Tuberculosis Epidemiological Review

Ukraine 2025

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Abbreviations

APC	Annual percent of change
ART	antiretroviral treatment
CAD	computer aided diagnostics
DST	drug susceptibility testing
EPT	Extrapulmonary tuberculosis
FLD	first-line TB drugs
GDP	gross domestic product
HIV	human immunodeficiency virus
IS SSD	Information system of Socially Significant Diseases
LTBI	latent TB infection
LPA	line probe assay
MDC	medical death certificate
MDR-TB	multidrug-resistant tuberculosis
MTB	Mycobacteria tuberculosis
M&E	monitoring and evaluation
NBS	National bureau of statistics
N&R	new and recurrent
NRL	National reference laboratory
NTP	National tuberculosis programme
OOP	out-of-pocket
PAF	population attributable fraction
PHC	primary health care
PIN	personal identification number
PLHIV	people living with HIV
PTB	pulmonary tuberculosis
R&R	recording and reporting
RR-TB	rifampicin-resistant tuberculosis
S&B	standards and benchmarks
SLD	second-line TB drugs
TB	tuberculosis
TPT	TB preventive treatment
TSR	Treatment success rate
U5	under 5 years of age
UI	uncertainty interval
UNZR	unique registration number in the Unified State Demographic Register (унікальний номер запису в Єдиному державному демографічному реєстрі- **УНЗР**)
USDGR	Unified State Demographic Register (Єдиний державний демографічний реєстр)
VRS	vital registration system
WHO	World Health Organization
XDR-TB	Extensively drug-resistant tuberculosis

Summary

To tackle the public health threats posed by tuberculosis (TB) and HIV infection, the WHO Regional Office for Europe monitors trends in TB, TB/HIV coinfection, and drug-resistant TB and supports Member States in strengthening surveillance systems by promoting the analysis, dissemination, and use of related health data and strategic information. The TB epidemiological reviews are part of priority studies and aim to provide necessary background information to help understand the burden of TB disease and the characteristics of the TB epidemic in the country. WHO/Europe received a request from the Ministry of Health of Ukraine to conduct a thorough review of the TB epidemiological situation in the country by assessing the available surveillance, survey, programmatic, and other data. TB Epi-review has been conducted in August 2025 ahead of comprehensive external evaluation of National Tuberculosis Response program for period 2023-2024, to inform the mission as well as to feed into an update of the National Action Plan for TB and prepare new Funding Request to Global Fund for post 2026 period.

Current report provides an up-to-date assessment of TB epidemic in Ukraine and progress in prevention, diagnosis and treatment of the disease at national and regional levels. This is done in the context of national and regional and global TB action plan strategies and targets. Data are based primarily on data reported by national surveillance system, reported by national reference laboratory and global TB database.

It is essential to acknowledge that this epidemiological review is subject to significant limitations, primarily due to uncertainties in the underlying population at both national and regional levels. Factors such as mass displacement, migration, and war-related fatalities have rendered denominator estimates (total population) unreliable, thereby complicating the calculation of rates. Furthermore, the absence of a dependable vital registration system as a consequence of ongoing war presents additional challenges. Lastly, routine surveillance data from annexed areas and war-affected zones were unavailable.

The purpose of the tuberculosis epidemiological review in Ukraine was to assess the quality and coverage of routine tuberculosis surveillance and vital registration (VR) and to investigate the plausible drivers of the TB epidemic in the country.

Ukraine was among the first countries in the region to implement and effectively operate a case-based, real-time national electronic surveillance system, generating consistent and reliable surveillance data along with robust human resource capacity. From 2015 to 2019, Ukraine achieved an average annual decline of 4% in TB incidence. However, the disruption of health services due to the COVID-19 pandemic in 2020-2021, followed by the Russian invasion commencing in February 2022, significantly impacted the TB system—interrupting treatment continuity and impeding diagnosis and care, especially within war-affected zones—thereby reversing progress made over previous decades. Despite the numerous challenges posed by ongoing war, Ukraine's surveillance system continues to demonstrate strong programmatic performance. Key achievements include near-universal access to GeneXpert and HIV testing, and comprehensive second-line drug susceptibility testing among individuals diagnosed with RR-TB. Additionally, performance indicators that were previously suboptimal, such as bacteriological confirmation and treatment success rates among patients treated for RR-TB and pre-XDR/XDR TB, have shown improvement. There has also been an increase in preventive TB treatment for close household contacts of PLHIV and greater ART coverage among those with TB/HIV co-infection.

Case definitions in Ukraine are generally consistent with WHO recommended guidelines. Data quality assurance procedures are applied throughout all stages of data processing and at every level. All detected TB cases, including MDR/RR-TB, those diagnosed within the private sector or penitentiary system, identified post-mortem, as well as individuals who did not present after diagnosis or declined treatment, are reported. Since start of the war in 2022 mortality data from the system are not published. Analysis of surveillance data against WHO standards and benchmarks indicates that surveillance system in Ukraine is lack sufficient robustness to provide accurate and reliable information related to size of people diagnosed with TB in the country. In particular, individuals—especially children—who receive treatment exclusively at tertiary care facilities throughout the course of their therapy are at elevated risk of being omitted from the surveillance system, resulting in under-notification. TB surveillance system is not strong enough to diagnose all TB cases in the country. Due to restricted access to healthcare, many individuals with TB remain undiagnosed or experience significant delays

in diagnosis, leading to ongoing transmission within the population. Certain regions report an unacceptably high proportion of confirmed cases among individuals with presumptive TB. Additionally, some areas demonstrate low testing rates per capita alongside high positivity rates, indicating under-detection of TB cases. Consequently, TB notification levels in Ukraine cannot be regarded as reliable proxies for TB incidence due to both potential under-notification and under-detection. Overall, of the 16 WHO standards for TB surveillance that were assessed, 9 were met and 5 were partially met and only 2 were not met (Annex 1).

In 2024 there were an estimated 33,000 (95% uncertainty interval [UI]: 26,000-40,000) incident TB patients in Ukraine, equivalent to 86 (95% UI: 68-106) cases per 100,000 population. As of 2024, the incidence of tuberculosis in Ukraine has decreased by only 20.4% compared to 2015 levels, suggesting that the country is unlikely to achieve the End TB Strategy milestone of a 50% reduction in TB incidence by 2025 relative to 2015.

TB caused an estimated 4,200 deaths (95%UI: 3,600-4,800) in 2024 in the Ukraine, including 1,600 deaths (95%UI: 1,100-2,300) among people with HIV. The reduction of TB mortality slowed significantly after COVID 19 pandemic. Cumulative reduction of number of TB death between 2015 and 2024 is 53% against 75% reduction by 2025 targeted by End TB strategy.

A total of 18,311 people were reported as newly diagnosed with TB in 2024 in Ukraine, down from 20,058 in 2023. The gap between estimated and notified cases widened resulting to only 56% case detection in 2024.

According to routine surveillance, in 2024 in total 2,770 PLHIV were detected among those diagnosed with new episode of TB, down from 3.501 reported in 2023. This is about two times lower compared to 2019 data. Expressed as percentage TB/HIV co-infection declined from 23.0% in 2019 to 15.3% in 2024.

In 2024 in total 3,300 people were diagnosed with MDR/RR-TB. In 2024, the proportion of RR/MDR TB among people diagnosed with new pulmonary TB was 22.1%, representing a notable decrease from the pre-COVID-19 level of 27.2% in 2019. Similarly, the percentage of RR-TB among previously treated cases in 2024 was 32.2%, down from 42.9% in 2019.

The treatment success rate impressively improved among and RR/MDR-TB without FQ resistance (67%- 2022 cohort), pre-XDR/XDR-TB (68% - 2022 cohort), but remains low among drug-susceptible TB (77% in 2023 cohort).

Across region TB notification rates in 2024 varies in wide range. This variation only partially reflects the difference in true TB burden, as across all area proportion of bacteriologically confirmed among presumptive patients varies in wide range. In addition, there is large variation in per-capita testing rate across sub-national units indicating that there are some areas with limited access to diagnosis.

Ongoing war crisis is the key external factor affecting TB epidemiology affecting many direct and indirect aspects of TB epidemiology including population size, displacement, destruction of diagnostic health facilities, reduction of domestic financing, reduction of HIV case-findings etc. Some of the external indicators are slightly have been improved in Ukraine, which itself most likely positively affects the TB epidemiology. Those include health system strengthening (demonstrated by decrease in under-5 mortality), access to health care and universal health coverage (expressed by decline in proportion of out-of-pocket payment of total health expenditure (THE OOP), improved economic status (expressed by increase of GDP per capita), reduction of incarceration rate, increase of ART coverage among PLHIV, decline of smoking prevalence. Nevertheless, some of indicators that are known contributors to TB epidemic are persisting at a high level (high level of alcohol consumption, HIV incidence, diabetes), contributing sustaining TB transmission in the population.

Key recommendations

- Upgrade IS SSD TB module in line with new requirement of electronic surveillance system by streamlining with other systems through to receive and share the data. Establish automated connectivity solutions for all GeneXpert machines to avoid manual data entry and ensure fast data transmission. Implement personal identification numbers (unique registration number in the Unified

State Demographic Register UNZR)[1] and/or other unique identifier for linkage of data, to avoid duplicate entry and improve data quality. For this purpose, public health center might consider to promote the linkage of IS SSD with Unified State Demographic Register (Єдиний державний демографічний реєстр) as long-term solution.

- Expand the system to generate standard reports, and dashboards for key national indicators at regional and PHC level.
- Introduce case-based modules for laboratory results, contact tracing and TPT.
- Monitor closely the trend in number of people with presumptive people tested for GeneXpert and positivity of tests result among people with presumptive TB. Monitor closely positivity rate by testing sites to identify hotspots for focused interventions as well areas requiring additional support.
- Improve the accuracy of childhood TB surveillance, drug-resistance surveillance and TB/HIV surveillance.
- Undertake relevant measures to ensure that all people diagnosed with TB are included into surveillance system, especially those with elevated risk of under-notification including children, PLHIV, people with DR-TB.
- NTP staff to be trained on advanced data management.

[1] UNZR is a digital, immutable human identifier that helps to quickly and reliably establish an identity. It consists of a sequence of eight and five digits, which are separated by the "-" symbol. The first eight digits are the date of birth of the person in the format - year of birth, month and date. This is followed by a four-digit code from 0001 to 9999. The last digit is control and unique. The UNZR is unchanged throughout life (does not change in the event of a change of surname, name or any other information) - https://mvs.gov.ua/en/news/unikalnii-nomer-zapisu-v-jeddr-shho-ce-ta-de-sukati accessed on 12 September 2025

1. Introduction

Having a robust disease surveillance and response monitoring system is essential to collect reliable data from the Member States, measure the indicators and monitor the progress towards the Regional and Global targets. It is important to make sure that the data collected by the member states and reported to the WHO is fully compliant with all elements of the data quality. The TB epidemiological reviews are part of the priority studies and aim to provide necessary background information to help understand the burden of TB disease and the characteristics of the TB epidemic in the country. It also seeks to provide an overview of the TB surveillance system and Monitoring and Evaluation (M&E) activities and evaluate its compliance to the TB case definitions and reporting framework, and check if the surveillance standards and benchmarks are met at the country level.

First standard and benchmark assessment in Ukraine was conducted in late 2016. Current review aimed to assess the national surveillance system's ability to accurately measure TB incidence and TB deaths and identifying gaps in national surveillance systems that must be addressed in order to improve TB surveillance. The specific objectives of the review were:

- To describe and assess the current national TB surveillance and vital registration systems using the WHO checklist of standards and benchmarks
- To assess the progress made since the last S&B assessment conducted in 2019
- To assess the level of, and trends in, the TB disease burden (incidence, and mortality) using available surveillance, survey, programmatic and other data.

2. Methods

Methods of data collection included: (1) desk review of available TB control-related policy papers, manuals, guidelines and forms; (2) interviews and discussions with TB authorities and health care providers at national and district level; (3); review of electronic databases to assess the level of incompleteness of core variables, invalid entries, (4) analysis of notification/surveillance data over time and space to identify trends in disease burden and programmatic efforts.

Most of the TB related data were provided by Public Health Centre of MoH Ukraine. We used also WHO global tuberculosis database for the national level data analysis. In addition, other resources were utilized to obtain data on TB determinants such as AIDS Info, WHO Global Health Observatory, World Bank, UNICEF, databases. All data sources are presented in the text and footnotes.

The standard WHO-recommended assessment checklist and associated user guide, from "Standards and benchmarks for tuberculosis surveillance and vital registration systems",[2] were applied. For analysis and interpretation of the influence of TB predictors and external factors, guidance from the handbook "Understanding and using tuberculosis data"[3] were followed.

We used WHO population estimates for the calculation of per capita indicators at national level. To calculate the rates for subnational level data we used NTP provided. It is essential to acknowledge that this epidemiological review is subject to significant limitations, primarily due to uncertainties in the underlying population at both national and regional levels. Factors such as mass displacement, migration, and war-related fatalities have rendered denominator estimates (total population) unreliable, thereby complicating the calculation of rates. Furthermore, the absence of a dependable vital registration system as a consequence of ongoing war presents additional challenges. Lastly, routine surveillance data from annexed areas and war zones were unavailable.

[2] Web Annex B. Standards and benchmarks for tuberculosis surveillance and vital registration systems: checklist, 2nd edition. In: Consolidated guidance on tuberculosis data generation and use. Module 1: Tuberculosis surveillance. Geneva: World Health Organization; 2024. Licence: CC BY-NC-SA 3.0 IGO.

[3] WHO Global Task Force on TB Impact Measurement. "Understanding and using Tuberculosis data" WHO/HTM/TB/2014.09, Geneva: World Health Organization 2014, available from https://www.who.int/tb/publications/understanding_and_using_tb_data/en/

Analysis conducted includes plotting of annual data followed by visual observation; computation of slopes by linear regression to describe/compare the speed of change of various indicators; and ecological analysis of TB case notification rates and trend of external factors. Province-level data were mapped using Stata software to identify spatial patterns.

3. Results

3.1. Description of TB surveillance system

3.1.1. Structure

In Ukraine, the Ministry of Health (MoH) has the primary responsibility for TB control in the country implemented through the central unit of the NTP - the National Public Health Centre (NPHC), involving other government agencies, in collaboration with non-governmental organisations (NGOs) and international partners in the aspects of planning, implementation, and monitoring and evaluation (M&E). TB control interventions are delivered through a network of specialised facilities, TB laboratories, and primary health care (PHC) services.

TB care is provided through a vertically integrated system that operates at the national, regional (oblast), district, and PHC levels. Epidemiological surveillance of TB is organised through a system of standardised recording and reporting (R&R) of TB cases at two different administrative levels: regional and national. At the central level, two institutions are responsible for the TB surveillance system: Centre of Medical Statistics of the MoH of Ukraine and NPHC. At the regional level, TB services are managed by phthisiopulmonology centres operating in each oblast, which coordinate TB care and host clinical expert commissions responsible for the management of TB patients, with a particular focus on RR-TB.

Management of TB patients is performed exclusively by public health facilities. Diagnosis confirmation and initiation of TB treatment are carried out exclusively by specialized TB facilities at all levels. PHC providers are responsible for identifying presumptive TB cases through both active and passive screening, referring them to specialized TB services, and supporting treatment adherence and follow-up at the community level, in coordination with TB specialists.

According to the legislation of Ukraine, the detection of TB people infected with *Mycobacterium tuberculosis* is carried out by medical staff in accordance with the standard of medical care[4]. In the case of detection of a person with symptoms that may indicate TB, all health care providers are obliged to register and notify about the identified case in accordance with the Procedure for epidemiological surveillance of tuberculosis[5]. The diagnosis of TB is confirmed (not confirmed) at specialised anti–TB institutions (specialised structural subdivisions of healthcare institutions) of secondary/tertiary medical care. All TB cases are classified by case definition in accordance with the Criteria for determining cases of infectious and parasitic diseases that are subject to registration[6].

Epidemiological TB surveillance is organized through a standardized case-based recording and reporting system operating at three administrative levels: district, oblast (regional), and national.

3.1.2. Tools and quality assurance

The TB R&R system in Ukraine is both paper based and electronic. The legally required paper-based R&R system includes a set of medical cards, forms and registers listed in Table 1. Each of the R&R forms/registers is accompanied by detailed instructions on how to complete it.

[4] Law of Ukraine "On Combating Tuberculosis", Article 9, Part 1; https://xn--80aagahqwyibe8an.com/ukrajiny-zakony/zakon-ukrajini-pro-vnesennya-zmin-zakonu-2012-18976.html [accessed on 16 October 2025]

[5] Order of the Ministry of Health dated 03/09/2021 No. 406, registered in the Ministry of Justice on n May 11, 2021 under No. 622/36244 On approval of the Procedure for epidemiological surveillance of tuberculosis and changes to the criteria for determining cases of infectious and parasitic diseases that are subject to registration https://zakononline.com.ua/documents/show/496953__675109 [accessed on 01 November 2022]

[6] Order of the Ministry of Health dated December 28, 2015 No. 905, registered in the Ministry of Justice on March 12, 2016 year under No. 379/28509 https://zakononline.com.ua/documents/show/364759__664783#n13 [accessed on 01 November 2022]

Table 1. List of medical cards, forms and registers used for recording and reporting

TB Laboratory
TB 03 Referral for molecular genetic testing (# 200-1/o)
TB 03-1 Referral for microbiological examination (# 200-2/o)
TB 03 Referral for molecular genetic testing Xpert MTB-XDR (# 200-3/o)
TB 04 Laboratory TB register (# 252-1/o)
TB 04-1 Laboratory TB register (# 252-2/o)
TB 05 Description of biological material samples sent to the laboratory (# 240-1/o)
TB recording
F058 - Emergency notification of infectious disease, food, acute occupational poisoning, unusual reaction to vaccination
F089 - "Notification of a patient with a first-time diagnosis of active tuberculosis or its relapse"
TB 01 Individual medical card for tuberculosis treatment (# 081-1/o)
TB 01-1 TB risk groups (# 081-2/o)
TB 01-MDR-TB Individual medical card for MDR-TB treatment (# 081-3/o)
TB 02 TB register (# 060-1/o)
TB 02-MDR-TB treatment register for patients on second line drugs (# 060-2/o)
TB reporting
TB 06 Quarterly report on number of registered TB cases (F#8)
TB 07 Quarterly report on the results of microscopic, microbiological examinations, rapid tests (Xpert MTB/RIF)/ULTRA/LF - LAM) and DST for TB cases registered 3-6 months ago (F#8-3)
TB 08 Report on the treatment outcomes of TB patients registered 12 - 15 months ago (F# 8-1)
TB 09 Extract from inpatient or outpatient medical card (# 027-4/o)
TB 10 Quarterly report on sputum conversion in patients with pulmonary tuberculosis (F#8-2)
TB 06–MDR-TB Quarterly report on the number of Rif-TB/ MDR-TB/pre-XDR-TB/XDR-TB cases notified and treated with second-line drugs (F#4-2)
TB 07-MDR-TB Quarterly report on interim results of treatment of Rif-TB/ MDR-TB/pre-XDR-TB/XDR-TB cases (F#8-4)
TB 08.1 – MDR-TB Quarterly report on treatment outcomes of Rif-TB/XDR-TB/pre-XDR-TB/XDR-TB cases who started treatment 18 (20) months ago (F#8-6.1)
TB 08.2-MDR-TB Quarterly report on treatment outcomes of Rif-TB/ MDR-TB cases who started treatment 9 (11) months ago (F#8-6.2)
Annual report on tuberculosis patients (Form 33)

Once sputum is collected for examination, paper-based Referral for molecular genetic testing (TB 03) form is completed which accompanies a biological sample sent to a laboratory. Data from laboratory request forms are used to complete paper-based laboratory registers (TB 04).

Once a person is confirmed with TB, individual treatment card TB 01 is completed. Simultaneously, the TB case is registered on the paper TB register (TB 02 or TB 02 MDR-TB depending on type of TB) at the patient's actual place of residence and is assigned a serial number and entered into electronic surveillance system. In addition, for those individuals diagnosed by bacteriologically confirmed TB a form **No. 058/o** Emergency notification of infectious disease, food, acute occupational poisoning, unusual reaction to vaccination is completed within 12 hours and submitted to territorial public health institutions of MoH. In parallel, primary registration form No. 089/o "Notification of a patient with a first-time diagnosis of active tuberculosis or its relapse" is sent to relevant regional TB dispensary is sent within 3 days.

Digital recording and reporting of TB data

Electronic TB register - Informational System Socially Significant Diseases (IS SSD). The IS SSD is the main digital platform used for TB data collection, recording, and reporting in Ukraine, functioning as a web-based, real-time system that integrates four core modules: Cases, Laboratory, Analytics/Reporting, and Administration.

In 2022 Ukraine transited from e-TB manager to IS SSD and the TB component is a dedicated module in it. Data from eTB Manager that were collected since 2009 have been transferred to the new system. IS SSD is designed to create a unified repository of data on epidemiological surveillance of tuberculosis, HIV, and hepatitis C, medical surveillance, as well as information support for monitoring and evaluation, procurement planning, accounting, and control movement of medicines and medical products. Data is entered via a web-based interface, coming from paper-based TB recording cards, forms and registers at the district, hospital, regional and national levels.

The Case module within the IS SSD system captures detailed information on all confirmed TB cases, including those with DR-TB. Laboratory results, such as smear microscopy, Xpert MTB/RIF, culture, and drug susceptibility testing (DST), are entered by laboratory staff through the Laboratory module, and can only be recorded for confirmed TB cases. The treatment card (TB01), which documents daily TB drug intake, is fully integrated into the Case module, ensuring comprehensive tracking of patient treatment.

The Administration module includes three defined levels of access: User, Read-only, and Administrator. The User level is assigned to medical personnel (TB doctors, nurses, M&E specialists, laboratory staff and PHC providers), who have both read and edit rights within the system. The Read-only level is granted to medical personnel who require access to view data without the ability to modify it. The Administrator level is reserved for personnel responsible for managing user access rights and maintaining the system's data dictionary.

Reporting

Reporting of data is carried out by paper reporting forms related to notification, treatment outcomes, and performance (number of tests, positivity, number of people screened, detected, contacts investigated, TPT started and TPT completed). Reported data are aggregated at regional and national level. Submission of aggregated data from PHC to regional and from regional to national level is implemented using words format and excel sheets. Calculations for rates (notification, prevalence), proportions, cohort analysis for TB treatment are carried out manually by using an Excel spreadsheet by adding population sizes and the respective formulas.

Quality assurance

Quality assurance of data entered in IS SSD includes measures preventing errors during data entry through validation checks; cross-checking between electronic and paper-based systems during monitoring and evaluation (M&E) visits performed at national and regional levels; and validation of statistical data carried out at all levels of care. IS SSD is enhanced with analytic tables, which allows to filtering data by the desired fields and validate the aggregated reported data with the data entered into electronic system.

Assurance at the data-entry level. The TB software IS SSD generates an identification number for each TB patient to prevent duplicate data entry. Some rules such as "must enter" or "not allowed" set up at the time of data entry. In addition, the software does not allow an empty form to be saved, and only numbers can be entered into numeric fields and only dates can be entered into date fields. There are set some cross-checking validations rules between fields, and the explanatory messages appear if the data entered in the field is incorrect or incomplete.

At the regional level, during the reporting period the M&E specialist export data from the IS SSD system into an Excel spreadsheet and verify whether the reported data generated by IS SSD corresponds with the information recorded in the TB registers. In cases where discrepancies are identified, the cross-checking filters are applied, and the entered data are corrected. If inconsistencies persist, the primary documents and registers are reviewed to enable dispensaries to correct any errors. In parallel, a similar validation process is conducted at the central level, where TB data are exported from the IS SSD system into Excel spreadsheets and filtered to verify the accuracy of the information entered into the system.

In conclusion, the quality assurance of data entered into the IS SSD can only be carried out using the standard functions of the database. There are no advanced control functions in the system that provide specific control elements in the field of TB (for example, a specialized software module for data entry control and completeness

of the information integrated into the system). Standard operating procedures for data quality assurance have not been developed.

Laboratory digital tools.

At the laboratory level, TB examination results are managed through multiple systems. In addition to the Laboratory module within the IS SSD system, laboratories have developed case-based electronic Excel registers (TB04) that include comprehensive data on TB examinations, which is adapted individually by each laboratory to meet its specific operational needs.

Laboratory results are also entered into hospital databases at the oblast level; however, these databases differ significantly between oblasts, and many lack the functionality to generate reports

Ukraine has implemented electronic tools such as GxAlert, a separate database that automatically records results from GeneXpert machines. Despite these efforts, TB laboratory reporting remains fragmented, relying on paper-based forms, customized Excel registers, and data extracted from hospital systems. Currently, there is no integrated electronic reporting system or interconnected Laboratory Information Management System (LIMS) capable of ensuring timely, complete, and high-quality transmission of test results between laboratories and healthcare facilities.

QuanTB[7]. is a downloadable desktop tool designed to enhance TB treatment procurement and supply planning. It functions as an electronic quantification and early warning system. NTP staff manually enter data into QuanTB, using information from IS SSD on TB cases and treatment regimens, as well as paper-based reports on TB drug consumption and stocks.

To maintain a comprehensive management system, the NTP has implemented additional TB-related digital applications:

- Video Support Treatment (VST) application. A three-tiered system with roles for administrators, doctors/nurses, and patients. The app, downloadable from Google Play, enables asynchronous video-data exchange authenticated by phone number and password. TB patients record their medication intake, which is reviewed by healthcare providers. VST was significantly scaled up in 2020 country-wide as a result of adaptation to the COVID-19 pandemic-related challenges in TB service provision.
- evriMed pillboxes for adherence monitoring of the RR-TB patients
- One Impact mobile application - to support community-based monitoring of the TB response

Digital platforms external to the NTP's systems

There are national databases for recording TB information but are not managed by the NTP.

A case-based application for surveillance, used at regional levels of the Regional Public Health Centres. It allows epidemiologists to collect urgent notifications (F058) at the district level and send them electronically to regional institutions for response (such as contact tracing) and analysis. It collects emergency notification forms for confirmed TB cases. For the collection of additional data related to contact tracing, some centres use Google Drive as a supplementary tool at the oblast level.

At the oblast level, hospital-based information systems are in place to manage data on all patients seeking medical care, including those presumptive or diagnosed with TB. These systems are structured to cover healthcare services from the district level down to primary care, with data centralized at the oblast level. The databases contain information on diagnostic examinations, including laboratory tests and x-ray. However, these databases are not integrated with the national IS SSD system and are not fully utilized for the management of presumptive or diagnosed TB cases. Moreover, the structure and functionality vary across oblasts, resulting in a lack of uniformity and limited interoperability.

Non-governmental organizations involved in the TB response maintain nominal databases that include information on TB patients, individuals from key risk groups, and beneficiaries of community-based services.

[7] https://msh.org/resources/quantb/

These databases are used to support the implementation of activities such as treatment monitoring, contact tracing, case reporting, and coordination of local interventions, complementing national electronic register.

3.1.3. Human resources, capacity-building plan, financial resources

The implementation and coordination of the TB program in Ukraine are led by the NPHC. Within its structure, the Monitoring and Evaluation (M&E) Department is directly responsible for overseeing the execution of NTP activities, that monitors program performance evaluates progress against national targets and ensures alignment with strategic priorities. The structure and functions of the M&E Department are defined by internal regulations of the NPHC[8], in accordance with the institutional framework approved by the Ministry of Health.

To support cross-sectoral implementation, the M&E Department collaborates with specialists from other units within the NPHC, including departments for finance, research, pharmaceutical management, and information technology. The core M&E team consists of four staff members: an epidemiologist, a data manager, a medical statistician, and the head of the department. Additional personnel from other departments of NOHC are engaged as needed to support specific tasks related to program implementation and evaluation.

Financing of M&E national staff is carried out partially from funds, which are allocated by the MoH and also from the Global Fund. The M&E staff provides overall policy guidance and coordination with regards to other components of the Programme, maintains official communications with international partners and acts as official country contact point within the European TB surveillance network established jointly by the WHO Regional Office for Europe and the European Centre for Disease Prevention. In the Centre of Medical Statistics of the MoH there is one full-time employee responsible for reporting on TB (Form #8 and Form #33).

At the regional level, according to the distribution of medical staff working in TB service M&E activities are carried out by 2-3 specialists of the organizational and methodological unit of the oblast TB hospital and at the district level is assigned to the district coordinators for TB (district TB doctors). It is important to note that there is no standardized or formalized M&E team structure at the oblast level. The organization and distribution of responsibilities vary significantly across regions, depending on available resources, institutional capacity, and local priorities.

M&E visits are primarily conducted from the national level to regional levels (oblasts, districts, PHC facilities), with at least one visit per year typically organized in each oblast. Given the current circumstances in Ukraine, some of these visits are conducted online, allowing continued oversight despite logistical constraints.

