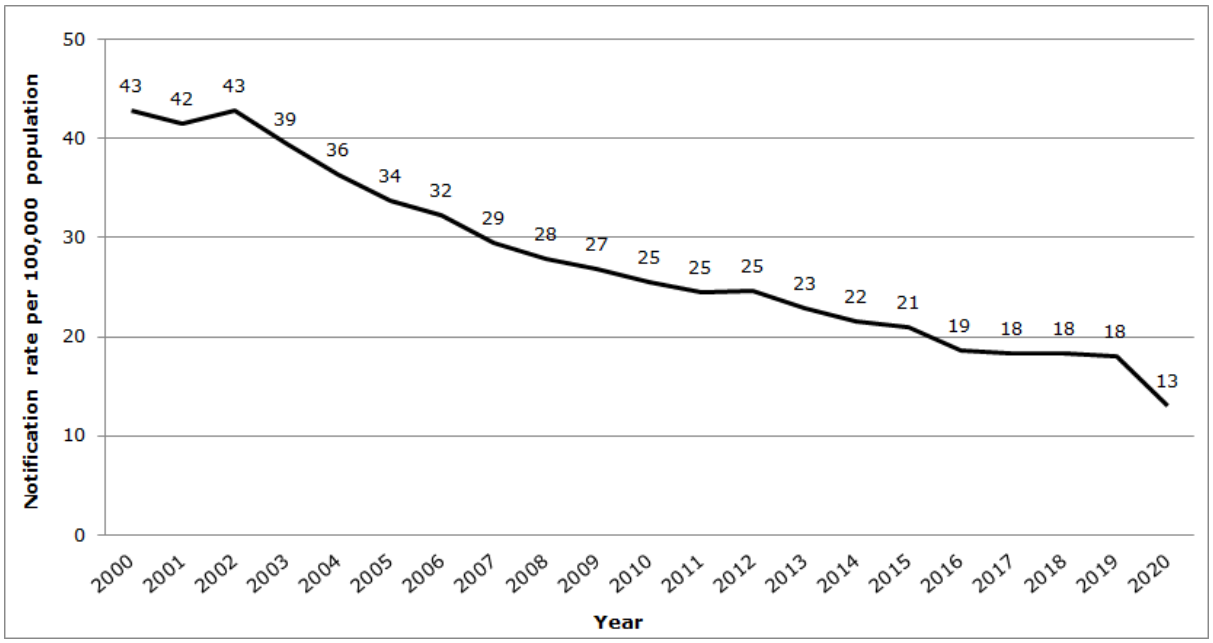
2. Epidemiology and tuberculosis services

2.1. Epidemiology of tuberculosis in Portugal

Portugal has seven regions: five on the mainland (Alentejo, Algarve, Centre, Lisbon and Tagus Valley, and North) and two autonomic regions (Azores and Madeira). Figures in this document refer to the entire country unless otherwise specified. Regions are further divided into districts.

The country has seen a downward trend in TB notifications in recent years, as have most European Union (EU) countries. The country's estimated incidence of 16 per 100,000 in 2020 is the sixth highest in the EU after Bulgaria, Latvia, Lithuania, Malta and Romania [2]. The country reported 1,855 TB patients in 2019 and 1,337 in 2020, with notification rates of 18 and 13 per 100,000 population respectively [3]. Figure 1 demonstrates that the downward trend in notification rate since 2000 came to a standstill between 2016 and 2019.

Figure 1. Tuberculosis notification rate per 100,000 population, Portugal, 2000–2020



Source: The tuberculosis surveillance system, Sistema de Vigilância de Tuberculose (SVIG-TB), 2021

Lisbon district and Porto district had notification rates of 26.5 and 25.7 per 100,000 people respectively in 2019. Both districts have been among those with the highest notification rates in the country for years [4]. The cities of Marco de Canaveses and Penafiel in Porto district in the north of Portugal have the highest rates: 85 and 47 per 100,000, respectively. For Marco de Canaveses, this was a 67% increase in rate compared to 2014.

About two-thirds of TB cases occur in men, with the disease affecting older populations more than younger ones. Although there were few TB cases in children below the age of 15 up until 2015, numbers of TB in children, including serious forms, have increased in recent years. This is probably because the increased time to diagnosis resulted in higher numbers of children with TB [5].

Delay in diagnosing TB has increased in recent years, going from 65 days in 2015 to 79 days in 2020 [6]. Several factors are considered to be related to this delay: low TB

literacy in the population and in health care professionals; stigma associated with TB and stigma associated with determinants of health such as poverty and drug use that lead to delayed heath care seeking and reluctance to talk about the disease; and the challenges vulnerable populations have in accessing health care. In 2020, during the COVID-19 pandemic, the delay especially increased in the most vulnerable: for example, in people who are homeless, the delay in 2020 was 124 days while it was 50 days in 2016 [6].

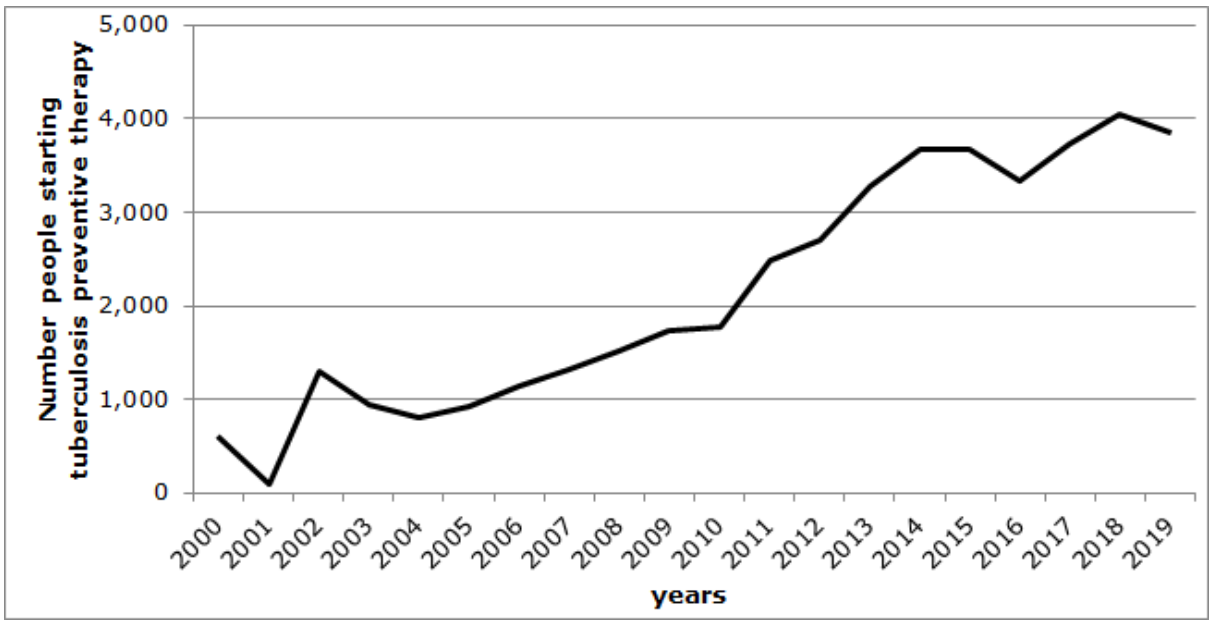
In 2019 and 2020, the country notified 7 and 11 patients, respectively, with multidrug-resistant TB (MDR-TB), less than 1% of notified cases, and no patients with extensively drug-resistant TB (XDR-TB). The districts Lisbon, Porto and Setúbal notified the most MDR-TB patients, which is similar to the pattern seen with drug-susceptible TB notifications [5].

Information on the HIV status of TB patients is often underreported. That being said, 84% of TB patients knew their HIV status in 2019, while the preliminary/incomplete data for 2020 suggests this to be 77%. HIV-positivity rates for 2019 and 2020 were 9% and 10%, respectively; the rate has dropped gradually from 14% in 2010 [3].

The treatment success rates have remained relatively stable and were 84% in 2018 and 2019 combined [5]. In these years, 7% of patients died, 5.3% were lost to follow up, 3.6% were transferred or left the country and less than 1% had treatment failure. Of the nine MDR-TB patients that started treatment in 2017, eight were treated successfully.

