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Extensive review of tuberculosis prevention, control and care in Tajikistan, 15–24 July 2013

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ABSTRACT

This report is informed by the findings and recommendations of a WHO extensive review of tuberculosis prevention, control and care in Tajikistan conducted between 15 and 24 July 2013 at the request of the Minister of Health. The review was carried out by the WHO Regional Office for Europe and the WHO country office for Tajikistan in collaboration with the National Programme for Tuberculosis Protection of the Population of the Republic of Tajikistan for 2010–2015 and with support from the German Development Bank, United States Agency for International Development and the United Nations Development Programme. The methodology included surveillance of data, interviews with Ministry of Health authorities and others, and field visits to city and rural health centres, tuberculosis laboratory services and HIV/AIDS centres. Team members also visited tuberculosis prison services. The review found that Tajikistan has made significant progress in following and addressing recommendations from a previous review conducted in 2009, but capacity needs to be further strengthened to translate the most important policy priorities into action and improved performance.

Keywords

CHILDREN
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TUBERCULOSIS, MULTIDRUG-RESISTANT

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Abbreviations and acronyms

ACSM	advocacy, communication and social mobilization
ART	antiretroviral therapy
BCG	bacillus Calmette-Guérin
BSL	biosafety level (following WHO biosafety manual 2004)
CCM	country coordination mechanism
CI	confidence interval
CPT	co-trimoxazole preventive therapy
CSV	comma-separated values (files)
DOTS	directly observed therapy short-course (services)
DRSub	districts of republican subordination
DST	drug-susceptibility testing
EPTB	extrapulmonary tuberculosis
EXPAND–TB	Expanding Access to New Diagnostics for TB Project
FEFO	first expiry, first out (system)
FFP–3	filtering face-piece (respirator)
GBAO	Gorno-Badakhshan administrative oblast
GDF	Global Drug Facility
GDP	gross domestic product
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
IOM	International Organization for Migration
IPT	isoniazid preventive therapy
LMIS	logistics management information system
MDR–TB	multidrug-resistant tuberculosis
MGIT	Mycobacterial growth indicator tube used in the BACTEC™ MGIT™ 960 system (BD, United States)
MTBC	*Mycobacterium* TB complex
NCTPTS	National Centre for TB, Pulmonary Diseases and Thoracic Surgery
NGO	nongovernmental organization
NHA	National Health Account
NRL	National TB Reference Laboratory
NTP	National Programme for Tuberculosis Protection of the Population of the Republic of Tajikistan for 2010–2015
OR	odds ratio
PHC	primary health care
PTB	pulmonary tuberculosis
RCTC	Republican Centre for Tuberculosis Control
RMMCPC	Republican Medicines and Medical Commodities Procurement Centre
SIZO	pre-trial detention facility
SM	Tajik somonis (currency)
TB	tuberculosis
TSG	treatment support group
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
UVGI	ultraviolet germicidal irradiation
WFP	World Food Programme
XDR–TB	extensively drug-resistant tuberculosis

Executive summary

Tuberculosis remains a priority public health problem in Tajikistan, which is among the 27 high-burden multidrug-resistant tuberculosis countries in the world and 18 tuberculosis high-priority countries in the WHO European Region.

This report is informed by the findings and recommendations of a WHO extensive review of tuberculosis prevention, control and care in Tajikistan conducted between 15 and 24 July 2013 at the request of the Minister of Health. The review was carried out by the WHO Regional Office for Europe and the WHO country office for Tajikistan in collaboration with the National Programme for Tuberculosis Protection of the Population of the Republic of Tajikistan for 2010–2015 and with support from the German Development Bank, United States Agency for International Development and the United Nations Development Programme.

The review team comprised 12 international experts, including representation from the WHO Green Light Committee and the Global Drug Facility. The methodology included: surveillance data quality audit; revision of relevant technical reports, surveillance data, national reports and epidemiologic data; interviews with Ministry of Health and National Programme for Tuberculosis authorities, chief oblast and chief tuberculosis physicians, health care staff and representatives of the State Sanitary and Epidemiological Service, nongovernmental organizations, country coordination mechanism members and people affected by tuberculosis; and field visits to city and rural health centres (outpatient health facilities), tuberculosis laboratory services and HIV/AIDS centres. Team members also met with prison health authorities (in Sugd and Dushanbe) and visited tuberculosis prison services and administrations. Tuberculosis prevention, control and care interventions were assessed against the six health system building blocks.

The review found that Tajikistan has made significant progress in following and addressing recommendations from a previous review conducted in 2009. Governance and management of the National Programme for Tuberculosis has been developed, but capacity needs to be further strengthened to translate the most important policy priorities into action and improved performance.

Diagnosis and treatment of tuberculosis was found to follow WHO recommendations and the basic package that underpins the Stop TB strategy services, with coverage expanded throughout the country. Integration of tuberculosis control activities in the primary health care system is progressing, with expansion of provision of ambulatory (outpatient) treatment for many patients. The country is becoming increasingly successful in prohibiting the open sale of first-line tuberculosis drugs and has made financial savings for tuberculosis control programmes from ongoing bed rationalization processes. Multidrug-resistant treatment coverage among diagnosed patients is increasing year by year and a significant number of national and international nongovernmental organizations, communities and other partners are involved in supporting tuberculosis prevention and control activities in the country.

Despite the progress made, Tajikistan still faces many challenges in tuberculosis control. The programme is heavily dependent on international donors, including the Global Fund to Fight AIDS, Tuberculosis and Malaria, and current funding is insufficient to fully scale-up multidrug-resistant tuberculosis prevention, diagnostic and control activities and achieve full country

coverage. Biosafety in moderate- and high-risk tuberculosis laboratories is inadequate due to insufficient maintenance of key equipment and inadequate infrastructure in some facilities. Patient-centred approaches and social support services for patients exist only on a very limited scale and lack standardization.

The review developed key recommendations for decision-makers and development partners to promote better strategic planning to further improve tuberculosis control in Tajikistan. Detailed technical recommendations were developed to more sustainably improve overall programme performance.

Key findings

The review established the following key findings.

- Tajikistan has the highest estimated number of incident tuberculosis cases (all forms) in the European Region, with 193 (range 159–230) per 100 000 population. The latest drug resistance survey (2011) found the prevalence of multidrug-resistant tuberculosis was 13% among new and 54% among previously treated cases.
- The latest treatment success rates reported by the National Programme for Tuberculosis for new sputum-smear-positive and re-treatment pulmonary tuberculosis patients were 80% and 71% respectively (2011 cohort), which is the same as 2010.
- A national strategic plan for tuberculosis prevention and control for 2010–2015 has been developed and adopted by the Government of Tajikistan.
- The National Programme for Tuberculosis reported multidrug-resistant tuberculosis treatment coverage among diagnosed patients in 2012 of 70% (489 laboratory-confirmed cases were enrolled into treatment out of 694 detected); this was an improvement from 2011, when treatment coverage was 63% (380 out of 604).
- Tajikistan has made significant progress in following and addressing recommendations from the previous programme review.
- National Programme for Tuberculosis governance and management have been developed through improvements in horizontal and vertical governance elements, but additional capacity is required to translate the most important policy priorities into action and improved performance.
- Open sale of first-line tuberculosis drugs has been prohibited by the Government, which has initiated procurement of amikacin for 100 multidrug-resistant tuberculosis patients from its own resources.
- Tuberculosis hospital rationalization is progressing in line with health sector reform. The National Programme for Tuberculosis anticipates that tuberculosis beds will be reduced from 2630 to 1800 by 2015. Funds saved from bed rationalization are expected to be allocated to tuberculosis control purposes.
- The tuberculosis laboratory network and management of drug-resistant tuberculosis have been strengthened.
- Diagnosis and treatment follow WHO recommendations and directly observed therapy short-course service coverage has been expanded throughout the country.
- Tuberculosis, multidrug-resistant tuberculosis and tuberculosis/HIV management has been successfully implemented in the prison system.

- Integration of tuberculosis control activities in the primary health care system is progressing, with expansion of provision of ambulatory (outpatient) treatment for many patients. Almost half (45.3%) of multidrug-resistant tuberculosis patients are treated as outpatients from the start of treatment.
- Collaborative tuberculosis/HIV activities have been established but further strengthening is needed, especially at oblast and district (rayon) levels.
- A significant number of national and international nongovernmental organizations, communities and other partners are involved in supporting tuberculosis prevention and control activities.

Key challenges

The review found the following key challenges.

- The National Programme for Tuberculosis is heavily dependent on international donors, including the Global Fund to Fight AIDS, Tuberculosis and Malaria. The national budgetary contribution to tuberculosis services was less than 30% in 2012.
- Current funding for the National Programme for Tuberculosis is insufficient to fully scale-up multidrug-resistant tuberculosis prevention and control activities and achieve full country coverage.
- Diagnostic capacity for drug-resistant tuberculosis is found in only 23 (including the prison system) of 66 districts. Only 773 multidrug-resistant cases from an estimated (among notified) pool of 1000 were detected in 2012.
- Not all multidrug-resistant tuberculosis patients are currently enrolled in treatment due to lack of second-line drugs; around 240 patients were on a waiting list at the time of the review.
- The treatment success rate for multidrug-resistant tuberculosis was 61.6% in 2011 (latest available data), which was similar to the internationally reported average but below the Regional target of 75%.
- Biosafety in moderate- and high-risk tuberculosis laboratories is inadequate due to insufficient maintenance of key equipment and inadequate infrastructure in some facilities.
- In 2011, 67.3% of drug-sensitive patients were hospitalized during the intensive phase of treatment. The figure for 2012 was 65.9%.
- Asymptomatic children with latent tuberculosis infection are admitted to sanatoria. The practice of sending children who are either contacts and/or in the continuation phase of treatment to sanatoria continues in Sugd oblast.
- Guidelines and a national plan for provision of palliative care for terminally ill tuberculosis patients have not been developed.
- Patient-centred approaches and social support services for patients exist only on a very limited scale and lack standardization.

Key recommendations

The review recommends that the Ministry of Health, Ministry of Justice, Ministry of the Interior, National Programme for Tuberculosis, National Reference Laboratory and international and nongovernmental organizations focusing on tuberculosis should consider:

- revising and updating the national strategic plan for tuberculosis prevention and control by March 2014, including costings to reflect the incremental increase of (national) public expenditure on tuberculosis and monitoring and evaluation and human resource development plans;
- initiating an application planning process for the Global Fund to Fight AIDS, Tuberculosis and Malaria new funding model mechanism and beginning preparations for concept note development;
- improving the quality of performance assessment with targeted training and capacity-building on how to monitor performance comprehensively;
- updating and progressing the plan to complete the process of rationalization of tuberculosis hospitals;
- accelerating expansion of ambulatory treatment, home-based care and day-care treatment and including all eligible patients (particularly sputum-smear-negative and multidrug-resistant tuberculosis cases);
- developing and implementing guidelines and an implementation plan for palliative care;
- developing a transition plan to ensure uninterrupted supply of quality-assured anti-tuberculosis medicines after completion of the current donor-supported programmes and exploring possibilities for gradual procurement of first-line tuberculosis drugs through the national budget;
- strengthening collaboration between the tuberculosis and HIV programmes;
- discontinuing admissions of children with latent infection to sanatoria by the end of 2014;
- developing a budgeted implementation plan for patient-centred approaches, including provision of social support for adherence to tuberculosis treatment based on pilot results;
- the Government taking over the cost for, and start procurement of, first-line tuberculosis drugs; and
- implementing a specific wage-adjustment mechanism tailored to the needs of tuberculosis professionals to ensure sustainable provision of tuberculosis care and treatment.

A detailed list of preliminary recommendations is presented in Table ES.1.