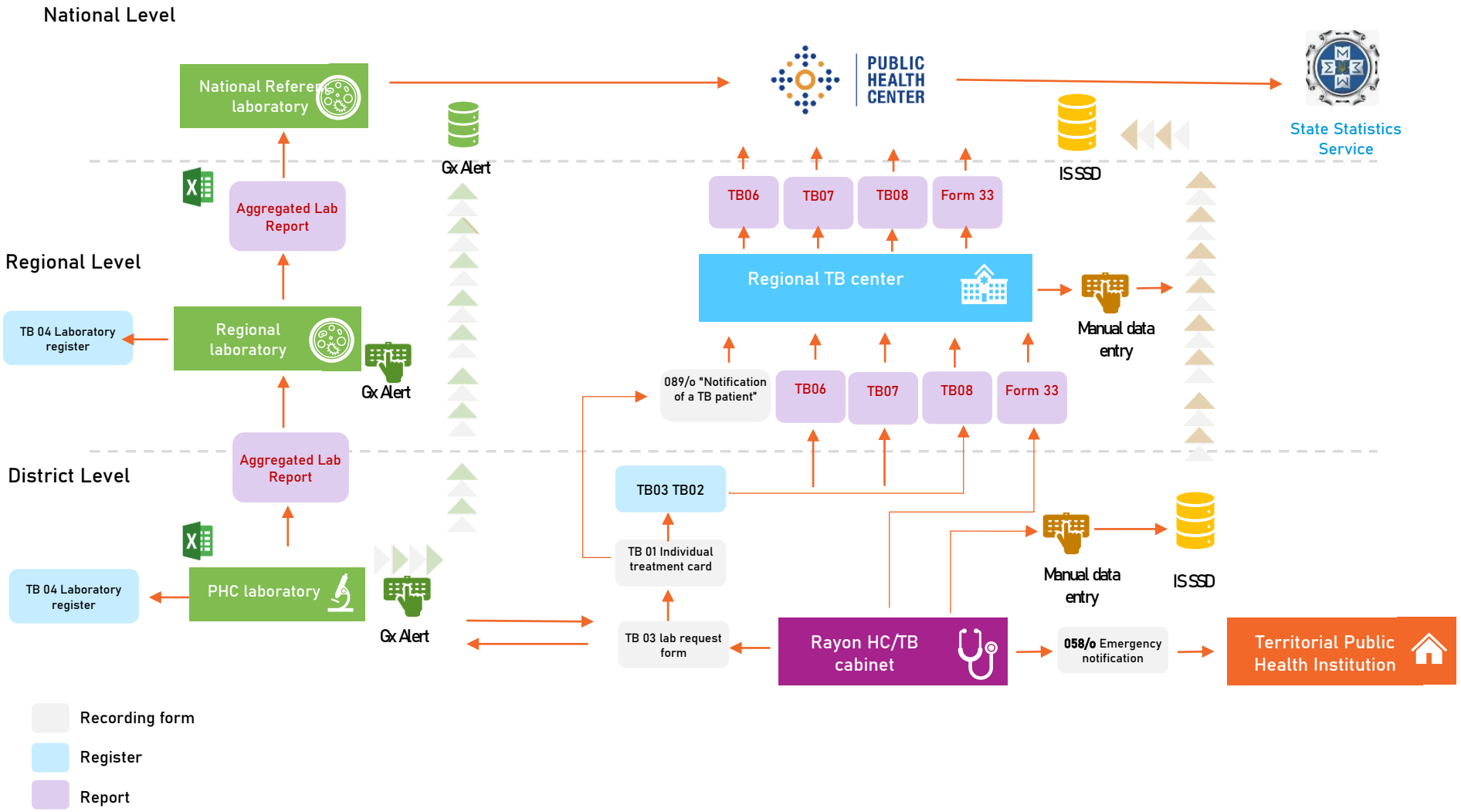
At the regional level (oblast), M&E visits to lower administrative levels (districts, PHC facilities) do occur; however, there is no standardized frequency for these activities. The organization and regularity of such visits vary significantly across oblasts. In many cases, coordination and supervision of activities are carried out remotely, often via telephone communication.

It is important to highlight that in some oblasts, collaborative agreements exist between PHC structures, oblast hospitals, and epidemiological services, aimed at supporting the implementation of TB program activities - agreements facilitate intersectoral cooperation and improve operational efficiency.

Nevertheless, there is no clearly defined or formalized structure for the organization and implementation of M&E activities at the oblast level. The approach to M&E remains fragmented and inconsistent, influenced by local capacities, available resources, and regional priorities.

[8] Статут Державної установи «Центр громадського здоров'я Міністерства охорони здоров'я України» (затверджено Наказом МОЗ України від 09.02.2024 № 224), https://phc.org.ua/sites/default/files/users/user90/PHC_statut_MOZ_nakaz_2024.02.09_224.pdf

Figure 1. Tuberculosis data recording tools and information flow



3.2. Description of vital registration system

Law[9] of Ukraine "On state registration of acts civil status acts" and rules[10] of state registration of civil status acts in Ukraine are the main directive legal framework related to death reporting, recording forms, timing, required documentation, responsible bodies and information flow.

The existing registration system involves the transfer of paper documents along a chain: a medical certificate of death from a healthcare institution to the state registration bodies of civil status acts, issuance a death certificate from the state registration bodies to the relatives and friends of the deceased, and transfer of paper documents from these bodies to the state statistics bodies.

When a person dies, a medical certificate of death (Медичне свідоцтво про смерть, Form No. 106/o) is issued by the doctor who treated the deceased, based on observations of the patient and records in the medical records that reflected the patient's condition before his death. If the death occurred outside a medical facility (at home, in public, etc.), the certificate can be issued by a pathologist, emergency doctor based on a study of the medical records and the results of the autopsy.

The medical certificate of death is drawn up in two copies: the first copy is issued to the relatives of the deceased or other persons who have committed to bury the deceased; the second copy remains at the healthcare facility and is stored for one year, after which it is subject to destruction. In rural settlements, where healthcare institutions in the event of medical doctor, a paramedic can issue a paramedic certificate of death. In the event of a violent death of a person or suspicion of such, or in the event of sudden death or under unclear circumstances, as well as when it is impossible to establish the identity, or in the event of the sudden death of children of the first year of life, a forensic medical expert is involved.

Information on civil status acts (death) is entered into the State Register of Civil Status Acts of Citizens (DRACS) - an electronic information system maintained by the departments of state registration of civil status acts. The holder of the State Register of Civil Status Acts of Citizens is the Ministry of Justice of Ukraine, and the administrator is the state enterprise "National Information Systems". The bodies carrying out state registration of civil status acts (including death) are departments of state registration of civil status acts; executive bodies of village, settlement and city councils, diplomatic missions and consular offices of Ukraine. An application for registration of death is submitted no later than three days from the date of death. After registration, the applicant receives an official Death Certificate (Свідоцтво про смерть).

For administrative purposes data is exchanged with National Health Service, Unified State Demographic Register, State Register of Individual Taxpayers, State Voter Register, Pension Fund and Ministory

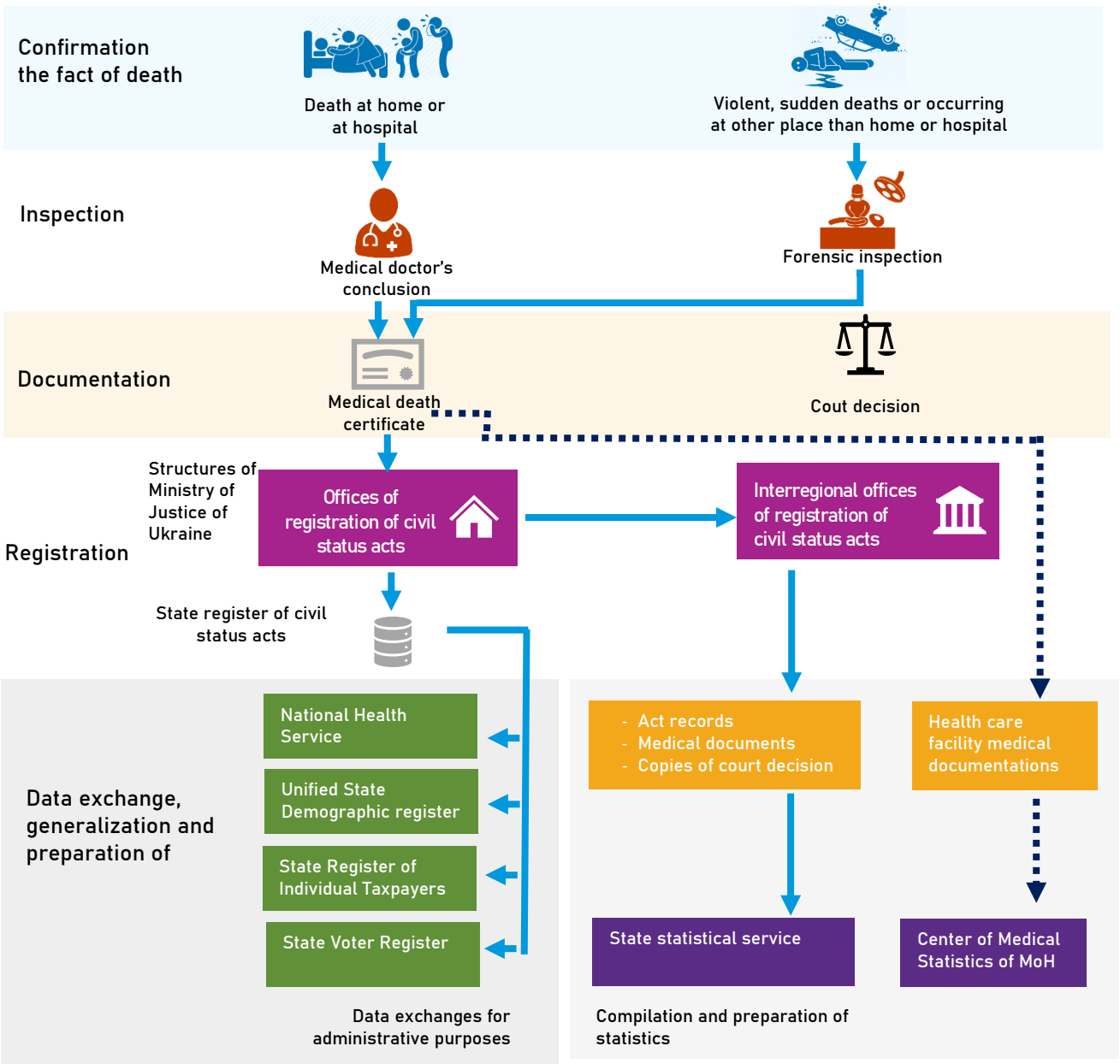
Publication of is carried out be two entities: State Statistic Services and State Enterprise "Medstat". Detailed mortality data are published annually in open statistical collections (available on the websites of the State Statistics Service and its regional departments). A significant part of the data is also available through the data bank "Population Statistics of Ukraine" (https://bit.ly/3Dypb5m), which provides the ability to generate tables and export data to files of various formats. Annual and monthly mortality data since 1989 are also available on the State Statistics Service website[11].

[9] Закон України Про державну реєстрацію актів цивільного стану https://zakon.rada.gov.ua/laws/show/2398-17 [accessed on 01 November 2022]

[10] MoJ order On the approval of the Rules for state registration of acts of civil status in Ukraine http://zakon2.rada.gov.ua/laws/show/z0719-00 [accessed on 01 November 2022]

[11] Український центр суспільних даних. Реєстрація та обмін даними щодо випадків та причин смерті Київ — 2022. https://socialdata.org.ua/death-registration-2022/ [Accessed on 01 September, 2025]

Figure 2. Diagram registration of death information and data exchange



Medical documentation of health facilities, which is used for medical statistical reporting is not limited to medical death certificates, but includes many other primary documentations, therefore in diagram this connection is shown by dotted line

Diagram is adapted from report "Реєстрація та обмін даними щодо випадків та причин смерті" Київ — 2022

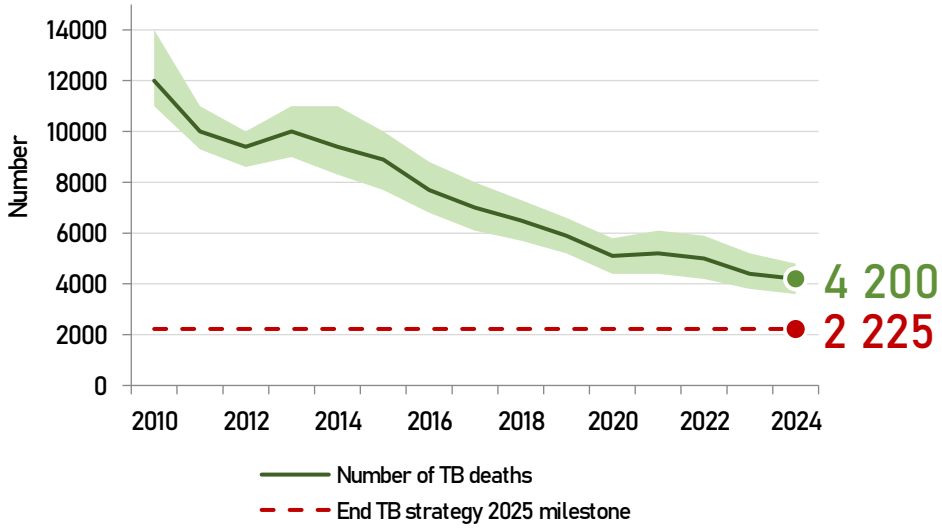
3.3. TB burden

3.3.1. Mortality

According to WHO estimates in 2024 in total 2,600 (range 2,500-2,700) people died from TB disease. Another 1,600 (range: 1,100-2,300) deaths occurred among people with TB/HIV co-infection, resulting 4,200 (range: 3,600-4,800) total TB deaths which is equivalent to 11 (range 9.6-13) total deaths per 100,000 population. This is high, to achieve End TB strategy milestone to reduce number of all TB deaths in 2025 by 75% in comparison to 2015 data (Figure 3). In comparison to 2015 data, there has been a 53% reduction in deaths by 2024. The primary challenge contributing to the sub-optimal decrease in TB mortality was the disruption of TB services caused by the COVID-19 pandemic in 2020, which resulted in a plateauing and subsequent significant slowdown in the rate of decline of TB-related deaths.

Figure 3. Estimated number of TB deaths, Ukraine, 2010–2024

Shaded area around lines indicates uncertainty range



Given that TB deaths in the Ukraine largely is attributed by HIV co-infection, interventions to detect people with HIV infection, early enrolment into ART and provision of TB preventive treatment should be prioritised to accelerate the reduction of TB death in the country.

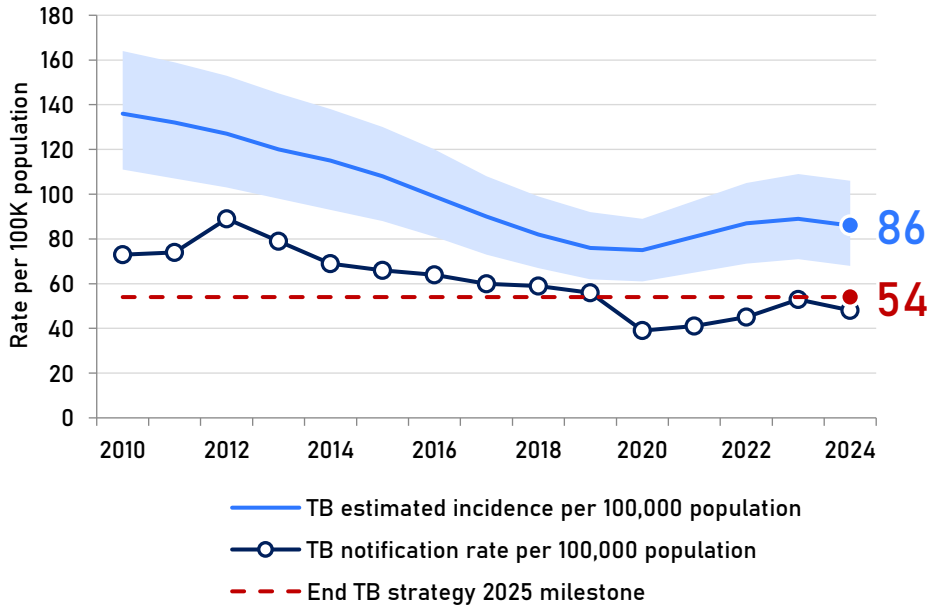
As indicated above WHO burden estimates are based on UN population data, which incorporate annexed territories and regions not under the effective control of Ukraine. As a result, the population denominator used in WHO calculations exceeds the population that is actually served by the Ukrainian health system. This methodological choice leads to an overestimation of TB mortality attributed to Ukraine.

3.3.2. TB incidence

The WHO-estimated incidence for 2024 was 86 (95% UI: 68–106) new and recurrent cases per 100,000 population. Increases in TB incidence in 2021–2023 are the consequence of disruptions to TB diagnosis and treatment during the COVID-19 pandemic, when the reported number of people newly diagnosed with TB fell from 25,4 thousand in 2019 to 17.5 thousand in 2020. This reduction is assumed to have resulted in an increase in the number of people with undiagnosed and untreated TB resulting in increased transmission of TB infection in the population (Figure 4). As of 2024, the incidence of tuberculosis in Ukraine has decreased by only 20.4% compared to 2015 levels, suggesting that the country is unlikely to achieve the End TB Strategy milestone of a 50% reduction in TB incidence by 2025 relative to 2015.

Figure 4. Estimated TB incidence and notification rate of incident TB cases, per 100,000, Ukraine, 2010–2024

Shaded area around line indicates uncertainty interval



In 2024, the notification rate for people with new episode of TB in the country was 48 cases per 100,000 population using UN population estimates for Ukraine. Despite of recovery of TB notification, the gap between estimated and notified TB cases between 2020 and 2023 widened, implying decrease of detection of TB cases in the population. Thuse, the estimated treatment coverage (previously known TB case detection rate) in 2024 was 56% (46-71%), down from 74% (range 62-91%) in 2019 (Figure 4). The 2025 milestone set by Regional action plan 2023-2030 of at least 85% case-detection rate in member states by 2025 most likely will be unachievable in Ukraine.

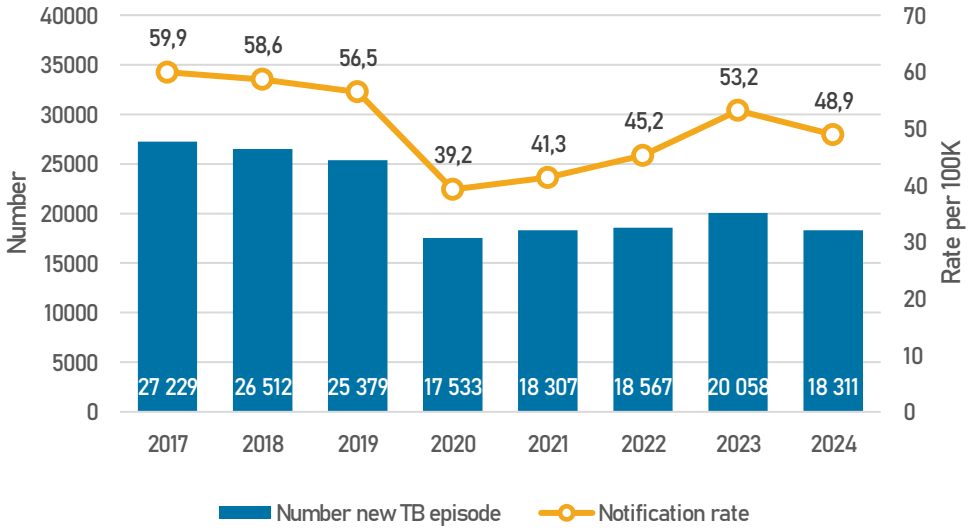
Similar to mortality estimates, TB incidence calculations in Ukraine are affected by an inflated population denominator. UN demographic data include annexed territories and regions outside Ukraine's effective control, resulting in an overestimation of the incidence rate and a misrepresentation of the true epidemiological burden.

3.4. TB notification

3.4.1. Overall TB case notification and time trend

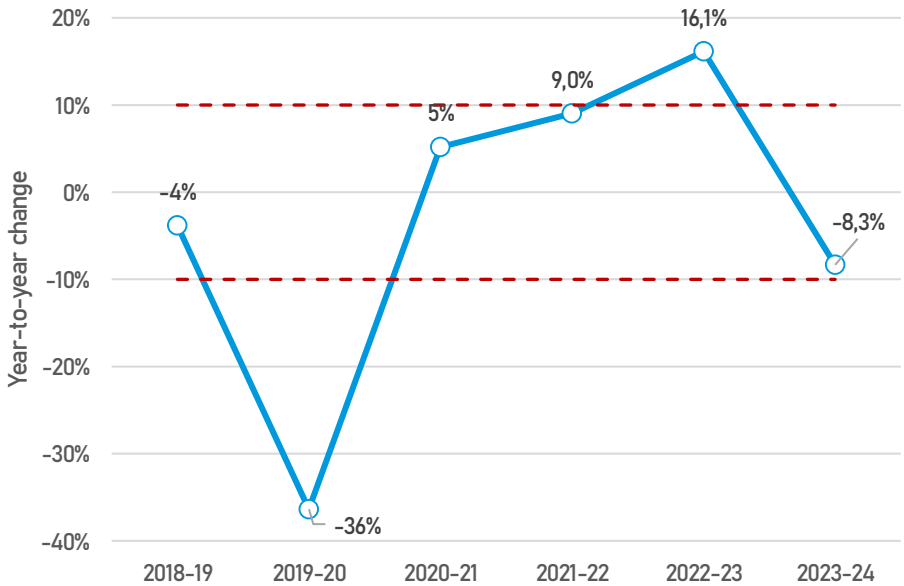
A total of 18,311 people (equivalent to 48.9 per 100K) were reported as newly diagnosed with TB in 2024 in Ukraine, a decline from 20.058 in 2023 (53.1 per 100K) (Figure 5).

Figure 5. TB notification number and rates per 100,000 population, 2017-2024



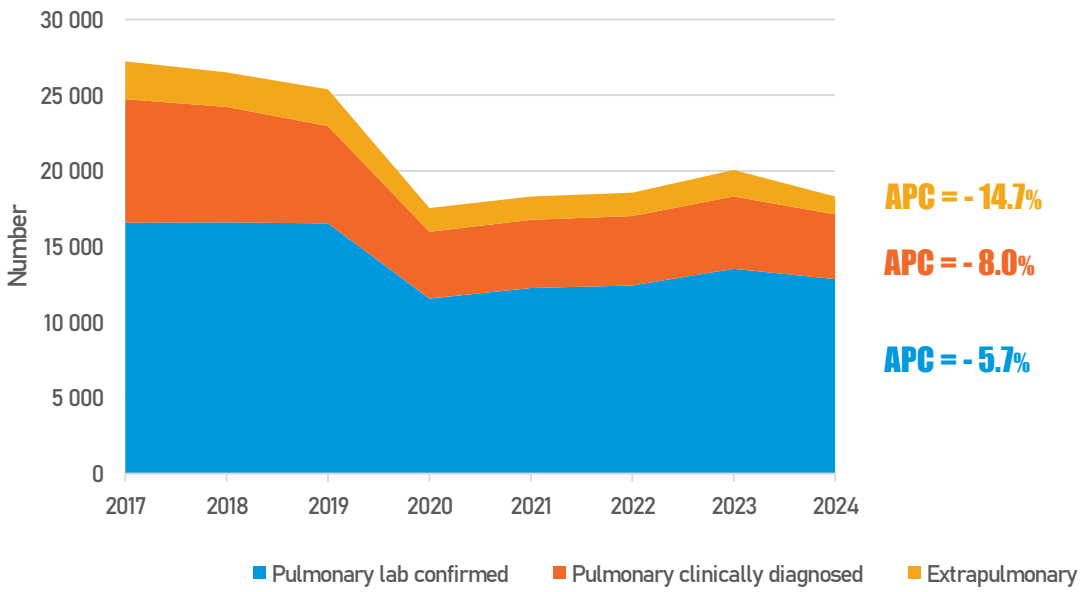
In 2020 because of disruption of routine health services and health care seeking the annual decline of TB notification in 2020 compared to 2019 made 36% (Figure 6). Following three consecutive years after COVID Ukraine was recovering TB. And in 2024, for the first time, the trend of notification was reversed toward the decline. This pattern in general reflects notification trend of most of other member states in WHO European region.

Figure 6. Annual percent of change in TB notification



As shown in figure 7, the trend of TB notifications disaggregated by site of disease and bacterial confirmation follow the same trajectories, but with different pace: between 2019 and 2024 the fastest decline is observed in people with extrapulmonary TB, which decreased on average by –14.7% per year between 2019 and 2024 followed by clinically diagnosed TB cases with average annual decline of -8.0% during the same period. In comparison, the average annual decline of bacteriologically confirmed pulmonary TB cases over the same period was-5.7 % (Figure 7). Faster decline clinically diagnosed patients might be explained by reduction of hyper-diagnosis. Improvement of laboratory testing most likely is not related to faster decline of clinically diagnosed, as Gene Xpert testing always is done in parallel to microscopy examination and Xpert testing coverage in Ukraine over the time remains quite high.

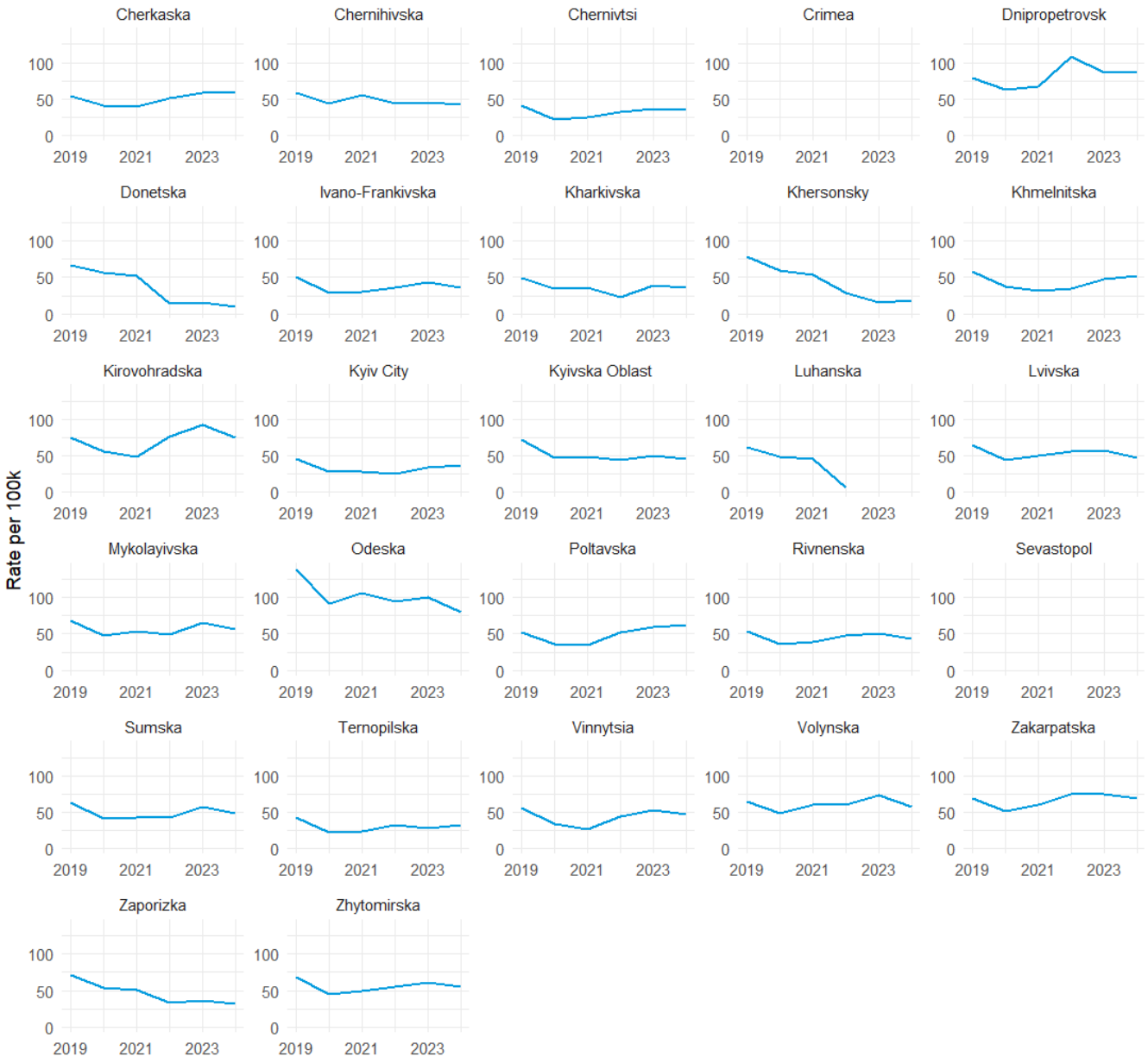
Figure 7. Notification number of new and recurrent TB cases by laboratory confirmation and site of disease, and annual percent of change (APC) between 2019 and 2024



Most of regions following the sharp drop in 2020 showed recovery almost to the same level in the following two or three years (Cherkaska, Chernihivska, Charnivtsi, Ivano-Frankovska, Lvivksa, Mykolayviska, Rivenska, Vinnytsia, Zakarpatska) or even at higher level (Dnipropetrovsk, Kirovohradska). While other regions TB notification never recovered after sharp drop in 2020 and since then either continued to decline (Donetska, Khersonsky, Odeska, Zaporizka) or remained largely stable (Kyiv City, Kyivska Oblast) (Figure 8).

At regional level in 2024 TB notification rate was highest in Dnepropetrovsk region (86.2 per 100,000) and lowest in Donetsk region (10.2 per 100,000). Sharp decline of TB notification rate in Donetska, Khersonsky, and Zaporizka regions is largely driven by incomplete coverage due to partial occupation of those region by Russia and uncertainties of underlying population.

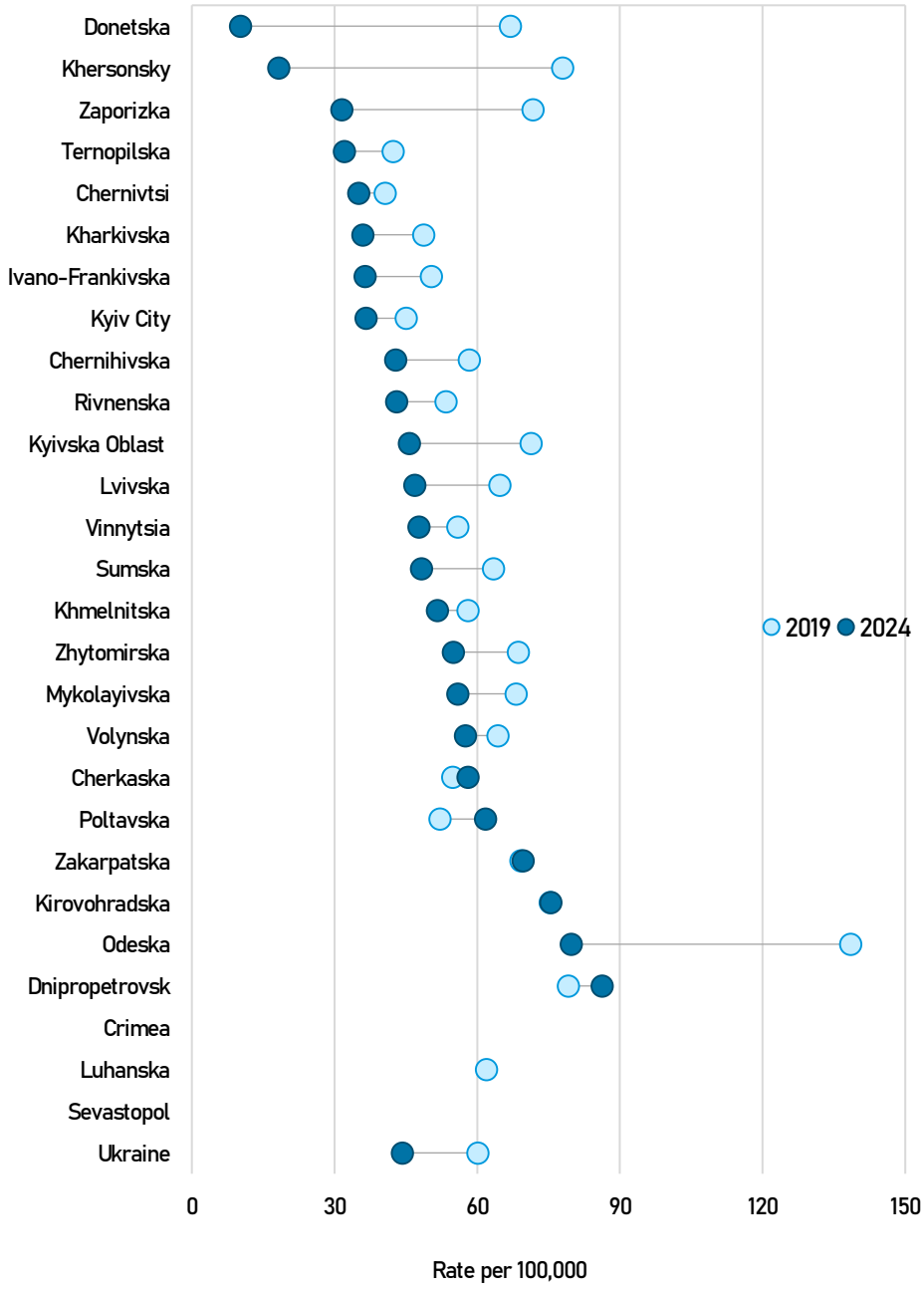
Figure 8. New and recurrent TB notification per 100,000 population by region, from 2019 to 2024



Of 24 regions units reporting TB surveillance in the country in 19 TB notification rate in 2024 compared to 2019 decreased, while in five regions TB notification rate either remained stable or slightly increased (Figure 9). There are numerous factors affecting magnitude and variability of TB notification rates in Ukraine. Apart true burden of TB notification and programmatic factors (such as detection efforts and access to diagnosis) the key external factor driving TB notification is the war and its consequences, including massive displacement of population from the war-affected zone to comparatively safer locations. Decrease of TB notification in Donetska, Khersonsky and Kharkivska regions are likely due to reduced testing, incomplete reporting and uncertainty in underlying population due to massive flow of people from war-affected zone to safer locations. Other reasons of variation in TB notification most likely reflects the variation of true burden in TB across the geographic area as access to xpert testing in vast majority of regions is hight and positivity of testing in majority of regions is below 15% (Figure 34). However, the regions with hight positivity of Xpert test results (Sumska, Khersonsy,

Mikolayivska, Ternopilska) as well as those with low per-capita testing rate combined with above average Xpert testing positivity (Zaporizka, Rivenska) most likely have higher TB burden in the population compared to notification (Figure 9). Those regions have good potential to increase TB notification if more people are presumed for TB and tested.