The TB surveillance system includes data on people with TB infection (TBI) who started TB preventive treatment (TPT). The majority of people starting TPT are those who had contact with a TB patient and people starting immunosuppressive therapy; 5% were PLHIV. Figure 2 shows a gradual increase of people starting TPT, demonstrating the increased attention for prevention of TB.

Figure 2. People initiating tuberculosis preventive treatment, Portugal, 2000–2019



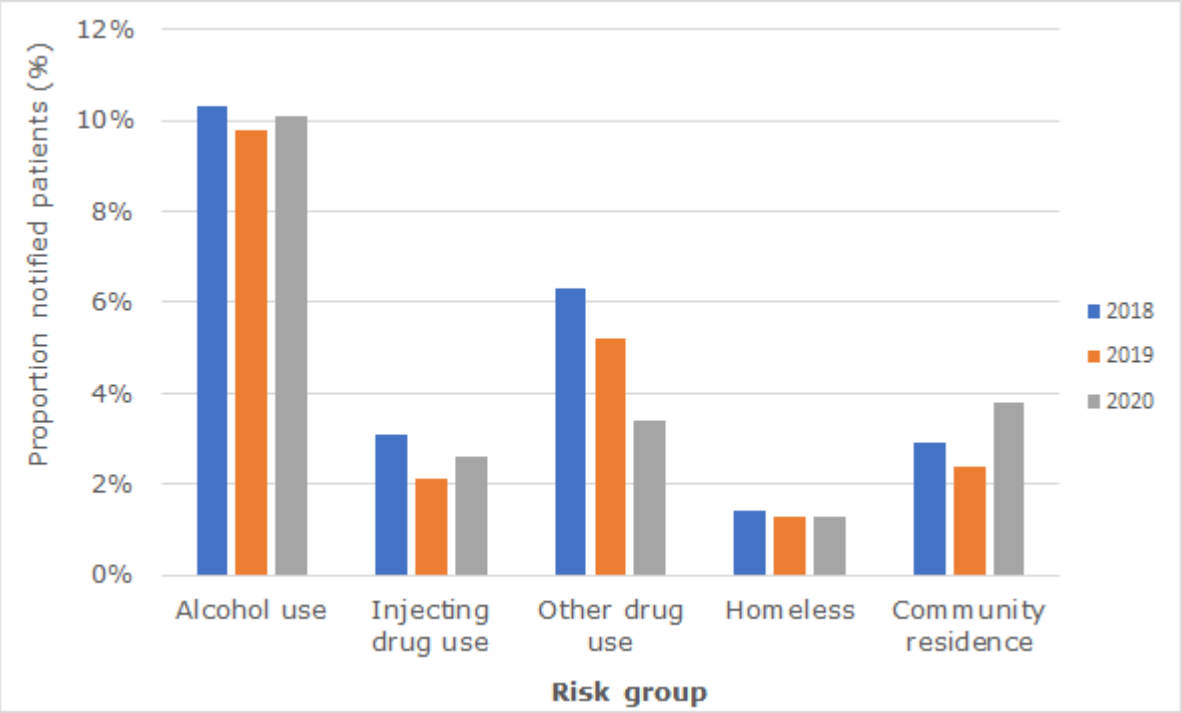
Source: SVIG-TB, 2021

2.2. Epidemiology of tuberculosis in vulnerable populations

Vulnerable populations are considered 'Those whose socioeconomic conditions or lifestyle makes it difficult to recognise TB symptoms, access health services, self-administer treatment and attend regular healthcare appointments' [7]. People from such populations have a higher risk of getting infected with TB and subsequently developing the disease: vulnerable populations are often hard-to-reach and marginalised [7]. People may belong to more than one vulnerable population: for example, PLHIV may also use drugs or have a migrant background; and many people who have addictions are also homeless.

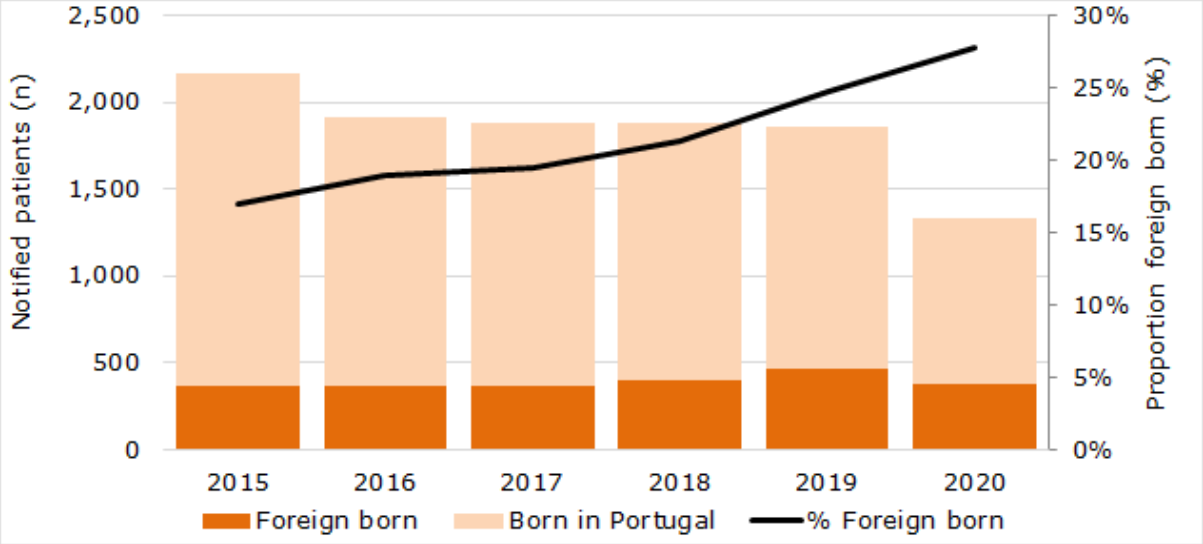
Figure 3 shows the proportion of TB patients belonging to a vulnerable group nationally in the years 2018 to 2020. Data for people currently/formerly working in the stone quarries are not available. The proportions are mostly stable, but the proportion of TB patients who used non-injecting drugs decreased. Meanwhile, Figure 4 shows that the proportion of TB patients born outside Portugal increased from 17% in 2015 to almost 28% in 2020.

Figure 3. Risk factors for tuberculosis, Portugal, 2018–2020



Source: SVIG-TB, 2021

Figure 4. Tuberculosis notifications among Portugal-born and foreign-born populations, and proportion foreign-born, Portugal, 2015–2020



Source: SVIG-TB, 2021

Table 1 shows the proportion of TB patients belonging to a vulnerable group at the national level and the variation between the two districts with the highest TB notifications. Porto district includes the towns of Marco de Canaveses and Penafiel, around which most of the stone quarries are located. The table does not include people who work currently/formerly in stone quarries because this occupational risk is not included as risk factor in the national database; silicosis is included as co-morbidity.

Migrants settle mostly in Lisbon district, which is part of the larger Lisbon and Tagus Valley region, explaining the high proportion of TB in migrants there. In Porto city, the proportion of migrants is much higher compared to the district: 23% and 20% higher in 2019 and 2020 respectively [8]. This is because Porto district has a large rural area while migrants settle mostly in the city.

Table 1. Proportion of tuberculosis patients belonging to vulnerable populations, Portugal and selected districts, 2019 and 2020

Vulnerable population	**National**		**Lisbon district**		**Porto district**	
	2019	**2020**	**2019**	**2020**	**2019**	**2020**
PLHIV	9%	10%	16%	15%	5%	6%
Migrants	25%	28%	46%	52%	7%	8%
People who are homeless	1%	1%	2%	2%	2%	1%
People who use alcohol and/or drugs	17%	16%	14%	13%	16%	17%
People with silicosis	2%	2%	0%	0%	6%	6%

PLHIV: People living with HIV.
Source: SVIG-TB, 2021

Additional data on TB in people working in stone quarries are available from the project Menos TB Pedreiras (Less TB in Stone Quarry Workers), an initiative of the North region health department in collaboration with the occupational health department [8]. The project started in 2018 and has included symptom screening for TB alongside annual occupational health chest X-ray (CXR) screening. The project has also collected sputum samples for microbiological examination and blood for interferon gamma release assay (IGRA) testing for TBI. Table 2 shows the results of screening in 2018 and 2019. During the 2019 screening, 226 IGRA-negative individuals in 2018 were retested; 19 (8.4%) were positive, suggesting recent transmission [9].