Table ES.1. Review recommendations

Area	Action	Timeline	Responsibility
Cross-cutting and strategic aspects	Revise and update the national strategic plan for TB[a] prevention and control	By March 2014	NTP[b]
	Initiate an application planning process for the GFATM[c] new funding model mechanism and start preparations for concept note development	Upon completion of national strategic plan revision by end of September 2014	NTP, Ministry of Health
DOTS[d]	Maintain achievements in directly observed therapy, ensure more active involvement of nurses at PHC[e] level and expand patient support group	As of November 2013	NTP, PHC

Area	Action	Timeline	Responsibility
	approaches		
	Provide in-service training and strengthen supervision of PHC providers in rural areas involved in case management of TB and DR–TB[f]	As of November 2013	NTP, PHC
	Expand ambulatory care of patients with sputum-smear-negative results, including sputum-smear-negative MDR–TB[g] patients	As of November 2013	NTP, PHC
MDR–TB prevention and control	Continue resource mobilization to ensure sustainability of DR–TB-related activities, particularly provision of second-line drugs to reach full countrywide coverage of DR–TB	As of November 2013	NTP, Ministry of Health
	Scale-up second-line treatment for all diagnosed MDR–TB patients in civilian and prison sector (1 000 per year according to the national MDR–TB plan)	As of beginning of 2014	Ministry of Interior, Ministry of Health, NTP
	Scale-up rapid molecular diagnostic tests for TB and MDR–TB (all MDR–TB suspected cases to be tested by molecular methods by the end of 2014)	By end of 2014 and ongoing	NTP, Ministry of Health
	Develop guidelines and implementation plan for palliative TB care and initiate implementation	By end of 2014	NTP, Ministry of Health
Migration and TB	Ensure completion of intensive phase of treatment for external migrants before any potential deportation and continue health promotion activities targeting TB among migrant workers (such as returnees from foreign countries)	As of December 2013	Ministry of Health
TB and HIV collaborative activities	Update the national TB/HIV joint strategy and action plan	By June 2014	National AIDS Programme with NTP
	Ensure symptom screening for people living with HIV at every clinic visit, including at non-central levels and PHC facilities	As of June 2014	NTP, in collaboration with National AIDS Programme
	Ensure people living with HIV with presumptive TB (suspects) are tested by Xpert MTB/RIF assay (Cepheid, United States)	By June 2014 and beyond	NTP in collaboration with National AIDS Programme

Area	Action	Timeline	Responsibility
	Revise the national protocol on management of TB and HIV coinfection based on the latest WHO recommendations (including management of paediatric TB/HIV and antiretroviral therapy initiation at higher CD4 cell count)	By February 2014	National AIDS Programme in collaboration with NTP
	Provide isoniazid preventive therapy prophylactic treatment for people living with HIV (for whom active TB has been ruled out)	As of January 2014	National AIDS Programme in collaboration with NTP
TB infection control	Update Sate Sanitary and Epidemiological Service regulatory documents and discontinue outdated and ineffective infection control practices, such as disinfecting houses of individuals with TB	As of March 2014	NTP, Ministry of Health and State Sanitary and Epidemiological Service
	Coordinate implementation of infection control action plan with support of partner and donor organizations	As of November 2013	NTP, State Sanitary and Epidemiological Service, Ministry of Health and partners
	Improve public education on preventive activities regarding infection control in the community and congregate settings, such as cough etiquette, and knowledge of TB signs and symptoms	As of January 2014	NTP in collaboration with Ministry of Health
ACSM[h]	Reinforce political advocacy component in national strategy on ACSM by including a separate objective in national strategic plan addressing high-level decision-makers	By end of 2014	NTP thematic working group on ACSM
	Involve individuals who have had TB, communities and local civil society organizations in ACSM thematic working group and country coordination mechanism	As of January 2014	NTP thematic working group on ACSM
	Continue training and involvement of religious and community leaders in TB prevention and control efforts	As of November 2013	NTP with Religious Committee and partners
	Provide national training for health care workers on communication and counselling	As of October 2014	NTP with Institute for Postgraduate Medical Education
Contact investigation	Update training (especially in-service) for PHC physicians and nurses to include TB contact-tracing and active case-finding strategies (including TB and PHC system roles and responsibilities) and develop indicators to monitor and evaluate	By July 2014	Ministry of Health, NTP and Institute for Postgraduate Medical Education

Area	Action	Timeline	Responsibility
	contact-tracing activities		
TB laboratories	Make standard operating procedures and documentation consistent across all network laboratories in collaboration with the Supranational Reference Laboratory	By end of 2014	NRL
	Optimize management of the laboratory network by officially assigning individual coordinators to various areas of the network	By end of 2014	Ministry of Health, National TB Reference Laboratory
	Analyse TB laboratory network costs and develop a budget plan that includes further rationalization of the network, maintenance of laboratory equipment, and scaling-up of logistics	By December 2014	NTP and National TB Reference Laboratory, with partners
Childhood TB	Discontinue admissions to sanatoria for children with latent TB infection and noninfectious TB	By end of 2013	Ministry of Health and NTP
	Prioritize children who are contacts as a high-risk group for active case-finding activities (including at least quarterly symptomatic assessment and follow up of children who are contacts to MDR–TB cases)	As of December 2013	Ministry of Health and NTP
HR[i]	Assess the potential gap in HR needs for TB control beyond 2014 (ongoing education reforms of medical specialties and advanced average age of current TB staff)	By end of 2014	Ministry of Health and NTP
	Develop measures and a plan of action to ensure sufficient HR coverage for TB control (by, for instance, promoting the TB topic among interns and developing a social protection package and incentives for TB physicians)	By end of 2014	Ministry of Health and NTP
	Assess the impact of current performance-based payment mechanisms, in collaboration with partners (including WHO)	By end of 2014	Ministry of Health and NTP
Surveillance	Develop a national standard and benchmarks for systematic and regular appraisal of the quality (that is, the completeness, timeliness, consistency and validity) of TB programme data at national and oblast level, including regular reports on data quality	By end of 2014	NTP, oblast TB centres and National Centre for Medical Statistics and Information, with partners

Area	Action	Timeline	Responsibility
	Include all cases with resistant forms of TB in registers and notification reports to ensure reliable surveillance regardless of patients' respective area of residence	By May 2014	Ministry of Health, NTP and National TB Reference Laboratory
Monitoring and evaluation	Ensure the national strategic plan contains realistic and measureable goal, outcome and output indicators and regularly reports and measures progress against the targets	By March 2014	Ministry of Health and NTP, with partners
	Disseminate the analysis of progress among all stakeholders and use it to further inform planning and action	By March 2014	Ministry of Health and NTP, with partners
	Introduce WHO-recommended TB forms and definitions	By July 2014	Ministry of Health, National Centre for Medical Statistics and Information and NTP, with partners
	Improve the accuracy and check procedures and completeness of the electronic data collection system	As of March 2014	NTP
	Engage all culture and drug-susceptibility testing laboratories in contributing to electronic registers to facilitate reporting of laboratory results	As of March 2014	NTP
Operational research	Develop an operational research plan with allocated funding and include it in the national strategic plan	By July 2014	Ministry of Health and NTP
	Improve the NTP's operational research capacity by supporting its staff to access relevant national and international training	As of January 2014	Ministry of Health and NTP
	Continue to publish finalized studies in international peer-reviewed journals	Ongoing	NTP with partners
Prison sector	Address the problem of understaffing and personnel motivation through a sustainable HR plan	By July 2014	Ministry of Justice and Ministry of Health
	Retain the system of pre- and post-release of TB and DR–TB patients from prison to civilian TB services to ensure treatment continuation and follow-up	Ongoing	Ministry of Justice and Ministry of Health
	Consider sharing the findings and recommendations of this review with the Ministry of Justice via the country coordination mechanism platform	By March 2014	Country Coordination Mechanism Secretariat
Drug management,	Develop a transition plan to ensure the uninterrupted supply of quality-	By end of 2014	Ministry of Health and NTP

Area	Action	Timeline	Responsibility
vaccines and technologies	assured anti-TB medicines after completion of current donor-supported programmes, ensuring that the plan is written into the NTP		
	Allocate funds in the 2015 state budget to cover the country's needs at least for first-line drugs	By 2015	Ministry of Health and Ministry of Finance
	Consider continued use of GDF[j] services for procurement of anti-TB medicines with state funds	By 2015	Ministry of Health and Ministry of Finance
	Work with the GDF and manufacturers to facilitate registration of quality-assured anti-TB medicines to ensure availability of international sources for Tajikistan (when the country switches to Government-funded procurement)	By end of 2014	NTP
	Access procurement and supply formulations from the GDF that do not involve compliance with cold-chain requirements	All subsequent procurements	Ministry of Health, United Nations Development Programme, Project HOPE and KNCV Tuberculosis Foundation
	Ensure TB medical facilities' drug-storage rooms meet storage temperature requirements for anti-TB drugs	By August 2014	Ministry of Health and municipalities, with partners
	Support the Ministry of Justice to strengthen drug-management capacity in the prison sector	By June 2014	Ministry of Justice, Ministry of Health and partners
Governance	Specify implementation plans with budget estimations to address selected technical priority areas (such as further improving case-finding)	By end of 2014	Ministry of Finance and Ministry of Health
	Revise the completeness, specificity and achievability of targets in the NTP, directing more attention to evaluation of national programme performance	By March 2014	Ministry of Health and NTP
	Link targets and evaluation of implementation to joint annual review of overall health reforms	By end of 2014	Ministry of Health and NTP
Financing and TB hospital rationalization	Develop a strategy for sustainable health system funding (including TB)	By end of 2015	Ministry of Finance and Ministry of Health
	Implement a specific wage-adjustment mechanism tailored to the needs of TB professionals to ensure sustainable provision of care	By end of 2014	Ministry of Finance and Ministry of Health

Area	Action	Timeline	Responsibility
	Provide appropriate financing for NTP logistics and transportation system	By September 2014	Ministry of Health and NTP, with partners
	Develop and establish a financial incentives protocol through a pay-for-performance scheme at PHC level (to help improve TB case-finding)	By end 2014	Ministry of Health and Ministry of Justice, with partners
	Update, sustain and complete the implementation of the rationalization plan for TB hospitals (target bed reduction from 2 630 to 1 800)	Update by March 2014	Ministry of Health and NTP

[a] TB = tuberculosis.
[b] NTP = National Programme for Tuberculosis.
[c] GFATM = Global Fund to Fight AIDS, Tuberculosis and Malaria.
[d] DOTS = directly observed therapy short course.
[e] PHC = primary health care.
[f] DR–TB = drug-resistant tuberculosis.
[g] MDR–TB = multidrug-resistant tuberculosis.
[h] ACSM = advocacy, communication and social mobilization.
[i] HR = human resources.
[j] GDF = Global Drug Facility for Tuberculosis.

1. Introduction and background

1.1 The report

This report has been informed by the findings and recommendations of a WHO extensive review of tuberculosis (TB) prevention, control and care in Tajikistan conducted between 15 and 24 July 2013 at the request of the Minister of Health. The review was carried out by the WHO Regional Office for Europe and the WHO country office for Tajikistan in collaboration with the National Programme for Tuberculosis Control of the Population of the Republic of Tajikistan for 2010–2015 (NTP) and with support from the German Development Bank, United States Agency for International Development (USAID) and the United Nations Development Programme (UNDP).

The review team comprised 12 international experts, including representation from the WHO Green Light Committee and the Global Drug Facility (GDF). The methodology included: surveillance data quality audit; revision of relevant technical reports, surveillance data, national reports and epidemiologic data; interviews with Ministry of Health and NTP authorities, chief oblast and chief TB physicians, health care staff and representatives of the State Sanitary and Epidemiological Service, nongovernmental organizations (NGOs), country coordination mechanism (CCM) members and people affected by TB; and field visits to city and rural health centres (outpatient health facilities), TB laboratory services and HIV/AIDS centres. Team members also met with prison health authorities (in Sugd and Dushanbe) and visited TB prison services and administrations. TB prevention, control and care interventions were assessed against the six health system building blocks *(1)*.

The review team and programme are listed in Annex 1, people and stakeholders met in Annex 2 and publications reviewed in Annex 3.

1.2 Tajikistan

Tajikistan is a mountainous land-locked country in central Asia bordering Afghanistan, Uzbekistan, Kyrgyzstan and China. It is the smallest country in the region, covering 143 000 km^2, with the longest east–west extent being 700 km and north–south 350 km. More than half the country is covered by the Pamir-Alay mountain range.

The population was about 8 million in December 2012, around 756 000 of whom lived in the capital, Dushanbe. The ethnic groups are Tajik (79.9%), Uzbek (16.5%), Russian (1.1%) and Kirgyz (1.1%); other groups, including Pashtuns, Bukharian Jews and Volga Germans, make up 2.6%. The official language is Tajik.

The country is divided into administrative divisions (oblasts): Sugd and Khatlon, the autonomous province of Gorno-Badakhshan administrative oblast (GBAO) and the districts of republican subordination (DRSub).[1] Each oblast is divided into several districts, which in turn are subdivided into jamoats (village-level self-governing units) and villages (qyshloqs). As of 2012, there were 68 districts and cities and 367 jamoats in Tajikistan. Besides Dushanbe, the biggest cities are Khujant in Sugd oblast (with a population of 166 000) and Kulyab and Qurghonteppa in Khatlon oblast (97 700 and 76 700 respectively).

[1] Known in Russian as rayoni respublikanskogo podchineniya.

Tajikistan is a low-income country (one of the poorest of the former Soviet Union republics), with total gross domestic product (GDP) of US$ 7 million and per capita gross national income of US$ 860 (2012 figures) *(2)*.Shortages of employment opportunities mean that about 1 million Tajik citizens work abroad, mainly in the Russian Federation, supporting their families in Tajikistan through remittances. Less than 7% of the land area is arable, with cotton being the most important crop. Mineral resources include silver, gold, uranium and tungsten. Industry consists mainly of a large aluminium plant, hydropower facilities and small old-fashioned factories (mainly light industry and food processing). The civil war (1992–1997) severely damaged the already weak economic infrastructure and caused a sharp decline in industrial and agricultural production.

Tajikistan's economic situation remains fragile due to uneven implementation of structural reforms, corruption, weak governance, seasonal power shortages and the external debt burden. According to 2012 World Bank data, about half of the population (47.2%) in 2009 were living below the national poverty level *(2)*, with a greater proportion in rural areas (55% against 49.4% in urban). Education is universal and mandatory: primary education enrolment was 100% between 2004 and 2012 *(2)*.

1.3 Health care system

The health care system is based on the former Soviet Union Semashko model with some structural and organizational changes. It is characterized by centralization, prioritization of maternal and child care, a focus on prevention, treatment and elimination of social determinants of disease, and public involvement in health activities.

The Ministry of Health is responsible for national health policy and management of (most) health facilities at national level. Health care is administered by local authorities that are responsible for most social services, including health and education. The oblast health departments are responsible for health care provision of oblast-owned health care facilities and the activities of city and district health facilities (in partnership with city and district executive local authorities) within the respective oblasts *(3)*. Fig. 1 presents an organizational chart of the health system in Tajikistan.