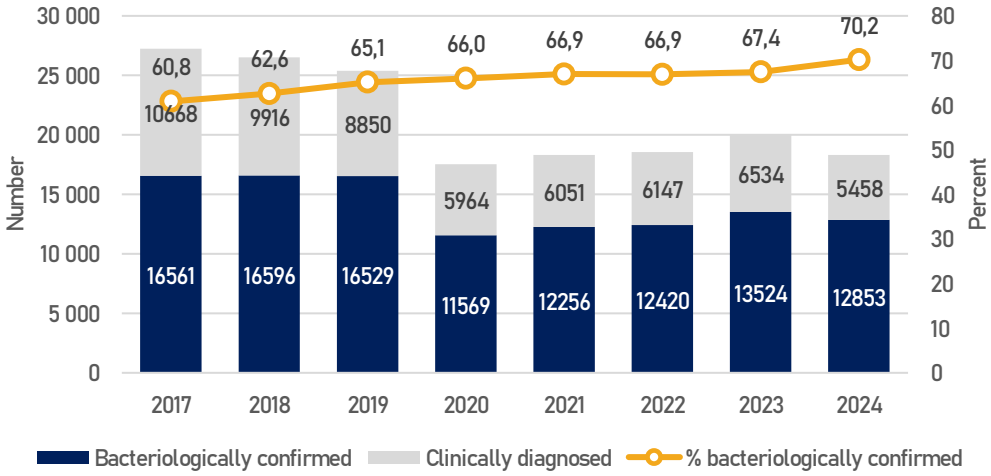
Figure 9. Notification of people with new episode of TB per 100,000 population by rayons in 2019 and 2024



3.4.2. Trend by bacteriological confirmation

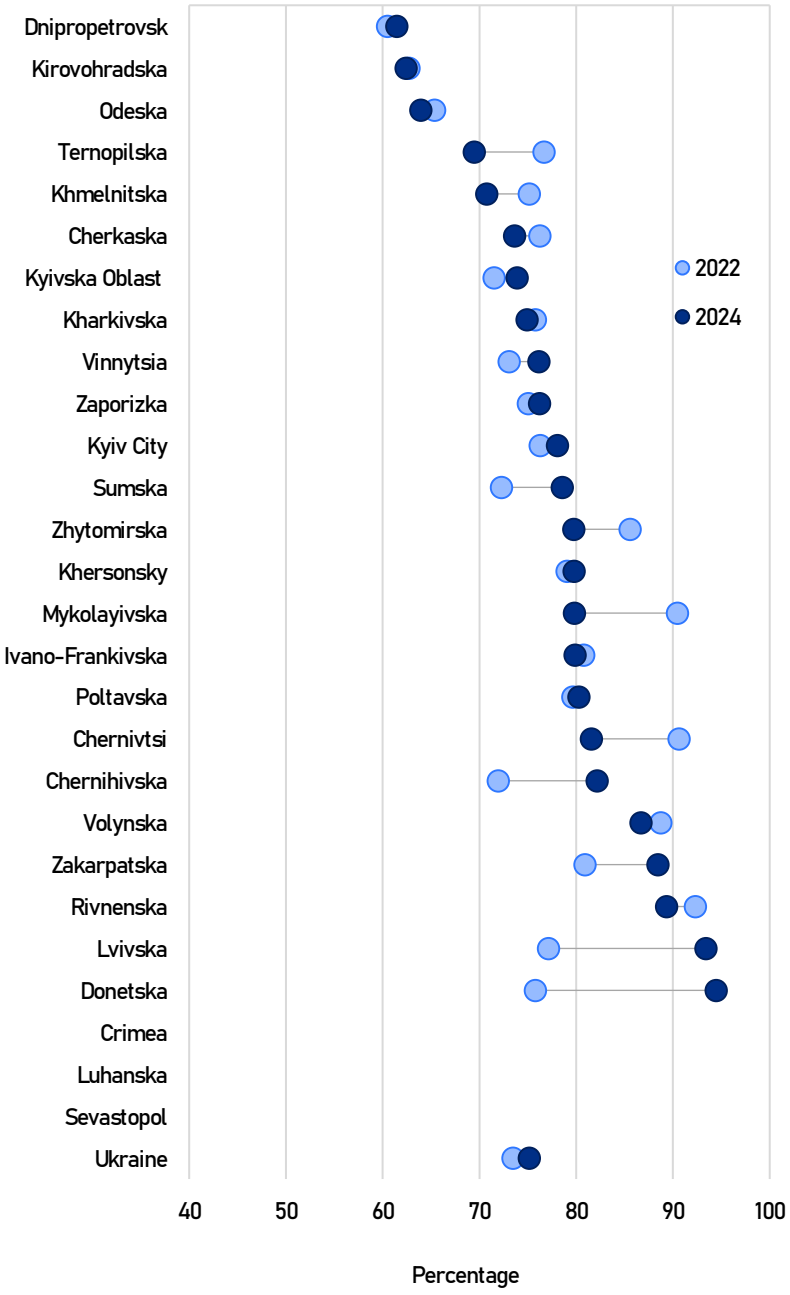
Between 2017 and 2024, both bacteriologically confirmed and clinically diagnosed PTB cases declined, however, decline in clinically diagnosed cases was slightly faster, which resulted that the percentage of bacteriologically confirmed steadily increased from 61% in 2017 to 70% in 2024. (Figure 10).

Figure 10. Trend in notification of PTB by bacteriological confirmation and % of BC PTB



In 2024 the proportion of bacteriologically confirmed among people diagnosed with new episode of pulmonary TB ranged from 62% to 94% indicating variety in access and practice to TB diagnosis across the entire country. Of 24 subnational reporting units reporting TB surveillance data only in three the percentage of bacteriologically confirmed was below 70%. Regions with lowest bacteriological confirmation in 2024 were Dnipropetrovsk, Kirovohradska, and Odeska. Sub-optimal bacteriological confirmation in those areas might indicate an over-diagnosis. In another two regions (Donetska, and Lvivska) the proportion of bacteriologically confirmed exceeded 90% (Figure 11). Such extreme bacteriological confirmation might indicate there is a risk that people with paucibacillary TB are missed to be diagnosed. Greater attention to the quality of TB case detection is warranted in rayons both with excessive lower (below 70%), as well as excessive higher (>90%) bacteriological confirmation.

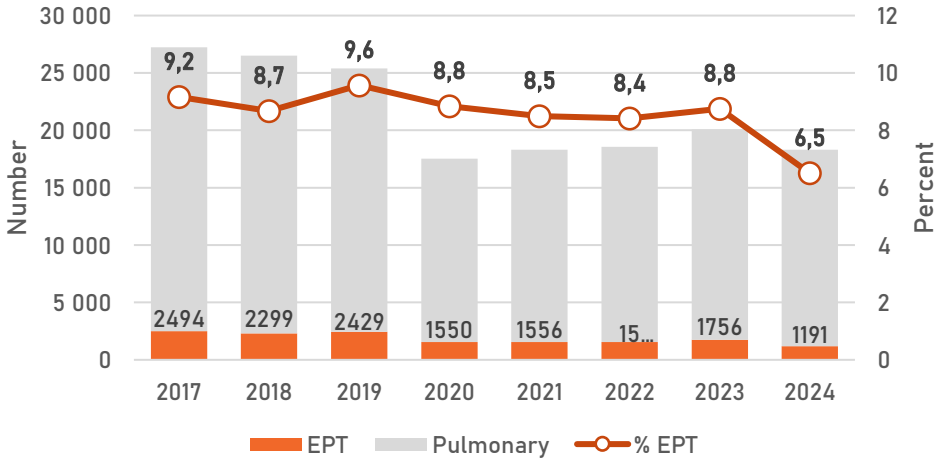
Figure 11. Proportion of bacteriologically confirmed TB cases N&R PTB patients by rayon in 2022 and 2024



3.4.3. Trend by site of disease

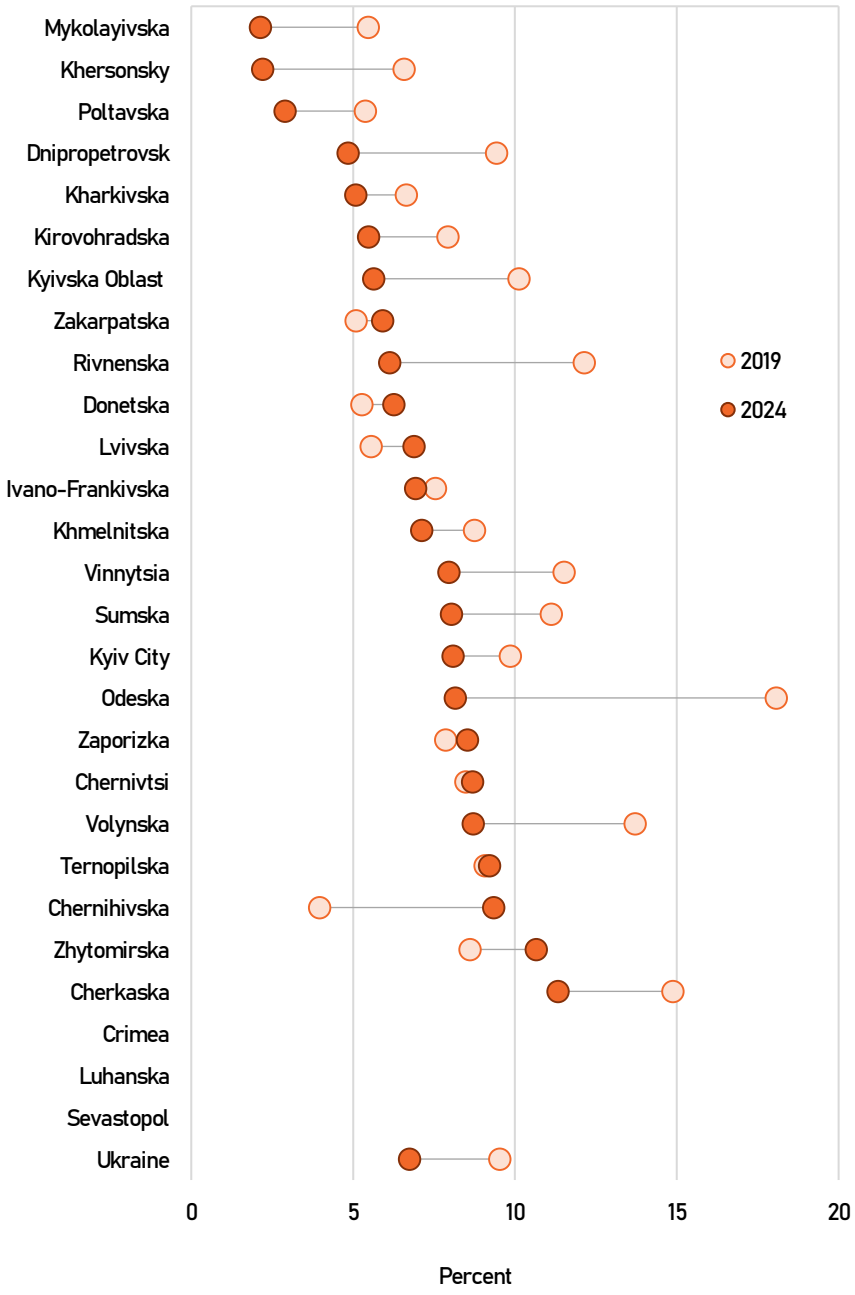
In 2024 6.5% of people diagnosed with new episode of TB had extrapulmonary localization. Between 2017 and 2023 proportion of people TB with extrapulmonary localization of disease in the Ukraine remained largely stable ranging between 8.5 and 9.6. Observed 6.5% is a sharp drop compared to 8.8% reported in 2023 indicating possible change in practice of diagnosis (Figure 12).

Figure 12. Number and percent of people diagnosed with new episode of extrapulmonary TB, 2017-2024



In 2023 the proportion of extrapulmonary TB cases varied largely from 2.1 in Mykolayivska to 11.3% in Cherkaska (Figure 13). This may reflect under-lying differences in TB epidemiology, attributed by proportion of child TB cases, proportion of TB/HIV co-infected, which have higher risk of extrapulmonary localization, as well as diagnostic practices. Fifteen regions reported notably lower percentage of people with ETP in 2024 compared to 2019 level, and only two regions reported higher percentages (Chernihivska and Zhytomirska) indicating that pattern of diagnosing less EPT cases is countrywide and not driven from certain location.
However, unexpected sharp year-to-year variation observed between 2023 and 2024 might suggest unstable diagnostic practice and greater attention to quality of diagnosis of extrapulmonary cases is warranted.

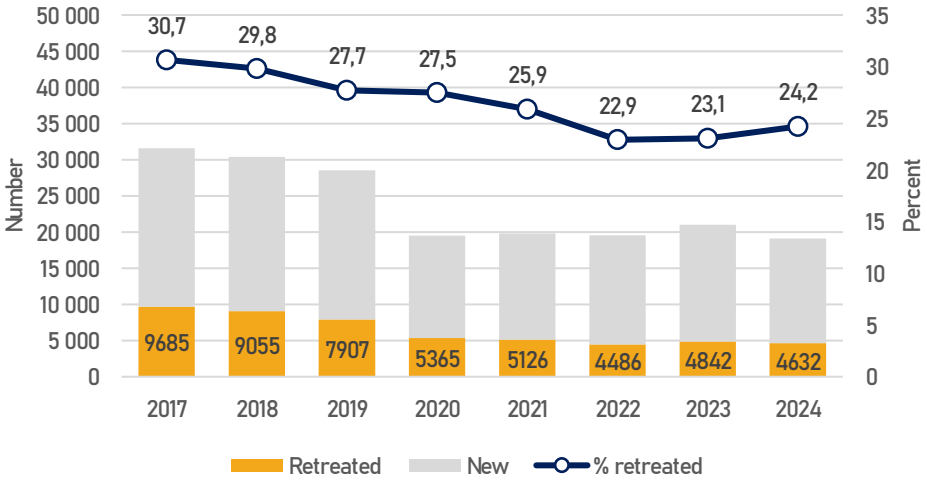
Figure 13. Percentage of ETP in 2019 and 2024 by rayons



3.4.4. Trend by history of treatment

As of 2024, people with retreated TB account about quarter of the total number of notified. Between 2017 and 2022, the percentage of retreated cases in Ukraine gradually decreased. Absolute number of retreated cases sharply dropped in 2020, almost proportional to TB cases. but subsequent recovery was slightly faster compared to new TB cases resulting in a gradual further relative decrease in the proportion of retreated cases from 27.5% in 2020 to 22.9% in 2022 (Figure 14). This pattern partially might be explained by the improvement of effectiveness of TB treatment, such as introduction of all-oral and shorter treatment regimens thus preventing disease re-occurrence. However, in 2023 and 2024 there was reversion of trend and percentage of retreated again slightly increased.

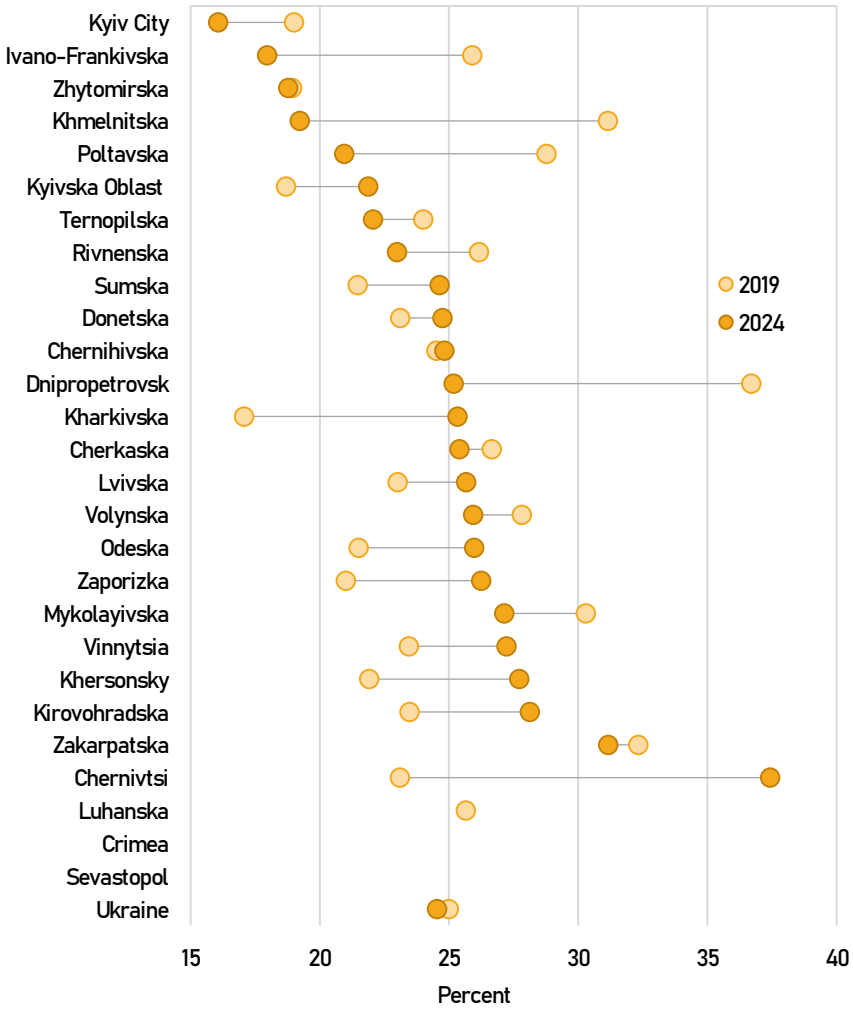
Figure 14. Trend in number and proportion of retreated TB cases, 2014-2023



The proportion of retreated cases by regions in 2024 varies from 16.1% in Kyiv city to 37.4% in Chernivtsi. There was no clear trend across the rayons: in 7 regions proportion of retreated declined, in another 10 regions percentage increased and in the rest seven regions remained largely stable (Figure 15).

Regions reporting excessive variation of proportion of previously treated between 2019 and 2024 were Chernivtsi, Khmelnitska, and Dnepropetrovsk regions.

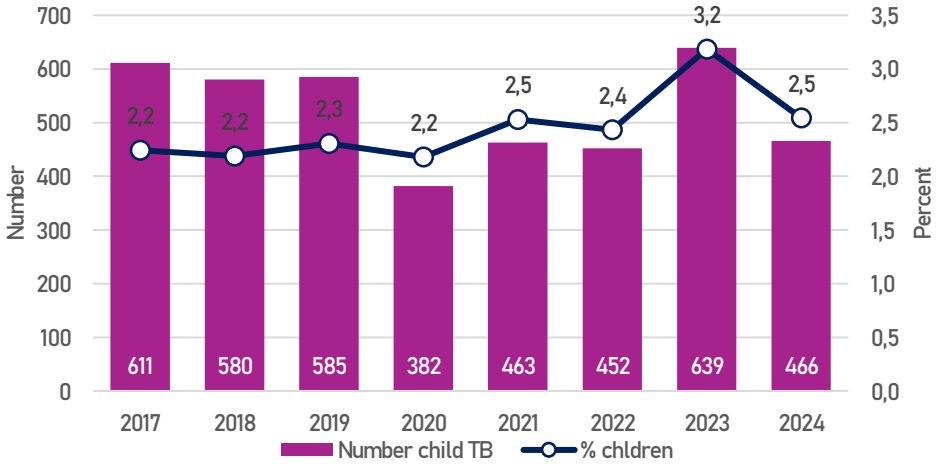
Figure 15. Proportion of previously treated TB cases by region in 2019 and 2024



3.4.5. Trend by childhood TB notification

Between 2017 and 2024 the proportion of child TB cases among people diagnosed with new episode of TB was largely stable around 2.5% without any clear trend. In 2023 there was a sharp increase of children from 452 to 639 (40% increase), which might be indication of internal inconsistency possibly due to unstable notification of childhood TB disease. (Figure 16).

Figure 16. Trend in number and percent of child TB cases among all new and relapse TB patients

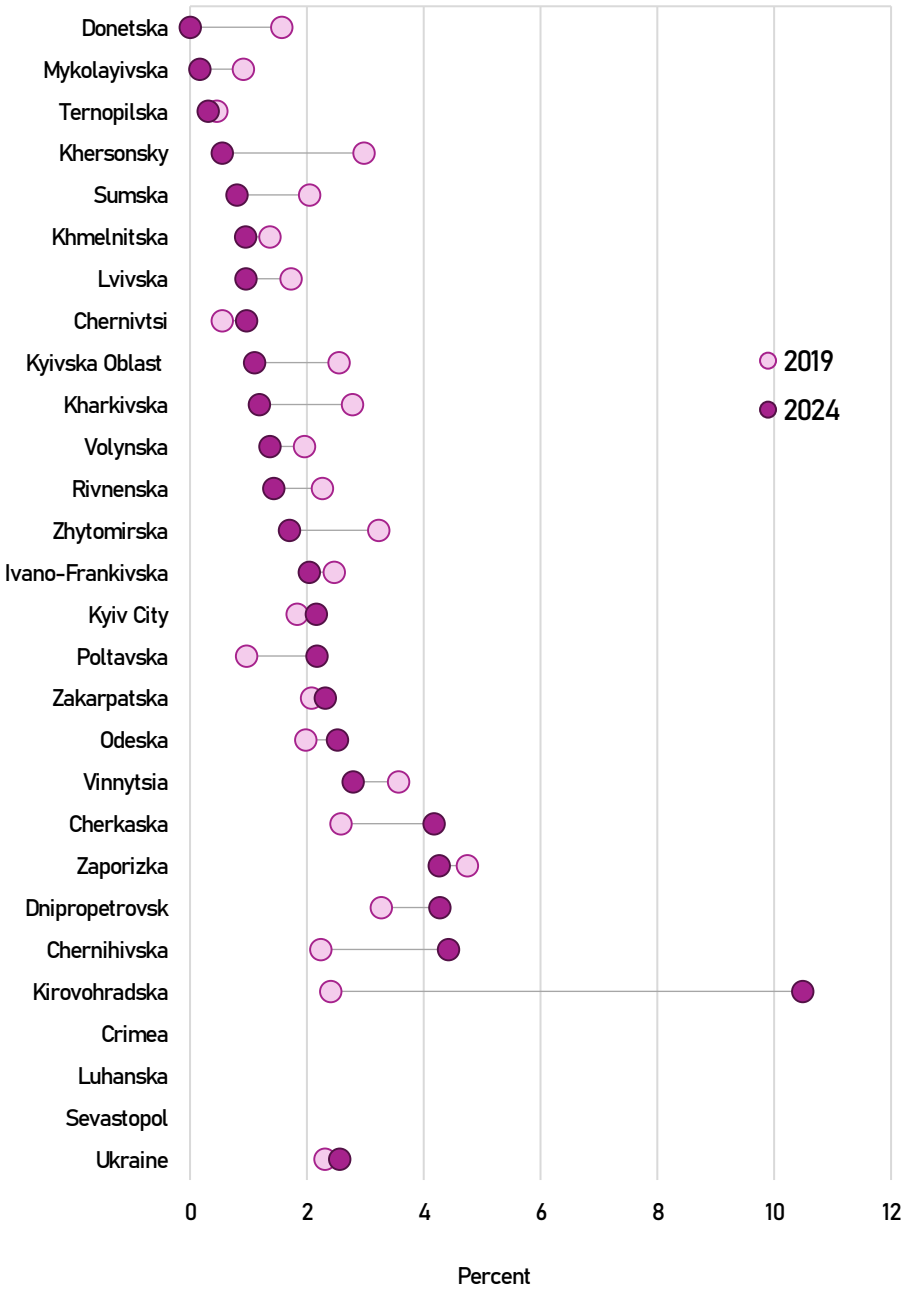


At the regional level, in 2024 the proportion of child TB cases ranged from 0% in Donetska to 10.5% in Kirovohradska. (Figure 17).

In second edition of standards and benchmarks benchmark of external consistency of surveillance of 5-15% of child TB notification has been dis-continued as it has been shown that percentage of childhood TB is determined largely by population structure, level of economy development and magnitude of TB epidemic. However, considering that percentage of childhood TB notification in Ukraine is much lower compared to average of 18HPCs, as well as EU/EEA sub-region (valuable to be compared due to similar population structure), and benchmark of childhood TB notification is not met, there is a likelihood that childhood TB cases in Ukraine are either under-detected or under-notified or both. Recent exploratory linkage exercise in three regions indicated that 57% of bacteriologically confirmed childhood TB cases found in laboratory registers are failed to be matched in TB register[12].

[12] Level of underreporting of detected TB cases in Ukraine: an inventory study in three selected oblasts using record linkage: cross-sectional study. (programmatic report)

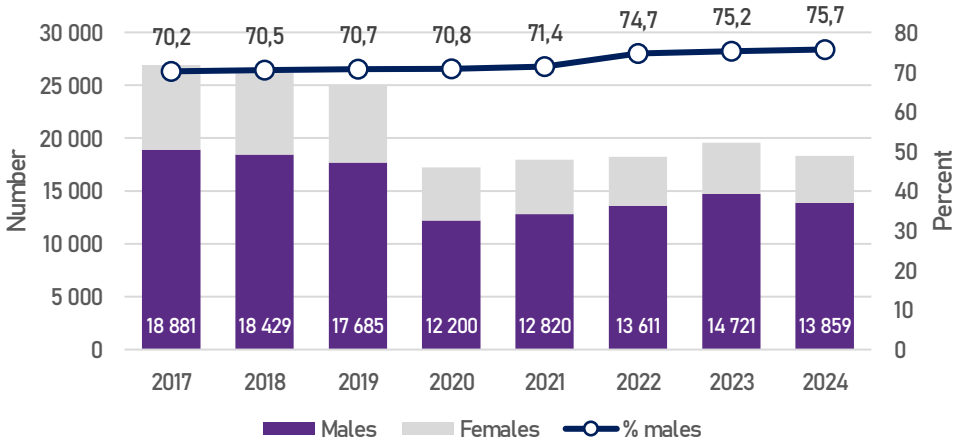
Figure 17. Percent of child TB cases among people with new episode of TB in 2019 and 2024 by rayons



3.4.6. TB notification trend by sex

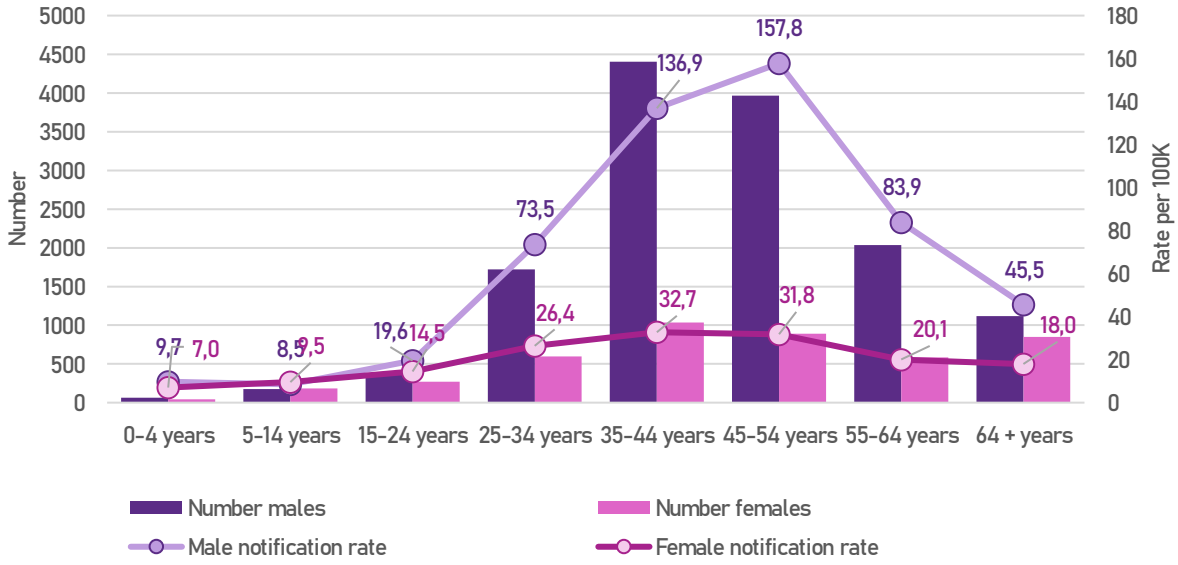
Between 2017 and 2024 the proportion of males among people notified with new episode of TB slightly increased from 70.2% to 75.7%, without any major year-to-year variation (Figure 18). Likely reason could be that people that left the country after the Russian invasion are females and demographic structure of underlying population has been shifted.