Table 2. Overview of results from the project Menos TB Pedreiras, North region, Portugal, 2018-2019

Year	People screened with CXR (n)	People with silicosis (n, %)	People with new silicosis (n, %)	Diagnosed with TB (n)	People tested with IGRA (n)	People with TBI (n, %)*	People initiating TPT (n, %)
2018	355	84 (24%)	38 (45%)	0	394	57 (14%)	35 (61%)
2019	335	89 (26%)	17 (19%)	2	447	91 (20%)	63 (70%)

CXR: chest X-ray; IGRA: interferon gamma release assay; TBI: tuberculosis infection; TPT: tuberculosis preventive therapy.

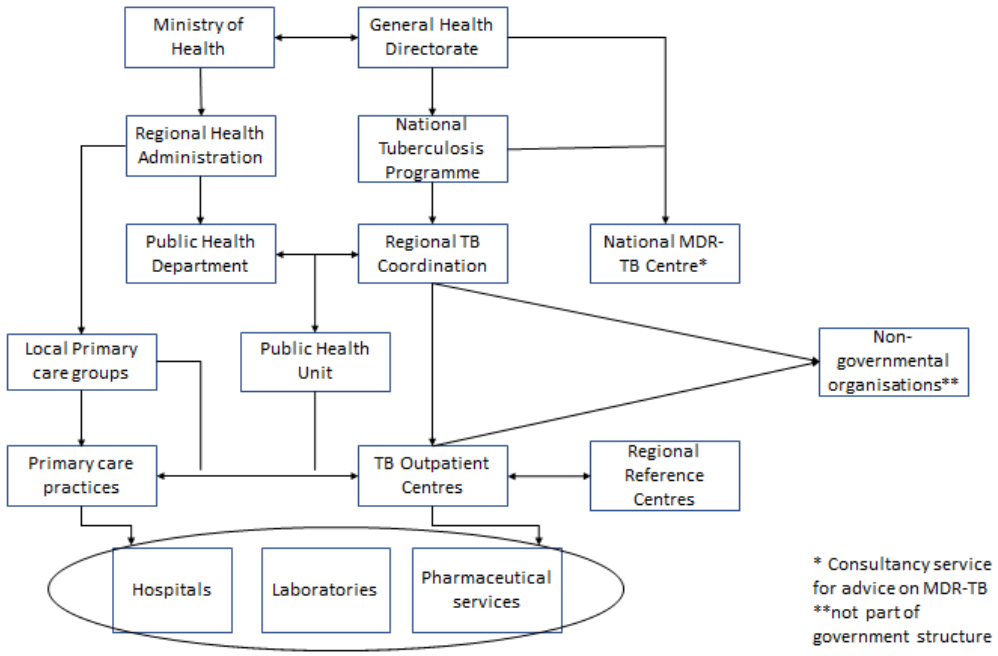
*Of the people with TBI, 31% was diagnosed in people with silicosis in both 2018 and 2019; the remaining 69% was diagnosed in people without silicosis.

Annex 1 provides more details on the current TB situation of vulnerable populations.

2.3. Organisation of tuberculosis services

The NTP is a programme of the General Health Directorate within the Ministry of Health (MoH) (Figure 5); TB is among the priority programmes of the Directorate. The role of the NTP is to provide clinical guidance; protocols for prevention, screening, diagnosis, and treatment of TB; conduct and promote TB surveillance; and implement strategies for TB control and elimination.

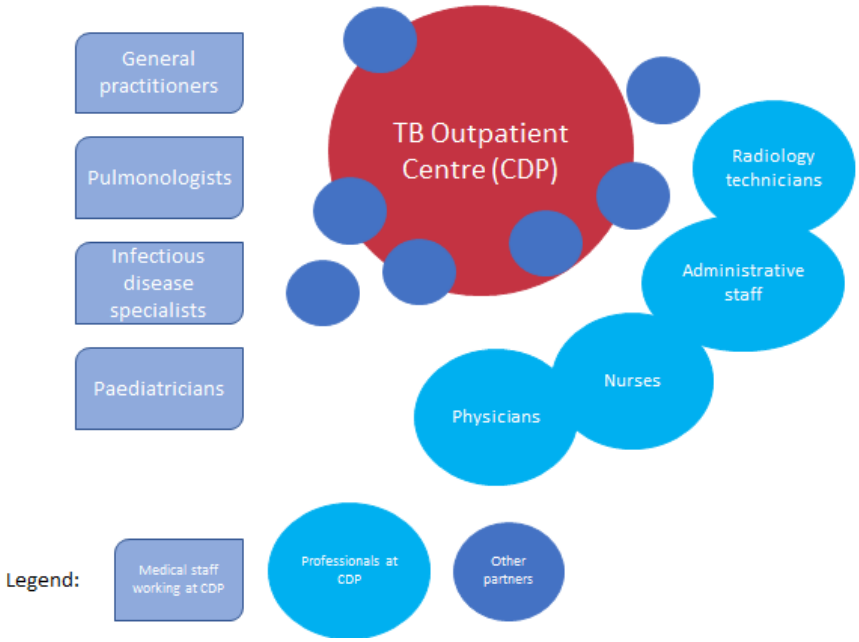
Figure 5. Structure of health and tuberculosis services in Portugal, 2021



MDR: multidrug-resistant tuberculosis; TB: tuberculosis.

The outpatient TB centres, *Centros de Diagnóstico Pneumológico* (CDP), are mostly integrated in the primary health care centres (Figure 6); although some are physically separated from these primary health care centres. People that need examination for TB and patients on TB treatment attend these outpatient TB centres for their care. Core staff are physicians, nurses and administrative staff; centres with radiology equipment also have radiology technicians. Physicians are often pulmonologists or general practitioners, and some centres have infectious disease specialists or paediatricians. Not all staff work full-time at the outpatient TB centres; they may have other clinical duties as well. Centre partners include for example, social and physiotherapy services, as well as other healthcare services such as hospitals and primary care. Annex 2 has more details on services for vulnerable populations.

Figure 6. Structure of the outpatient tuberculosis centres, Portugal, 2021



Based on the original version in Portuguese.

3. Current challenges

Successful implementation of TB interventions in Portugal has led to reducing notifications. Access to TB diagnosis and treatment is completely free for all patients, including documented and undocumented migrants. The coverage of TB services is well distributed across the country with a network of outpatient TB centres. However, several challenges identified during the assessment done in 2021 on TB care for vulnerable populations prevent successful provision of integrated services to vulnerable populations.

The main current challenges are as follows.

1. *TB occurs relatively more in vulnerable and hard-to-reach populations and these populations have longer diagnostic delay and poorer treatment outcomes compared to the general population.*