Data from the National Health Account (NHA) *(4)* suggest that public expenditure on health is very low (1.7% of GDP in 2011) but private expenditure is very high (up to 4.1% of GDP, including financial resources of external donors), equating to 70.4% of total expenditure on health in 2011 (Table 1). The NHA data also show that although the government has been raising public expenditure as a share of GDP since the mid-2000s, prioritization of health within the state budget did not change much between 2005 and 2011 and public expenditure remained at a low level.

Representatives of the ministries of health and finance indicated during meetings with the review team that the government is going to raise the level of public expenditure on health in the current year. It is important to note that the second NHA report *(4)* indicated that central government continued to play a marginal role in financing health services (22% of public expenditure); local government allocated the remaining 78% of public resources to providers in 2011, the bulk of which came from local taxation *(4)*. External donors provide significant funds to ensure the treatment of priority diseases, the share of which reached 14.3% of total expenditure on health in 2011. Out-of-pocket payments contributed 85.4% of private expenditure and informal payments

were estimated at more than 46%, which is slightly more than the total 514 million Tajik somonis (SM) of public expenditure on health that year (Table 2) *(4)*.

Fig. 1. Organizational chart of health system in Tajikistan

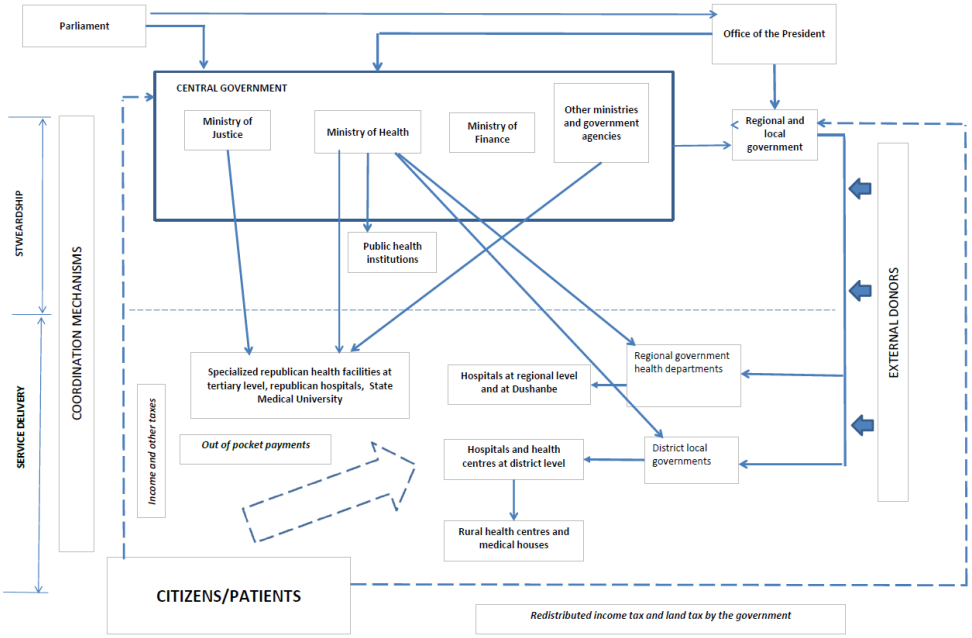


Table 1. Selected indicators on expenditure on health, 1995–2011

Indicators of expenditure	Year					
	1995	2000	2005	2009	2010	2011
Total expenditure on health as percentage of GDP	3.1	4.6	4.8	5.9	6.0	5.8
External resources on health as percentage of total expenditure on health	17.3	2.3	14.6	10.0	8.3	14.3
Government expenditure on health as percentage of total expenditure on health	41.5	20.4	23.6	24.9	26.7	29.6
Government expenditure on health as percentage of GDP	1.3	0.9	1.1	1.5	1.6	1.7
Private expenditure on health as percentage of total expenditure on health	58.5	79.6	76.4	75.1	73.3	70.4
Government expenditure on health as percentage of Government expenditure	7.4	6.5	5.9	5.4	5.9	6.2
Out-of-pocket expenditure as percentage of private expenditure on health	99.2	99.0	96.5	90.3	90.7	85.4

Source: Ministry of Health *(4)*.

1.4 Epidemiology of TB

1.4.1 TB notification

An estimated 13 000 incident cases of TB occurred in 2011 (uncertainty range: 11 000–16 000), equivalent to a rate of 193 (uncertainty range: 159–230) per 100 000 population, which is the highest in the WHO European Region. TB incidence peaked in 2002 followed by a slow decrease, but remained about three-fold higher than in the early 1990s (Fig. 2). Estimated prevalence for 2011 was 24 000 (uncertainty range: 12 000–41 000), equivalent to a rate of 350

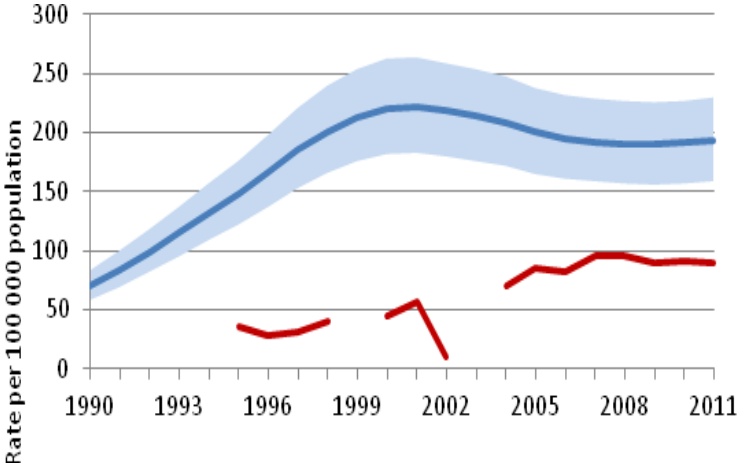
(uncertainty range: 170–593) per 100 000 population *(5)*. An estimated 1100 (uncertainty range: 760–1500) HIV-uninfected people died from TB in 2011, which was 16 (uncertainty range: 11–22) per 100 000 of the population. Only 47% of TB cases (uncertainty range: 39–57%) are estimated to be detected by the country health system.

Table 2. Source of private expenditure, 2011

Sources of private expenditure	Expenditure (in million SM)	Percentage
Informal payments	586.60	46.46
Outpatient drugs	482.00	38.18
NGOs	158.60	12.56
User fees under Ministry of Health Decree 600	28.70	2.27
Copayment under the State Guaranteed Benefit Package	5.40	0.43
Private insurance	1.30	0.10
Total	**1 262.30**	**100.00**

Source: Ministry of Health *(4).*

Fig. 2. Case notification and estimated incidence rates, overall trend in case notification rate (new and relapse cases, all forms) and estimated TB incidence rate



Note: the blue shaded area represents the uncertainty range.
Source: WHO Regional Office for Europe *(6).*

In 2012, 6929 TB cases were notified in Tajikistan (86.5 per 100 000 population). Rates varied across the oblasts from 58.4 to 135.8 per 100 000. A full breakdown of notifications is shown in Table 3.

Of the 5484 new TB cases notified, 3952 (72.1%) were pulmonary TB (PTB) and 1532 (27.9%) extrapulmonary TB (EPTB). The proportion of PTB cases varied across the oblasts between 59.2% and 77.0% and accounted for 86.4% of all new cases notified in prison.

Confirmation of TB by microscopy varied considerably across the oblasts. Between 29% and 63% of new PTB cases and 19% and 51% of re-treatment PTB were sputum-smear-positive (Fig. 4 and 5). The highest smear positivity among new cases was observed in Sugd oblast and, for previously treated cases, the prison system.

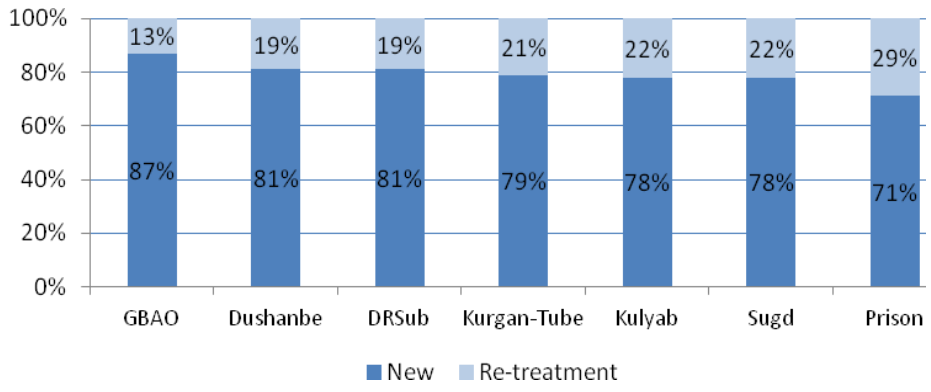
Table 3. Tuberculosis case notification by regions, 2012

Region	Total cases		New cases			Re-treatment			
	Number	Rate	Smear-positive	Smear-negative	Extra-pulmonary	Relapse	After failure	After default	Other
Dushanbe	540	72.2	105	155	179	15	14	4	68
DRSub	1 431	80.3	393	398	361	74	30	15	160
Kulyab	1 394	135.8	407	424	259	75	10	12	207
Kurgan-Tube	1 766	102.0	522	474	394	72	46	29	229
Sugd	1 345	58.4	513	296	241	69	44	25	157
GBAO	247	118.6	40	98	78	4	1	1	25
Prison	206	2 060.0	61	66	20	18	1	7	33
Tajikistan total	**6 929**	**88.7**	**2 041**	**1 911**	**1 532**	**327**	**146**	**93**	**879**

Source: NTP, unpublished data, 2012.

Of the 6929 TB cases notified, 5484 (79.1%) were new and 1445 (20.9%) were re-treatment, of which 22.6% were relapses, 6.4% re-treatment cases after treatment default, 10.1% re-treatment cases after treatment failure and 60.8% other re-treatment cases. The proportion of re-treatment cases varied across the oblasts from 12.6% to 21.9% of all TB cases notified (Fig. 3), with the highest proportion (28.6%) registered in the prison sector.

Fig. 3. Notified TB cases, 2012

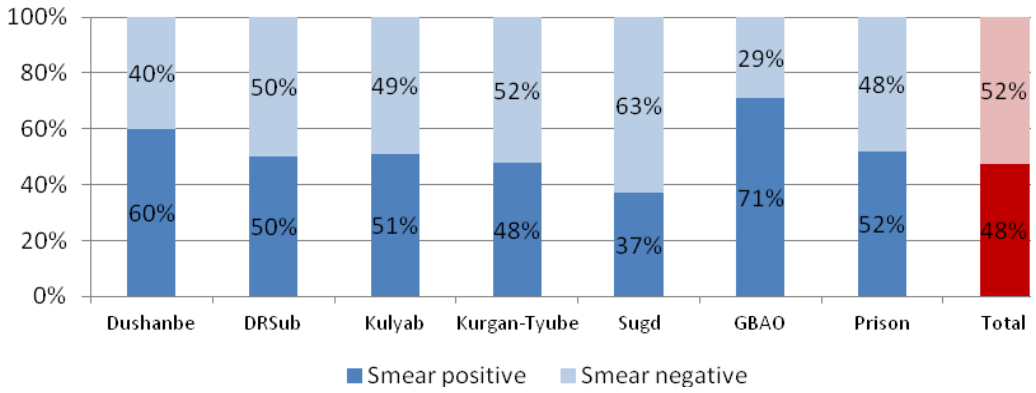


Source: NTP, unpublished data, 2012.

Over half (56.4%) of all new TB cases notified in 2012 were males and 6.6% were children (aged 0–14 years). Notification rates were similar among males and females up to 14 years. In both sexes, rates rapidly increased in the 25–34 age group, fell among 45–54-year-olds then rose again in people over 65. Notifications were higher for males in the 25–34 group but male–female rates varied only slightly among 45–54-year-olds.

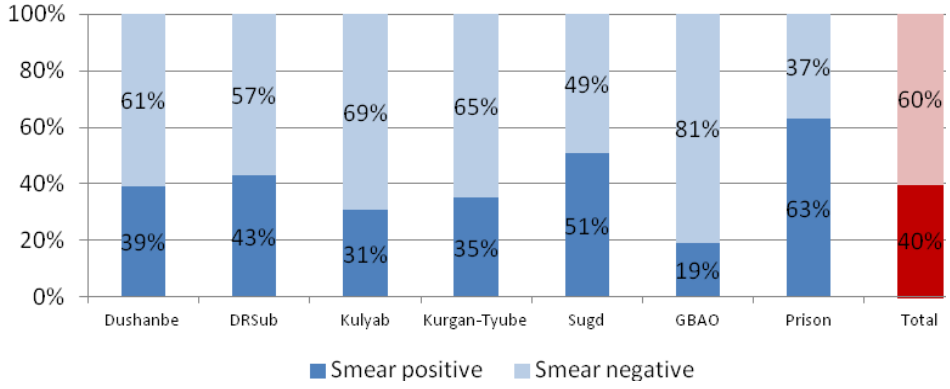
The highest rate for both sexes among new smear-positive TB cases was observed in those over 65. The rate among males and females was equal in the 55–64 age group but women exceeded males in the group over 65 years; the rate of smear-positive TB among women over 65 was about two-fold higher than at ages 25–34 (Fig. 6).