Figure 18. Trend in number N&R TB by sex and proportion of males



The most populated age group of TB patients in 2024 are males aged 35-44 years; however, the highest age and sex-specific notification rate is observed among males aged 45-54. In males, the TB notification rate increases with age and peaks at 45-54 and then declines. Among females, the notification rate peaks in the 35-44 age group and then slightly declines, with stable notification rates until the elderly age group (Figure 19).

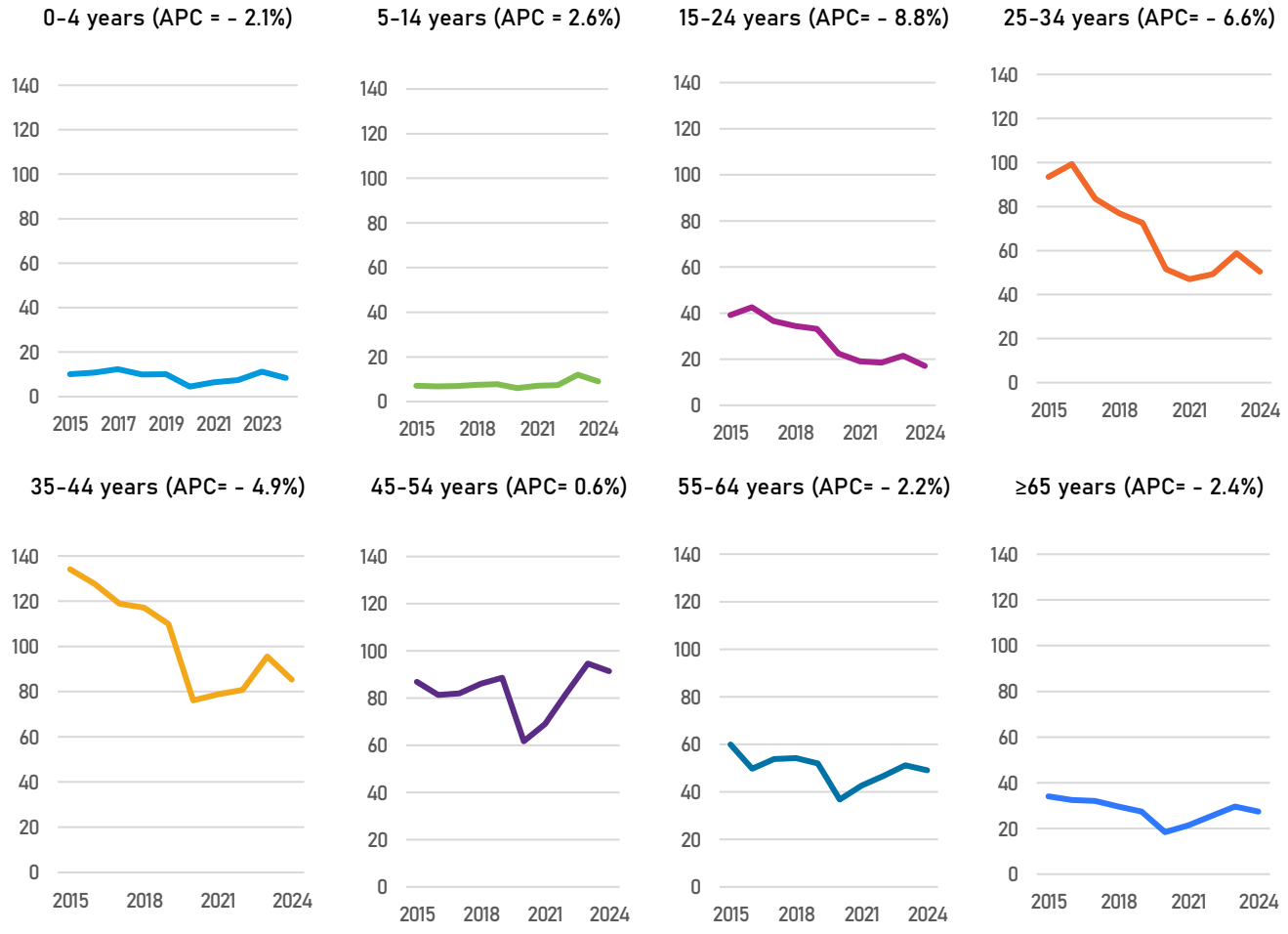
Figure 19. TB number and rates disaggregated by age group and sex, 2024



3.4.7. Trend of TB notification by age

Figure 20 shows the trends in notification rates for people diagnosed with new episode of TB disaggregated by age group. Between 2015 and 2024, the TB notification rate declined for all age groups except the children aged 5-14 years and those aged 45-54. The fastest decline was observed among young adults aged from 15 to 24 years (-8.8% annually) followed by 25-34 years (-6.6% annually) and 35-44 (-4.9% annually) (Figure 20). Thuse, among adults, the speed of decline was negatively associated with the age almost in linear pattern. This pattern of temporal change is consistent with the general understanding of TB epidemiology- "aging of the epidemic", which is a sign of the true decline of TB burden in the population. Because TB in the elderly mostly results from the reactivation of latent infection, the decline in transmission rate has little effect on TB incidence in this age group. In contrast, TB in younger age groups is the result of recent infection, and decreased TB notification in this age group suggests a decline in the annual risk of infection and therefore, a decline of TB transmission in the general population. Ideally, we should expect faster decline of TB notification in children, however, because of possible under-detection and under-notification of childhood TB over the time resulting sub-optimal data quality, the expected time-trends in children are missing.

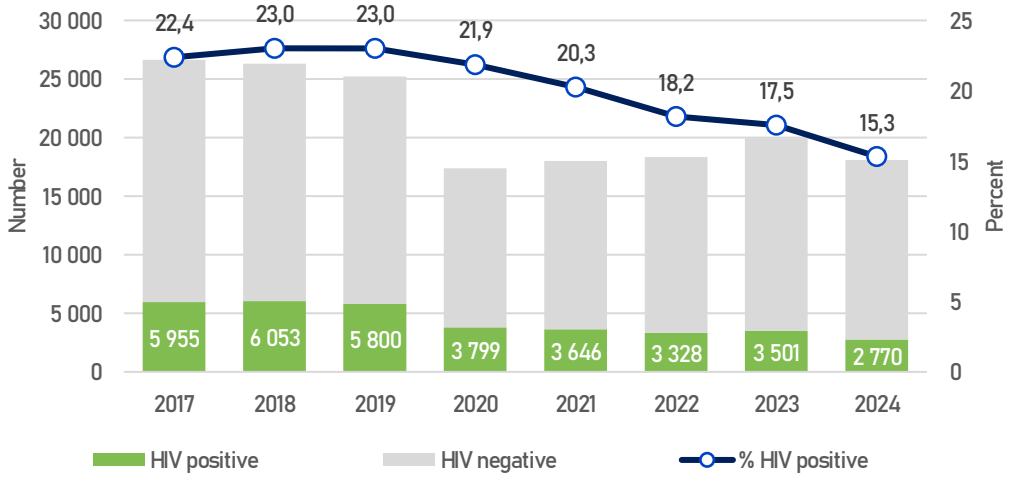
Figure 20. Trend in age-specific TB notification rates in Ukraine, 2015-2024



3.4.8. TB/HIV co-infection trend

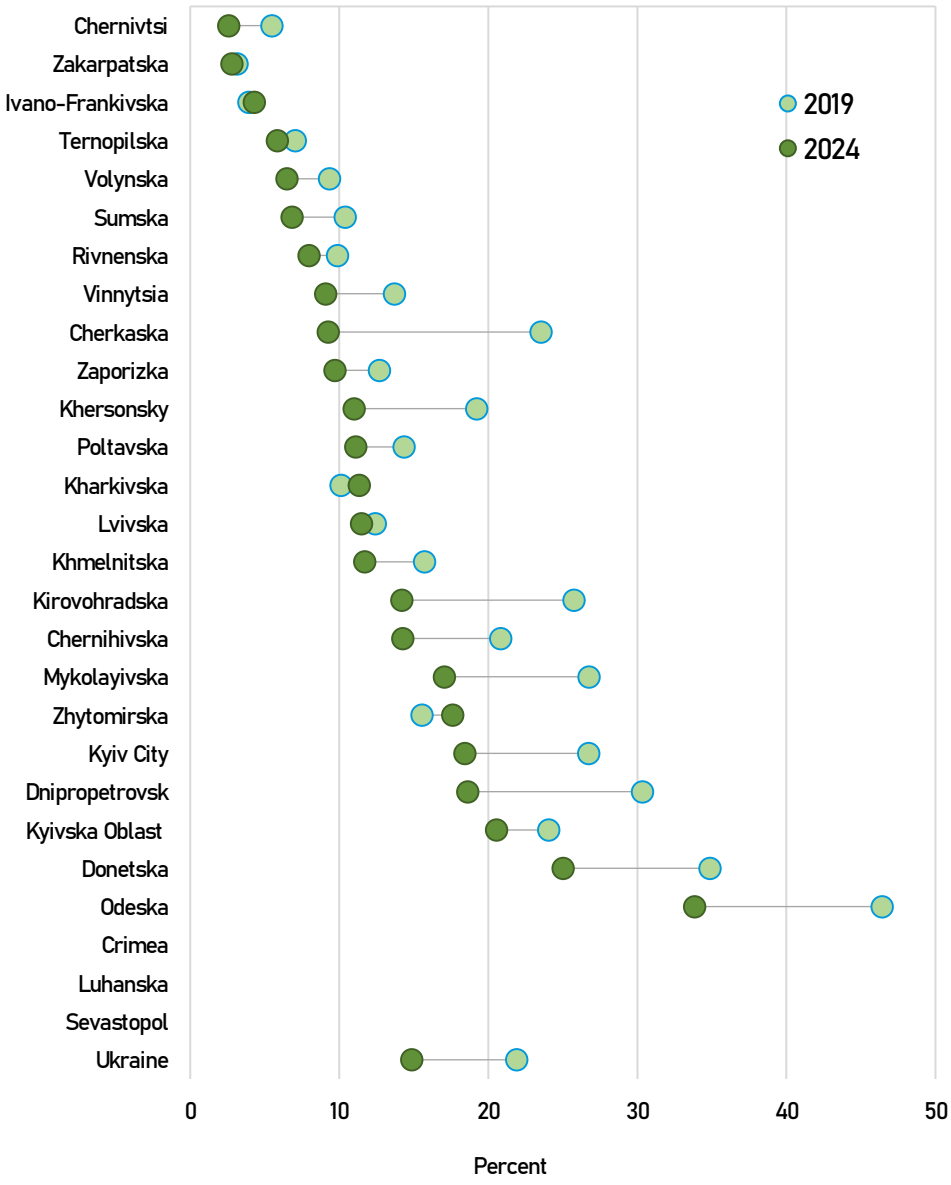
According to routine surveillance, in 2024 in total 2,770 PLHIV were detected among those diagnosed with new episode of TB, down from 3.501 reported in 2023. This is about two times lower compared to 2019 data. Expressed as percentage TB/HIV co-infection declined from 23.0% in 2019 to 15.3% in 2024 (Figure 21).

Figure 21. Trend in number and percent of people with HIV co-infection among people with new episode of TB



Of 24 regions reporting routine surveillance data 19 regions reported decline of TB/HIV co-infection, in three regions it remains stable and only Zhytomirska region reported slight increase, indicating that reduction was common pattern and was not driven by selected sites. Many regions showed excessive variation, including Cherkaska (from 24 to 9%), Odesska (from 46 to 34%), Dnipropetrovsk (from 30 to 19%), Kirovohradska (from 26 to 14%) (Figure 22). Those variations are very rapid to attribute to reduction of TB/HIV coinfection in the population. Although there are many external factors under the context of war that could result in the reduction of TB/HIV co-infection (e.g. selective outflow of PLHIV from the country, cessation of reporting data from occupied territories that had higher level of HIV co-infection), TB program should undertake additional efforts to ensure data integrity in entire flow of TB/HIV detection, aiming that people with TB/HIV infection are not missed from the health system.

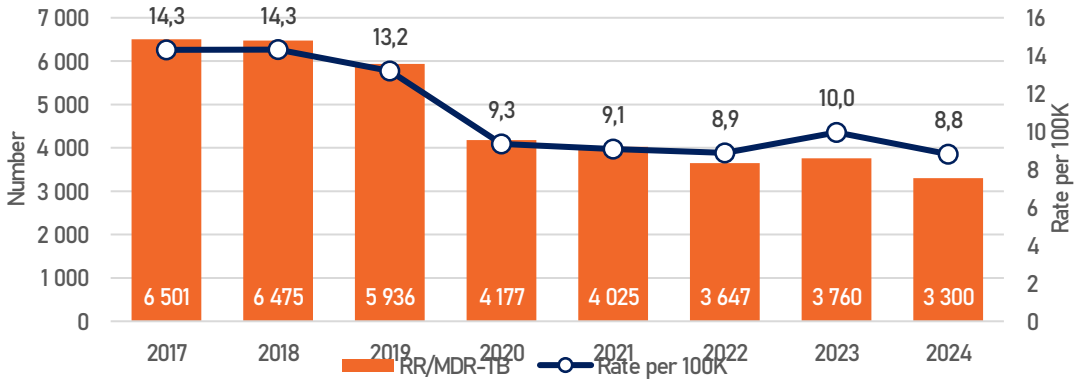
Figure 22. Percent of TB/HIV co-infected among new episode of TB in 2019 and 2024 by regions



3.4.9. Trend of RR/MDR-TB

Between 2017 and 2024 total number of people notified with RR-TB in Ukraine consistently declined from 5,936 in 2019 to 3,300 in 2024. After COVID pandemic resulting 30% drop in RR-TB notification between 2019 and 2020, absolute number of RR-TB unlike TB notification trend continued to decline with slight recovery in 2023 only, which still was far below even 2020 level. Another sharp decline was observed between 2023 and 2024 from 3.760 to 3,300. Expressed as relative to population, this translates to a decline from 13.2 in 2019 to 8.8 in 2024 per 100,000 population (Figure 23).

Figure 23. Trend in number of RR-TB and rate per 100,000 population



In 2024, the proportion of RR/MDR TB among people diagnosed with new pulmonary TB was 22.1%, representing a decrease from the pre-COVID-19 level of 27.2% in 2019. Similarly, the percentage of RR-TB among previously treated cases in 2024 was 32.2%, down from 42.9% in 2019 (Figure 24). Although Ukraine has all prerequisites for high-quality routine drug-resistance surveillance—including high bacteriological confirmation, universal access to drug-resistance testing, and quality-assured laboratory services -such rapid decline in the percentage of RR-TB should be interpreted cautiously, given ongoing programmatic challenges, such as the completeness and quality of the surveillance system and uncertainties regarding the underlying population. For instance, increased risk of primary lost to follow-up, especially among displaced population, lack of integration between laboratory module and electronic TB register, lack of automated connectivity, and reduced face-to-face supervisory visits, may have affected the accuracy of reported data.

Figure 24. Trend in percentage of RR/MDR TB among people with new and previously treated pulmonary TB with DST results

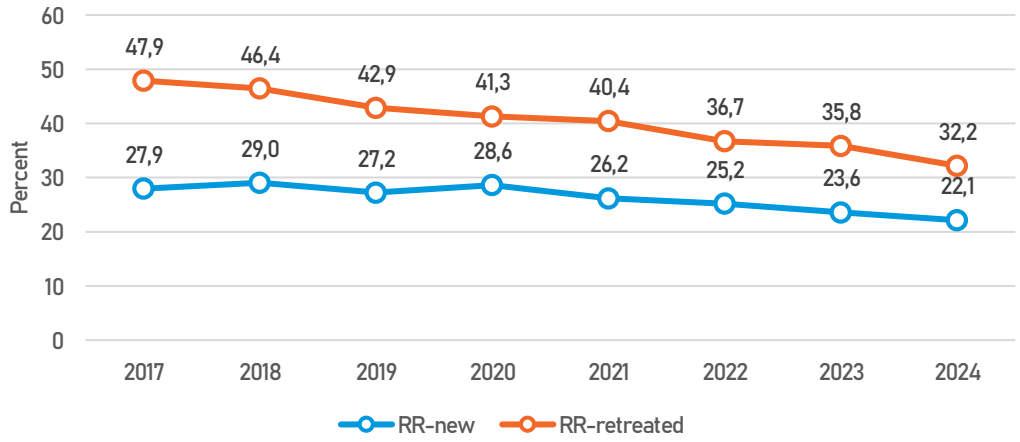
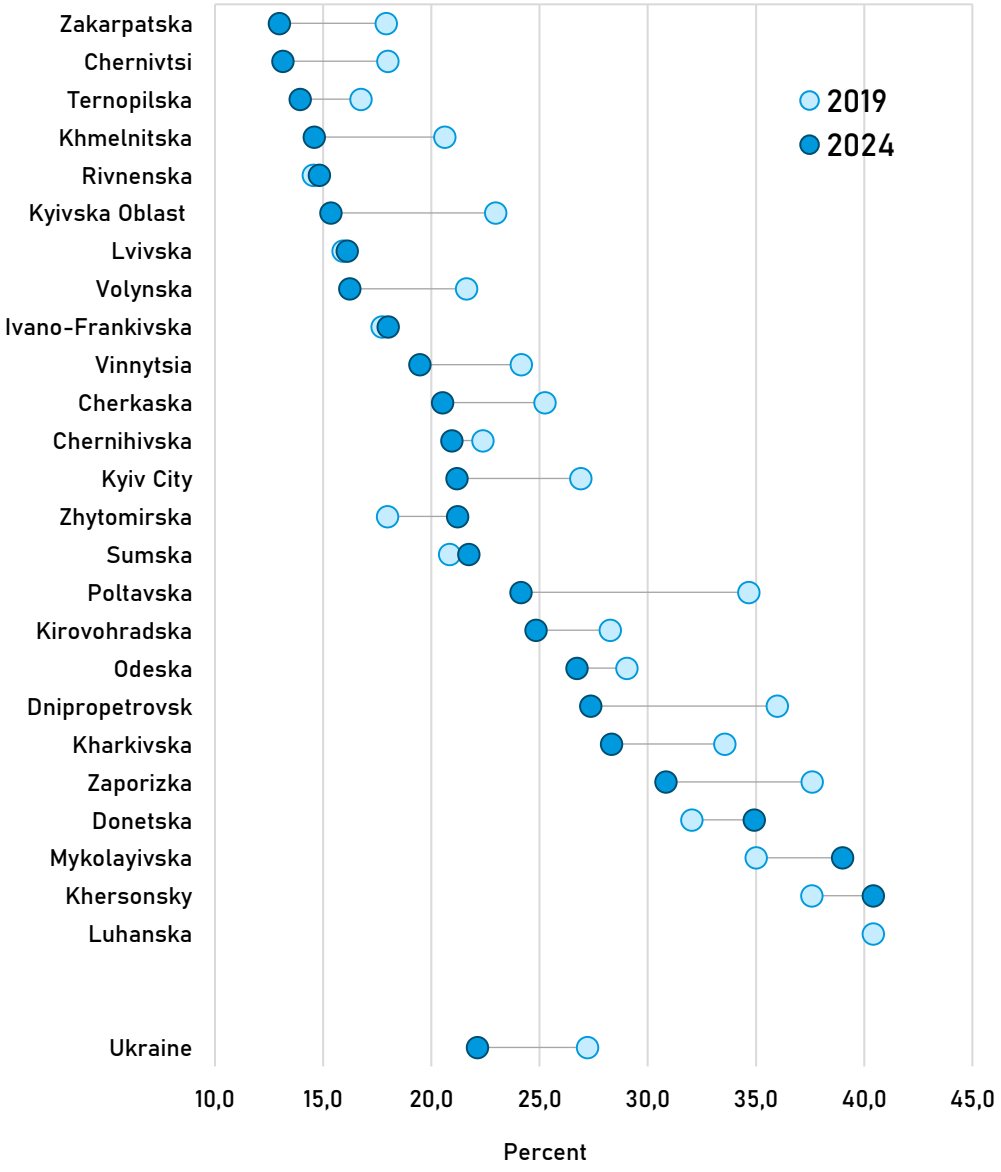


Figure 25. Trend in percentage of RR/MDR TB among people with new and previously treated pulmonary TB with DST results by region

While at national level the trends RR-TB percentage declines smoothly, among both new and retreated cases, without major variation, at regional level the trends of RR-TB in most regions are largely inconsistent: trends converge or diverge from year-to-year. In Dnepropetrovsk, Donetska, Zhytomirksa, Zakarpatska, Ivano-Frankivska, Kirovohradska, Cherkaska, Chernivtsi regions and prison at some time-point the trends of percentage of new and retreated intersect or even value of new becomes higher than those retreated, which is highly unlikely (Figure 25).

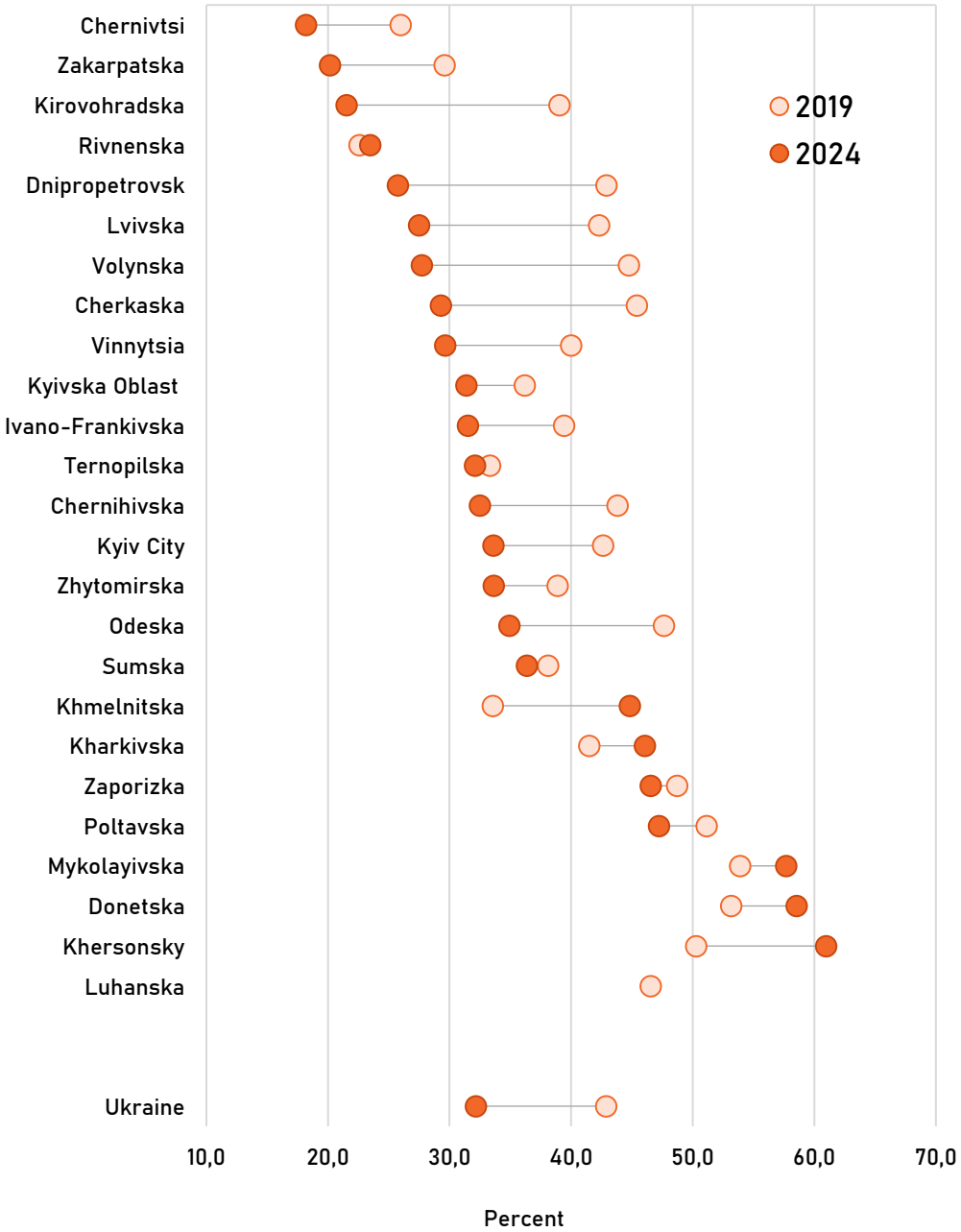
At regional level the percentage of RR-TB in 2024 ranged from 13% in Zakarpatska to 40% in Khersonsky region. Of 24 regions providing routine surveillance data 16 reported decline of RR-TB percentage, indicating that this was countrywide pattern, rather than driven by few affected area. War affected regions, such as Donetska, Khersonsky, as well as Mykolayivska and Zhytomirska showed increase of RR-TB prevalence in 2024 compared to 2019, while in the remaining regions (Rivenska, Lvivska, Ivano-Frankivska and Sumska) the trend was comparable despite of large year-to-year variation over the previous five years (Figure 26).

Figure 26. RR/MDR-TB percentage among people with new pulmonary TB in 2019 and 2024 by regions



The percentage of RR-TB among people with retreated TB in 2024 ranged from 18% in Chernivtsi to 61% in Khersonsky region. Of 24 regions providing routine surveillance data 18 reported decline of RR-TB percentage among retreated. Only five regions showed increase of RR-TB prevlanece among retreated in 2024 compared to 2019, including Kharkivska, Khmelnitska, Khersonsky, Donetska, as well as Mykolayivska (Figure 27).

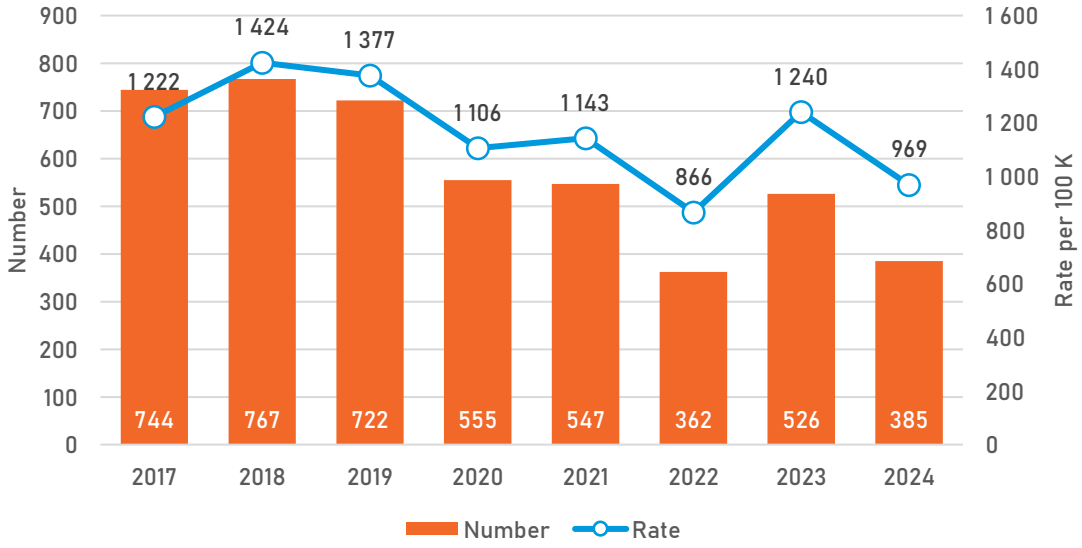
Figure 27. RR/MDR-TB percentage among people with previously treated pulmonary TB in 2019 and 2024 by regions



3.4.10. Trend of TB among prisoners

TB notification rate in 2024 in penitentiary system was 969 per 100,000, which is over 20 times higher compared to notification in civilian population. From 2019 to 2024, notification of new and recurrent TB cases in prison decreased from 722 to 385 (Figure 28). Relative to size of penitentiary population the TB notification rate declined from 1.377 per 100,000 in 2019 to 969 in 2024. The decline of TB cases in prison was slightly faster compared to civilian population, which resulted to decline of relative contribution of new episode of prison TB from 2.8% to 2.1%.

Figure 28. Trend in number of prison TB cases and rate per 100,000 population

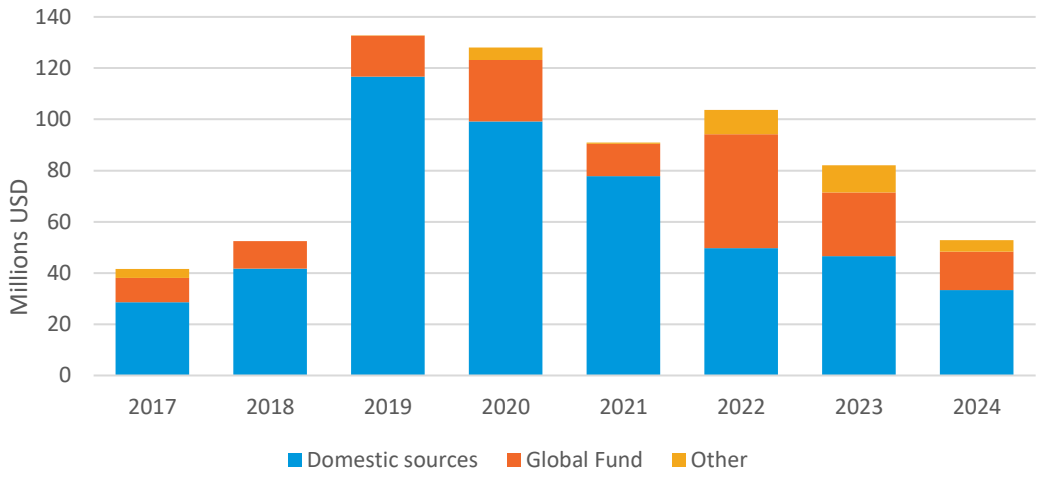


3.5. Determinants of TB: programmatic factors

3.5.1. Funding

Reduction of tuberculosis disease burden requires sustained long-term adequate funding. In 2024, the total funding available for TB prevention, diagnostic and treatment services was US$ 52.8 million, equivalent to 95% of the funding required to implement national strategic plan for the reporting year. The level of funding of TB program in Ukraine in 2024 was much lower than that available in each of the previous five years (2019–2023) (Figure 30). Explanations for the decline in the total amount of available funding for TB between 2019 and 2020–2021 include reductions in the number of people reported as diagnosed with TB; changes to models of service delivery (e.g. fewer visits to health facilities and more reliance on remote support during treatment); reduction of the cost of second-line drugs, and new regimen and reallocation of resources to the COVID-19 response. In 2022 there was a sharp decline in available funding from domestic sources and an increase in funding provided by international donors determined of Russian invasion in the country, re-allocation of government priorities. However, over the last three years the international donor funding reduced to 2019 level and share of domestic funding increased and as of 2024 domestic funding in Ukraine constitutes 63% of overall TB program funding (Figure 29).