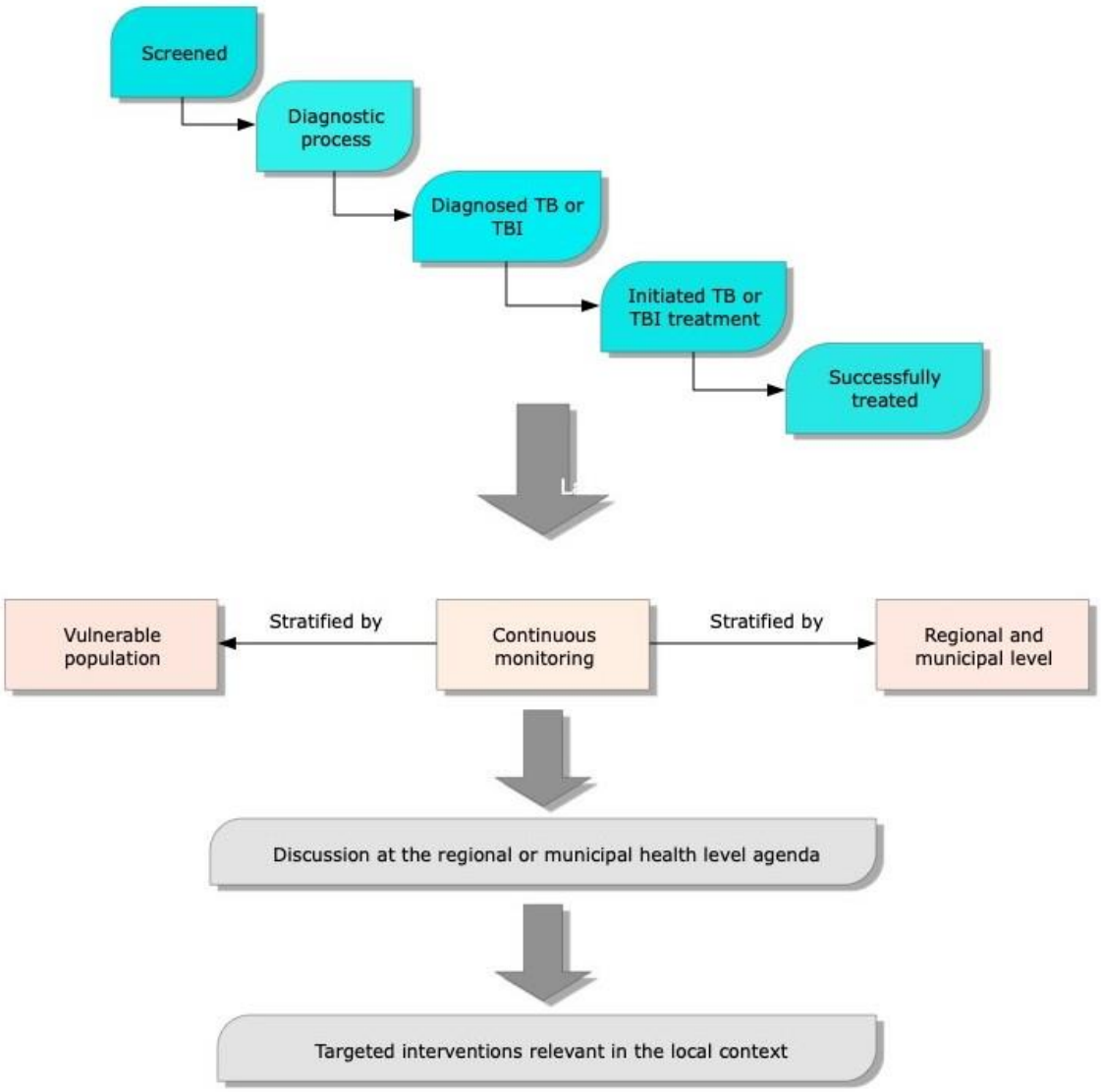
Country data show that many TB patients belong to socially vulnerable populations such as PLHIV, migrants, people who are homeless, people who use alcohol and/or drugs and, especially in the northern part of Portugal, people currently/formerly working in stone quarries. As people within these populations may not prioritise seeking health care and often face difficulties of accessing care, TB disease may go undetected for considerable time. Together with poorer treatment outcomes for vulnerable populations once diagnosed, the diagnostic delay may contribute to ongoing transmission both within vulnerable populations as well as in the broader society.

An assessment of national strategies in EU and European Economic Area (EEA) countries including Portugal revealed that reaching vulnerable groups was considered a priority action by 80% of respondents [10]. The same assessment also identified unmet TB care needs related to diagnosis and treatment for such groups, which was highest in undocumented migrants [10]. The MoH in Portugal has also identified the need to provide integrated services to vulnerable populations,5 but has not yet achieved this integration completely.

2. *Coverage of TB care for vulnerable populations is not sufficiently systematic across the care pathway. In addition, the current focus is on TB disease, with opportunities to prevent TB through diagnosis and treatment of TBI not optimally used.*

While there are many TB screening activities in Portugal, there is no systematic screening of vulnerable populations across the range from exposure to infection and disease apart from PLHIV. Furthermore, screening for TBI in Portugal is limited to contacts of TB patients, PLHIV and people with certain medical conditions. It is also not possible to systematically assess the coverage through the TB cascade (Figure 7) within specific vulnerable populations because the data cannot be disaggregated by vulnerable population. Cascade of care data are crucial to analyse gaps in service delivery and to assess effectiveness and efficiency.

Figure 7. Tuberculosis cascade, Portugal, 2021



TB: tuberculosis; TBI: tuberculosis infection.

Another challenge is the monitoring of TB service coverage because of lack of data on the size of the population, although organisations providing services may have estimates based on the services they provide.

People who enter Portugal as refugees have mandatory screening for TB and TBI prior to arrival. The migration centres organise the TB screening at the outpatient TB centres or with mobile X-ray units for asylum seekers reporting to these centres. However, other people migrating to Portugal, for example those coming for medical or study purposes, do not undergo entrance screening for either TB or TBI. This group has free access to primary care services who should do TB screening; however, this TB screening depends on the actions of both the individual and provider. Screening coverage cannot be assessed because of lack of data on how many migrants were eligible for screening and how many completed it.

3. *Data use for decision making and developing targeted interventions for vulnerable populations, especially at the sub-national level, is sub-optimal.*

SVIG-TB, a non-automated TB-only surveillance system, together with a broader, web-based system for all notifiable infectious diseases, forms the basis for the annual surveillance reports published by NTP. These reports cover trends in TB notifications, include analysis of TB patient demographic data, and provide information on social and medical characteristics of patients. Furthermore, the reports include information on treatment outcomes and medical use, as well as actions for the immediate future. The North region and the Tagus and Lisbon region publish similar reports annually. However, continuous monitoring of the TB situation stratified by vulnerable population at the regional and municipal level (Figure 7) is limited and not real-time. This limits the possibility of timely adaptation of interventions. In addition, gaps in TB care provision, as identified by data analysis, is not fully discussed at each regional and municipal health level, preventing a local approach to the development of targeted interventions relevant to the local context.

Furthermore, in terms of TBI, SVIG-TB only includes data for people initiated on TPT and not those who test negatively or do not start TPT; this prevents a full cascade of care analysis of TBI.

4. *There is insufficient funding and continuity of funding to sustain longer term TB care activities in vulnerable populations.*

Currently, NGOs providing services for vulnerable populations receive short-term funding only. The NGOs providing services for people who use alcohol or drugs, people who are often also homeless, receive money from the General Directorate for Intervention on Addictive Behaviours and Dependencies (*Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências*, SICAD); however, this budget covers only 80% of their funding needs.

Another challenge is the process through which NGOs can receive funding via the NTP. The allocation of this funding occurs through an application process that only the larger NGOs with staff who have the necessary skills for application writing apply to. This means that new or smaller organisations have difficulty accessing such funding and that only a limited number of NGOs end up providing these services.

Both the SICAD funding for NGOs serving vulnerable populations and the NTP funding for NGOs providing TB services are usually for the period of 1 year. The 1-year funding allocation poses risks for continuation of services and particular challenges for those working with vulnerable populations as building relations and trust with beneficiaries, many of whom need long-term services, takes time. In other words, the lack of financial support and uncertainty of longer-term funding threatens the continuity of care provided for groups for whom such is crucial.

5. *Fragmented staffing at the national level prevents a concentrated effort and coordinate and implement targeted interventions.*

All technical staff working within the NTP perform their duties part-time addition to other duties, for example as clinicians. While many clinicians would be reluctant to take up a full-time post in the NTP [8] and while combining duties has benefits in the sense that staff are well aware what is happening in clinical care, fragmented staffing hinders NTP to achieve its goals. Integrated care for vulnerable populations requires a more concentrated effort than currently in place to develop targeted interventions, coordinate with stakeholders and monitor implementation.