Fig. 4. Notified TB cases by microscopy results among new PTB cases, 2012 (n = 3952)



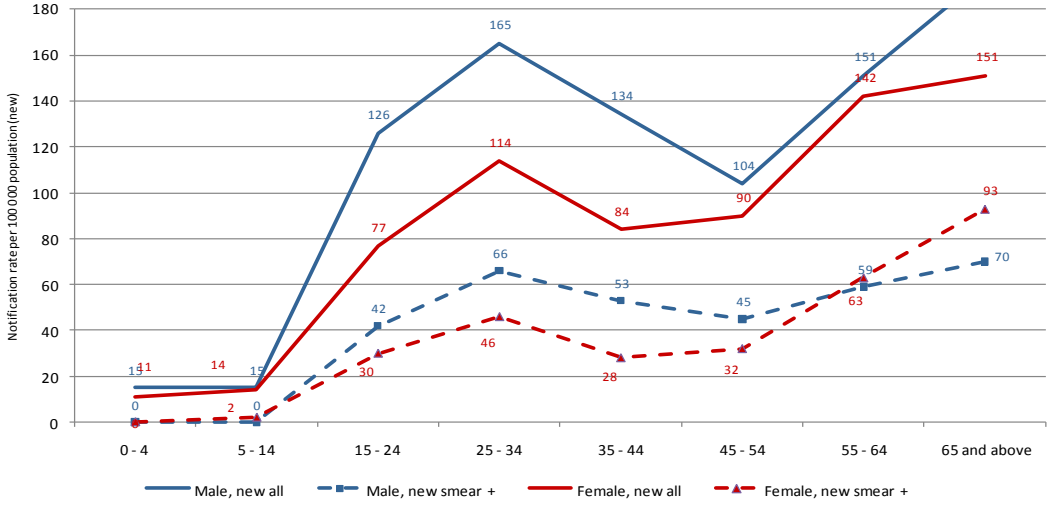
Source: NTP, unpublished data, 2012.

Fig. 5. Notified TB cases by microscopy results among retreated PTB cases, 2012 (n =1160)



Source: NTP, unpublished data, 2012.

Fig. 6. Tuberculosis case notification rates by sex and age group, 2012



Source: NTP, unpublished data, 2012.

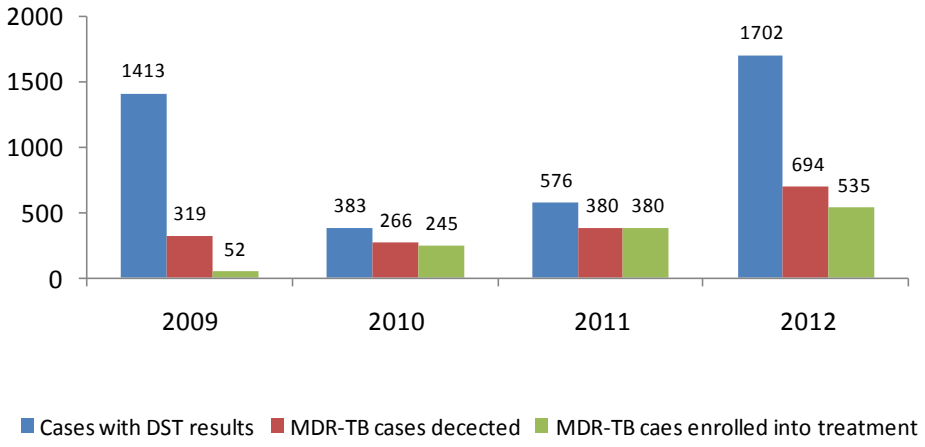
1.4.2 Multi- and extensively drug-resistant TB

Tajikistan is among the 15 highest multidrug-resistant TB (MDR–TB) burden countries in the European Region, with 910 (range: 800–1000) MDR–TB cases estimated among notified cases in 2012. A recent drug-resistance survey found that 13% of all notified new and 54% of notified re-treatment cases were MDR–TB. Tajikistan notified 694 laboratory-confirmed MDR–TB and 260 rifampicin-resistant TB cases (detected using the WHO-endorsed rapid molecular diagnostics (Xpert MTB/RIF assay[2] (Cepheid, United States)) to the global TB database in 2012.

Coverage of drug-susceptibility testing (DST) in 2012 was 36.8% among new PTB patients (1454 of 3952) and 45.2% among re-treated (653 of 1445). Another 300 patients with unknown treatment history had access to DST.

An overview of first-line drugs DST coverage of TB patients, detection of multidrug resistance and enrolment into MDR–TB treatment from 2009 to 2012 is shown in Fig. 7.

Fig. 7. Trend in number of DST MDR–TB notifications and enrolment into treatment, 2009–2012



Source: NTP, unpublished data, 2013.

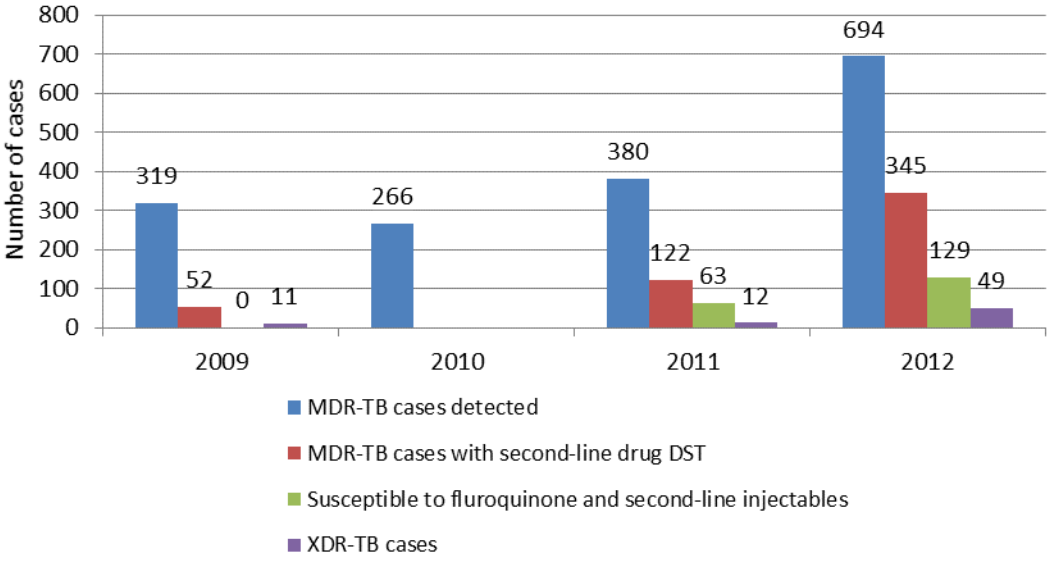
The absolute number of multidrug-resistant cases detected during the four years more than doubled, mainly due to an increase in DST coverage and the roll-out of the new Xpert MTB/RIF assay diagnostic tool. About 74% (694 of 910) of estimated incident MDR–TB cases were detected among notifications in 2012. Enrolment of patients into MDR–TB treatment has increased progressively since 2009; 77.1% (535 of 694) of notified MDR–TB patients started second-line TB treatment in 2012.

Coverage of second-line drug DST among confirmed MDR–TB patients increased progressively from 16% in 2009 to 50% in 2012. Out of 345 MDR–TB patients with second-line drug susceptibility results, 128 (37.1%) were susceptible to fluroquinone and second-line injectables, 18 (5.2%) were resistant to any fluroquinone, 73 (21.2%) were resistant to any second-line injectable and 49 (14.2%) were extensively drug-resistant. The proportion of extensively drug-resistant TB (XDR–TB) among MDR–TB cases with second-line drug DST results over the four years varied between 21.2% and 9.8%, without any clear trend over time (Fig. 8).

[2] Xpert MTB/RIF assay is an automated diagnostic molecular test to detect TB and rifampicin drug resistance with test results available in two hours.

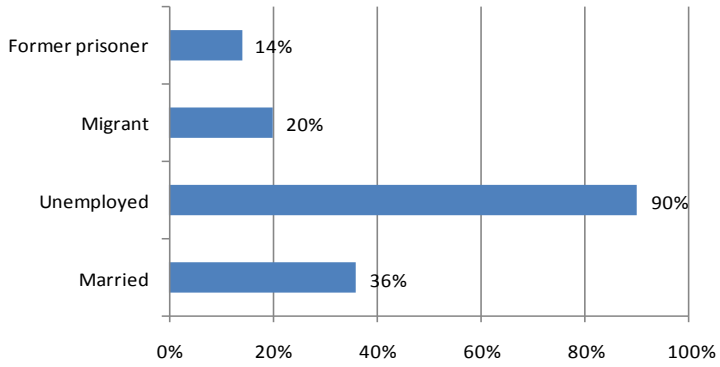
MDR–TB patients were mainly male (56.4%) and younger than those with regular TB (15–35 versus 15–44 years). The vast majority were unemployed, 36% were married, 20% were migrants and 14% were former prisoners (Fig. 9).

Fig. 8. Trend in coverage of second-line drugs DST among MDR–TB patients and XDR–TB notification, 2009–2012



Source: NTP, unpublished data, 2013.

Fig. 9. Social status of MDR–TB patients



Source: NTP, unpublished data, 2013.

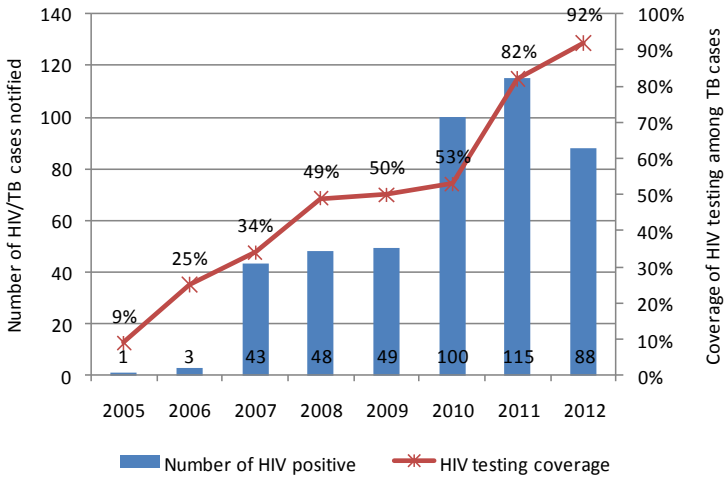
The second DST survey, conducted in 2010/2011, was countrywide. MDR–TB was found in 13% (9.8–16%) of never-treated cases and 54% (48–59%) of previously treated. The drug-resistance survey uncovered 25 XDR–TB cases, 21 (15.3%) among previously treated MDR–TB patients and four (2.7%) among new.

1.4.3 TB/HIV coinfection

An estimated 11 000 (uncertainty range: 7600–15 000) people were living with HIV in Tajikistan at the end of 2011 and 1500 had become newly infected. The prevalence of HIV on the basis of official registration was reported to be 43.4 per 100 000 population *(6)*.The estimated

incident number of HIV/TB coinfection was 250 (190–320). HIV-testing coverage among TB cases gradually increased from 2005 to a point where 6375 people were tested or knew their HIV status in 2012, which was equivalent to 92% of all TB cases notified in the same year. Eighty-eight (1.4%) of all cases tested or with known HIV status were HIV positive. The proportion of notified TB cases with HIV coinfection increased rapidly and reached its peak in 2010, but increasing testing coverage between 2010 and 2012 saw the level decrease to 1.4% (Fig. 10).

Fig. 10. Trend in HIV-testing coverage and number of TB/HIV coinfected cases, 2005–2012



Source: National AIDS Centre, unpublished data, 2012.

1.5 Treatment outcomes

Treatment success across groups of TB cases in Tajikistan is quite high compared to the European Region average. The treatment success rate for the 2012 cohort of new bacteriologically confirmed PTB cases was 79.7%: this is below the WHO target of 85% but is considerably higher than the Regional average of 62%.

The poorest treatment outcome is observed in the cohort of HIV-positive TB cases. Almost one in four HIV/TB coinfected cases dies during TB treatment. These patients are also more likely to be lost to treatment outcome evaluations compared to other cohorts.

A total of 11.1% of the 2011 cohort of new smear-positive PTB patients failed, 4.8% died, and 3.4% defaulted (Table 4). The trend of treatment outcomes between 2002 and 2011 shows that the highest treatment success was achieved in 2005 (86.2%), with a slight decrease to 79.7% being seen in the 2012 cohort. Correspondingly, the failure rate has been progressively increasing from 5.6% in 2007 (Table 5).

The observed decline in the treatment success rate in recent years might be explained by the growing burden of MDR–TB among new TB patients. The gradual increase in the proportion of patients with a failed outcome most probably relates to the higher number of MDR–TB cases and possibly to improvements in the recording system in the country. The size of treatment-outcome cohorts from 2007 therefore match well with the notified number of cases; in the 2005 reporting year (when the highest rate of treatment success was recorded), the treatment cohort size included only 74% (1296 of 1745) of notified new smear-positive cases. Missed cases, which are

most likely to result in poor treatment outcomes (as nonreporting sites usually have poor directly observed therapy), bias the overall treatment success rate of cohort to higher values.

Table 4. Treatment outcomes for different groups of TB cases, 2011 cohort (2010 for MDR–TB)

Cohort	Total	Success		Died		Failed		Defaulted		Not evaluated	
		n	%	n	%	n	%	n	%	n	%
New PTB, smear positive	2 174	1 732	80	104	5	242	11	74	3	22	1
New, smear negative	3 761	3 413	91	126	3	75	2	105	3	42	1
HIV-positive cases	115	51	44	27	23	10	9	10	9	17	15
Previously treated cases	1 674	1 183	71	162	10	222	13	85	5	22	1
MDR–TB cases	245	151	62	34	14	33	13	25	10	2	1

Source: NTP, unpublished data, 2013.