Figure 29. Funding available by source of funding



3.5.2. TB diagnostic facilities

Shortening the duration of disease through detection and treatment of cases will also reduce the prevalence of TB disease, and therefore, transmission. Ukraine has well-functioning TB laboratory network organized on three diagnostic levels. The first level consists of 223 GeneXpert laboratories integrated within general primary health care network. The second level includes laboratories located at regional TB dispensaries that in addition to Xpert and microscopy, perform culture, first-line LPA, second-line LPA, and phenotypic DST for FLD, SDL as well as for Mfx, BDQ and LZD. These laboratories are responsible for quality control of first level laboratories in respective areas. The third level is represented by NRL, has the leading role in organization of TB laboratory service, development of protocols for laboratory diagnosis, training and supervision. (Table 2).

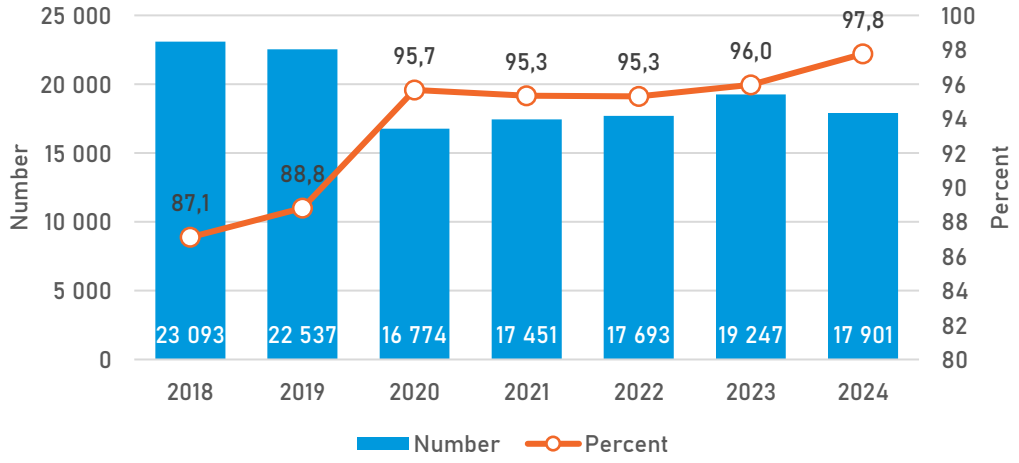
Table 2. Number sites providing laboratory diagnostic services

Year	Molecular WHO-recommended rapid diagnostics for detection of MTB	Molecular tests for detection of isoniazid resistance	Molecular tests for detection of fluoroquinolone resistance	Culture	Phenotypic drug susceptibility testing for FQs, BDQ and LZD
2020	159	4	5	52	34
2021	159	4	28	39	35
2022	238	28	28	26	25
2023	336	31	31	31	31
2024	223	34	34	30	34

3.5.3. Xpert testing coverage among people with new and recurrent TB

Xpert testing in Ukraine was used as the initial diagnostic test for of the people newly diagnosed with TB. In 2024, 98% of people diagnosed with new episode of TB were diagnosed using Xpert testing, up from 96% in 2023. Since 2020, Xpert testing coverage in Ukraine has remained above 90%, indicating almost universal access to WHO recommended rapid diagnostic testing (Figure 30).

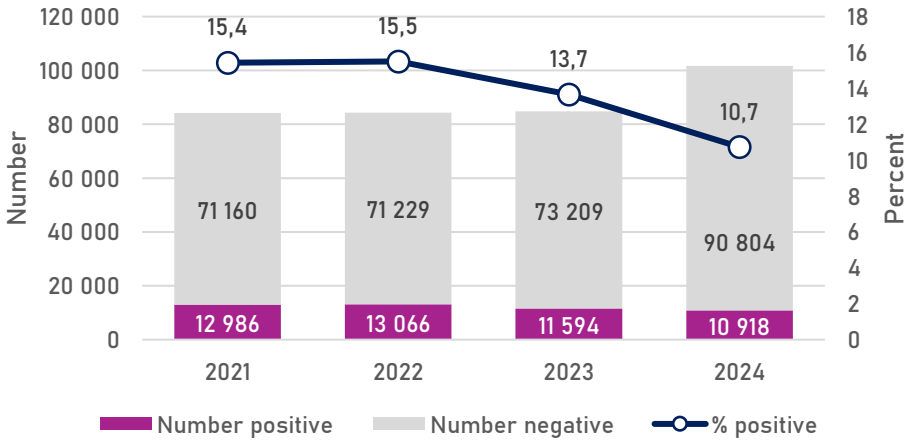
Figure 30. Trend in Xpert testing coverage among people diagnosed with new episode of TB



3.5.4. Trend in number of people tested for TB

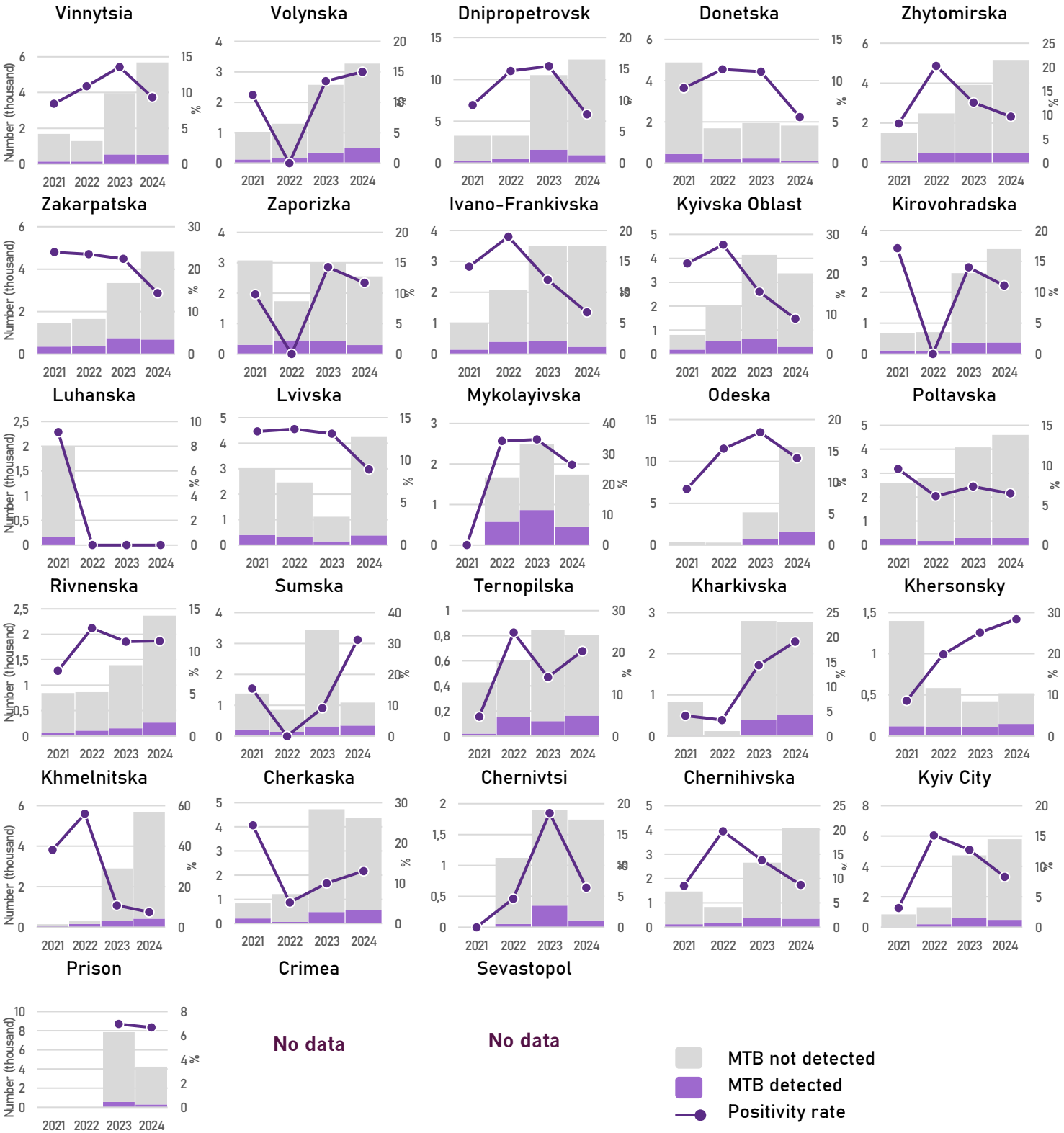
In 2024 in total 134,304 mWRD tests were performed. While across 2021 to 2023 around 84,000 mWRD tests have been performed annually. Trend in the percentage of people initially tested with Xpert who had positive test results provides an indication of the trend in the burden of disease in the population. It is noteworthy that in 2023 at national level positivity declined compared to pervious two years, despite of constant testing level. While with increase of testing coverage in 2024 positivity declined to 10.7% (Figure 31). This could be an indication of decline of TB burden in the population if the characteristics of population tested remains similar (in terms of active vs passive case-finding) and duplicate testing is reasonably low.

Figure 31. Trend in number mWRD tests for diagnostic purpose and percent of positives



At sub-national level the pattern of trends of WRD testing coverage and positivity varies widely. Most regions show increase in WRD testing coverage, exceptions are regions that are affected by war, such as Donetska, Khersonsky. Some regions show decline of positivity along increase of testing coverage (Zhytormirska, Zakarpatska, Chernihivska, Kyiv City) which is an expected pattern. Other regions show no correlation between testing coverage and positivity (such as Kyivska Oblast, Poltavska, Kharkivska). There are regions even showing higher positivity with increase of testing coverage or contrary – low positivity with decrease of testing (Volynska, Mykolaiv, Chernivtsi). Last two are inconsistent patterns and should be closely monitored to identify possible reasons (duplicate testing, incomplete reporting) (Figure 32).

Figure 32. Number of people tested by xpert by results and percent of positives



While at national level Xpert testing was 2.7 per 1000 population, up from 0.9 in 2019, there was substantial variation in Xpert per capita testing rate ranging from 0.5 in Khersonsky to 5.0 in Odeska and 138 in prison (not shown) (Figure 33). Most of sub-national units reported substantial increase of testing in 2024 compared to 2019 in relation to population with exception of war affected areas, including Khersonsky, Donetska, Sumska and Zaporizkha. It is noteworthy that few regions with low testing rate also report very low notification rate (Donetska, Khersonsky, Ternopilska). This might hint that low notification might be due to low testing/referral, indicating that those regions have a potential to increase notification rate and improve case detection just by increasing the number of presumptive people to be tested for TB (Figure 34)

Figure 33. Xpert diagnostic testing rate per 1,000 population by rayons in 2021 and 2024

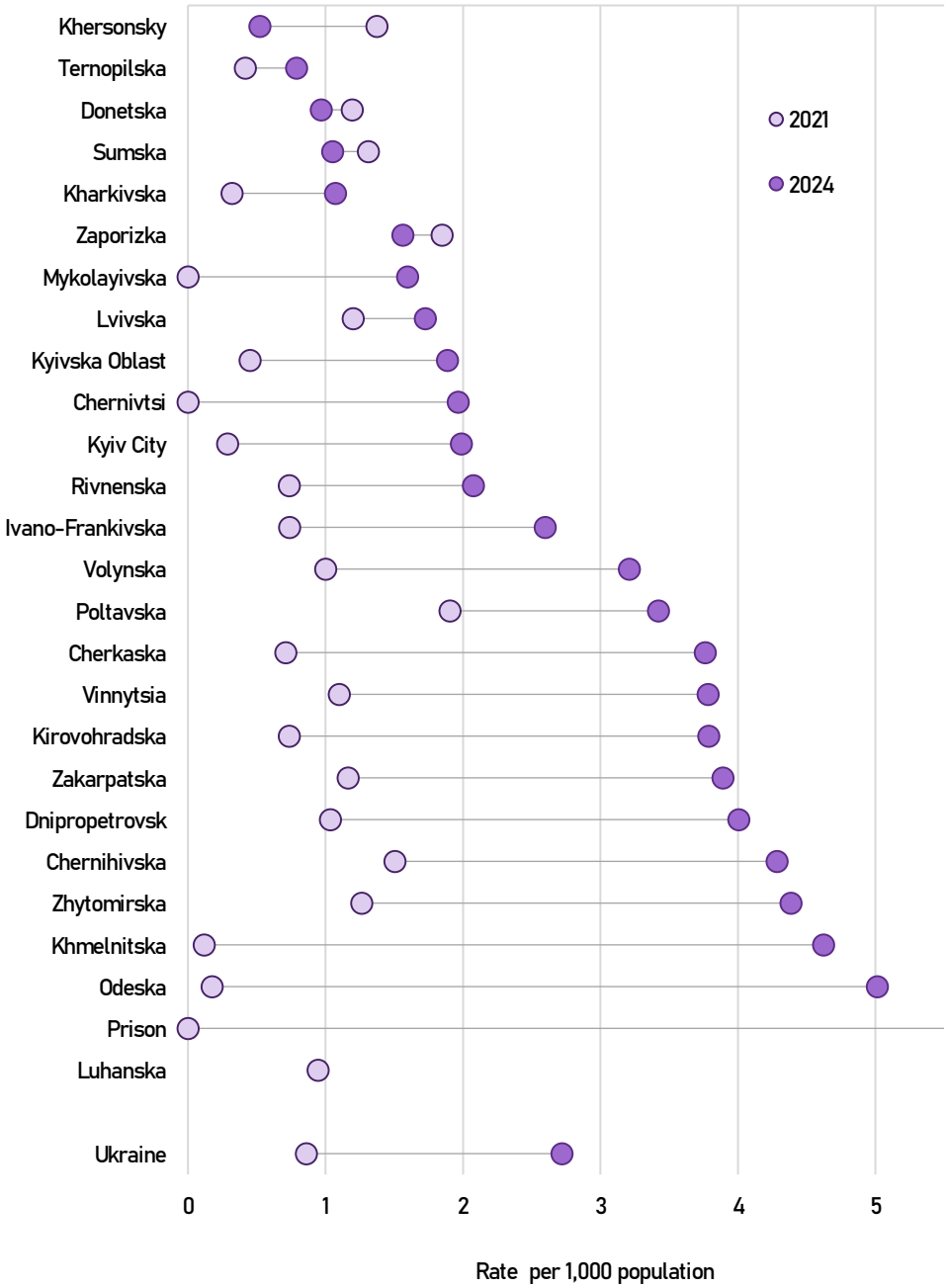
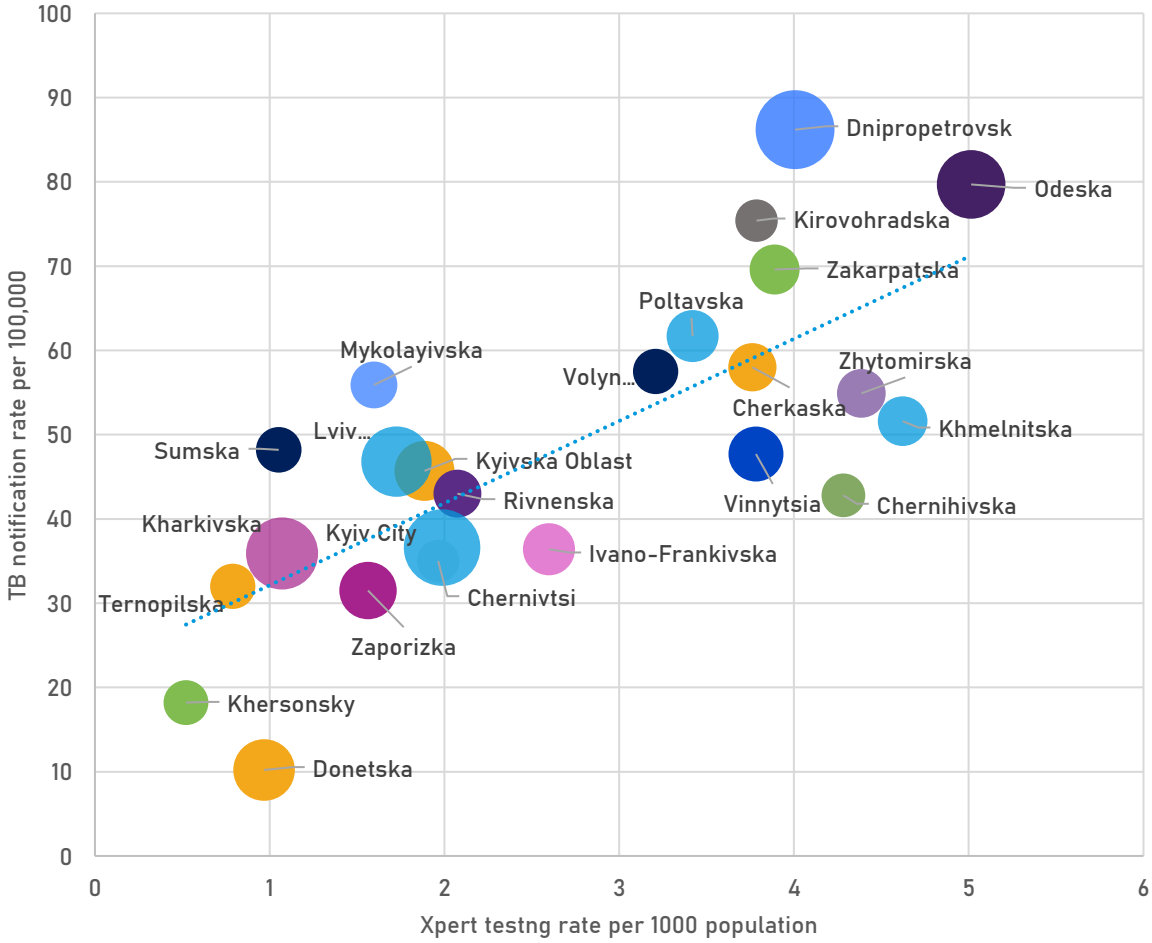


Figure 34. Scatterplot of TB notification rate per 100,000 population against Xpert population testing rate per 1000 population by rayon, 2024

Each circle represents pair of level data point. Size of circle is proportional to rayon population.



GeneXpert test positivity also provides an indication of the level of diagnostic effort in relation to TB burden among tested. Low positivity suggests a lack of precision in deciding who to test, while high positivity among tested suggests suboptimal efforts to detect people with TB in communities. In 2023 Xpert positivity across sub-national units ranged substantially from 5.6% to 31.2%. Five regions reported above 15% positivity, including, Kharkivska, Ternopilska, Mykolayivksa, Khersonsky, Sumska (Figure 35). It is noteworthy that all those listed five region with high positivity also report low Xpert testing rate per capita population indicating that those areas have a good potential to increase TB notification just increasing Xpert testing coverage (Figure 36).

Figure 35. Percentage of people with positive MTB tested by GeneXpert by regions, 2021 and 2024

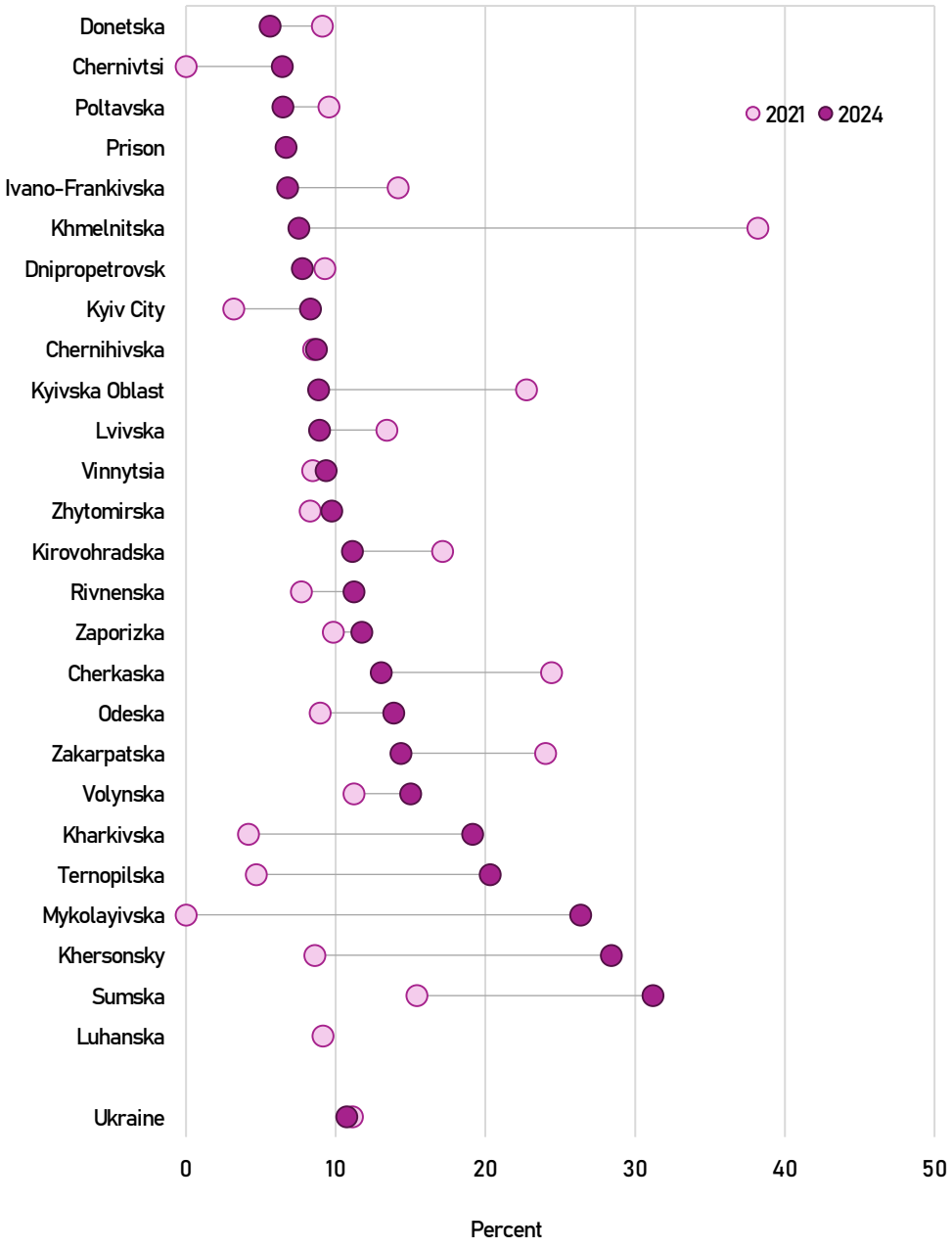
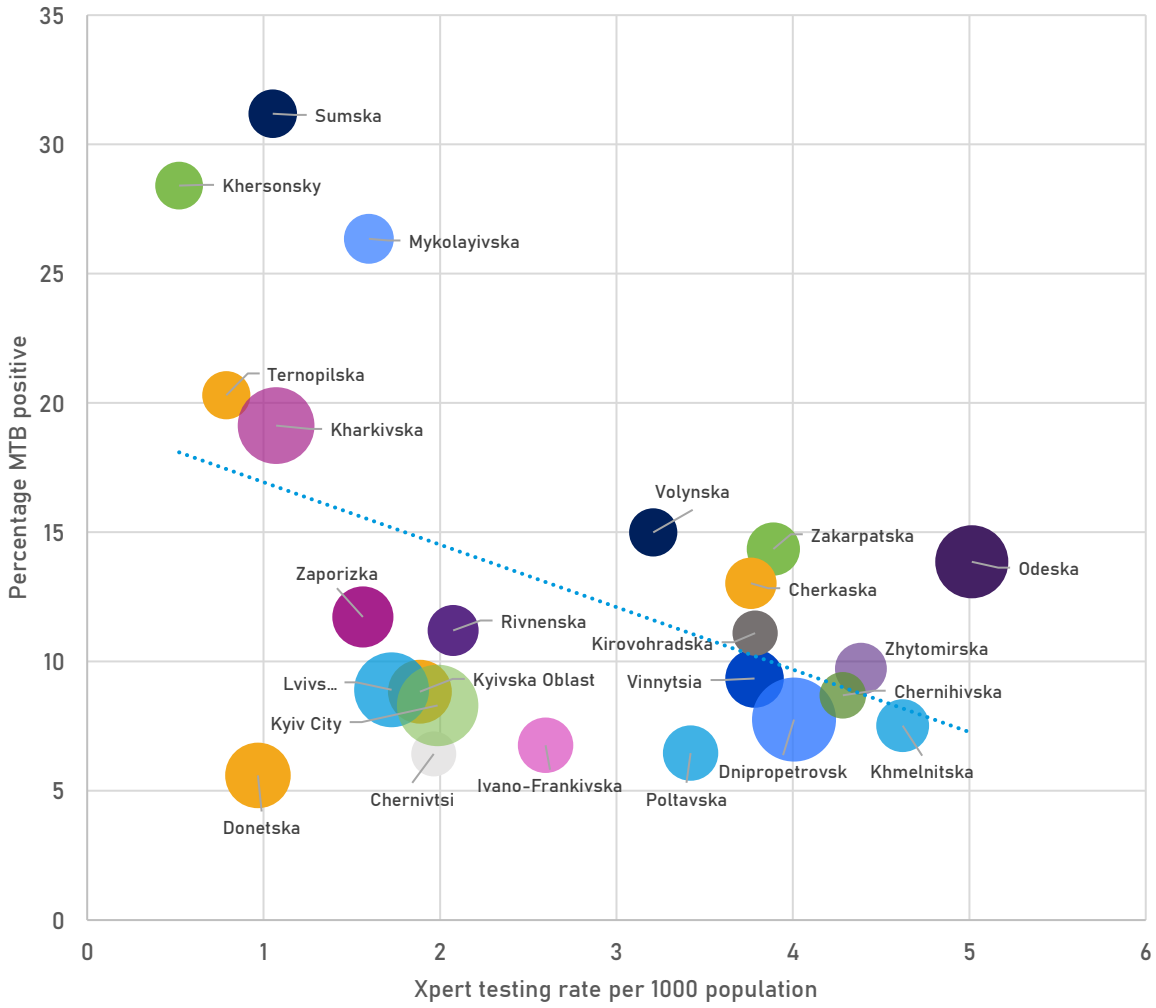


Figure 36. Scatterplot of percentage of people MTB positive among those tested with Xpert against Xpert testing rate per 1000 population by region, 2024

Each circle represents pair of level data point. The size of circle is proportional to rayon population.



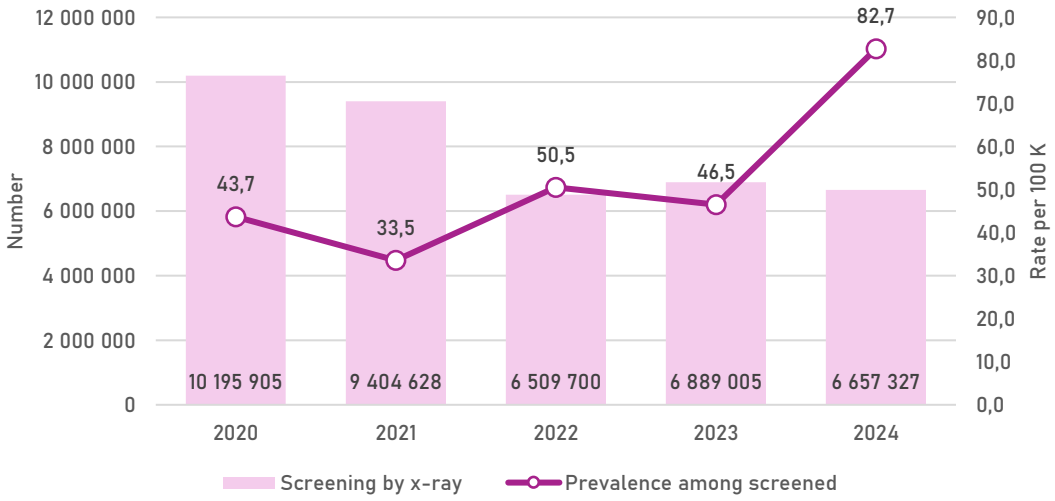
3.5.5. Trend in number of people screened for TB

National guideline define 18 groups of people at risk to be systematically screened for TB and TBI including persons held in temporary detention centers, healthcare workers, homeless people, active smokers, IDUs, alcohol abusers, people living below poverty line, people with BMI below 18, people with pneumonia, people over 60 years of age, pregnant women, persons in psycho-neurological healthcare facilities etc[13]. To reach the people at risk in remote communities mobile radiological installations (machine-based) have been used, which were equipped with CAD. In 2024 in total about 6.7 million people were actively screened for TB, which is 83% of planned. (Figure 37). Highest screening coverage was reported among medical workers (96%), people with pneumonia (93%), and

[13] Наказ МОЗ України від 16.02.2022 року № 302 затверджено Порядок організації виявлення туберкульозу та латентної ТБ інфекції, зареєстрований у Міністерстві юстиції України 30 березня 2022 року за № 366/37702https://moz.gov.ua/uk/decrees/nakaz-moz-ukrayini-vid-01-04-2024-553-pro-vnesennya-zmin-do-nakazu-ministerstva-ohoroni-zdorov-ya-ukrayini-vid-16-lyutogo-2022-roku-302

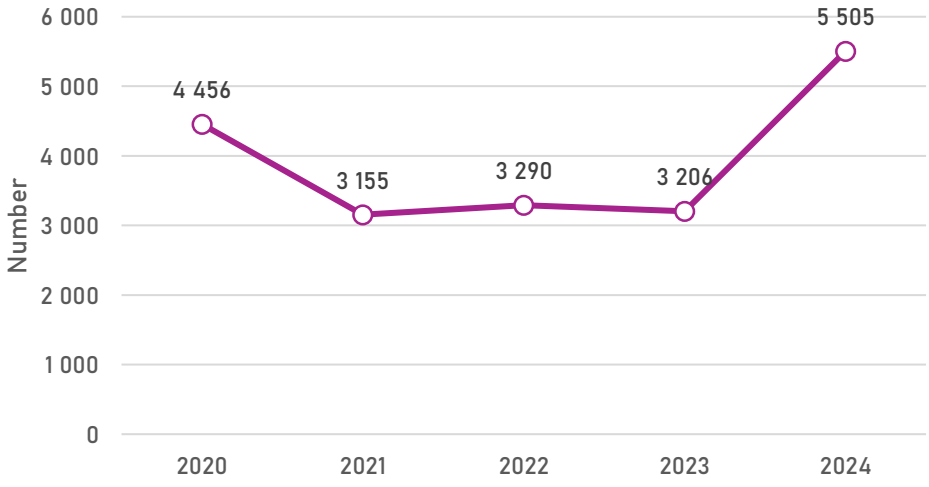
pregnant women (92%). Meanwhile, the lowest screening coverage rates are among people who abuse alcohol or use drugs (68%), people over 60 years of age (69%), people with a BMI <18 (70%), people who have worked in conditions involving exposure to silicon dioxide (71%), smokers (72%), people living below the poverty line (75%), people in neuropsychiatric healthcare facilities (77%), people with newly detected fibrotic residual changes in the lungs who have not received treatment for TB (77%), and people with chronic respiratory diseases (79%). Overall prevalence of TB among screed ranged between 34 to 83 per 100,000: which is below of TB notification among adult population indicating that people screened actually have comparable risk of TB with general population and/or screening method is not sufficiently sensitive/accurate. Despite of comparable number of people screened in 2023 and 2024, the prevalence of TB among screened almost doubled.