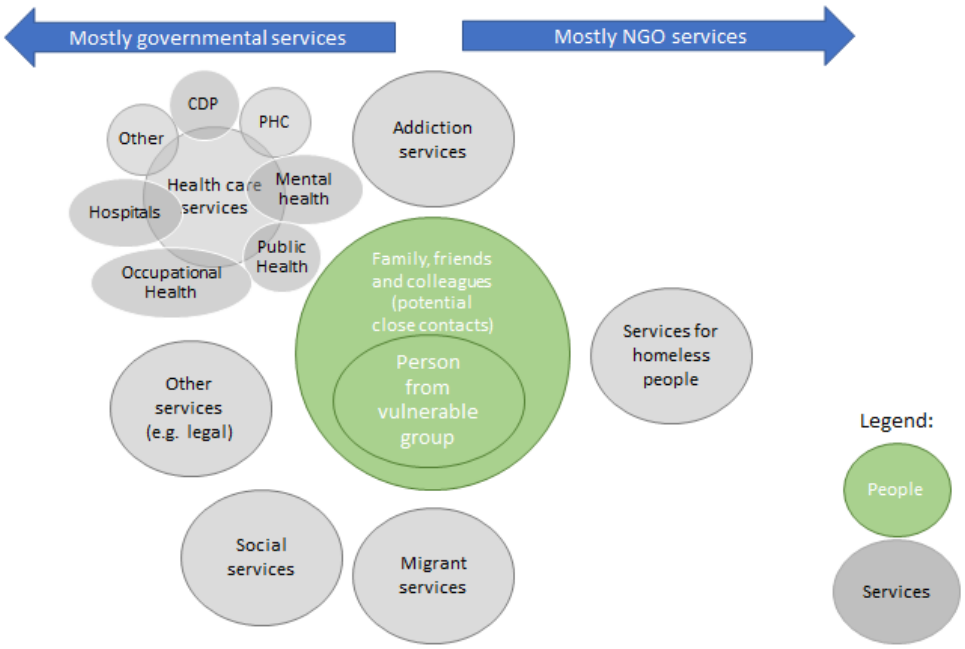
4. Theoretical framework for the roadmap

This roadmap of integrated TB care for vulnerable populations has a people-centred approach and uses the person- and provider-initiated TB care pathways.

A people-centred approach (also called patient-centred or person-centred approach) to TB care is part of the first pillar of the End TB strategy [11]. While no universal definition is available, people-centred care focuses on the person rather than on the disease, and takes into account the person's needs. Vulnerable populations often have multiple needs that often go beyond what health care services address; integrating services helps to address the various needs together [7].

Placing a person at the centre of the care approach is essential for optimal care (Figure 8). Individuals' social network of family, friends and colleagues should be included in care where relevant.

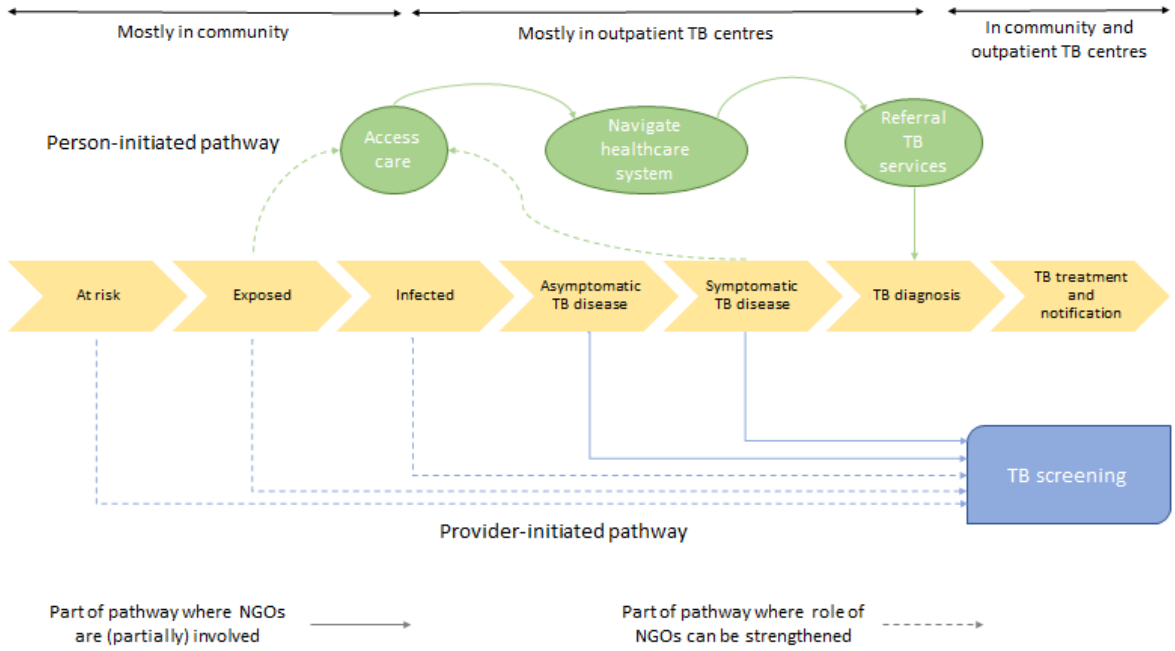
Figure 8. People-centred approach to tuberculosis care in Portugal, 2021



CDP: outpatient TB centre; NGO: Non-governmental organisations; PHC: primary health care.

The people-centred approach focuses on the individual, who may enter the TB care pathway through her own initiative for example because of symptoms. Alternatively, providers can approach people for TB care activities such as screening for active disease of TBI. Figure 9 demonstrates these pathways and indicate where NGOs are currently active.

Figure 9. Person and provider-initiated tuberculosis care pathways, and current and potential engagements of NGOs in Portugal, 2021



NGO: Non-governmental organisations; TB: tuberculosis.

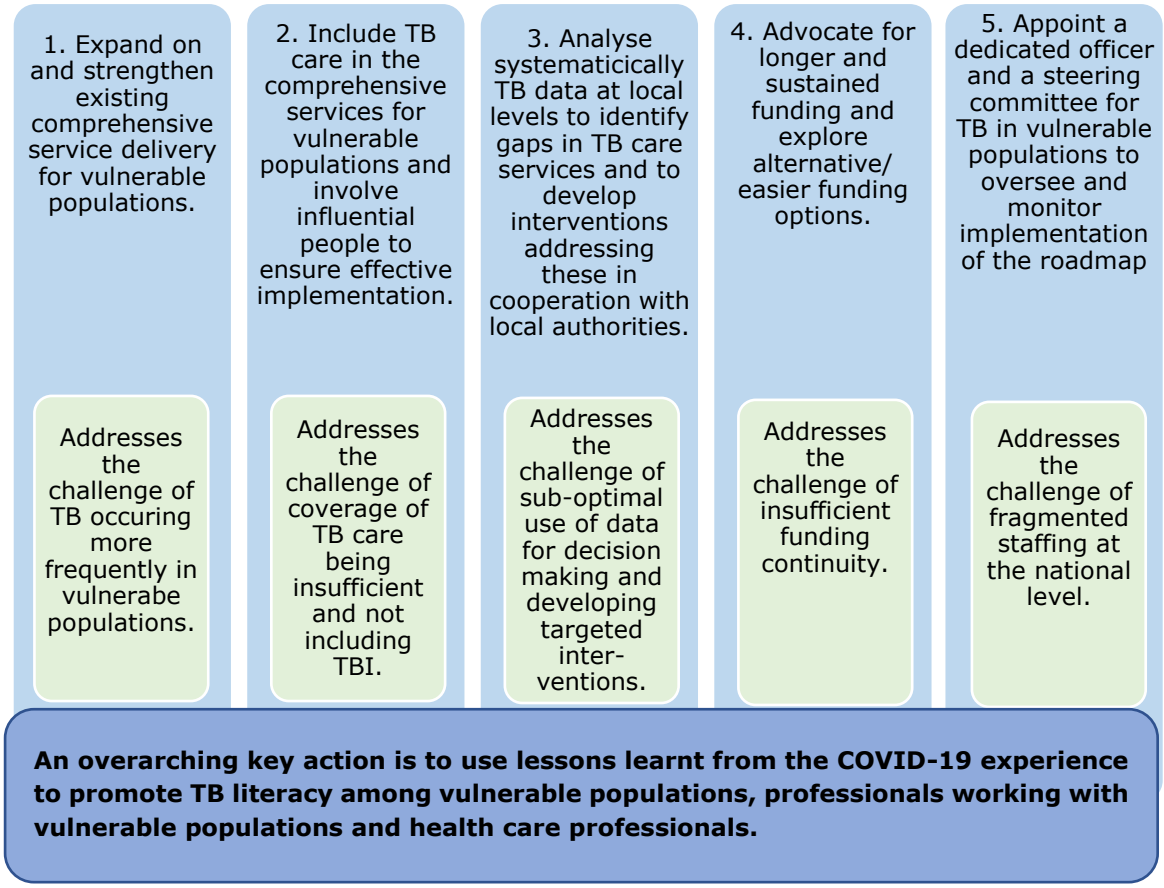
Adapted from World Health Organisation (WHO), WHO operational handbook on tuberculosis. Module 2: screening - systematic screening for tuberculosis disease, 2021 [12].