Table 5. Treatment outcomes of newly detected sputum-smear-positive PTB cases, 2002–2011

Year	Cohort size	Cured		Completed		Died		Failed		Defaulted		Not evaluated	
		n	%	n	%	n	%	n	%	n	%	n	%
2002	107	84	78.5	0	0.0	5	4.7	12	11.2	5	4.7	1	0.9
2003	927	342	36.9	81	8.7	92	9.9	68	7.3	56	6.0	288	31.1
2004	1 055	552	52.3	41	3.9	82	7.8	47	4.5	235	22.3	98	9.3
2005	1 729	1272	73.6	150	8.7	70	4.0	110	6.4	119	6.9	8	0.5
2006	1 932	1540	79.7	96	5.0	88	4.6	104	5.4	77	4.0	27	1.4
2007	2 073	1618	78.1	95	4.6	96	4.6	117	5.6	114	5.5	33	1.6
2008	2 044	1549	75.8	133	6.5	79	3.9	152	7.4	108	5.3	23	1.1
2009	1 972	1487	75.4	117	5.9	87	4.4	160	8.1	94	4.8	27	1.4
2010	2 290	1747	76.3	87	3.8	111	4.8	246	10.7	72	3.1	27	1.2
2011	2 174	1607	73.9	125	5.7	104	4.8	242	11.1	74	3.4	22	1.0

Source: WHO *(7).*

1.6 Regulation of TB care-delivery system

The NTP, which was endorsed by the Government in December 2009, describes the country's strategic vision on the organization, goal and targets of TB control. Community mobilization in the NTP is also supported by a dedicated strategy.

Fundamental Regulation of Republic of Tajikistan No. 223 on protection of the population from TB was endorsed by the Government in December 2006 and is the main regulatory document. The wider regulatory framework consists of acts, governmental and ministerial decrees and guidelines (Table 6).

The Ministry of Health regulates most activities through decrees and guidelines, while provider and stakeholder actions are steered by Government-endorsed strategies and action plans evaluated through monitoring plans. Health care providers are accountable to the Ministry of Health for their professional activities through local authorities and to local government for their financial management. Hospital managers have limited flexibility to manage performance beyond their approved budgetary frameworks. Senior managers of hospitals, who are chief physicians, are appointed by (and accountable to) the government administration *(3)*.

Table 6. Summary of regulations and guidelines on the NTP

Year	Topic	Legal reference(s)
2013	National TB infection control action plan for 2013–2017	MOH[a]/NTP of Tajikistan No. 3/1, 20 February 2013 Endorsed by Order No. 9, 14 June 2013
2013	Joint TB State Sanitary and Epidemiological Service monitoring plan	MOH/NTP of Tajikistan No. 3/1, 20 February 2013 Endorsed by Order No. 9, 14 June 2013
2012	Guideline on management of drug-resistant TB	MOH Decree No. 590, 30 November 2012
2012	Expansion of MDR–TB programme in the Rasht zone	MOH Decree No. 590, 30 November 2012
2012	Guideline for TB control in penitentiary facilities. Practical recommendations for health and non-health staff of the penitentiary system (the guideline also includes MDR–TB management)	MOH Decree No. 1, 5 May 2012
2012	TB monitoring and evaluation guideline	MOH Decree No. 1, 5 May 2012
2011	National guideline on TB control (including MDR–TB) for children	MOH Decree No. 198, 20 April 2011 (it has been revised and is currently awaiting ministry approval)
2011	National guideline on monitoring and evaluation of TB/HIV coinfection	MOH Decree No. 198, 20 April 2011
2011	Clinical protocol on tuberculin diagnostics and preventive treatment of contamination by TB agents	MOH Decree No. 198, 20 April 2011
2011	Expansion of MDR–TB programme (three more districts were included)	MOH Decree No. 23, 21 January 2011
2011	Sanitary, hygiene, epidemic control and disinfection regimens in TB hospitals, wards and TB centres	MOH Decree No. 343, 21 June 2011
2011	TB infection control guidelines	MOH Decree No. 198, 20 April 2011
2011	Memorandum of understanding between ministries of health, justice and interior and administration of the border troops and national security and National Guard of the Republic of Tajikistan regulating the provision of health care services, TB-related technical assistance, supervision and monitoring in the penitentiary system	Approved 26 October 2011
2011	National guideline on TB control	MOH Decree No. 198, 20 April 2011
2010	Management of MDR–TB in the penitentiary system	MOJ[b] Decree No. 81, 2 August 2010
2009	National programme for TB protection of the population of the Republic of Tajikistan for 2010–2015 (including drug-resistant TB management)	Government Order No. 694, 30 December 2009
2009	MDR–TB treatment	MOH Decree No. 324, 22 May 2009

Year	Topic	Legal reference(s)
2009	Outpatient treatment of MDR–TB patients	MOH Decree No. 571, 16 July 2009
2009	Expansion of MDR–TB programme	MOH Decree No. 810, 4 December 2009
2009	Sanitary and epidemiological regulations and standards: proper collection, storage and disposal of waste from health care facilities	Normative Act No. 2.1.7.020–09, 8 April 2009
2007	TB control in the penitentiary system, outlining the responsibilities of the MOJ for TB control	MOJ/MOH Decree No. 346/86, 5 July 2007
2006	Registry of disinfection in infectious patients' outbreak setting; supportive document on disinfection chamber	Ministerial Order No. 98 Form N354 and Form N351, 27 March 2006
2003	Ensuring sanitary epidemiological safety of the population	Government Law No. 49, 8 December 2003
2003	Regulation of State Sanitary and Epidemiological Service	Government Resolution No. 575, 29 December 2003
2003	National TB infection control action plan for 2013–2017	Order No. 9, 14 June 2013
2006	Law on the protection of the population from TB infection and disease	Government of Tajikistan, 2006
2010	Management of MDR–TB in the penitentiary system	MOJ Decree No. 81, 2 August 2010

[a] Ministry of Health.
[b] Ministry of Justice.

The strategy and plan for the provision of palliative TB care had not been developed at the time of the review and no guidelines related to provision of palliative care for terminally ill TB and MDR–TB patients were available.

The legal framework for infection control consists of laws supported by government resolutions and ministerial decrees and orders, including regulations used by the State Sanitary and Epidemiological Service.

1.7 Structure of specialist TB services

Tajikistan has an extensive network of TB institutions and facilities, including the Republican Centre for Tuberculosis Control (RCTC), four oblast centres for TB control and a number of city- and district-level centres. RCTC provides strategic planning of TB activities in the country, with regional (oblast) centres offering organizational and methodological support and outpatient management.

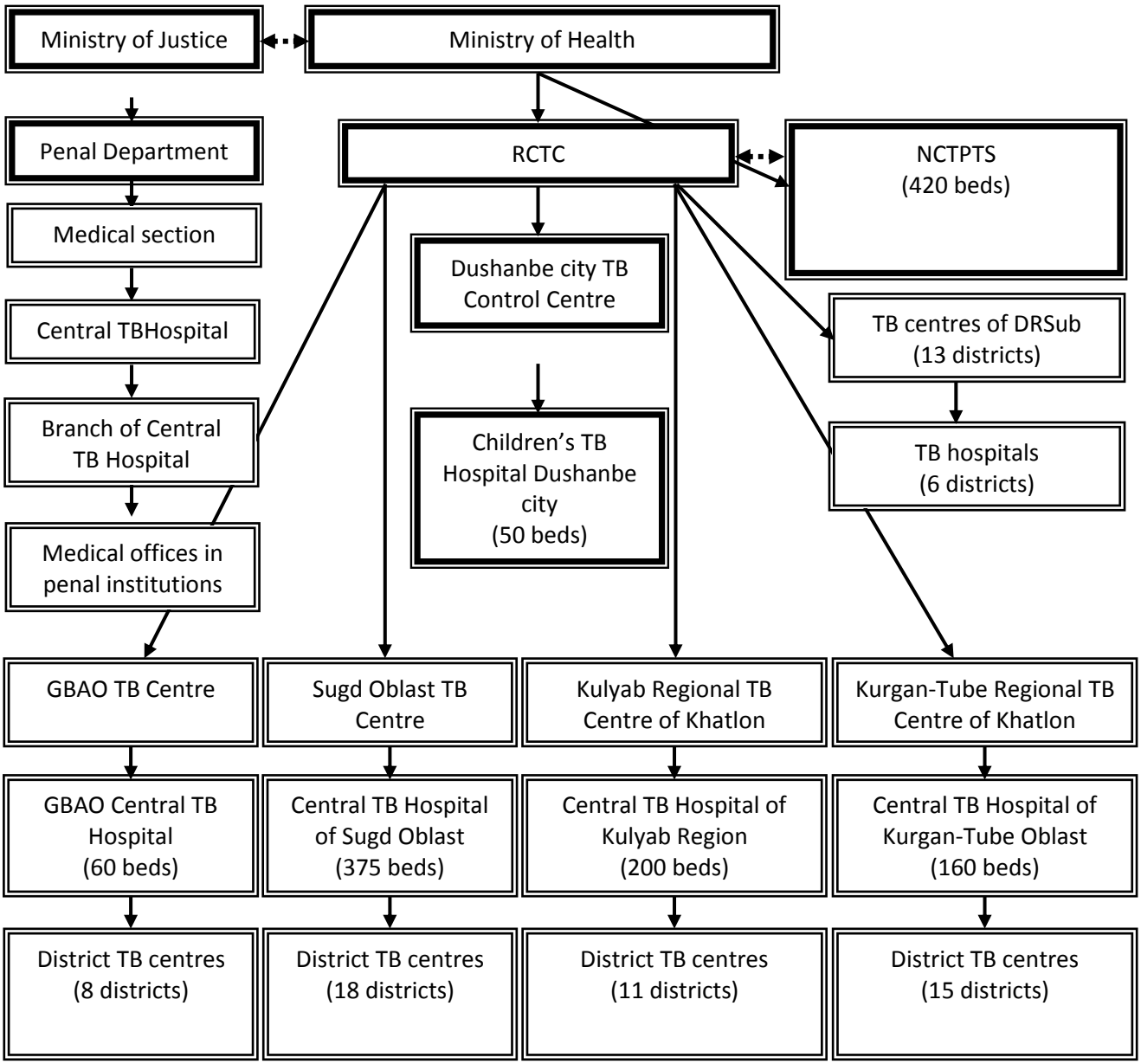
The TB hospital setting comprises the National Centre for TB, Pulmonary Diseases and Thoracic Surgery (NCTPTS) (formerly Machiton Hospital), four regional (oblast) TB hospitals and 29 city- and district-level TB hospitals. The number of MDR–TB beds has increased recently from 80 to 192. These currently are allocated to: NCTPTS (100 beds, compliant with infection control requirements and recently refurbished and equipped at a cost of €11 million); the children's TB hospital (five beds); Sugd oblast (15 beds); Khatlon oblast (30 beds in total, with 10 in each oblast); and the prison system (42 beds). Two regional TB hospitals are in the process of construction in Khorog (50 beds) and Kurgan-Tube (60 beds); the estimated completion date is

2013 and the cost will be in excess of US$ 2 million. The children's TB hospital is sited in Dushanbe city.

The TB laboratory service includes the National TB Reference Laboratory (NRL) (in Dushanbe city), two oblast-level culture laboratories and a number of microscopy laboratories at city and district levels. More information on the TB laboratory setting is provided in section 3.2.

The structure of TB control in Tajikistan, including TB hospitals and bed capacity, is shown in Fig. 11.

Fig. 11. Structure of the national TB control programme



2. Leadership and governance

2.1 Organizational framework of NTP: government and local authority commitment

Fig. 12 and 13 show the main policy cycle for governance of NTP and the current organizational structure, which are based on the structure of TB services envisaged in the NTP amended by the review's observations and interpretations. Ownership of the programme lies with the Ministry of Health and local government, which provide direct supervision of, and financing to, providers.