Figure 37. Number of adult population screened for TB by chest X-ray and prevalence of TB among screened, 2020-2024



Number of people detected among those screened do not follow the same trajectory as number of people screened, with lowest level in 2021 and reaching to its peak in 2024 with 5,505 people detected among those screened (Figure 38). This makes about 29% of all people notified with TB disease.

Figure 38. Number of people with TB detected by ACF, 2020-2024



3.5.6. Contact tracing and LTBI treatment coverage

According to national guidelines, all household and close contacts of TB patients, regardless of site if disease and bacteriological confirmation are subject of active screening for TB. Total number of identified contacts and contacts U5 between 2019 and 2024 largely varied from year-to-year with sharp decline in 2020, 2021 and 2022. Considering the average number of household size in Ukraine is 2.53, the average number of 2.5 contacts per index case as of 2024 surveillance results is an indication of extensive contact tracing coverage. Between 2019 and 2024 the percentage of people diagnosed with TB among the contacts screened ranged from 1.2% to 4.5% among all age groups and 1.7-6.3% among children U5. There was no clear trend of TB yield among the contacts. Number of child TB cases among contacts varies largely from year-to-year despite of comparable number of screened (Table 3). TB prevalence among contacts in Ukraine is within expected: A meta-analysis based on 203 published studies showed about 3.1% (95%CI 2.2-4.4%) TB prevalence among contacts in low and middle countries and 1.4% (95%CI 1.1-1.8%) among high income countries[14].

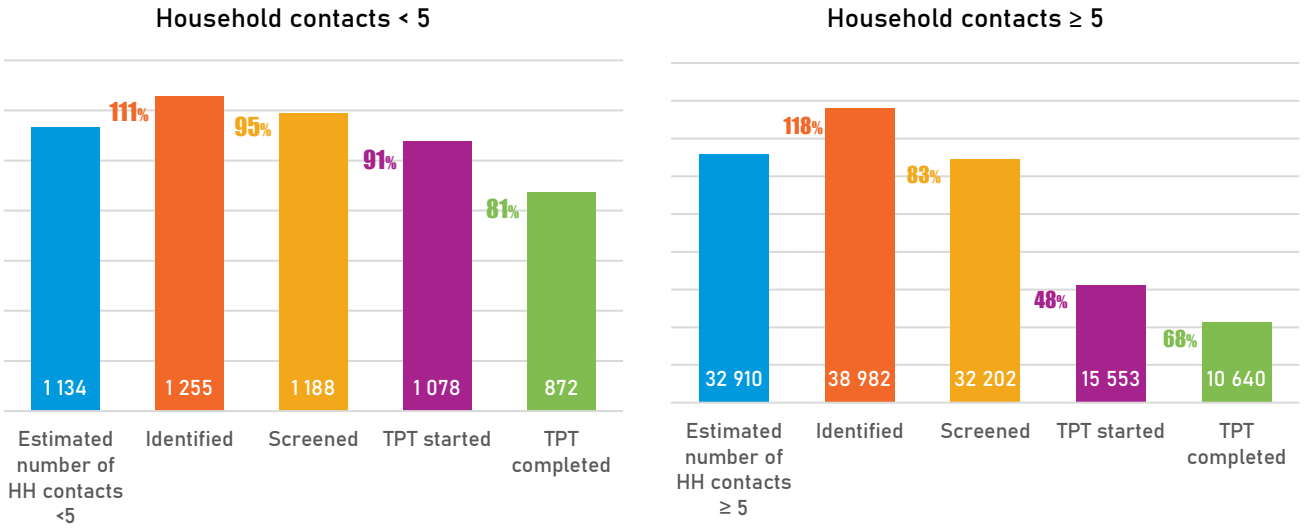
Table 3. Number of TB contacts screened and yield of TB cases among contacts

Year	People with new episode of TB	Number of contacts screened		Mean N contacts identified per index case	TB cases detected among contacts				TPT enrolled	
		<5 yr	all ages		<5 yr	%	all ages	%	<5 yr.	all ages
2019	15,475	2,374	35,422	2.3	47	2.0	426	1.2	2,777	28,846
2020	12,813	1,520	24,226	1.9	26	1.7	473	2.0	1,445	17,454
2021	13,306	1,024	23,552	1.8	65	6.3	576	2.4	953	15,088
2022	13,704	854	24,282	1.8	46	5.4	1101	4.5	771	15,184
2023	14,604	1,030	30,617	2.1	18	1.7	383	1.3	787	17,389
2024	13,456	1,188	33,390	2.5	56	4.7	895	2.7	1,079	16,631

Figure 39 shows cascade of care of household contacts diagnosed with bacteriologically conformed pulmonary TB disaggregated by contacts aged under five and above five years of age. Total number of contacts screened is much higher than expected, which indicates that much wider range of people are investigated, apart close household contacts. Screening coverage of identified also is high reaching 95% among under 5 contacts and 83% among contacts over 5 years. 91% of screened U5 contacts initiate TPT, while only half of screened among those over 5 years initiate TPT. TPT completion with 81% is largest gap in cascade of care of contacts of U5. Among those over 5 years started TPT only 68% completes the treatment.

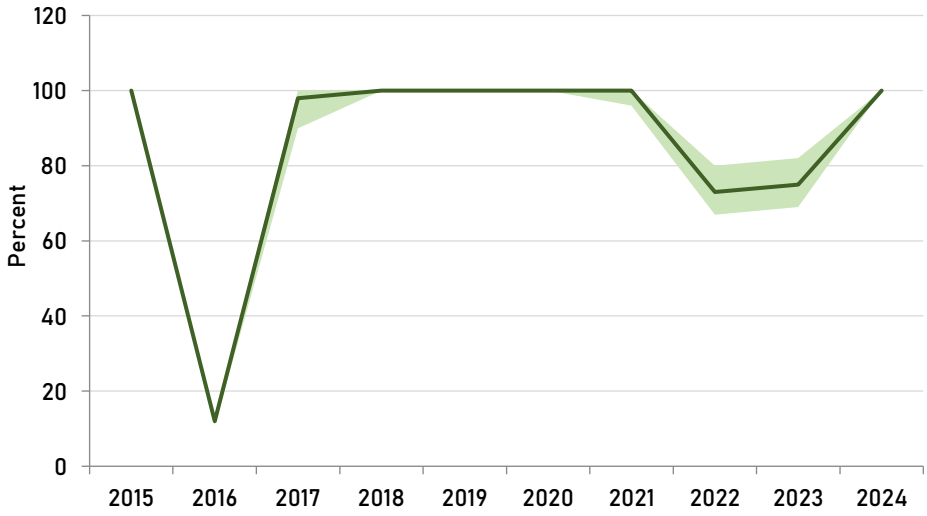
[14] Fox GJ, Barry SE, Britton WJ, Marks GB. Contact investigation for tuberculosis: A systematic review and meta-analysis. *Eur Respir J*. 2013;41(1):140-156. doi:10.1183/09031936.00070812

Figure 39. Cascade of care household contacts of people newly diagnosed with bacteriologically confirmed pulmonary TB, 2024



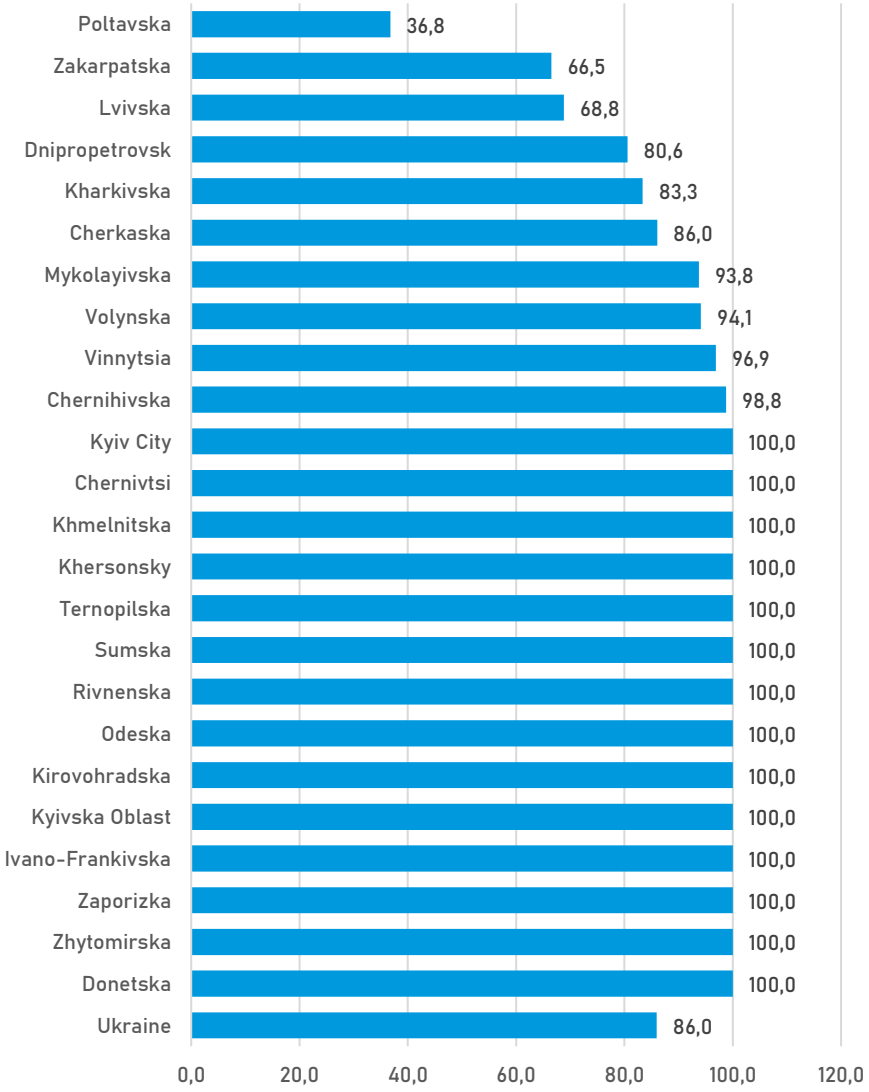
According to WHO estimates accounting total number of pulmonary bacteriologically confirmed cases, household size and percentage of children under 5 years of age among the population, in 2024 there were about 960 (range 870-1,000) children under 5 eligible for preventive TB treatment. Thuse TPT coverage among children as of 2024 is estimated 100%, up from 75% in 2023. (Figure 40)

Figure 40. Trend of TPT coverage among children under 5 years of age, 2015-2024



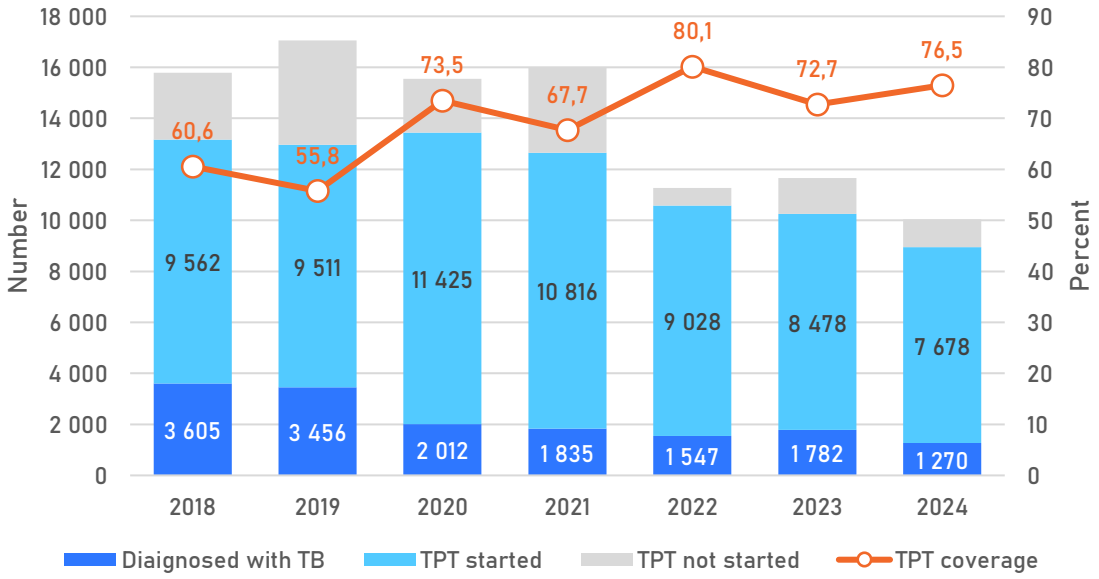
At subnational level in region with reported data on TPT coverage among children under 5 years of age ranged from 37% (Poltavska) to 100% in 14 regions. Overall, only in 6 regions, TPT coverage was below 90% (Figure 41).

Figure 41. TPT coverage among children under 5 years of age eligible for TPT, 2024



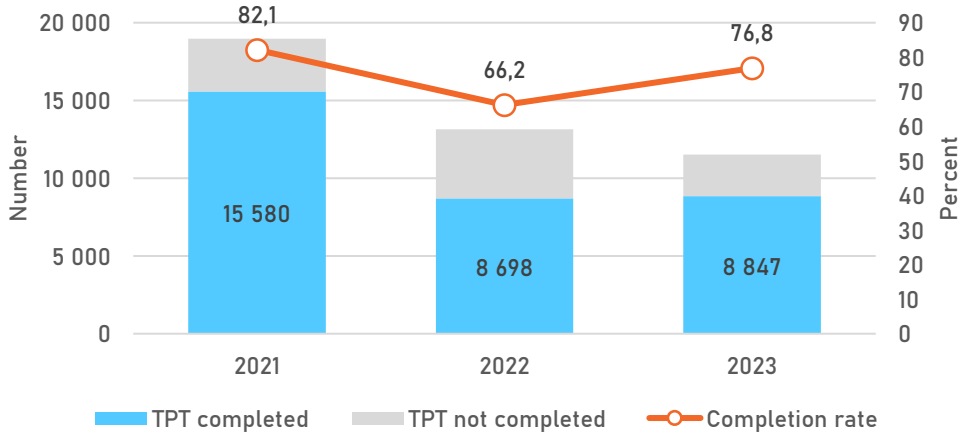
Ukraine has progressively scaled up access to TPT for people living with HIV, aligning with WHO guidelines. These efforts aim to reduce the risk of TB infection progressing to active TB, which is a significant risk factor in immunocompromised individuals. To enhance uptake and completion rate Ukraine introduced and scaled up shorter and more tolerable rifampicin-containing TPT regimen. There was sizable reduction of number PLHIV newly enrolled into ART from 16,000 in 2021 to 11,200 in 2022 and 2023 and even lower in 2024 probably reflecting reduction of overall population size due to migration combined with decreased social activity of population at risk. TPT coveage among PLHIV in 2024 was 76.5%, up from 55.8% reported in 2019 (Figure 42).

Figure 42. Number of PLHIV newly enrolled into ART by TB diagnosis, TPT initiation and TPT coverage, 2018-2024



TPT completion rate among PLHIV between 2021 and 2023 ranged between 66 and 82%, without clear trend over time. This is higher than completion rate among TB household contacts (Figure 43).

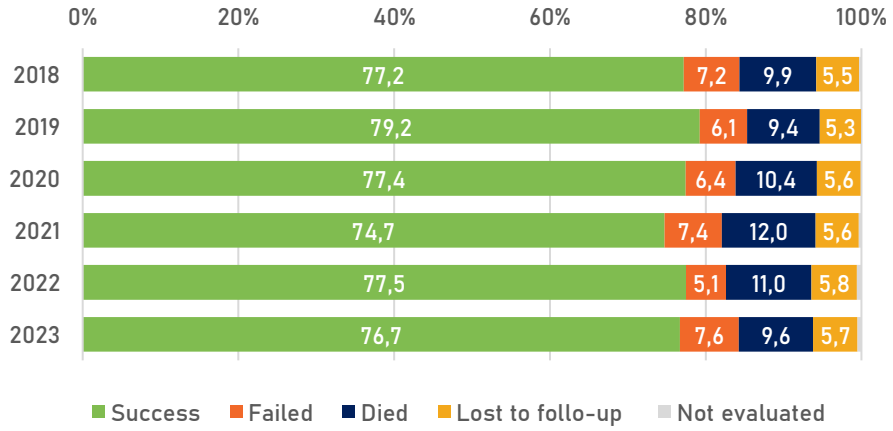
Figure 43. Number of PLHIV started TPT by TPT completion and TPT completion rate, 2021-2023



3.5.7. TB treatment outcome

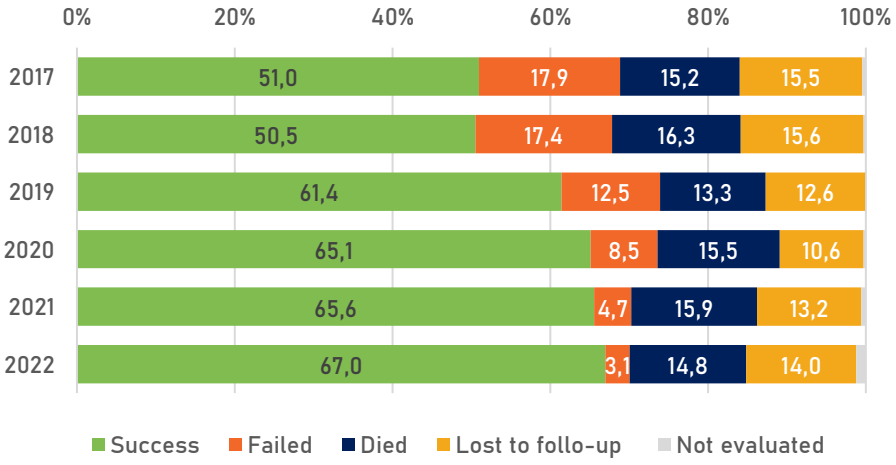
TB treatment is one of the most effective interventions in TB control to reduce the prevalent cases in the population and reduce the transmission of infection. Between 2018 and 2023 the treatment success rate among new and recurrent TB eligible for first-line treatment ranged between 75 to 79%. This is comparable to 75 TSR reported in WHO European region, but somewhat below of Regional target of strategy target of 90% TSR. Main reason of unfavourable outcome is death. High death rate can hint that most likely the patients with TB are detected at the advances stage of disease (Figure 44).

Figure 44. Treatment outcomes of people with episode of TB eligible DS-TB treatment, 2018-2023



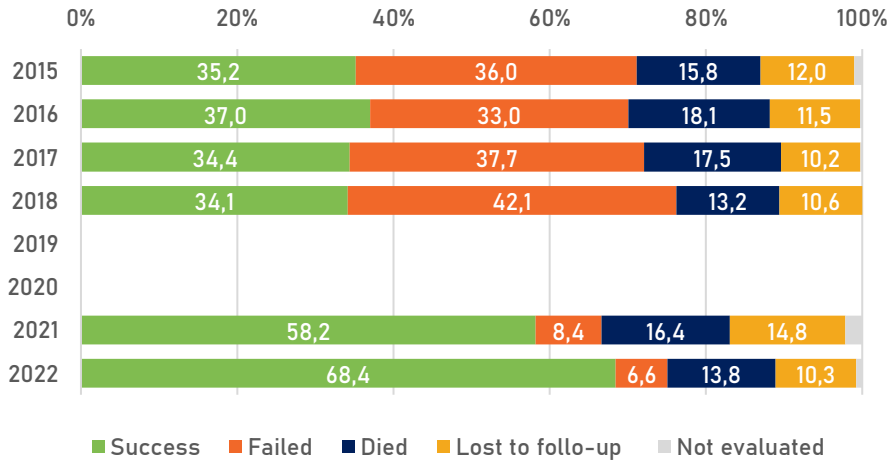
Between 2017 and 2022 treatment success rate among RR/MDR-TB patients without FQ resistance gradually increased from 51 to 67% (Figure 45). Improvement of treatment outcome was attributed largely by the impressive reduction of treatment failure (from 18% in 2017 to 3% in 2022) and partially by the reduction of lost to-follow-up, most likely related to introduction and scale up new fully oral-shorter treatment regimens and rapid methods of testing for FQ resistance.

Figure 45. Treatment outcomes of RR-TB patients without FQ resistance 2017-2022



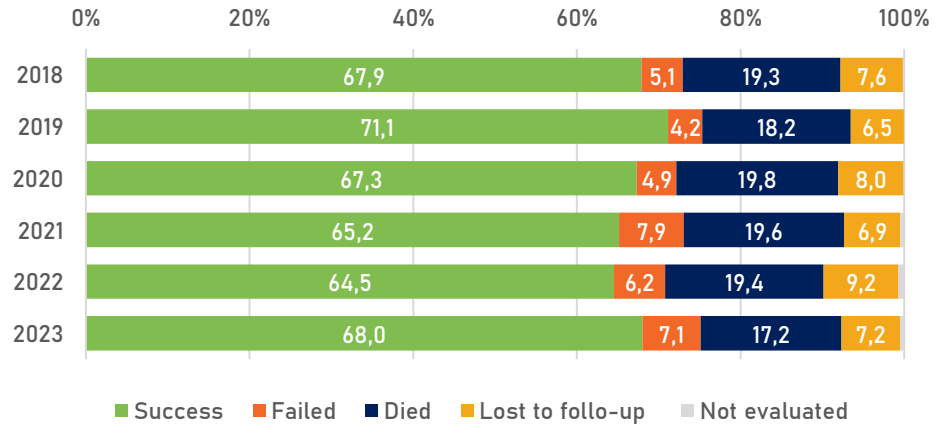
Treatment outcome among people treated for pre-XDR/XDR-TB was 68% in 2022 cohort, up from 58% reported in 2020 and 34% in 2018 treatment cohorts. Improvement was attributed mainly by impressive reduction of percentage of treatment failure. Main reason of unfavourable treatment outcome is death, followed by lost to follow-up (Figure 46).

Figure 46. Treatment outcomes of people treated for pre-XDR/XDR-TB 2015-2022



Treatment success rate among HIV/TB patients in 2023 cohort was 68%. Main reason of unfavorable outcome in TB/HIV cohort is death, which commonly is related to low or inefficient ART coverage among PLHIV, due to lack of adherence or late detection. (Figure 47).

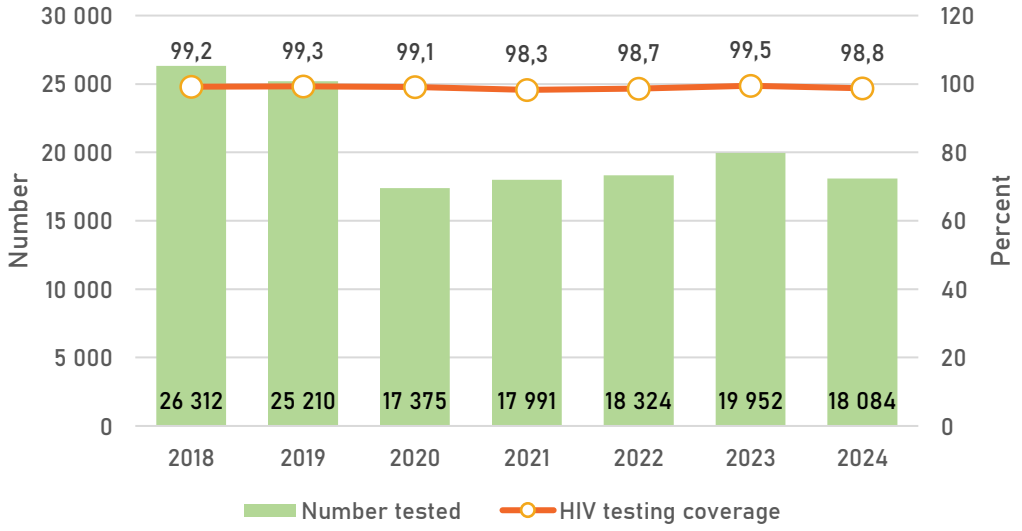
Figure 47. Treatment outcomes of new and recurrent HIV/TB cases 2018-2023



3.5.8. HIV testing and ART coverage people with new episode of TB

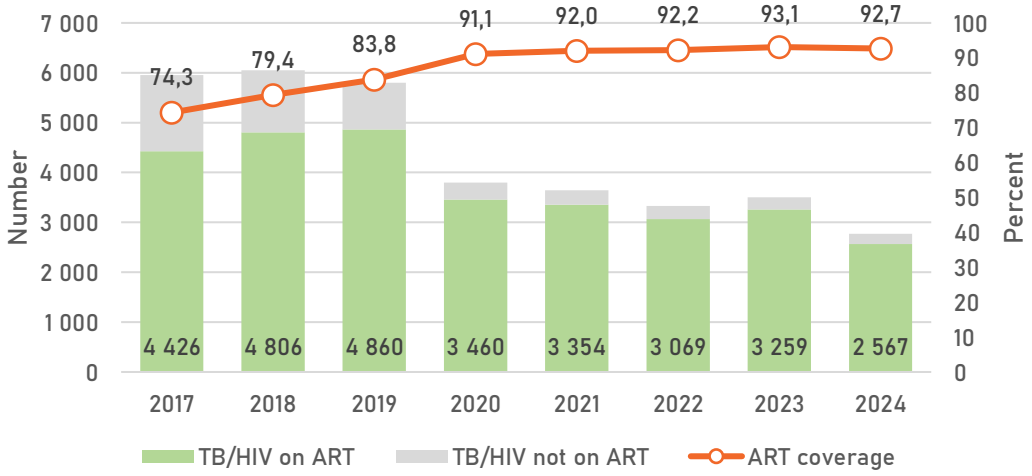
To ensure effective and integrated TB and HIV service delivery, WHO recommends HIV testing for all people diagnosed with TB; provision of antiretroviral treatment (ART) to those who are HIV-positive; as well as regular TB screening for PLHIV; and offer of preventive TB treatment to PLHIV who do not have active TB. HIV testing of among people diagnosed with TB over last 10 years in Ukraine consistently exceeded 95% and in 2024 was 99% (Figure 48).

Figure 48. HIV testing coverage among people with new episode of TB, 2018-2024



ART coverage among people with TB/HIV co-infection has been improving in recent years in the Ukraine. In 2024 ART coverage among people co-infected with TB/HIV has been over 92%, up from 84% reported in 2019 (Figure 49).

Figure 49. ART coverage among people with TB/HIV co-infection, 2017-2024



3.6. TB determinants: External factors

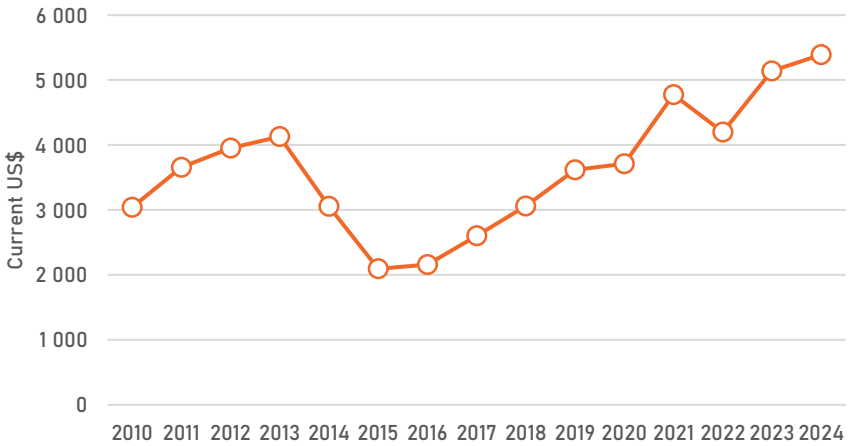
3.6.1. Ongoing war crisis

It is well known that war might worsen the TB epidemic by increasing transmission and mortality, while simultaneously masking the true burden through under-detection and underreporting. The impact on TB notification is complex and involves multiple factors: destruction of diagnostic health facilities and surveillance system (e.g. destruction of electricity power plants resulting power interruptions, interruptions of supervisory visits due to security issues) can result to under-diagnosis and under-reporting. On the other hand, the TB burden may increase during or after war due to war-associated risk factors such as the disruption of TB prevention and control programmes, malnutrition, poor sanitation and hygiene and mass migration of people to relatively safer areas, leading to poor living conditions and overcrowding. These factors may facilitate TB transmission in the affected community and increase the risk of progression from latent to active TB. Those factors also contribute to worse treatment outcomes. These include system- level and individual- level factors such as weakened healthcare systems, a shortage of healthcare workers due to displacement and re-assignment, collapse of infrastructures, malnutrition, a lack of TB medications due to disruptions in the supply chain of life- saving anti- TB medications, de-prioritization of TB during wartime crisis[15]. After Russian invasion in 2022 TB notification remarkably declined in war affected region (Donetska, Kersonsky, Zaporiska). No data is available from Luhanska region. In Central part of the country there was increase of TB notification, especially in the Dnipro region, which has become one of the areas with the highest number of internally displaced persons since hostilities began in 2022[16] (Figure 8). Other indirect impact of war on TB epidemiology includes reduction of TB financing from domestic sources (Figure 30), reduction of the HIV case-findings (Figure 53), sharp reduction of overall population size.

3.6.2. Per capita gross national product

Economic growth is expected to drive TB epidemic to downward. It may affect numerous TB determinants such as overcrowding, education, nutrition and health care-seeking behaviour, and thus contribute to reduced transmission of infection and a reduced risk of progression from infection to disease. Gross National Domestic Product (GDP) per capita is the most commonly used measures of county economic status.

Figure 50. GDP per capita (current US$), 2010–2024



Data source: https://data.worldbank.org/indicator/ny.gdp.pcap.cd

[15] Gebreyohannes EA, Wolde HF, Akalu TY, et al. Impacts of armed conflicts on tuberculosis burden and treatment outcomes: a systematic review. BMJ Open 2024;14:e080978. doi:10.1136/ bmjopen-2023-080978

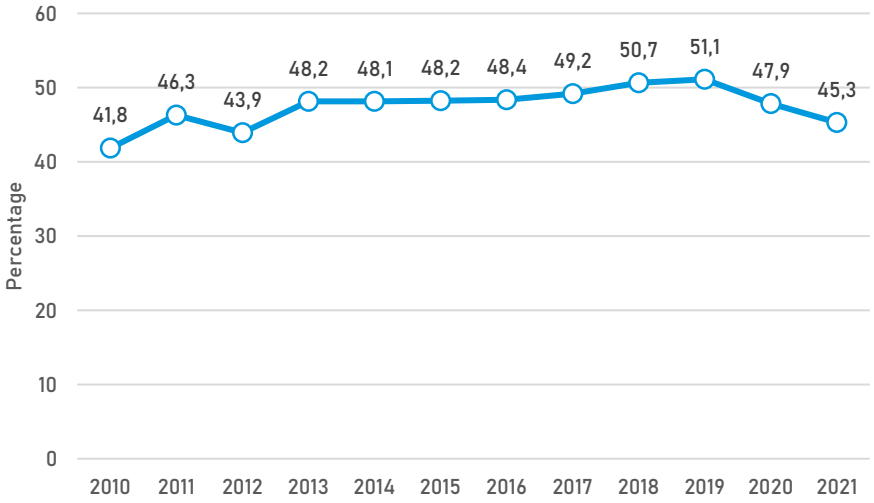
[16] International Organization for Migration (IOM). Ukraine — Internal Displacement Report — General Population Survey Round 16. April(2024). https://dtm.iom.int/reports/ukraine-internal-displacement-report-general-population-survey-round-16-april-2024?close=true(2024).