The General Directorate of Health and NTP consider the involvement of NGOs important and crucial for further improving TB care because NGOs already work with and provide services to vulnerable populations, some of whom are hard to reach. The role of NGOs in both the person- and the provider-initiated pathway is supportive if the person wants support. Support can be provided at the stages of care seeking, e.g. with accessing care, completing the diagnostic process, as well as treatment for those diagnosed with TB or TBI.

5. Roadmap: key actions to improve integrated tuberculosis services for vulnerable populations

The roadmap (Figure 10) presents the key actions that NTP and TB stakeholders could consider taking with the aim to improve integrated TB services into other services provided for vulnerable populations. The key actions build on existing opportunities and address the challenges described in section 3. Each key action is presented in more detail following the figure.

Figure 10. Overview of key actions to improve integrated tuberculosis services for vulnerable populations in Portugal



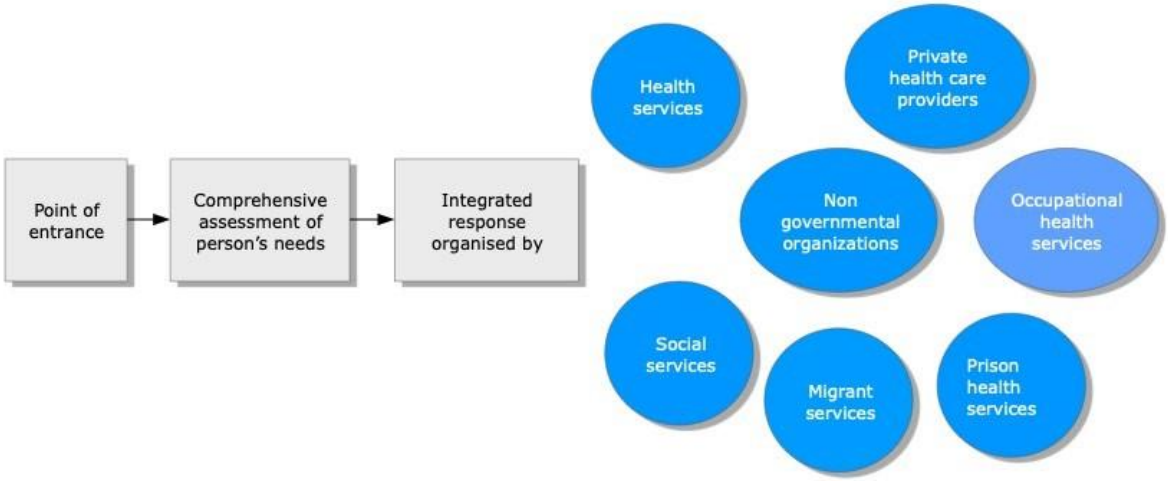
5.1. Key action 1: Expand on and strengthen existing comprehensive service delivery for vulnerable populations.

NTP together with NGOs could develop a document describing an integrated care approach with comprehensive service delivery for each of the following vulnerable populations: PLHIV, migrants, people who are homeless, people who use alcohol and/or drugs (including intravenously) and people currently or formerly working in stone quarries. The document should at the minimum clarify the roles and responsibilities for all stakeholders involved. This is especially important for NGOs and their cooperation with the various health, including public health, and other services. The services should include at least legal, medical and social services, and will thus have a multisectoral and multidisciplinary approach. Figure 9 details possible expansion of NGO involvement in TB care.

Whenever a person from a vulnerable population attends one of these service providers, called the point of entrance, a comprehensive assessment of this person's needs should

occur followed by offering comprehensive services organised for this person (Figure 11). In practice, this means that a person could present at social services, and the subsequent intake will include also legal, medical and other needs. Social services will then initiate the organisation of these services in cooperation with the individual. Where relevant, outreach services form part of the service delivery.

Figure 11. Possible process of comprehensive care delivery for vulnerable populations



Parts of such interventions already occur, and while free access of care is clearly documented, roles and responsibilities of the various stakeholders involved are less formally documented.

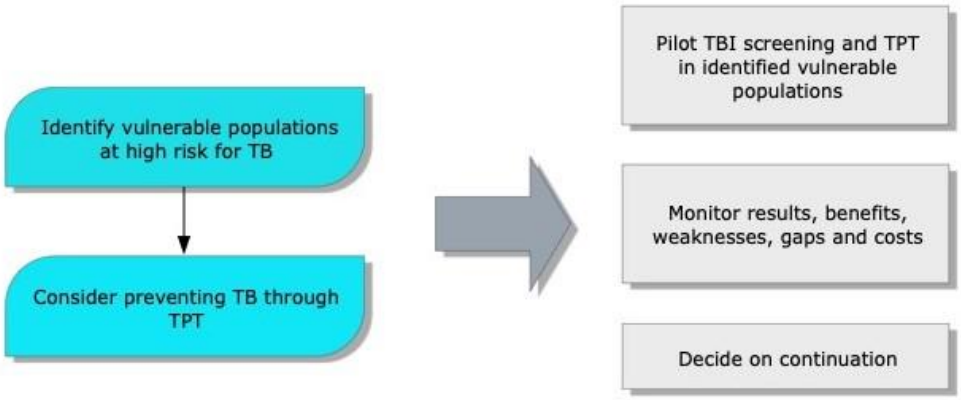
This key action builds upon the opportunity of NGOs already providing services, including outreach activities, using a people-centred approach and the service integration that already occurs in some parts of Portugal. For example, NGOs providing services in Lisbon and Porto for people who are homeless, people who use alcohol or drugs, and people in socially disadvantaged communities (*Não Vale* TB project in Vale do Sousa) include outreach services for people who are homeless and mobile services for people on opioid substitution therapy (OST). In Lisbon, the mobile OST services are integrated with TB screening using a mobile radiology unit at regular intervals. Outreach teams on the street also approach people who use alcohol or drugs to offer services and/or assistance to address their needs.

5.2. Key action 2: Include tuberculosis care in the comprehensive services for vulnerable populations and involve influential people to ensure effective implementation.

The document developed under key action 1 forms the basis for comprehensive service delivery, including TB care for each vulnerable population. NTP could assess for which vulnerable population, in addition to PLHIV who are currently already screened for TBI, screening for TBI and subsequent TPT is beneficial (Figure 12). Stone quarry workers with silicosis should have screening for TB and TBI in line with international recommendations [13]. TBI interventions for migrants, people who are homeless, and people with addictive behaviours might be beneficial and could be initially piloted. While some characteristics of vulnerable populations such as migration background, use of alcohol and injecting drug use are risk factors for not completing TBI treatment, experience with hepatitis C treatment in current or former injecting drug users shows that good treatment outcomes are possible, even in a population considered difficult to treat [14]. NTP should monitor the TBI pilots closely to assess effectiveness of the

interventions including weaknesses and gaps, and assess whether the additional benefits merit the additional resources needed. A decision on continuation or expansion of the activities should be based on these results [12].

Figure 12. Possible steps for tuberculosis infection screening in Portugal



TB: tuberculosis; TBI: tuberculosis infection; TPT: tuberculosis preventive therapy.

A possible model for a comprehensive approach are open-door health campaigns where members of the public, including vulnerable populations, can receive screening for diseases or conditions such as diabetes, hypertension and TB. Open-door campaigns reduce the effect of stigma because they do not carry the label TB and because they are open to all members of the public. Community leaders, peers and influential people in the vulnerable populations could disseminate information on the campaigns and encourage members of vulnerable populations to participate. Monitoring such a model is crucial and should take costs, effectiveness and efficiency as well as feasibility into consideration in the decision to continue the intervention.

This key action builds on the opportunity of already existing interventions regarding screening for TB disease and provides a foundation upon which screening and coverage could be further systematically applied in these populations. TBI screening could be added to this systematic screening if considered beneficial.