Fig. 12. Stages of the main policy cycle for TB governance

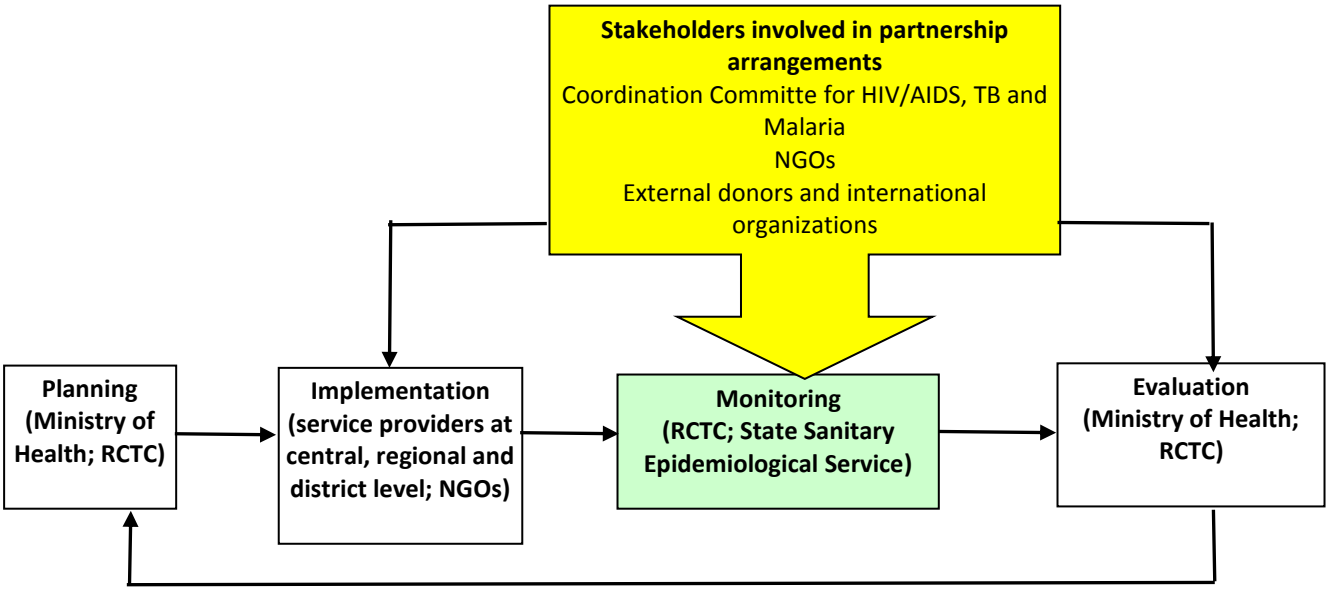
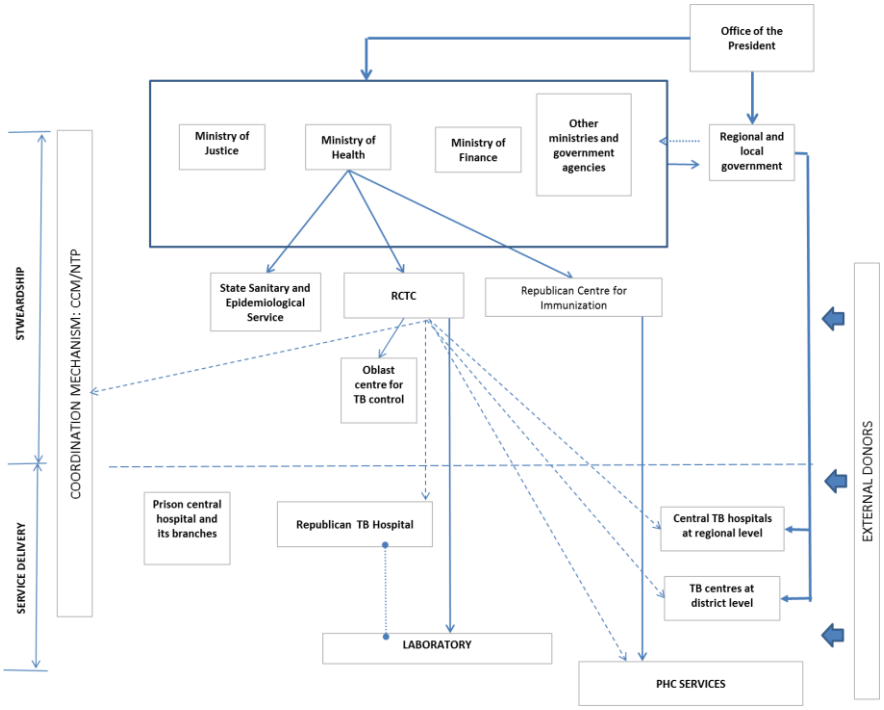


Fig. 13. Organizational structure of NTP in Tajikistan



Ministry of Health roles include drafting and approving regulations, developing overall planning strategies and assessing the performance of the NTP. It also plays a key role in coordinating with other ministries, government agencies, international organizations, commissions on social determinants of health and the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) CCM, established in 2005. The CCM is entrusted with ensuring a horizontal governance structure and coordinating stakeholder activity at national and local levels, which includes high-level decision-makers from responsible ministries, agencies and committees (for youth and religious issues, for instance) and representatives from international agencies, civil society and NGOs.

The Ministry of Health established the TB Coordination Council to oversee technical implementation of the NTP and strengthen horizontal governance and technical discussions. The committee has representation from all departments of the ministry, national centres for TB and HIV, the Ministry of Justice, international TB technical agencies and donors working in the country. It meets quarterly and can invite technical specialists from governmental and nongovernmental agencies.

Established structure, feedback and organizational mechanisms are in place to link the main stages of the policy cycle for governance of the NTP.

The hierarchical line of governance at national level demonstrates that other ministries also have responsibilities in relation to the NTP. The Ministry of Finance approves budget proposals from providers at local government level, reviews and submits the Ministry of Health budgetary proposal for planned public expenditure to the Government for further approval and allocates the central budget, particularly to institutions working at central level but also in some cases to local government. The Ministry of Justice, together with the Ministry of Health, is responsible for coordinating NTP implementation in prisons and other detention facilities. Other ministries, such as those for the interior, defence, education, labour and social protection, and agriculture, have dedicated NTP tasks in their respective fields. Importantly, the Government committee that considers television and broadcasting has an active role in transmitting social spots on TB prevention and treatment and conducting awareness-raising campaigns to improve knowledge on TB prevention among different social groups.

Three government agencies under the Ministry of Health have direct roles in NTP implementation. The main responsibility for controlling and monitoring implementation of the programme was assigned to the RCTC, which also plays an important role in developing plans, reporting on budgets and strengthening cooperation with national and international stakeholders. RCTC acts through centres for TB control at oblast level and runs thematic working groups on issues such as laboratory services and monitoring and evaluation. Field reviews and reviews of the monitoring and evaluation part of the programme show that RCTC has a wide mandate to carry out reviews and programme-performance analysis. It also has a central role in facilitating the translation of global targets into performance expectations defined in Government strategies on TB prevention through active participation in international collaboration.

The TB laboratory network is hierarchically organized and includes the NRL (whose chief executive is appointed by the RCTC) and NCTPTS.

The other important agency under the Ministry of Health is the State Sanitary and Epidemiological Service, which conducts epidemiological analysis of the TB situation and, most importantly, carries out investigations of contacts. It also coordinates activities on bacillus

Calmette-Guérin (BCG) immunization (supplied and supervised by the Republican Centre for Immunization) and implements vaccination through primary health care (PHC) facilities. The current organizational arrangements of these three agencies offer a sound base from which the Ministry of Health can implement hierarchical elements of governance effectively.

In addition to the Government's impact on implementation, the Office of the President also issues occasional presidential decrees declaring actions with deadlines and responsible actors.

The most important developments in other health sector reforms in relation to leadership and governance are the implementation and further refining of a draft action plan for introducing a new health-financing mechanism that aims to improve pooling of funds and payment mechanisms in health facilities from 2011 to 2014 *(8)*. This policy action introduces new provider payment mechanisms (full per capita payment at PHC level and case-based for hospitals) that can improve NTP performance when NTP management is involved in setting priorities for payment mechanisms, such as in case-finding for pay-for-performance for general practitioners.

2.2 Strategy and policy development

The main stages of policy development and the policy cycle are shown in Fig. 12. The government has increasingly been using horizontal and hierarchical elements of governance for strategy and policy formulation since the mid-2000s within the framework of a decentralized state health system that integrates financing and provision functions at regional and local government levels. These elements include setting up coordination mechanisms that involve different stakeholders in partnership arrangements discussing NTP implementation at central and local levels, applying strategic planning tools and monitoring the outcomes of implementation.

The review could identify the organizational background and documentation of all important stages of the main policy cycle, such as planning, implementation, monitoring and evaluation, with organizational linkages between the stages apparent for some aspects. The NTP can only slowly translate some of the most important policy priorities into action. Better performance requires careful understanding and interpretation of the complex governance mechanism of the NTP. In light of this, the review paid special attention to questions such as the following.

- What is the organizational structure for governance of the NTP?
- Is there a well functioning comprehensive planning process and monitoring system that includes all health system functional aspects, including surveillance, detection, prevention, treatment outcomes and health financing mechanisms?
- Does a well established coordination mechanism that involves all stakeholders in policy assessment and planning exist?
- Are organizational links among the main elements of the policy cycle of governance, such as monitoring, assessment, planning and implementation, identified and described?

Strategic planning for TB has been in place in Tajikistan since the mid-1990s, with the third national strategy (2010–2015) being approved in 2010. The strategy aims to address emerging major threats to TB control, such as drug-resistant TB, TB/HIV coinfection and low case detection *(9)*. Its strengths include setting clear and specific targets, highlighting priority policy problems and listing planned mechanisms to implement projected actions that are intended to be updated annually by RCTC *(9)*. Only a few more specific targets for case detection rate and treatment outcome can be found in the strategy, however, and not for all listed indicators *(9)*.

Case detection rates, which represent the NTP's most significant problem, were targeted to increase from 38.4% in 2010 to 70% in 2015. While this is a particularly important indicator, the target seems challenging for NTP implementation: the RCTC reported to the review that rates were expected to be only 40% in 2013, but that the plan was still to achieve the original target of 70%. The NTP should focus more attention on specific and realistic targets that planned actions can achieve in the country context. This should be done in a more comprehensive manner, involving all planned priority indicators and harmonizing with the dedicated performance framework (discussed below).

The review evaluated monitoring and evaluation capacity and NTP organizational processes separately. The RCTC monitoring and evaluation team was established in 2006 and has adequate human resource capacity at central and local levels to conduct reviews and performance assessment of the main health outcome indicators. A dedicated performance framework for 2010–2015 was developed jointly by NTP and local and international stakeholders. The NTP annual progress report for 2012 summarized 13 indicators that only partly replicate those defined in the current strategy. A specific guideline was developed for monitoring and evaluation team supervisory visits. While the performance assessment is well organized, the comprehensive annual progress report lacks detailed explanation of root causes and bottlenecks that block better performance in priority areas.

The Ministry of Health strengthened evaluation of health reforms and strategies by organizing annual assessments involving other ministries, agencies and development partners and presenting the main findings at the national health summit. The joint annual review, prepared by Ministry of Health departments and its Health Policy Analysis Unit, was established in 2008 *(8)* to review all important achievements and challenges emerging during implementation of the health strategy.

In theory, the joint annual review and health system assessment framework offer opportunities for more detailed assessment of the NTP. In practice, however, it seems that the scope of NTP assessment is restricted to presenting only a few descriptive indicators, with no analysis of achievements and challenges in NTP performance. Also, joint annual review reporting on improving TB incidence rates in 2011/2012 indicates a far lower value and better incidence situation than the global TB report for 2012 *(5)*. The joint annual review might incorrectly interpret declining notifications as incidence rates and view them as achievements, disregarding performance targets that aim to increase notifications to increase case detection rates. If a country aims to increase the case detection rate, it needs to diagnose more TB cases (or increase notifications): reduction in the number of detected TB cases should therefore not be interpreted as an achievement, but as underachievement of set targets.

The review considers the stagnating and very high incidence rate and low case detection rate from the global TB report for 2012 *(5)* as the basis for situation analysis. In this regard, the most important problem with NTP governance is that despite the many developed components of horizontal and hierarchical governance, including comprehensive planning, evaluation and coordination processes, there is no organizational process for translating NTP policy priorities into action at provider level and ensure accountability for performance. One of the challenges in relation to NTP performance is how to create performance incentives (such as dedicated incentives for active case-finding at PHC level) during implementation. There is potential for improving governance in this area which, of course, cannot be implemented without consideration of other main components of the NTP, in particular ensuring an adequate level of financing.

One way to improve current organizational and policy processes is to apply the tools of results-based management approaches that are offered to countries through targeted training by the TB team of the WHO Regional Office for Europe.

Strategy and policy development: recommendations
• It would be helpful to develop specifically focused and detailed implementation plans (with dedicated budgets) for selected main priority problems, such as addressing the low case detection rate.
• The completeness, specificity and achievability of targets set or amended in the NTP should be revised, with more attention directed to evaluating NTP performance based on these targets and linked to the joint annual review of health reforms.
• The quality of performance assessment should be raised, with targeted training and capacity-building on how to address bottlenecks to implementation.
• The performance assessment framework should be harmonized with targets set in the strategy and linked to the implementation of performance-based management tools for improved results.
• A more detailed analysis of NTP developments and challenges to progress should be compiled and communicated effectively to the joint annual review.
• The capacity of the Health Policy Analysis Unit of the Ministry of Health to conduct independent performance review of the NTP should be strengthened to support the NTP to develop standards for overall performance assessment, including dimensions beyond health outcomes (such as efficiency and equity).

2.3 Partnership and civil society involvement

Thirty-seven local NGOs have been working on TB projects in Tajikistan. Most commenced in the past 5–10 years and rely on 3096 volunteers trained in outreach activities around health issues. NGOs are providing crucial services to patients and communities in areas for which services would otherwise be nonexistent, such as prevention, case-finding and treatment adherence. Activities include: awareness-raising on symptoms and free TB treatment; distribution of information, education and communication material and condoms; referral to TB facilities and directly observed therapy short-course (DOTS) services; harm reduction; treatment follow up; psychosocial support; and distribution of incentives, such as food and motivation packages provided by donors.

NGOs in Tajikistan are entirely dependent on international funding from USAID, AIDS Foundation East–West and the GFATM. Grants are usually allocated for shorter-term pilot projects and are therefore implemented with target populations in different areas. NGOs in the Khatlon and Sugd oblasts mainly target vulnerable groups such as migrants, prisoners, sex workers, injecting drug users and men who have sex with men. Some work on TB and HIV prevention and harm reduction among vulnerable groups in target districts (NGO Anis in Kulyab) while others are more focused on, for example, migrants in rural areas (NGO Akhtari Bat in Rumi district) or MDR–TB patients' ambulatory treatment (NGO Nakukor in Kulyab).