In 2024, Ukraine was promoted to the upper middle-income countries for 2024 fiscal year, an increase from its previous lower-middle income status. This classification reflects increase of Ukraine's increase of GDP per capita, driven by economic recovery and population decline following 2022 invasion. (Figure 51)

3.6.3. Coverage of financial protection for health care costs

As of 2021, 45% of total health expenditure in Ukraine was covered by out-of-pocket (OOP)[17], which is hight. Since 2010, the proportion covered by OOP has been largely stable (Figure 51). According to WHO general benchmarks for middle-income countries OOP should ideally be kept below 20%. Therefore, access to quality health care still might be not affordable for many vulnerable people at highest risk of TB in Ukraine.

Figure 51. Out-of-pocket expenditure as a percentage of current health expenditure, 2010–2021



Data source: https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS

3.6.4. Prevalence of HIV in the general population and ART coverage

Before the war, UNAIDS estimated that about 260.000 people were living with HIV in Ukraine. However, there is no up-to-date country incidence published by UNAIDS, as ongoing war, loss of administrative control in certain regions, missing persons, and mass displacement affects the accuracy of overall assessment[18]. Despite the war, Ukraine managed to sustain its HIV response, with 143,600 people receiving antiretroviral treatment in 2023, and around 7,900 refugees and 1,900 returnees receiving HIV care abroad[19].

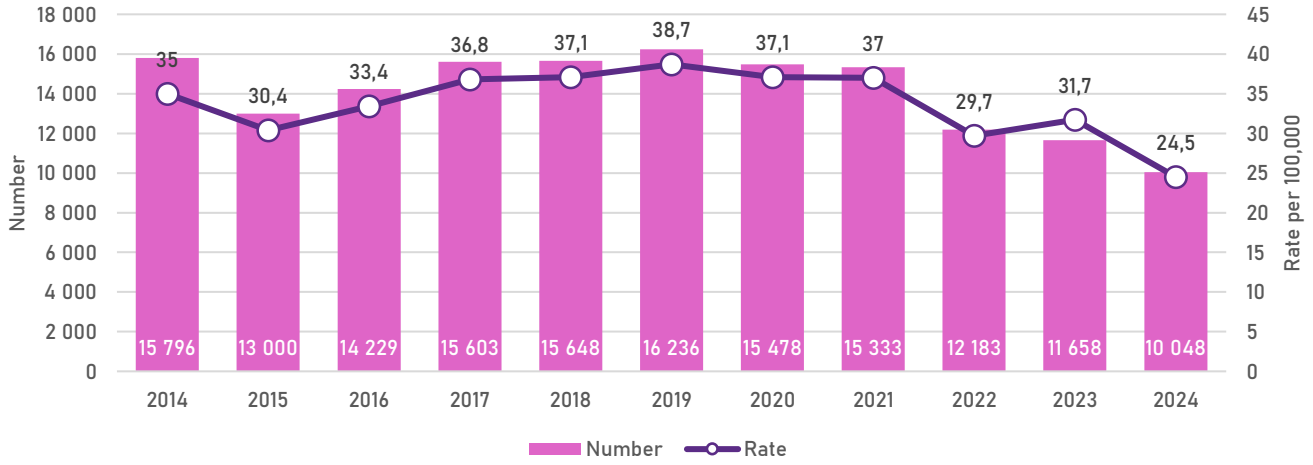
According to routine surveillance in 2024 in total 10,048 people were diagnosed with HIV. This is 38% lower compared to pre-COVID 2019 reporting year and 34% lower compared to pre-war 2021 reporting year (Figure 52). Such sharp decline most likely is combination of multiple factors including, war-related disruption of continuous data-collection system, displacement, and limited control over occupied territories, population decline and reduced social activity of population at risk due to increased stigma, and fear to be mobilized into military forces.

[17] Out-of-pocket expenditure (% of current health expenditure) [online]. Washington, DC: World Bank (https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS accessed 14 September 2025)

[18] "Tree Years On: From crisis to recovery… if possible" https://www.unaids.org/en/War-Ukraine-special?utm_source

[19] https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2024/july/20240722_eastern-europe-central-asia?utm_source=chatgpt.com

Figure 52. Trend number of people diagnosed with HIV (all ages) and rate per 100,000 population

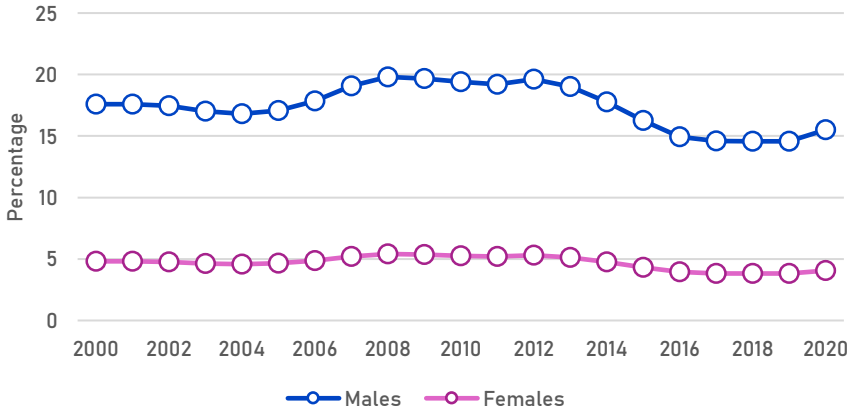


3.6.5. Alcohol consumption

Alcohol consumption has been shown to increase the risk of infection and subsequent mortality from tuberculosis and lower respiratory infections by suppressing a wide range of immune responses via multiple biological pathways, particularly in people who engage in heavy episodic drinking or who chronically consume large amounts of alcohol. The risk rises with the increase in levels of alcohol consumption. There is a three-fold increase in the risk of tuberculosis associated with a diagnosis of alcohol use disorder. People with alcohol use disorders are at greater risk for delayed health-seeking behaviour, poor treatment adherence, treatment failure, and drug-resistant tuberculosis infection. According to WHO estimates in Ukraine, about 4,900 (UI:1,500-3,400) TB cases estimated to occur in Ukraine in 2023 are attributed to alcohol use disorder.

Alcohol per capita (15+) consumption (in L of pure alcohol) in 2020 was 9.2 liters (15.5 L among males and 4.05 among women), which is higher compared to the European average of 8.9 L recorded in 2020 (Figure 53)[20].

Figure 53. Total alcohol consumption per capita, (liters of pure alcohol) male and females 15+ years of age)

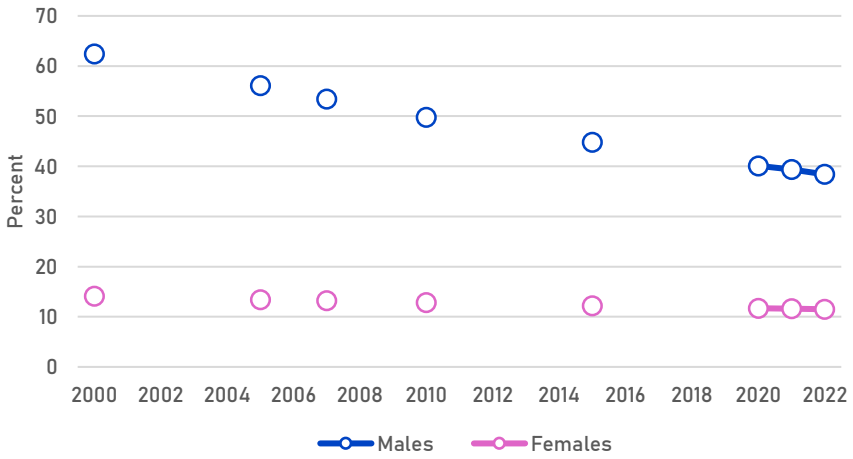


[20] Alcohol consumptions, males (% adults) Washington, DC: World Bank (https://data.worldbank.org/indicator/SH.ALC.PCAP.MA.LI. accessed 04 September 2025) and Alcohol consumptions, females (% of adults) [online]. Washington, DC: World Bank (https://data.worldbank.org/indicator/SH.ALC.PCAP.FE.LI accessed 04 September, 2025)

3.6.6. Smoking

Tobacco consumption doubles the risk of developing TB and remains a serious public health issue in the Ukraine. Smoking prevalence since 2000 declined both in sexes but remain comparatively high. In 2022, the prevalence of male and female smokers in the country was 38.4% and 11.5%, respectively[21] (Figure 54).

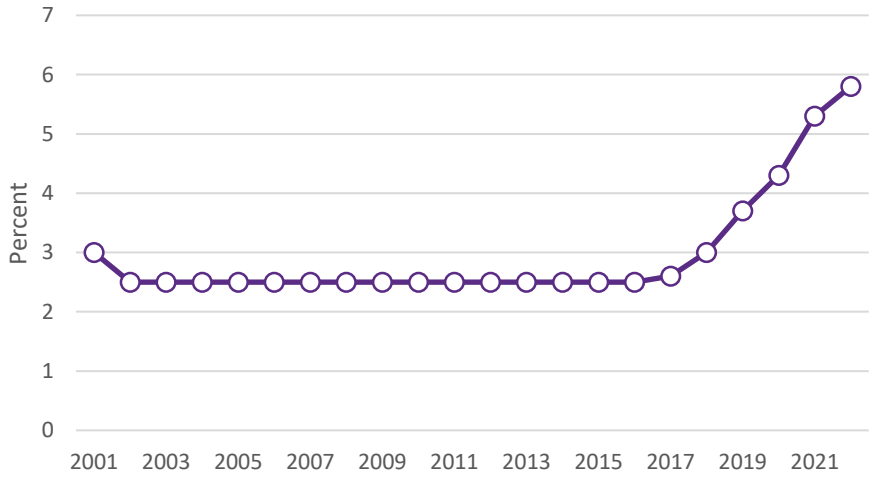
Figure 54. Trend in prevalence of smoking in adult males and females



3.6.7. Malnutrition

Malnutrition almost triples the risk of TB. It is a proximate risk factor for TB with its effect of impairing the host defence against infection. Up to 2017 the prevalence of malnutrition in Ukraine was stable and low level and then sharply increased. As of 2022 it was estimated that about 5.8% of the population was undernourished (i.e., they received below the minimum level of dietary energy consumption, also referred to as 'prevalence of undernourishment')[22]. (Figure 55)

Figure 55. Trend in prevalence of undernourishment (% population), 2001–2022



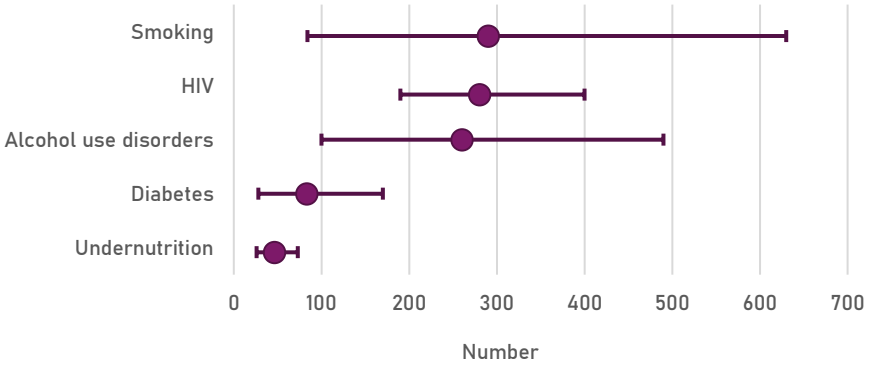
[21] Smoking prevalence, males (% of adults) [online]. Washington, DC: World Bank (https://data.worldbank.org/indicator/sh.prv.smok.ma accessed 04 September 2025) and Smoking prevalence, females (% of adults) [online]. Washington, DC: World Bank (https://data.worldbank.org/indicator/sh.prv.smok.fe accessed 04 September 2025)

[22] Prevalence of undernourishment (% of population) [online]. Washington, DC: World Bank (https://data.worldbank.org/indicator/SN.ITK.DEFC.ZS accessed 04 September 2025)

3.6.8. Diabetes Mellitus

Diabetes triples a person's risk of developing TB. In 2024 according to the International Diabetes Federation (IDF) there are 2,3 million people living with diabetes in Ukraine, equivalent to 8% prevalence[23] among people aged 20-79 years. Almost one in three adults (36.9%) with diabetes in Ukraine are undiagnosed (840 thousand people). The relative contributions of key risk factors of tuberculosis are presented in the figure 56 which could be considered in prioritizing TB control interventions. As it is shown above the risks of TB in Ukraine are associated with so-called modern risk risks such as smoking, HIV, alcohol use, while "traditional risks" which are associated with poverty, such as undernutrition has little contributing impact on TB burden in the country.

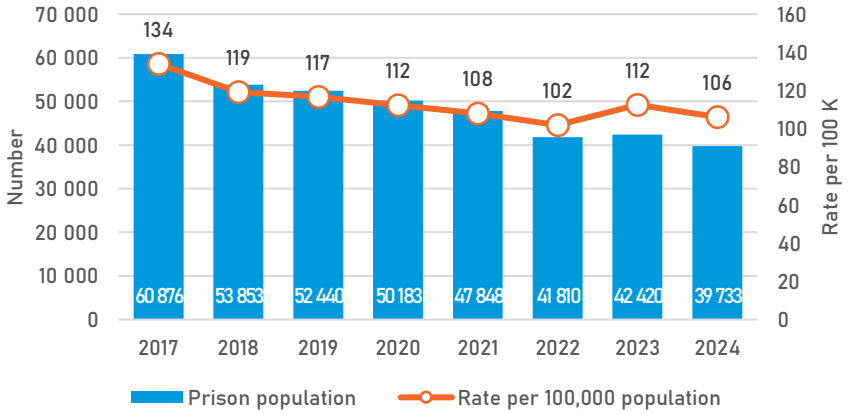
Figure 56. Estimated number of TB cases attributable to five risk factors, 2023



3.6.9. Incarceration rate

The level of TB in prisons has been reported to be up to 100 times higher than that of the civilian population[24]. Therefore, the changes in incarceration rates might notably affect county TB epidemic. Between 2017 and 2024 both incarceration rate and absolute number of prison population declined in Ukraine (Figure 57). As of 2023 the incarceration rate in Ukraine was 106 per 100,000, which is lower than the global median incarceration rate of 149 per 100,000 population[25].

Figure 57. Trend in number and rate of prisoners per 100,000 population



[23] IDF Diabetes Atlas 11th edition 2025: [online] (https://www.diabetesatlas.org/resources/idf-diabetes-atlas-2025/) accessed 10 October 2025

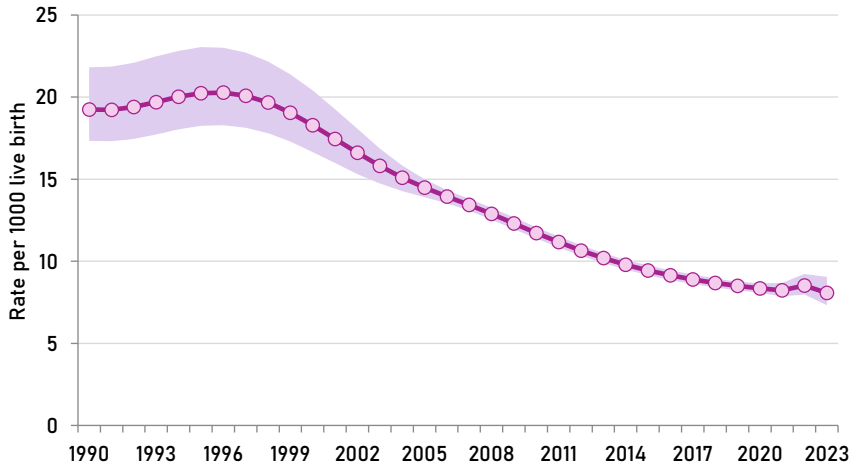
[24] Tuberculosis in prisons. Fact Sheet. https://www.who.int/tb/areas-of-work/population-groups/prisons-facts/en/

[25] World Prison Brief Data, [online]. https://www.prisonstudies.org/highest-to-lowest/prison_population_rate?field_region_taxonomy_tid=All

3.6.10. Under-5 mortality

It is assumed that an improvement in the general population's health is associated with a decreased TB burden. Under-five mortality is commonly used as a proxy indicator of overall population health and therefore for access to health services. The figure below shows the estimated trend in under-five mortality in Ukraine since 1990. Under-five mortality in Ukraine steadily declined starting from 1996. Since 2015 it remains below 10 cases per 1000 live births[26]. (Figure 58). This suggests that population health and access to health care have improved in Ukraine over this period, which could contribute to reductions in the burden of TB. It should be noted that since 2022 under-five mortality slightly increased and has much wider uncertainty interval due to impact of war.

Figure 58. Under-five **mortality** rate in Ukraine, per 1000 live births, 1990–2023



[26] UNICEF [online] https://data.unicef.org/topic/child-survival/under-five-mortality/ accessed 11 October, 2025

4. Synthesis

4.1. Key TB epidemiological trends of TB and program performance indicators

- Number of people diagnosed with new episodes of TB declined in 2024 relative to 2023. In 2024 for the first time after COVID pandemic absolute number of people notified with new episode of TB declined compared to previous year. The precise calculation of the TB notification rate in Ukraine poses significant challenges due to uncertainties regarding the actual size of the underlying population. Population estimates may be imprecise because of war-associated migration, displacement, and demographic shifts. These uncertainties complicate the computation of accurate notification rates, making it difficult to reliably assess trends and compare data over time or across regions. Based on UN population estimates, the TB notification rate is 48.9 per 100,000. However, if a current population of 31.1 million for Ukraine in 2024 is assumed[27], the TB notification rate would be to 61.5 per 100,000 population, which represents a significant rise compared to the pre-COVID period in 2019.

- Over recent years the percentage of bacteriological confirmation among people with new episode of pulmonary TB constantly improved. From 2017 to 2024, both bacteriologically confirmed and clinically diagnosed PTB cases declined, with clinical diagnoses decreasing more rapidly. As a result, the proportion of bacteriologically confirmed cases rose from 61% to 70%. Ukraine now meets the WHO external consistency standard (B.1.6) for the first time.

- There was an unprecedented and significant decrease in the percentage of RR/MDR-TB among people diagnosed with new and previously treated pulmonary TB who were tested for rifampicin susceptibility. In 2024, the proportion of RR/MDR TB among people diagnosed with new pulmonary TB was 22.1%, representing a decrease from the pre-COVID level of 27.2% in 2019. Similarly, the percentage of RR-TB among previously treated cases in 2024 was 32.2%, down from 42.9% in 2019. Although Ukraine has all prerequisites for high-quality routine drug-resistance surveillance—including high bacteriological confirmation, universal access to drug-resistance testing, and quality-assured laboratory services—the rapid decline in the percentage of RR-TB should be interpreted cautiously. This is especially important given ongoing programmatic challenges, such as the completeness and quality of the surveillance system and uncertainties regarding the underlying population. For instance, increased risk of primary loss to follow-up, especially among displaced population, lack of integration between laboratory module and electronic TB register, lack of automated connectivity, under-reporting and reduced face-to-face supervisory visits, may have affected the accuracy of reported data. More in-depth trend analysis at the regional level reveals patterns that appear implausible, such as significant year-to-year fluctuations and time points where the trends for new and retreated cases converge, diverge or intersect. In some instances, the percentage of new cases even exceeds that of retreated cases, which is highly unlikely. This support concerns that the reported decline of RR/MDR-TB percentage most likely is not authentic.

[27] Стратегія демографічного розвитку України на період до 2040 року https://ageing-policies.unece.org/browse-policy/3189

- A significant reduction in the percentage of HIV among individuals diagnosed with new episodes of TB was observed. In 2024, HIV prevalence among those diagnosed with new TB episodes was 15.3%, compared to 23% prior to COVID-19 in 2019. This trend may be partly attributable to expanded TPT coverage among PLHIV. Additionally, regions in the eastern part of the country—historically exhibiting the highest TB/HIV burden—have been substantially impacted by war, resulting in large-scale displacement and migration. However, further analysis at sub-national level reveals that the notable decline occurred predominantly in regions not affected by the war, including those accommodating significant numbers of internally displaced persons. Most regions also exhibit considerable and implausible year-to-year variation. Collectively, these findings suggest that the observed decrease in HIV prevalence among people with new episode of TB is unlikely to reflect a genuine reduction in the national TB/HIV burden.

- Percentage of childhood TB in Ukraine is lower compared to other counties with similar population structure. This might be explained by possible underdiagnosis and under-notification. Under-diagnosis most likely is more pronounced among children under 5 years of age as Ukraine doesn't meet standard of child surveillance (B.2.3) which stipulates that notification rates ratio for children 0-5 over those aged 5-14 years should be between 1.5-3. A record-linkage analysis conducted in three regions using 2019 data revealed a 57% under-notification rate among children diagnosed with bacteriologically confirmed TB. As the proportion of childhood TB has remained largely stable since 2019, it is probable that under-notification continues to be an on-going concern.

- Key programmatic performance indicators remain at high level. Despite ongoing challenges associated with war and its impact, major performance metrics such as Xpert testing coverage among people with new episode of TB, HIV-testing coverage, ART coverage among people with TB/HIV co-infection, FQ-testing coverage among people with RR-TB maintained high levels, achieving or approaching national and regional targets.

- Significant improvements have been observed in the effectiveness of TB treatment outcomes among people treated for RR/MDR-TB without fluoroquinolone resistance, as well as among those pre-XDR and XDR-TB. In the 2022 treatment cohort, the treatment success rate of people with RR/MDR-TB and pre-XDR/XDR-TB reached 67% (an increase from 51% in the 2017 cohort) and 68% (up from 35.2% in 2017), respectively. The enhanced treatment success rates are attributed to a reduction in treatment failures, likely associated with the introduction and gradual scale-up of shorter, all-oral regimens utilizing new and repurposed medications, along with the expansion of patient-centred approaches such as video-observed therapy (VOT).

4.2. Strengths of Surveillance system

Quality of surveillance

- TB surveillance system in Ukraine is designed to capture all core variables recommended by WHO. There is a smooth data flow across the primary, regional and national levels. Data transmission is implemented on continuous basis.
- In 2023 Public health centre introduced locally developed web-based information system of socially significant disease (IS SSD) replacing e-TB manager. New system integrates notifications and outcomes of socially significant diseases (TB, HIV/AIDS, viral hepatitis B and C, STIs) into one singly platform, allowing to view and share data across the modules of specific diseases. Presence of an established electronic system at primary, regional and national levels is one of the key achievements of the surveillance system in country. System is enhanced with numerous validation checks and functionalities to ensure data completeness and accuracy in the electronic system. The system allows the identification of patient-level data at the national level (identify multiple episodes of TB in the same person). Transmission of data from the first subnational administrative level to the national level is implemented on real-time basis.
- Bacteriological confirmation among pulmonary TB case in recent years increased and at national level reached to WHO set benchmark of for bacteriological confirmation of 70% for 2024 reporting year.

- Other important strength of surveillance quality is the high access to HIV testing, Xpert testing, drug-susceptibility testing to second-line drugs which allows to monitor the trends of TB epidemic over the time and area for the timely and tailored interventions.
- Ukraine scaled up additional digital tools for treatment adherence and community-based monitoring, including the Video Support Treatment (VST) application, *evriMed* electronic pillboxes and *SMS-reminder* for monitoring RR-TB patients; and the One Impact mobile app for community-based monitoring of TB services

Coverage of surveillance system
- TB notification in Ukraine is legal requirement.
- All types of TB cases are notified including MDR/RR-TB cases, those diagnosed in private sector, penitentiary system, identified post-mortem, as well as those that didn't show up after diagnosed or refused to start the treatment.
- There was an improvement of access to health care services expressed by decline of child mortality, decline of OOP which is an indirect indication of improved access to TB care.

Use of data and informed decision making
- NTP central team is staffed by highly skilled and motivated staff members. Additional personnel from other departments are engaged as needed, maintaining coordination with international partners and supporting cross-sectoral collaboration.
- Ukraine scaled up additional digital tools for treatment adherence and community-based monitoring, including the Video Support Treatment (VST) application, *evriMed* electronic pillboxes and *SMS-reminder* for monitoring RR-TB patients; and the One Impact mobile app for community-based monitoring of TB services
- There are numerous operational studies based on routine surveillance data conducted at national and sub-national level published in peer-reviewed articles. Routine surveillance data are used for informed decision making, identification of area with issues, targeted interventions.
- Detailed visually attractive annual surveillance report with analysis against the target and interpretation of results is produced on annual basis and available online for the wide public.

4.2. Challenges of surveillance system

Quality of surveillance
- MIS is stand-alone, without any interoperability with other systems. The system has no dashboard, auto-generated reports and there are no built-in features to produce time-series analysis tables, figures. Modules are missing for nominal presumptive TB patient, laboratory results, close contacts and preventive TB treatment.
- There is no Monitoring and Evaluation manual in place to guide data validation, indicator definitions, and interpretation, which limits standardization of practices, consistency in reporting, and the ability to ensure data quality across all administrative levels
- The Laboratory module of the IS SSD system permits entry of laboratory results only for confirmed TB cases, and does not allow registration of results for presumptive cases, which limits the ability to monitor diagnostic coverage, evaluate testing performance, and analyze the full diagnostic pathway
- System is not connected with the laboratory machines with electronic outputs (Gene-Xpert, Bacteck). Laboratory data manually is entered into several systems.
- Diagnosis of childhood TB presents a challenge in Ukraine. The benchmark of rate ratio of children U5 to those 5-14 years is much lower than expected, indicating that either children U5 are overlooked or/and those who aged 5-14 are over diagnosed.
- Suboptimal bacteriological confirmation in some of area noted, suggesting possible over-diagnosis or issues in bacteriological confirmation.

Coverage of surveillance system
- The gap between estimated and notified TB cases in the Ukraine remains wide, suggesting that TB notification can't be considered as a good proxy of TB incidence due to possible under-detection and under-notification. Health services have sub-optimal capacity to detect all TB patients because of

limited access to health care services and high prevalence of risk factors (such as alcohol use) preventing timely health care seeking and adherence to long-lasting treatment.

- According to current guidelines the registration of TB cases identified at tertiary centers (including National Institute of Phthisiology and Pulmonology named after F.G. Yanovsky, the National Children's Specialized Hospital "OKHMATDYT" of the Ministry of Health of Ukraine and the state institution "Institute of Epidemiology and Infectious Diseases named after L.V. Gromashevsky", National Academy of Medical Sciences of Ukraine) should be registered at the place of actual residence. However, large under-notification among children shown by inventory study indicates that most likely large number of people treated in those institutions are not notified in their place of residence and remain invisible for TB surveillance.
- An analysis of data regarding the number of individuals tested using Xpert reveals regional disparities in the practice of presuming tuberculosis (TB) and testing for active TB, both on a per capita basis and relative to the number of people notified with TB. Regions exhibiting lower per capita testing rates and higher positivity have significant potential to improve TB notification rates by increasing referrals for TB testing and utilizing Xpert as the primary diagnostic tool for TB.
- Out-of-pocket expenditure out of total health expenditure, UHC index in Ukraine despite of improving trends, still do not meet WHO benchmarks, indicating that access to quality health care services in Ukraine is sub-optimal. This means that there might be people with TB that are not detected by health systems due to financial barriers and/or health system capacity.
- Excessive percentage of positivity in some subnational area suggests that in those areas only people with obvious clinical signs and symptoms are diagnosed and there might be people with TB who are not presumed to have TB the disease and are missed by systems.
- Notification of TB among children under five years of age is below what would be expected in reference to knowledge of TB epidemiology and evidence demonstrated in high-performing countries with good TB surveillance systems, suggesting that most TB cases among children under five years of age are under-detected and/or under-notified

4.3. Recommendations

Strengthen quality of the TB surveillance system

- Aim to automate the integration or importation of data generated by other electronic systems (such as laboratory systems, digital X-ray, etc.) into the IS SSD without requiring manual data re-entry. Integrate all other systems with the TB electronic system using the systematic application of personal identification numbers (UNZR)[28] and/or other unique identifier, so that the IS SSD data collection system serves as a single source to generate all programmatic data.
- Discontinue entering the same laboratory data into several systems. Instead, all laboratory test results should be either entered through automated connectivity (in case of Gene Xpert) or entered directly into IS SSD, to reduce workload of laboratory staff, minimise errors and, ensure timely data submission and timely identification of initial loss to follow-up.
- Introduce electronic case-based modules for contact tracing and TPT.
- Create data dictionary and keep it updated.
- Develop a national M&E manual that defines indicators, validation procedures, and reporting standards to improve data quality, harmonize practices, and support evidence-based decision-making

Strengthen coverage of the TB surveillance system ("missed" TB cases)

- Given unplausible sharp decline of RR-TB prevalence among new and previously treated and HIV prevalence among new episode of TB, review team presumes that like child TB cases, considerable number of individuals with RR-TB and TB/HIV due to complexity of their management are treated exclusively at tertiary level health facilities. Because tertiary facilities are not connected with the IS SSD and probably do not adhere to TB notification guidance, childhood TB, RR-TB and TB/HIV cases disproportionately are omitted from the surveillance system resulting under-notification. To address these gaps, it is essential to improve data linkage between tertiary facilities and the IS SSD, ensuring that all TB cases—including RR-TB, TB/HIV, and childhood TB—are captured in the surveillance system. Strengthening collaboration with tertiary centers and providing targeted training on notification protocols can enhance reporting accuracy. In addition, regular audits and feedback mechanisms at tertiary facilities managing TB will help identify persistent barriers and inform ongoing system improvements. By adopting these measures, the integrity and completeness of TB case reporting can be reinforced, ultimately supporting decline of under-notification and improved accurate DR and TB/HIV continuous surveillance.
- Assess the reasons for the disparity in access to TB testing across rayons. Monitor relevant indicators for assessing the efforts of TB detection such as percentage of positivity among people tested for Xpert, number of tests in reference to per capita population as well as per notified TB cases. Provide feedback to regions and PHCs with extremely high and low positivity and per-capita testing.
- Conduct inventory study in selected regions using 2024 surveillance data, followed in-debt case studies of those not included into surveillance system.