5.3. Key action 3: Analyse systematically tuberculosis data at local levels to identify gaps in TB care services and to develop interventions addressing these in cooperation with local authorities.

Local level TB staff at regional, district and municipality levels, could systematically analyse their TB data supported by NTP. In places with TB notification rates substantially higher than the national level, TB should be discussed at the local health levels to develop targeted TB interventions. For example, TB in Vale de Sousa is related to silicosis and poor social circumstances, and discussion at the local level is important to develop local interventions in cooperation with local partners such as the occupational health services.

Analysis of data is needed to inform decisions on continuation, expansion or discontinuation of interventions. Data analysis may show that it is not effective or efficient to continue an intervention. For example, this may occur when active case finding efforts have lowered TB notifications in a certain population to below national notification rates.

This key action builds on the opportunity of existing data availability, although they may not always be in an optimal format. For example, the two data systems in use, the web-based notifiable infectious disease system and the TB surveillance systems are currently not connected. The web-based system obliges clinicians and laboratories to fill out details at the time of considering a diagnosis, but much TB information comes only at the end of treatment. During the COVID-19 pandemic, Portugal developed a tool specifically for COVID-19 (TRACE-COVID) that has the advantage of real-time monitoring. This provides an opportunity to develop a similar integrated data system for TB.

To optimise cooperation with local authorities, NTP could expand or use a similar approach as the existing Fast Track Cities initiative, a global partnership addressing HIV-related challenges through multisectoral and integrated care approaches [15], to reach out to the cities and discuss each city's main determinants of TB.

5.4. Key action 4: Advocate for longer and sustained funding and explore alternative/easier funding options.

As continuity in service provision is essential for vulnerable populations, NTP and NGOs could advocate to those providing the current funding for sustained funding to ensure service provision for a longer period of time. Possibilities for sustained funding via easy funding extension processes where only new/adjusted targets are needed for organisations implementing interventions that work well could also be explored. In addition, both NTP and NGOs could consider exploring alternative funding options.

This key action builds on NGOs already being eligible to receive government funding to complement government services. Examples of this are the funding SICAD provides for NGOs working with people with addictive behaviours and dependencies. NTP also provides financial support to (new) NGO projects especially in the higher TB incidence regions, reinforcing the support for the most vulnerable. This funding mechanism could be strengthened by allowing funding to a broader group of NGOs and of longer duration if necessary.

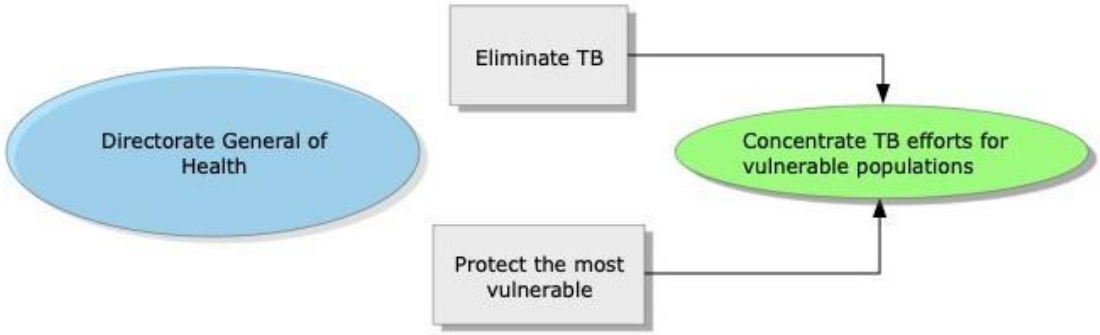
5.5. Key action 5: Appoint a dedicated officer and a steering committee for tuberculosis in vulnerable populations to oversee and monitor implementation of the roadmap.

The NTP should consider ensuring there is dedicated officer working full-time as focal point on TB care in vulnerable populations. This would include leading and coordinating the implementation of the key actions of this roadmap. Coordination on the integrated services for vulnerable populations would take place with the implementing NGOs and relevant government officials and services. The NTP should also consider establishing a working group in which stakeholders discuss actions and implementation; and a steering committee for TB in vulnerable populations that oversees, monitors, and reports on implementation of the roadmap to the Director General of Health. Members of the steering committee could come from relevant stakeholders and include people from affected vulnerable populations.

This key action builds on there being a political commitment for TB elimination efforts and protection of vulnerable people in Portugal (Figure 13), and capable NTP staff to support it. There is political commitment because the Directorate General of Health recognises TB as a priority disease and the Directorate is concerned about the stagnation

in reduction of TB notifications. It provides an impetus to act in a concerted effort to improve TB care within vulnerable populations.

Figure 13. Political commitment for tuberculosis elimination and protection of vulnerable populations in Portugal



5.6. Overarching key action: Use the COVID-19 experience to promote tuberculosis literacy among vulnerable populations, professionals working with vulnerable populations and health care professionals

This overarching key action supports all other actions and should ensure that TB remains known to vulnerable populations as well as relevant professionals, including health care professionals. The TB response could learn from the COVID-19 experience, particularly in terms of the rapid contact investigation response; the development of a surveillance system that allows real-time monitoring of COVID-19 patients; the rapid sharing of information on necessary measures with the public; and keeping health care professionals informed about the latest tests and diagnostic algorithms.

Furthermore, similar to the COVID-19 health literacy efforts aimed at the public and professionals, vulnerable populations need to know that access to TB diagnosis and treatment is free and health care workers need to know they can – and should – provide services to undocumented people in the country. NTP in cooperation with public health services and NGOs could take the lead in implementing this key action.

6. Roadmap: milestones and monitoring

This section presents possible milestones related to the key actions as well as how progress could be monitored (Table 3). The NTP could consider monitoring the implementation of the roadmap annually as part of the routine programme monitoring and reporting. Furthermore, the suggested steering committee could consider meeting at least once per year to discuss progress and provide recommendations for how to improve implementation.

Table 3. Possible milestones for monitoring implementation of the roadmap for integrated tuberculosis services for vulnerable populations, Portugal, 2021

		2022	2023	2024	2025	2026
Key action 1	Expand on and strengthen existing comprehensive service delivery for vulnerable populations.	Milestone 1: Document developed and approved (end-2022)				
Key action 2	Include TB care as part of comprehensive services for vulnerable populations and involve community leaders, peers and other influential people in the affected populations to ensure effective implementation.		Milestone 1: Comprehensive service delivery document including TB developed and approved	Milestone 2: Three open-door campaigns piloted and results analysed	Milestone 3: Successful interventions scaled up and results analysed	Milestone 4: Continue successful interventions and analyse results
Key action 3	Analyse TB data at sub-national and municipal level regularly to identify gaps in TB care services and to develop interventions to address these gaps in cooperation with local authorities.	Milestone 1: Regional data analysed and shared (mid-2022)	Milestone 2: Regional and municipal TB data discussed as a part of local health agendas in Lisbon and Porto (end-2023)	Milestone 3: Regional and municipal TB data discussed as a part of local health agendas in Lisbon, Porto and Vale de Sousa (end-2024)	Milestone 4: Regional and municipal TB data discussed as a part of local health agendas in Lisbon, Porto, Vale de Sousa and other municipalities with higher-than-national notification rates (end-2025)	Milestone 5: Regional and municipal TB data discussed as a part of local health agendas in all municipalities with higher-than-national notification rates (end-2026)
Key action 4	Advocate for longer and sustained funding for organisations to allow prolonged implementation and explore alternative/easier funding options.			Milestone 1: Pilot an easy funding extension process for two NGOs	Milestone 2: Pilot an easy funding extension process for another two NGOs and decide on way forward	Milestone 3: Have at least one alternative funding source
Key action 5	Appoint a dedicated officer and a steering committee for TB in vulnerable populations to oversee and monitor implementation of the roadmap.	Milestone 1: Officer appointed (end-2022) Milestone 2: Steering Committee established (end-2022)				
Overall		Milestone 1: Adopt the roadmap (mid-2022)		Milestone 2: First assessment of progress reported and shared (mid-2024)		Milestone 3: Second assessment of progress reported and shared (end-2026)

Annex 1. Current tuberculosis situation of vulnerable populations

This annex contains more details about the current TB situation for each of the populations addressed in this roadmap. This information arose from literature review and discussions with stakeholders.