They function with a few administrative staff members and a variable number of well trained outreach workers or volunteers (such as teachers, leaders and imams) carefully selected from the community. Volunteers visit households in their communities and raise awareness of TB in schools and mosques and during weddings and other ceremonies. TB carries a high level of stigma in Tajikistan and the affected population tends to hide in fear of arousing suspicion within

the community; volunteers have better access to communities and households than health workers, whose presence can increase stigma. Trained religious leaders are particularly effective due to their influential position in society and the high numbers of people they can reach.

Partnerships between stakeholders mainly develop through the CCMs at national and oblast level, but also occur through the thematic working groups, whose quarterly meetings involve a wide range of stakeholders. NGO involvement in the CCM has recently increased from 20% to 40% following a request from the GFATM in 2012. Coordination among NGOs and between NGOs and local authorities includes a memorandum of understanding for local NGOs active in Kulyab and between NGOs and local authorities in Kulyab district, with local authorities often providing facilities for conferences or sociocultural activities. The police department in Kurgan-Tube district is reportedly referring female sex workers to the NGO Orzu Plus, which works in HIV prevention. Local NGOs are well aware of the importance of involving local authorities in discussions: NGOs in Khatlon, for instance, are trying to persuade local authorities to provide food from publicly-owned gardens as incentives to ambulatory patients.

Partnership and civil society involvement: recommendations

- Sustainability of funds is the biggest challenge for NGOs. Most of the small grants allocated to NGOs are coming to an end or have already ended. Government authorities should move away from donor dependency and think about a financial strategy to sustain the work being done by community volunteers, who regularly need to be incentivized. Local authorities could help provide some of these incentives.
- Training should continue to be provided for community and religious leaders, with training activity being refreshed and renewed when new religious or community leaders take over. Local authorities could easily sponsor such activities by providing a location for the training and help cover related subsistence costs.
- NGOs are increasingly being recognized as indispensable actors in TB care and control in Tajikistan. They must therefore be involved in discussions at all levels, together with communities and former/current patients in the CCM (the GFATM new funding model requests representation of people living with the disease), thematic working groups and policy-definition and political forums such as the annual health summit.

2.4 TB/HIV collaborative activities

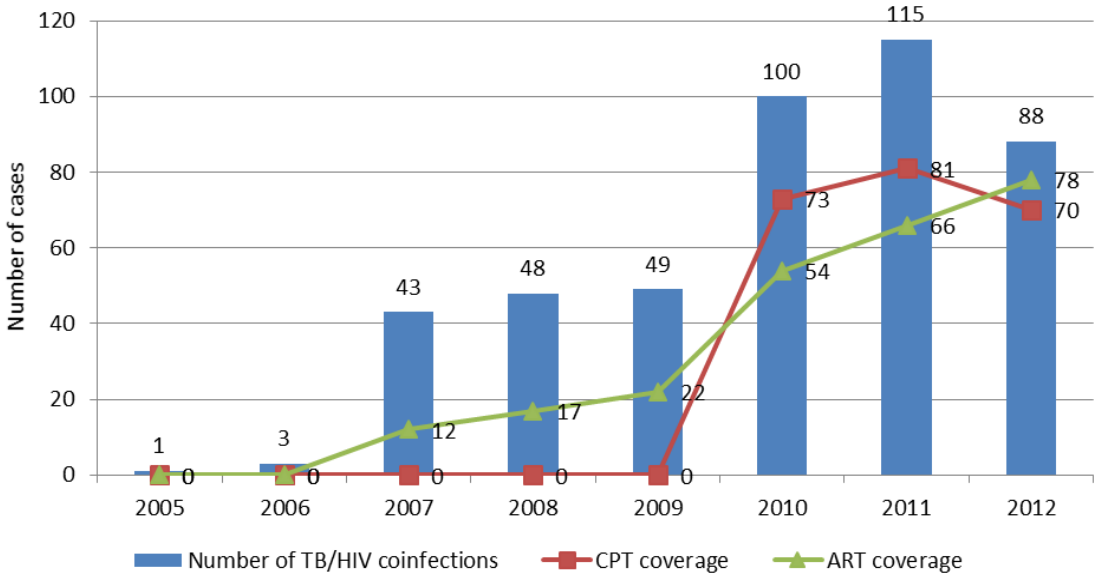
Coverage of antiretroviral therapy (ART) and co-trimoxazole preventive therapy (CPT) has progressively increased among TB/HIV coinfected patients over the past five years. Out of 88 notified TB/HIV cases in 2012, 78 (88.6%) started or continued ART and 70 (79.5%) were provided with CPT (Fig. 14).

Despite the progressive increase in HIV testing coverage among TB cases (from 53% in 2010 to 92% in 2012), the proportion and absolute number of HIV/TB coinfected cases reduced from 115 to 88 (Table 7). This might be explained by recent increased access to ART and isoniazid preventive therapy (IPT), which effectively prevented TB emergence among people living with HIV.

Collaboration and coordination at organizational and technical levels between the NTP and National AIDS Programme exist, reflected in the fact that each has appointed focal points for the other programme at central and regional levels. Intensification of collaboration over recent years has seen more frequent meetings at central level between national focal points of both

programmes, improvements in data quality on TB/HIV coinfection and pilot projects in which TB and HIV are jointly managed and integrated to a greater extent in the same health care facilities. There was, however, no feedback from HIV centres about the HIV status of TB patients to TB services during the time of the review.

Fig. 14. Number of HIV-positive TB cases, provision of CPT and ART, 2005–2012



Source: National AIDS Centre, unpublished data, 2013.

Table 7. HIV/TB surveillance, 2005–2012

Year	All TB cases	Cases with known HIV status	HIV-positive cases	TB cases with positive HIV	Testing coverage
2005	7 526	670	1	0.1%	8.9%
2006	6 671	1 639	3	0.2%	24.6%
2007	8 081	2 763	43	1.6%	34.2%
2008	7 996	3 949	48	1.2%	49.4%
2009	7 482	3 714	49	1.3%	49.6%
2010	7 641	4 049	100	2.5%	53.0%
2011	7 609	6 241	115	1.8%	82.0%
2012	6 929	6 375	88	1.4%	92.0%

Source: NTP, unpublished data, 2013.

Collaboration and coordination at organizational and technical levels between the NTP and National AIDS Programme exist, reflected in the fact that each has appointed focal points for the other programme at central and regional levels. Intensification of collaboration over recent years has seen more frequent meetings at central level between national focal points of both programmes, improvements in data quality on TB/HIV coinfection and pilot projects in which TB and HIV are jointly managed and integrated to a greater extent in the same health care facilities. There was, however, no feedback from HIV centres about the HIV status of TB patients to TB services during the time of the review.

TB/HIV coinfection case discussions (involving HIV health staff on TB and TB health staff on HIV) are conducted at central level, facilitating exchange of information, knowledge transfer and learning on both sides. Joint training, however, is not on a sustainable footing and is fully dependent on external donor funding. Collaborative mechanisms (such as meetings of representatives of the different programmes) are not sufficiently established at regional or local levels, demonstrated by the lack of regular consultative meetings. Joint policy and technical documents have been developed: some were found during field visits to local-level TB facilities, but others, including the joint national TB/HIV strategy and action plan and the national protocol on management of TB and HIV coinfection based on the latest WHO recommendations (including recommendations on managing paediatric TB/HIV coinfected patients and ART initiation at higher CD4 cell counts) need to be updated.

All diagnosed TB patients are tested for HIV in a provider-initiated, opt-out manner, either through rapid tests or indirect fluorescent antibody assays, but rapid tests for HIV are not always available in TB diagnostic and treatment facilities. Blood samples for HIV testing are sometimes sent to the National AIDS Centre in Dushanbe.

Symptom-based and X-ray diagnostic screening for TB is regularly carried out among people living with HIV but mostly at TB specialist facilities and not systematically in PHC settings; this is not only economically unsound, but also increases stigma for patients and heightens the risk of exposure to TB at the TB facility (unless infection control measures are fully optimal). X-ray options that exist in HIV/AIDS-associated health care facilities (or reasonably near) may not be free of charge, unlike those in TB specialist settings, where they are free for symptomatic patients. These factors could (at least partly) explain a certain loss to follow up of HIV patients in the screening process for TB.

In the case of a negative X-ray and absence of TB symptoms, IPT is administered for a period of nine months, but not systematically. People living with HIV are not tested for MDR–TB (by Xpert MTB–RIF assay), apart from in a few supported pilot sites partly funded by the GFATM. Stigma around HIV is still widespread, amplifying existing stigma of TB/HIV coinfection.

TB/HIV collaborative activities: recommendations

- The existing national TB/HIV joint strategy and action plan (2008–2012) should be updated, describing programmatic and operational potential for improving service integration through introducing better outreach mechanisms for diagnosis and management of TB and HIV, including care at PHC level (reflecting the movement towards strengthening PHC in health care reform).
- A comprehensive and fully functional system of relevant patient information exchange regarding HIV test results should be established between TB and HIV/AIDS specialist services.
- Systematic symptom-based screening should be provided for people living with HIV at every clinic visit/health care contact for HIV follow up, including at non-central levels and PHC facilities.
- Training opportunities and case study exchange should be expanded and more systematically provided at oblast, district and local levels to further improve health care workers' awareness and knowledge about specifics of TB/HIV coinfection.
- Gradually, all people living with HIV with presumptive TB (TB suspects) should be tested by Xpert MTB–RIF assay and X-ray machines should be installed in HIV/AIDS diagnostic and care-delivery facilities at all levels, particularly central/national and regional. X-rays should be performed free of charge to the patient to reduce stigma, risk of infection through visiting TB facilities for X-rays and economic loss (through, for instance, extra travel time).

- The national protocol on management of TB/HIV coinfection should be revised to reflect the latest WHO recommendations (including management of paediatric TB/HIV and ART initiation at a higher CD4 cell count).
- IPT prophylactic treatment should be provided systematically for people living with HIV for whom active TB has been ruled out.

2.5 Advocacy, communication and social mobilization

Great progress has been made in the area of advocacy, communication and social mobilization (ACSM), which has been integrated within the NTP. A new ACSM focal person was appointed to the NTP team in 2006 and an ACSM thematic working group chaired by the NTP Manager was created the same year. The thematic working group has 26 members from government institutions, international donors and NGOs. It drafted the national ACSM strategy for 2011–2015 with technical assistance from Project HOPE and financial assistance from USAID and the GFATM. The group meets on a quarterly basis. Most members participate in the group's work on planning activities and campaigns around World TB Day.

The main function of the thematic working group is to approve all information, education and communication materials developed by partners. Project HOPE conducted training for the group on the development of materials in February 2013. Any material to be disseminated within the country needs to be reviewed by the group before it is printed. A large number of leaflets on TB and HIV are available in many health facilities across the country. Some NGOs highlighted that videos with patient testimonies and so-called soap operas on TB also exist.

ACSM: recommendations

- No budget is attached to the ACSM strategy, so implementation is not possible. Stakeholders have nevertheless aligned their activities to the strategy's objectives and priorities. National authorities should allocate budgets to support implementation of the strategy and ACSM activities. If this does not happen, the ACSM thematic working group will not be sustainable: informal coalitions (such as the group) need common activities to generate interest and action from members.
- The ACSM thematic working group should expand its membership to (former) patients who have now become active in their communities, especially those who are educated and have media and communication skills. The membership should also be expanded to communities, local NGOs and representatives from other ministries such as education, justice and social affairs.
- The advocacy component of the ACSM strategy needs to be strengthened. International donors and NGO members of the thematic working group need advocacy training to enable them to develop (with external assistance) an advocacy strategy to determine requirements, targets (mapping of influential actors in the country) and objectives to improve political and financial commitment and civil society involvement in TB. Advocacy activities should be budgeted and conducted by members of the thematic working group. Options such as involving parliamentarians, hosting regular high-level roundtables involving all stakeholders, developing materials targeted at decision-makers and organizing field visits for local authorities should be explored.
- Many doctors and nurses at oblast level still refer to outdated texts and curricula. Access to Tajik- or even Russian-language modern publications on TB is scarce, so the ACSM thematic working group and the Institute for Postgraduate Medical Education should develop and disseminate a basic brochure in Tajik with latest updates on TB prevention, care and control (childhood TB, new methods of diagnosis, TB/HIV, MDR–TB etc.) for health care workers. This should be widely distributed and updated every two years. A knowledge, attitudes and practice study could be

conducted among health care workers to evaluate their level of knowledge before defining the scope of the brochure and topics covered.

- Videos of patient testimonies are available and should be disseminated among partners at national level. The thematic working group should develop brochures with patient testimonies, targeting decision-makers and communities. TV and radio should be used more consistently for communication purposes.
- The NTP and WHO should jointly present the main recommendations of the WHO review to the heads of Khatlon, Dushanbe and Sugd oblasts to raise political awareness of TB at oblast level.

2.6 Operational research

From a disease-control programme perspective, operational research can be defined as research into strategies, interventions, tools or knowledge that can enhance the quality, coverage, effectiveness or performance of the health system in which the research is being conducted. It uses systematic research techniques to achieve a specific outcome that can be used for programme decision-making.