[28] UNZR is a digital, immutable human identifier that helps to quickly and reliably establish an identity. It consists of a sequence of eight and five digits, which are separated by the "-" symbol. The first eight digits are the date of birth of the person in the format - year of birth, month and date. This is followed by a four-digit code from 0001 to 9999. The last digit is control and unique. The UNZR is unchanged throughout life (does not change in the event of a change of surname, name or any other information) - https://mvs.gov.ua/en/news/unikalnii-nomer-zapisu-v-jeddr-shho-ce-ta-de-sukati accessed on 12 September 2025

Use of data and informed decision making

- Include WHO-recommended standard visual dashboard elements[29] for TB programmes into the IS SSD to facilitate calculation of programmatic indicators, data analysis, interpretation and informed decision-making.
- To improve the usability of data generated by laboratory services, monitor the scale of laboratory services by the number of people tested by Xpert and the number of positives among those tested. Monitor the Xpert positivity across the regions using laboratory data. This might require linkage of the laboratory register with the TB register and deduplication of the laboratory register.
- Expend the M&E team by a staff -epidemiologist, to ensure data quality, cross-check, feedback, recommend/update MIS validation checks.
- NTP staff to be trained on advanced data management. Specifically, staff at central and regional level should be trained on internal and external probabilistic linkage to enhance regular deduplication of TB register and linkage with laboratory module to identify case that are diagnosed, but not included into TB register.
- Conduct a modeling study to project the trajectory of the tuberculosis epidemic in Ukraine, explicitly incorporating the multifaceted impacts of ongoing war and large-scale population displacement, both within the country and across international borders.

[29] WHO (2018). Analysis and use of health facility data: Guidance for tuberculosis programme managers. Geneva: World Health Organization (https://www.who.int/healthinfo/FacilityAnalysisGuide_TB.pdf?ua=1, accessed 27 August 2025).

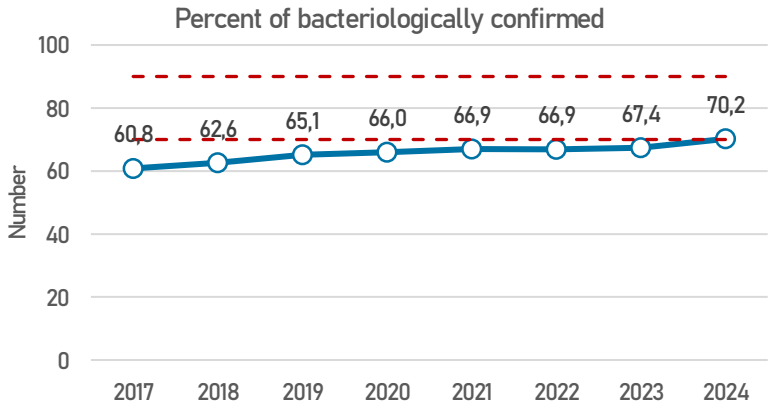
Annex 1. Checklist for TB surveillance and vital registration system

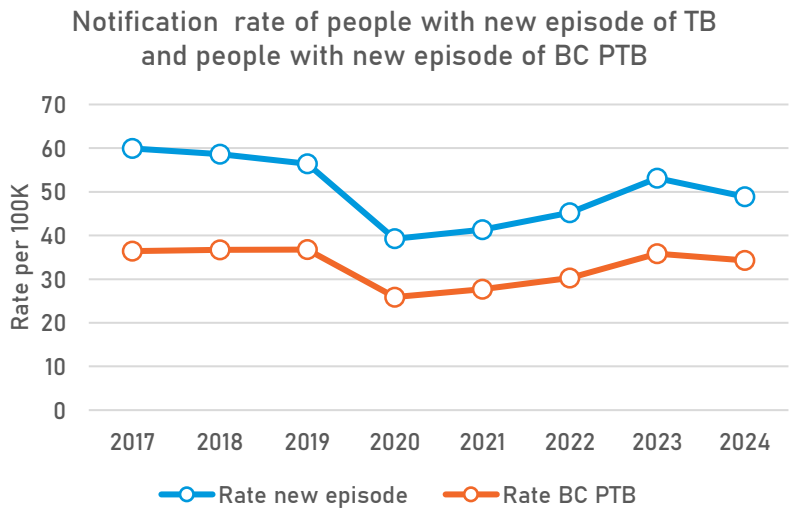
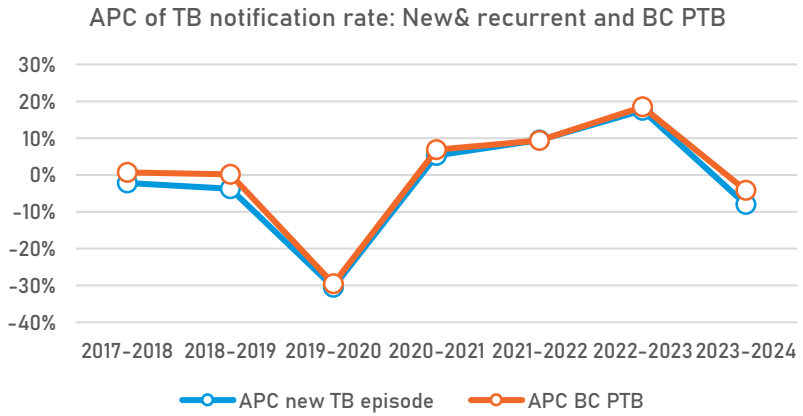
STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
TB SURVEILLANCE SYSTEM DATA QUALITY				
B1.1 Case definitions are consistent with WHO guidelines	All three benchmarks should be satisfied to meet this standard: • laboratory-confirmed cases are distinguished from clinically diagnosed cases; • new cases are distinguished from previously treated cases; • pulmonary cases are distinguished from extrapulmonary cases.	☑ **Met** ☐ Partially met ☐ Not met	We noted that In current guidance results of histological examination is considered as bacteriologically confirmed. NTP is planning to revise this.	
B1.2 TB surveillance system is designed to capture a minimum set of variables for reported TB cases	Data are routinely collected for at least each of the following variables: • age or age group; • sex; • year of registration; • bacteriological results; • history of previous treatment; • anatomical site of disease; • for case-based systems, a patient identifier.	☑ **Met** ☐ Partially met ☐ Not met	The National electronic TB register IS SSD contains all the main variables, including age, sex, and year of registration; results of bacteriological tests for TB (microscopy, culture, GeneXpert MTB/RIF, and LPA results, DST); history of previous treatment; disease localization for all registered TB patients; identification number (registration number automatically generated by the information system).	

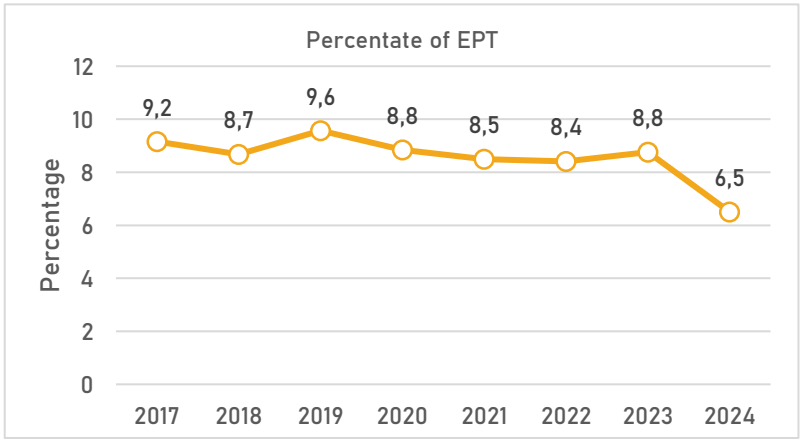
STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
B1.3 All scheduled periodic data submissions have been received and processed at the national level	For paper-based systems: • 100% of expected reports from each TB basic management unit have been received and data aggregated at national level. For national patient-based or case-based electronic systems that import data files from subnational (e.g. provincial or regional) electronic systems: • 100% of expected data files have been imported.	☑ **Met** ☐ Partially met ☐ Not met ☐Not applicable	The electronic TB system in Ukraine operates in real time and is based on web technologies; data for each notified case is entered in TB facilities and in the prison system, so importing a data file is not required. For reporting, a dual format is used: paper and electronic. Most of the quarterly and annual reports are generated from IS SSD, transferred to paper, and submitted electronically to the NTP. **Recommendation**: It is recommended to modernize the reporting system by transitioning exclusively to an electronic format, thereby eliminating duplications and reducing additional efforts in report generation. Furthermore, paper-based reporting (e.g., Form 33) should be discontinued	
B1.4 Data in quarterly reports (or equivalent) are accurate, complete, and internally consistent *(For paper-based systems only)*	All benchmarks should be satisfied to meet this standard: • Subtotals of the number of TB cases by age group, sex, and case type equal the total number of reported TB cases in ≥95% of quarterly reports (or equivalent) from BMUs; • The number of TB cases in ≥95% of quarterly reports (or equivalent) matches the number of cases recorded in BMU	☐ Met ☐ Partially met ☐ Not met ☑Not applicable		N/A

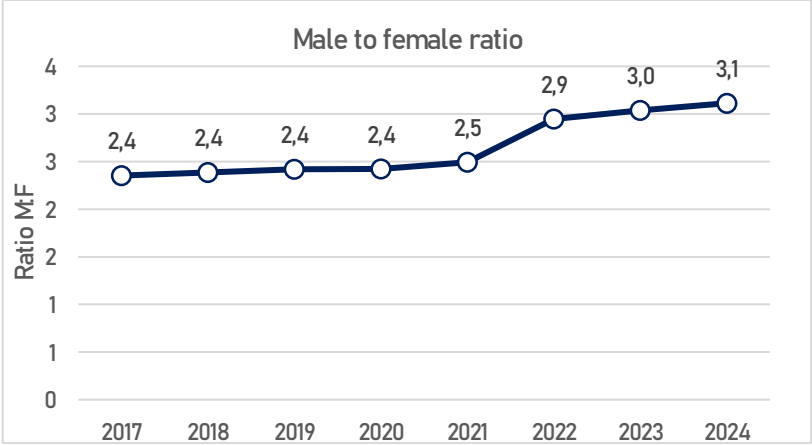
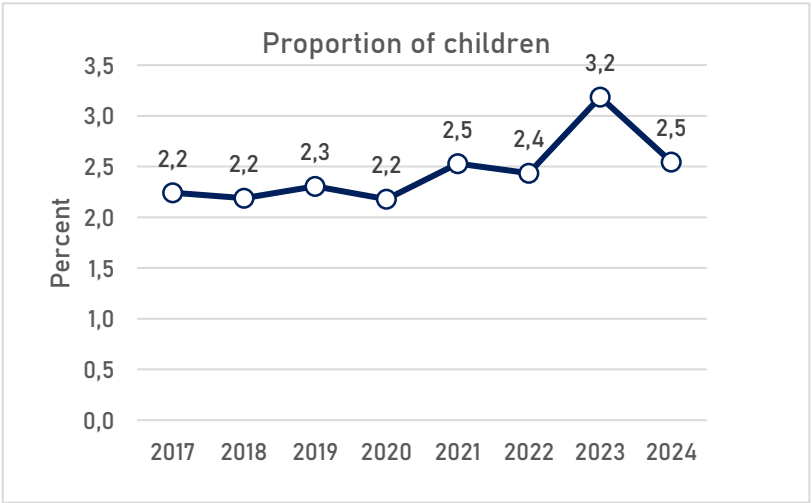
STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
	TB registers and source documents (patient treatment cards and laboratory registers); • Data for a minimum set of variables are available for ≥95% of the total number of reported TB cases in quarterly reports.			
B1.5 Data in national database are accurate, complete, internally consistent, and free of duplicates *(For electronic case-based or patient-based systems only)*	All benchmarks should be met to reach this standard: • Data validation checks are in place at national level to identify and correct invalid, inconsistent, and missing data in the minimum set (B1.2); • For each variable in the minimum set (standard B1.2), > 90% of case records are complete, valid and internally consistent for the year being assessed; • < 1% of case records in the national dataset for the year being assessed are unresolved potential duplicates.	☑ Met ☐ Partially met ☐ Not met ☐ Not applicable	MIS SSD is enhanced with range of data validation checks to prevent, identify and correct invalid, inconsistent and missing data. Most of core variables, such as name, surname, date of birth, sex, region, type of TB and site of disease are "must enter" fields, therefore without completing those variables the record could not be saved. Secondly, for most of variables (sex, geographical location, type, previous history, laboratory results) only pre-defined options are allowed to enter that appear as a drop-down menu during the data entry. In addition, fields are enhanced with the checks so, that only numbers are possible to enter into numeric fields and dates in date fields. Recommendations: NTP should aim to consistently implement PIN followed by establishment of linkage with Unified demographic register to allow to autocomplete demographic data, avoid entering error, duplicate entries, ensure smooth linkage with laboratory data. Existing and planned validation checks needs to be documented. NTP to consider enhancing the electronic system with dashboard to allow time series analysis of data and computation of rates at national and sub-national level. WHO has a recommended set of dashboards for programmatic management of TB control program[30].	

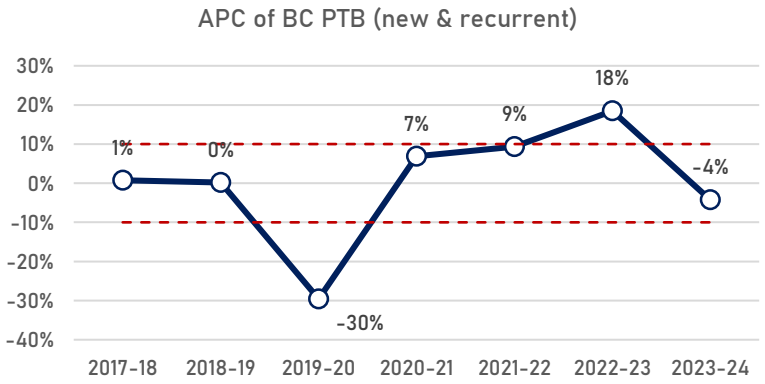
[30] World Health Organization. Analysis and use of health facility data: Guidance for tuberculosis program managers. https://www.who.int/healthinfo/FacilityAnalysisGuide_TB.pdf?ua=1, WHO 2018

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
B1.6 TB surveillance data are externally consistent	All benchmarks should be met to reach this standard: • Percentage of bacteriologically confirmed cases among pulmonary new and recurrent cases ranges between 70% and 90% • Year-to-year change of TB notification rates (new and recurrent, all forms) is consistent with the year-to-year change in bacteriologically confirmed notification rates for pulmonary TB (i.e. the trajectories are in the same direction) • Overall percentage of decline in proportion of bacteriologically confirmed pulmonary TB cases over the 5 years preceding the year of the assessment does not exceed 5%	☑ **Met** ☐ Not met	Percentage of bacteriologically confirmed TB case among new and recurrent pulmonary cases over the past 5 years ranged between 66 and 70.2%. Only in 2024 bacteriological confirmation reached lower level of benchmark of 70-90% laboratory confirmation. Thus, as of 2024 the first benchmark is **met**.  Despite of large variation of overall TB notification over the past five years, the bacteriological confirmation largely followed the same direction of the trend, indicating that the practice of diagnoses over the time was largely consistent towards the improvement. Thuse, the second benchmark also is **met**.	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
			  Percentage of bacteriologically confirmed TB cases among people with new episode of pulmonary TB in Ukraine in 2019 was 66% and improved to 70.2%	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
			in 2024. This makes **6.4%** increase over the five years. Because there was no decline, this benchmark also can be considered as **met**. Thuse all three benchmarks are met, therefore standard of external consistency is **satisfied.**	
B1.7 Number of reported TB cases is internally consistent	If vital registration data are available, then the following benchmark should be satisfied for this standard to be met: 1. Year-to-year change in the national number of reported TB cases is consistent with year-to-year change in national TB mortality (HIV-negative, from national vital registration) i.e. trajectories with the same direction. If vital registration data are not available, then the following benchmarks should be satisfied for this standard to be met: 2. Proportion of extrapulmonary TB cases out of all TB cases; 3. Ratio of male-to-female TB cases;	☐ **Met** ☑Partially met ☐ Not met	Because data from vital registration system is not available, therefore, internal consistency is assessed using other benchmarks  Proportion of extrapulmonary cases out of total shows sharp decline in 2024 compared to 2023 data.	N/A

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
	4. Proportion of childhood TB out of all TB cases; 5. Year-to-year change in the case notification rate for new bacteriologically confirmed TB; 6. Ratio of the number of people with presumptive TB to total notifications of TB cases.		 M:F ratio of sharply increased after 2022. Likely reason could be that people that left the country after the Russian invasion are females and demographic structure of underlying population has been shifted (assumed to be consistent). Males are in military …. 	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
			Proportion of childhood TB cases between 2017 and 2022 was largely stable, ranging between 2.2 and 2.5% with sharp increase 3.2% in 2023, and again decline to the 2.5% indicating some inconsistency. Year-to-year change of bacteriolgocially confirmed pulmonary TB notification rate was -30% between 2020-2021, followed by recovery reaching 18% between 2022-23 period, explained by COVID-related disruption of services. Data exceed expected +/-10% indicating internal inconsistenty.  Thus, some of the benchmarks of internal consistency are not met, therefore standard is partially met. Recommendations: (1) Possible reasons for inconsistency of EPT should be investigated by TB experts, discussed with paediatricians, especially in regions showing excessive variations. (2) After these discussions, it may be necessary to take corrective actions, including training of health care providers, revision of the differential diagnostic algorithm adopted at general hospitals. In-dept case study of childhood TB cases missed to be included into surveillance??	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
B1.8 All diagnosed cases of TB are reported	Both benchmarks should be satisfied to meet this standard: • TB reporting is a legal requirement; • ≥90% of TB cases are reported to national health authorities, as determined by a national-level investigation (e.g. inventory study) conducted in the last 10 years	☑ **Met** ☐Partially met ☐ Not met	In Ukraine, TB reporting is legally required according to the law[31]. According to the Order of the MoH from March 2002[32] the notification of TB new and relapsed cases is compulsory which is done per recording form 089 and 081-1/o (TB-01) - Order of the MOH from September 2009[33]. According to the unified clinical protocol for TB treatment of adults, the detection of patients with suspected TB is to be carried out at of PMC institutions and any other medical institutions by the staff of these institutions[34]. The diagnosis of TB is confirmed (not confirmed) at specialised anti–TB institutions. No inventory study was conducted in the country at national level. In 2024 linkage of laboratory and TB register has been done for 3 regions for 2019 reporting year data. Results showed 12% under-notification. Under-notification of child TB cases was as high as 57% according to linkage study. Thus, of the two benchmarks only one is met; the standard is therefore considered only **partially satisfied**.	
B1.9 Population has good access to health care	UHC index score is ≥80 (SDG Indicator 3.8.1)	☐ Met ☑ Partially met ☐ Not met	According to the Global health observatory UHC score in Ukraine improved since 2010 from 65 up to 77 in 2019. In 2021, which is the latest year with available data, the UHC score was **76** which is below of threshold set[35]. There is a need for further investments in improving the accessibility and affordability of healthcare, however this standard is beyond of scope of NTP.	

[31]Law of Ukraine "On Combating Tuberculosis", Article 9, Part 1; https://xn--80aagahqwyibe8an.com/ukrajiny-zakony/zakon-ukrajini-pro-vnesennya-zmin-zakonu-2012-18976.html [accessed on October 21, 2019]

[32]Наказ МОЗ України від N 112/139 від 25.03.2002 « Про затвердження форми первинного обліку N 089/о "Повідомлення про хворого з уперше в житті встановленим діагнозом активного туберкульозу або його рецидиву" та Інструкції щодо її заповнення» https://zakon.rada.gov.ua/laws/show/z0405-02 [accessed on October 21, 2019]

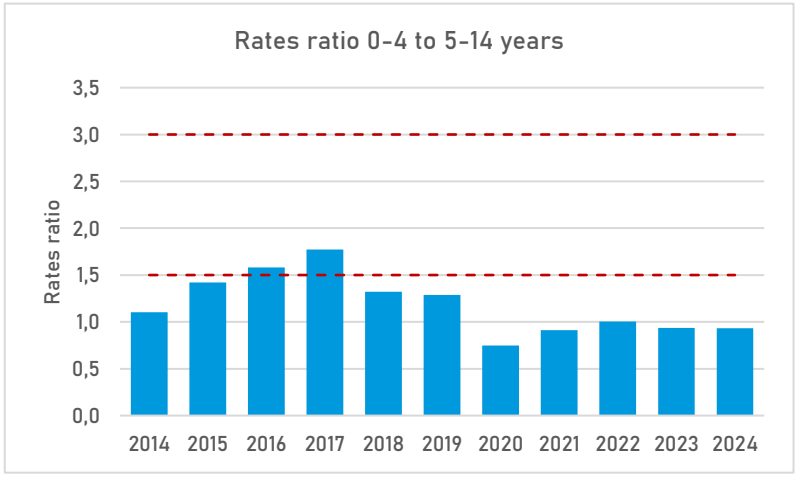
[33]Наказ МОЗ України від 02.09.2009 № 657 Про затвердження форм первинної облікової документації і форм звітності з туберкульозу та інструкцій щодо їх заповнення https://zakon.rada.gov.ua/laws/show/za069-09 [accessed on October 21, 2019]

[34]Unified clinical protocol of primary, secondary (specialised), and tertiary (highly specialised) medical care for adults with tuberculosis approved by order of the Ministry of Health of Ukraine No. 620 dated 4 September 2014, Clause 3.1; https://zakon.rada.gov.ua/rada/file/text/27/f434621n28.pdf?noattach=1 [accessed on October 21, 2019]

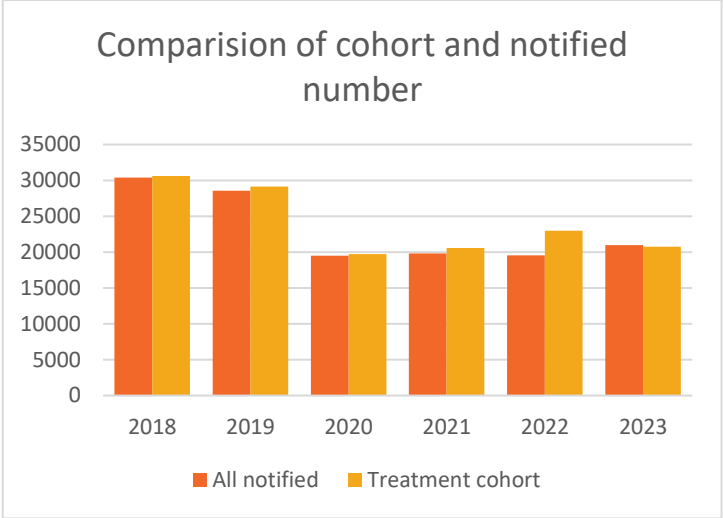
[35] WHO Global Health Observatory. Geneva World Health Organization https://data.who.int/indicators/i/3805B1E/9A706FD [accessed on August 29, 2025]

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
B1.10 Vital registration system has high national coverage and quality	• Vital registration data provided by CRVS is evaluated either "1-Hight" or "2-Medium"	☐ Met ☐Partially met ☑ Not met	According to the most recent WHO report[36] information related to Ukraine is missing. Standard is considered Not met/ Not applicable?	N/A
SURVEILLANCE OF DRUG RESISTANT TB				
B2.1 Surveillance data provide a direct measure of rifampicin-resistant TB in bacteriologically confirmed pulmonary cases	One of the two benchmarks should be satisfied to meet this standard: • Rifampicin susceptibility testing results are documented for ≥80% of all bacteriologically confirmed pulmonary TB cases; • Rifampicin susceptibility testing results are documented for a nationally representative drug-resistance survey conducted in the past 5 years.	☑ **Met** ☐ Partially met ☐ Not met	Per the 2024 routine surveillance report, in total 13,547 bacteriologically confirmed pulmonary TB cases were notified in Ukraine. Among them 12,266 (**98%**) had documented DST results for RIF. This is above 80%, thus the standard could be assumed fully met.	
B2.2 Surveillance data provide a direct measure of the	One of the two benchmarks should be satisfied to meet this standard:	☑ Met ☐Partially met ☐ Not met	According to surveillance reports into the WHO global TB database, in 2024 a total of 18,311 new and recurrent TB cases were notified in Ukraine. Among them 18,084 TB patients had their HIV status documented, which is **99%** of total cases, thus the standard could be assumed fully met.	

[36] WHO mortality database, Interactive platform visualizing mortality data https://platform.who.int/mortality/about/data-quality [accessed 29 August, 2025]

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
prevalence of HIV infection in TB cases	• HIV status (positive/negative) documented for ≥80% of all notified TB cases; • HIV status is available from a representative sample from all TB cases notified in settings with a low-level epidemic state where it is not feasible to implement routine surveillance.			
B2.3 Surveillance data for children reported with TB (defined as ages 0–14 years) are reliable and accurate AND all diagnosed childhood TB cases are reported	Both of the benchmarks should be satisfied to meet this standard: • Ratio of age groups 0–4 to 5–14 years is in the range 1.5–3.0; • ≥90% of childhood TB cases are reported to national health authorities, as determined by a national-level investigation (e.g. inventory study) conducted in the last 10 years.	☐ Met ☐ Partially met ☑ Not met	In 2024 in Ukraine the number of children notified with TB aged 0-4 and 5 – 14 years were 106 (equivalent to 8.4 per 100,000) and 360 (equivalent to 9,0 per 100,000) correspondingly. Expressed as rate ratio this makes 0.9, which is not within the expected range, 	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
			Recommendations: (1) Possible reasons for under-detection of childhood TB cases in the age group 0–4 years should be investigated by paediatric international and national experts, discussed with paediatricians, intensive care physicians from paediatric hospitals, pulmonologists, family practitioners and all those who make and report diagnoses of childhood TB. (2) After these discussions, it may be necessary to take corrective actions, including training of health care providers, revision of the differential diagnostic algorithm adopted at general hospitals, etc.	
B3.1 Monitoring treatment outcomes is consistent with WHO guidelines	Both these benchmarks should be satisfied to meet this standard: • Treatment outcome definitions for all TB cases are consistent with WHO guidelines. • Treatment outcomes of TB patients at national level can be disaggregated by at least the following variables: treatment history, HIV status and drug resistance status	☑ Met ☐ Partially met ☐ Not met	The definitions used to assess tuberculosis treatment outcomes are aligned with WHO recommendations. Treatment outcomes for TB patients can be disaggregated by treatment history, HIV status, and drug-resistance profile.	
B3.2 Recording and reporting of TB treatment outcomes are accurate, complete and consistent	All these benchmarks should be satisfied to meet this standard: *For paper-based systems:* • Assignment of treatment outcomes is correct for >95% of TB patients recorded in the facility register • Number of treatment outcomes (for each outcome category) in	☐ Met ☑ Partially met ☐ Not met	• Data validation checks are implemented in the electronic TB register (IS SSD) to ensure the validity of assigned treatment outcomes for individual cases. • Less than 1% of cases are assigned an outcome of Not evaluated. The proportion of unassessed cases (not evaluated) varied between 0.1% and 0.8% (new cases and relapses, 2023 cohort – 0.5%; RR-TB cases, 2022 cohort – 0.1%; FQ-resistant cases, 2022 cohort – 0.8%). • Comparison of treatment outcomes cohort size and those notified same year largely matches at national level.	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
	>95% of quarterly reports (or equivalent) matches the number recorded in BMU TB registers • Reported number of the cohort of patients with an expected assigned2 treatment outcome in any given year matches the number of patients notified the year before • <1% of cases are assigned an outcome of not evaluated *For case-based or patient-based digital systems:* • Data validation checks are in place to ensure validity of assigned treatment outcome for individual cases • Reported number of the cohort of patients with an expected assigned1 treatment outcome in any given year matches the number of patients notified the year before • <1% of cases are assigned an outcome of not evaluated.			
B4.1 Monitoring indicators for PMTPT are	All these benchmarks should be satisfied to meet this standard:	☐ Met ☑ Partially met ☐ Not met	M&E indicators for PMTPT	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
consistent with WHO guidelines	• M&E indicators for PMTPT are consistent with WHO guidelines in terms of: (1) Contact investigation coverage (2) TPT coverage (disaggregated by PLHIV, contacts <5 years of age and ≥5 years) (3) TPT completion (disaggregated by regimens lasting 6 months or more and others lasting <6 months) • PMTPT dataset contains the minimum variables for monitoring TPT at three important instances of PMTPT: (1) Assessment of contacts of TB patients (2) Assessment of PLHIV and other at-risk groups (3) Initiation and completion of TPT		Coverage of TPT in 2024 – 49.8% among contacts (90.8% among children under 5 years). TPT completion with 81% is largest gap in cascade of care of contacts of under 5 years. Among those over 5 years started TPT only 68% completes the treatment The PMTPT dataset contains the minimum variables for monitoring TPT in three important parts of PURPLT: • Information on contact investigation is included in the individual TB patient card and covers contact details, examinations performed and their results, and the decision to initiate TPT. • Information on screening of PLHIV and other risk groups is not available at the NTP level. • Results of TPT are aggregated at the territorial level from individual cards, summarized, and submitted to the NTP in Excel format via Google Drive.	
B4.2 PMTPT data are accurate, complete and consistent	All the benchmarks should be satisfied to meet this standard: For paper-based systems: • Number of individuals evaluated for TB disease and TB infection and recorded in the source	☐ Met ☐ Partially met ☑ Not met	Data on contacts and TPT administration are recorded in individual TB patient index cards. There are no dedicated registries for aggregating information on contacts and TPT; the electronic system does not include such a module. Data on contact investigations and TPT are reported at the national level in Excel format via Google Drive	

STANDARD	BENCHMARK(S)	RESULTS	RESULTS (DESCRIPTION) INCLUDING KEY ACTION(S) REQUIRED TO ADDRESS THE GAPS	ESTIMATED BUDGET TO ADDRESS KEY ACTION(S)
	registers at the health facility matches the number reported (disaggregated by PLHIV, contacts aged <5 years and those aged ≥5 years) • Number of individuals started on TPT in the source register at the health facility matches the number reported (disaggregated by PLHIV, contacts aged <5 years and ≥5 years) • Number of individuals who completed TPT in the source register at the health facility matches the number reported (disaggregated by PLHIV, and household contacts of all ages combined) For case-based or patient-based digital datasets: • Data validation checks are in place at national level to identify and correct invalid, inconsistent and missing PMTPT data in the minimum set of variables (B4.1) • For each variable in the minimum set (B4.1), ≥90% of individual records are complete, valid and internally consistent for the year being assessed			