1. *People living with HIV*

HIV incidence in Portugal has decreased since 2000; still, about 750 new infections occur annually in the country. TB is a disease that frequently occurs in PLHIV, and HIV diagnosis often results from the routine testing of TB patients for HIV [16]. The coverage of this routine testing among all TB patients was 85% in 2019; 9% were HIV-infected [5]. In Lisbon, the proportion of TB patients co-infected with HIV is higher than that nationally, while in Porto it is lower (Table 1, page 14). This is because of the concentration of migrants in Lisbon. The HIV-status of older people is often unknown [17]. A study in northern Portugal identified that TB patients living outside the city have an HIV test less often compared to those living in the city, which may be because of poorer access to care [18].
Several Portuguese studies identified PLHIV with TB at risk for unsuccessful treatment outcomes [19], including loss to follow up from treatment [20], more frequent hospitalisation [21], and more often having recurrent TB compared to the TB patients without HIV [22].

2. *Migrants*

Migration is becoming an important risk factor for TB in Portugal. In 2019, migrants had four times higher notification rates compared to the overall national notification rate and represented about a quarter of the TB cases [5], which is lower than the EU/EEA average of 35% [23]. An analysis of data from 2008 to 2014 suggested that migration did not affect notification rates significantly during this period [24]. However, the proportion of migrants with TB among all TB notifications in Portugal increased from 17% in 2015 to almost 28% in 2020 [6]. Most migrants with TB come from Lusophone countries with whom Portugal had long historical relations. While 14% of the foreign-born population with a legal residence status originated from Angola, Cape Verde, Guinee-Bissau, Mozambique and Sao Tomé e Principe in 2019 [25], migrants from these countries accounted for almost two-thirds of all TB in migrants that year, demonstrating a higher prevalence in the countries of origin [6]. A study analysing MDR-TB patients in Portugal from 2000 to 2014 showed that 93 out of 275 (35%) were born outside the country, of which, 76 out of 93 (82%) were born in African countries [26]. The study also found that alcohol use was a common risk factor among foreign-born MDR-TB patients.

Of the 454 migrants with TB in 2019, 276 (61%) were diagnosed in Lisbon and 67 (15%) in Setúbal [5]. The most frequent co-morbidity in migrants with TB is HIV, affecting 15% of migrants in 2018 and 2019. Alcohol use is the most frequent determinant of health affecting migrants with TB: around 7% of migrants with TB also used alcohol.

3. *People who are homeless*

Of all TB patients in 2020, around 1% were homeless and 3.5% lived in social residences. While this is not a large population, it is a population of concern because of higher risk of TB disease [27] and higher risk of poor treatment outcomes [19,20]. In addition, the delay in diagnosing TB in the homeless population is much longer; 124 days compared to 79 days overall in 2020. Of the delay in people who are homeless, 80% is because of persons presenting late to the health services [6]. The delay in 2020 was much higher than in 2019, which was 76 days, and may have been caused by the

COVID-19 pandemic. While people who want to stay in temporarily accommodation need to be screened within 3 days of admission [8], there is no data is available on how many people were screened and the yield of the screening.

4. *People who use alcohol and/or drugs*

People dependent on substances remain an important risk population for TB in Portugal. In 2020, approximately 10% of TB patients used alcohol and 3% injected drugs. These proportions have remained stable in recent years. The proportion of TB patients who have other drug addictions decreased in the last 3 years, from 5.8% in 2018 to 3% in 2020 [6]. Portugal conducted several studies demonstrating that people using alcohol or drugs are at risk of poor TB treatment outcomes [20]. In urban areas, several risk factors such as homelessness, poverty and addiction contribute to poorer treatment outcomes. A project in Vila Nova de Gaia, a city neighbouring Porto, provides services for a small population of drug users, mostly male and mostly Portuguese born. The project identifies about one person with TB per year through annual symptoms and CXR screening. About 5 years ago, this was often more than 10 people with TB annually [8].

5. *People currently/formerly working in stone quarries*

The sub-regional TB data covering 2015 to 2019 show that the towns with the highest notification rates are two in the north: Marco de Canaveses and Penafiel. Both are located in Vale de Sousa, part of Porto district. Notification rates in these areas are 67 and 65 per 100,000, respectively, almost four times the national rate. Silica exposure is a well-known risk factor for TB [28], and stone quarries form an important part of the economic activity in Vale de Sousa [29]. A study analysing all silicosis related TB patients from 1999 to 2012 revealed that all these patients lived in the north of Portugal, were almost exclusively male, and had longer treatment duration and higher death rates [30].

Silicosis notification rates in Penafiel in 2012 was 85 per 100,000 compared to 2.4 per 100,000 for the northern region in Portugal. Silicosis-related TB accounted for 8.5% in Penafiel versus 0.8% in northern Portugal. These data suggest that silicosis is an important risk factor in Vale de Sousa, although it may not explain fully the high notification rates. High alcohol consumption in combination with fewer TB outpatient centres serving the population may also be contributing factors.

Annex 2. Services for vulnerable populations

This annex contains more details on services available for vulnerable populations. This information arose from literature review and discussions with stakeholders

1. Services for people living with HIV

The national HIV programme is also under the General Health Directorate and like TB is a health priority programme. One of the programme's main focus areas is prevention provided by health care services and NGOs, especially for PLHIV who use drugs. In addition to needle and syringe programmes, services for PLHIV include self- and community-based testing; treatment with ART for all PLHIV; social support; and stigma and discrimination reduction through the addressing of human rights. NGOs partner with the government in the delivery of some of these services.

2. Services for migrants

The High Commission for Migration is the national policy making body that supports national and local reception centres for migrants. These centres provide accommodation and assist migrants with legal and cultural aspects of integration. The assistance includes information on access to health care for both documented and undocumented migrants. Refugees usually undergo TB screening prior to arrival in the country; for other migrants screening for TB is not mandatory. Those reporting to migration centres have TB screening organised by the centres, and for the remaining migrants, the intention is to have the them connected soon after arrival to primary health care services where screening with symptoms and CXR should occur.

3. Services for people who are homeless

Services for people who are homeless are provided by NGOs. The services consist of outreach teams who approach people on the street and offer access to health care, legal or social services among others. Several NGOs also provide residential care for up to 6 months, and during that time, people work together with the staff on addressing their housing, employment and health.

4. Services for people who use alcohol/drugs (including intravenously)

The foundation of the service structure for these populations are the primary health care services and secondary specialised care services at integrated response centres. All the services for people with addictive behaviours are part of a referral/cooperation network and people who use alcohol or drugs can access any of these services. Third level services include public and private detoxification units and therapeutic communities.

SICAD of the MoH develops policies on addressing addictive behaviours and provides funding to NGOs working with this population. Together with NTP, SICAD has established protocols to ensure screening for TB for people entering residential care.

The National Viral Hepatitis Programme, another health priority program, is testing actively for hepatitis B and C in injecting drug users. Portugal vaccinates teenagers against hepatitis B and offers vaccination and hepatitis B treatment to migrants, prisoners and people using drugs if necessary [6]. The majority of hepatitis C patients are current or former injecting drug users: 80-85% of this population is infected with hepatitis C [6]. Those infected receive treatment and have over 95% cure rates. NGOs play an important role in the diagnosis of hepatitis C by bringing people for testing. They also help people to adhere to treatment for any illness they may have.

5. Services for people working in stone quarries

The country noticed 3.5 times higher notification rates in two districts, Marco de Canaveses and Penafiel, compared to the national rate. Many stone quarries operate in these areas and silicosis is recognised as an occupational disease. Stone quarry employers should pay for occupational services for their workers at the start of employment and annually while employed. These services should include a CXR examination for silicosis. But employers are not always aware of the need for CXRs and may not always pay for the correct package of occupational services. The Directorate General of Health is responsible for licensing and authorisation of external occupational health services. The National Work Authority responsibilities include controlling the application of health and safety legislation in the workplace.

Former or current employees of stone quarries are connected to primary health care services like all others. Family doctors, especially in this region are aware of the risk of TB if the patient has previously worked in the stone quarry.

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