Operational research is one of the NTP's objectives. Activities planned include: establishing a thematic working group for operational research; capacity-building of expert groups assigned to the development and performance of operational research at local level; and identification of research priorities. Previously identified research priorities include migration and TB, burden of TB/HIV coinfection, side-effects of TB drugs, active case-finding of TB among risk groups, resistance among TB patients, cost-effective analysis of active versus passive TB case-finding, comparative analysis of outpatient and inpatient treatment results of TB patients, and QuantiFERON® testing for detection of latent TB infection among people who are in close contact with TB patients (children and teenagers).

The review found no advisory working group at the NTP looking systematically to identify research priorities for the TB control programme, plan for capacity development or create a core group responsible for operational research projects according to priority areas. Despite this, there is much interest in operational research from the NTP Manager and his staff, and several scientific projects are currently in process in the RCTC under his leadership. Two NTP staff obtained PhD degrees in the Russian Federation and two more are undertaking doctoral studies. Ten staff members participated in a professional development course and two received training on meningeal diseases and bronchology respectively (one specialist per discipline). The Ministry of Health supports these studies and the KNCV Tuberculosis Foundation provides support for a four-month course, but the costs of PhD courses are paid by students.

The NTP has identified many operational research areas and conducted projects with technical and financial support from development partners such as WHO, UNDP and Project HOPE. These include: comparison of TB treatment outcomes, cost and socioeconomic burden on patients in ambulatory versus hospital-based TB care; exploring TB-related knowledge, attitudes, practice, behaviour and access to services among migrant workers; and factors determining household expenditure for TB and coping strategies (the list is not exhaustive). Various research studies have been disseminated through publications in peer-reviewed international journals and presentations at national and international meetings.

NTP collaborated with WHO on two studies: migrants' access to services *(10)* and comparing inpatient and outpatient treatment. The latter (unpublished) study showed that outpatient treatment was more efficient and had better treatment outcomes. The NTP consequently

implemented the rationalization of hospital beds process: 70% of patients are now on outpatient treatment. The results of this study are also highly relevant to other countries in the Region and its dissemination deserves prioritization.

Examples of other recent studies include a knowledge, attitudes and practice survey conducted by Project HOPE and a USAID survey of TB services carried out by the Quality Health Care Project.

Operational research projects conducted with technical assistance from international partners have progressed with effective involvement of local staff, including NTP team members. This pool of staff can be targeted for further in-country capacity development at different levels. The programme would benefit from sustaining such practices and rendering them more systematic.

Research ethics clearance in Tajikistan can be obtained from the Ethics Committee at the Academy of Medical Science. Understanding of research ethics at NTP, however, remains limited.

The NTP has ideas for new operational research projects, including studies of TB among migrants, integration of TB services within family medicine and PHC, sustainability of NGOs' work, reform and financing of TB services, comparing infection control in refurbished versus nonrefurbished facilities and further rationalization of hospitals.

Laboratory and clinical infrastructure is sufficiently available for operational research: advanced and new laboratory technologies (such as Xpert MTB/RIF assay and the Hain test) to identify TB and anti-TB drug resistance are available at the NRL and National Public Health Reference Laboratory. Routine data collection tools are consistent across the regions/country and a computerized live-based TB electronic database is available. Administrative, laboratory and clinical barriers to conducting operational research are therefore minimal: the main barriers are lack of funding and low research capacity.

The introduction of new anti-TB drugs offers possibilities for operational research, including measurement of pharmacovigilance and comparing results obtained by using drugs from different companies. This is especially important for MDR–TB and XDR–TB patients, for whom the programme urgently requires appropriate treatments. Implementation of the Xpert MTB/RIF assay offers many opportunities for operational research, which could focus on investigating the effectiveness of patient risk assessment, the impact of Xpert MTB/RIF on case detection of TB (HIV associated or not), MDR–TB and access to care, and the effectiveness and cost–effectiveness of Xpert MTB/RIF. Excellent data are gathered by the NTP from recording and reporting processes (see Chapter 5), which also offer good opportunities for operational research.

Some remarkable findings made during the review require further investigation. While comparing laboratory register data (form TB–04) with form TB–03 reporting, it was found that a significant proportion of cases (mainly older ones) were not registered on form TB–03 because the people had died. This suggests a hypothesis of late TB diagnosis: the causes of death of these patients should be further analysed.

Another interesting finding is that the male/female ratio in Tajikistan is close to 1 (more females than males). This deserves further investigation, given that TB is usually more frequent among males. It was also noted that it sometimes takes about three weeks for Xpert MTB/RIF assay results to be fed back to doctors: the reasons for the delay should be investigated.

Priority topics for operational research in Tajikistan are:

- treatment interruption causes and risks factors for poor adherence to TB treatment;
- rates and risk factors for latent TB infection and active TB among health care workers;
- monitoring of adverse TB drug reactions, including those to new anti-TB drugs;
- active case-finding of TB among risk groups and testing the effectiveness of Xpert MTB/RIF assay by risk group;
- causes of early and late treatment relapses;
- the level of burden of TB/HIV coinfection;
- comparison of results of directly observed treatment with and without support from the community and NGOs; and
- implemention of intensified contact tracing/source case-finding in particular districts and measurement of effectiveness.

Operational research: recommendations
• An advisory committee/working group should be established at the NTP to identify operational research priorities based on the challenges the NTP faces and findings of this review.
• Funding sources for operational research and potential education and collaboration opportunities should be identified.
• A feasibility plan to sustainably build human resources operational research capacity for NTP should be developed. The plan should be part of the overall human resources development plan for TB control.
• Training and ongoing support for operational research should be organized, if necessary with external technical assistance. Medical education institutions should be actively involved in operational research.
• The use of routinely collected data in operational research should be increased.
• There should be an aim to increase publications in national and international peer-reviewed journals to heighten the impact of conducted operational research nationally and internationally.

3. Service delivery

3.1 Prevention

3.1.1 Contact-tracing and chemoprophylaxis

The review identified that latent TB infection is neither systematically diagnosed nor treated among adults. Contact-tracing among adults is carried out (if only by X-ray) and the QuantiFERON® test is not available. Contact-tracing among children is conducted using X-ray to exclude active TB disease and Mantoux test, but the latter is underused due to lack of tuberculin. It was anticipated that the Government would procure the tuberculin from 2013, responding to the need of the entire country and for children deemed to have been contacts of relevant TB patients; the GFATM had been supplying approximately one third of projected needs up to that time. Tuberculin was nevertheless apparently only available at NTP central level during the time of the review visit.

There is currently neither generalized nor robust information on how many contacts (children and adults) are screened for TB, how many are treated and for how long. Current country policy is to screen all children from 0–6 years who have been in contact with a PTB patient (regardless of whether the index case is smear-positive or negative). After active TB is excluded, a nine-month course of IPT is started. The treatment of children less than 6 years is partly determined by the lack of tuberculin and uncertainty among doctors on the quality of sputum smears.

Treatment of latent TB infection is usually coordinated by TB physicians and paediatricians. Treatment in Dushanbe is coordinated by the National Children's TB Hospital with daily doses usually observed by a directly observed therapy nurse or trained family member. Children may be hospitalized in a sanatorium for latent TB infection treatment, depending on social factors in the family environment (such as socioeconomic situation and limited or no potential for isolating the index case).

Tajikistan has two children's TB sanatoria (in Ravshan and Sharinav). The Ravshan sanatorium was visited during the review. It has 130 beds (30 pre-school age and 100 for school-age children), 83 of which were occupied at the time of the visit. Usually, three groups of children are hospitalized:

- group 1: continuous phase treatment for six months (there were two children in this group at the time of the visits);
- group 2: contacts of TB cases, who usually do not receive preventive treatment as they are older than 6 years; they are hospitalized for 2–6 months (there were 33 such children at the time of visit); and
- Group 3: the risk group, who are Mantoux test-negative children with lung diseases like bronchitis or pneumonia and who receive vitamins and sometimes gentamycin for 2–3 months (48 children).

The longest stay in a sanatorium is 2–3 years.

Assessment of TB facilities showed highly differing ratios of contact investigation and suspect yields (some had fewer contacts identified than actual TB patients) and no systematic approach by TB staff at facility level to investigating TB case contacts.

Contact-tracing and chemoprophylaxis: recommendations
• Feasible protocols, including indicators to systematically monitor and evaluate the quality of contact-tracing activities, should be developed.
• Training curricula should be updated to allow practice-based training for PHC physicians and nurses to include TB contact-tracing and adequate active case-finding strategies (including clear definitions of roles and responsibilities of the TB and PHC systems) in their daily work. This should also include training and teaching community workers and family members.

3.1.2 Vaccination

National guidelines on BCG vaccination and tuberculin skin-testing were introduced following approval by the Ministry of Health in 2010. They comply with international BCG guidelines: vaccination is recommended once, at birth, with IPT for non-HIV-infected and HIV-infected infants at 9 months.

According to the NTP, approximately 98% of children are vaccinated at birth. Ninety-nine per cent of Dushanbe children in a study conducted with the support of Médecins sans Frontière in June and July 2011 had either a BCG vaccination scar or documented BCG vaccination *(11)*. BCG vaccination delivery takes place at home in rural areas, however, and completeness and quality of the vaccination of children in these areas depends on the parents' compliance and knowledge of the vaccination programme and accessibility of health care services. Information on BCG vaccination is recorded in the neonate's personal file.

Vaccination: recommendations
• WHO's recommended BCG vaccination approach should continue to be included in all national document-updating processes, including not only those relating primarily to TB, but also childhood TB and vaccination policies, and treatment and care guidelines and protocols.
• BCG vaccination should be part of outreach activities and be included in training for community workers, including religious leaders and parents.

3.1.3 Infection control

Infection control is one of the main components of effective service delivery and is key to ensuring safe environments in health care facilities for patients and health care workers. TB is an airborne-transmitted disease that can present a high risk of nosocomial transmission in health care facilities, including treatment and diagnostic premises.

The infection prevention and monitoring mechanism (including for TB) is under the State Sanitary and Epidemiological Service, which has a vertical structure with national, regional and peripheral level formations (Annex 4). It supervises compliance with national sanitary, hygiene and epidemiological standards and conducts periodic inspections of health care facilities, including those providing specialist TB services. State Sanitary and Epidemiological Service epidemiologists from oblast and/or city departments conduct home visits and complete necessary activities directed by national norms.

The Government, NTP and partner and donor organizations have taken some important steps towards improving the TB infection control situation in recent years, including:

- appointing a national coordinator for TB infection control at the NTP;
- establishing a national TB infection control working group;
- developing (with WHO technical assistance) guidelines on TB infection control through the working group;
- developing and approving a TB infection control action plan for 2013–2017;
- providing training for trainers since 2010 with support from UNDP, GFATM and WHO;
- cascading NTP training on TB infection control for physicians and laboratory personnel;
- procuring measuring equipment and testing kits with GFATM support; and
- refurbishing TB/MDR–TB treatment facilities and the NRL, with necessary infection control measures (including engineering control measures) put in place.

The review identified the following challenges in TB infection control. At national level:

- State Sanitary and Epidemiological Service documents (Hygiene – epidemiological norms and regulations No. 2.1.7 001–11 and No. 2.1.7.020-09) addressing TB infection control have not been revised;
- the TB infection control action plan is at an early implementation stage but without clear funding;
- monitoring processes lack coordination, with inadequate involvement of oblast and district sanitary and epidemiological services in monitoring TB infection control at facility and community levels;
- public education on preventive activities in the community and congregate settings is quite heterogeneous and sometimes very limited; and
- the TB surveillance system among health care workers has some limitations.

At facility level, TB infection control measures at PHC facilities are very limited and environmental control measures are sometimes not adequately addressed and poorly monitored.

Normative acts and orders (see Table 6 for a summary) are supported by documents regulating approaches to, for example, assessment of infection control in health care facilities providing TB services, assessment of infectious patients' households and contact investigations. Although the 2011 guideline approved by a ministerial order is mainly focused on modern approaches to TB infection control, outlining the need for airborne control, several legal documents, ministerial orders and normative acts remain unrevised.

The approach to disinfection of patient households – an intervention that is completely unnecessary, rather costly and related to increased stigma – is currently an area of focus. Interviews with health care workers and patients revealed that disinfection practice is carried out only at central level (Dushanbe) and is limited regionally due to what they describe as inadequate staffing at oblast and district sanitary and epidemiological service levels.

Infection control: recommendations
• All old TB infection control documents regulating practice in health care facilities, congregate settings and outbreak premises should be revised to ensure proper implementation of the new TB infection control guideline and avoid confusion in monitoring processes. • Unnecessary disinfection practices, including disinfection of patient food waste in health care facilities and disinfecting patients' homes, should be abolished.

3.1.3.1 TB infection control action plan, implementation status and funding

The national TB infection control action plan for 2013–2017 was developed with WHO support and approved by the RCTC on 20 February 2013. The NTP has tried to coordinate partners' activities, but no clear statement on funding support has been made. The plan currently has no defined budget from the state or partner/donor organizations. A rough estimate of the funding gap for the next two years is approximately US$ 250 000. The status of activities planned for 2013 are shown in Annex 5.

TB infection control action plan: recommendations
• Several action plan activities for 2013 do not need extra funding to support implementation and should be progressed as a first step. • Planning of partner/donor organizations' activities related to the action plan requires greater coordination. Activities need to be prioritized and consensus among all stakeholders achieved on which activities will be carried out by whom. • Further possibilities for state and donor-organization funding should be explored for at least priority activities within the plan, agreed by the national TB infection control working group.

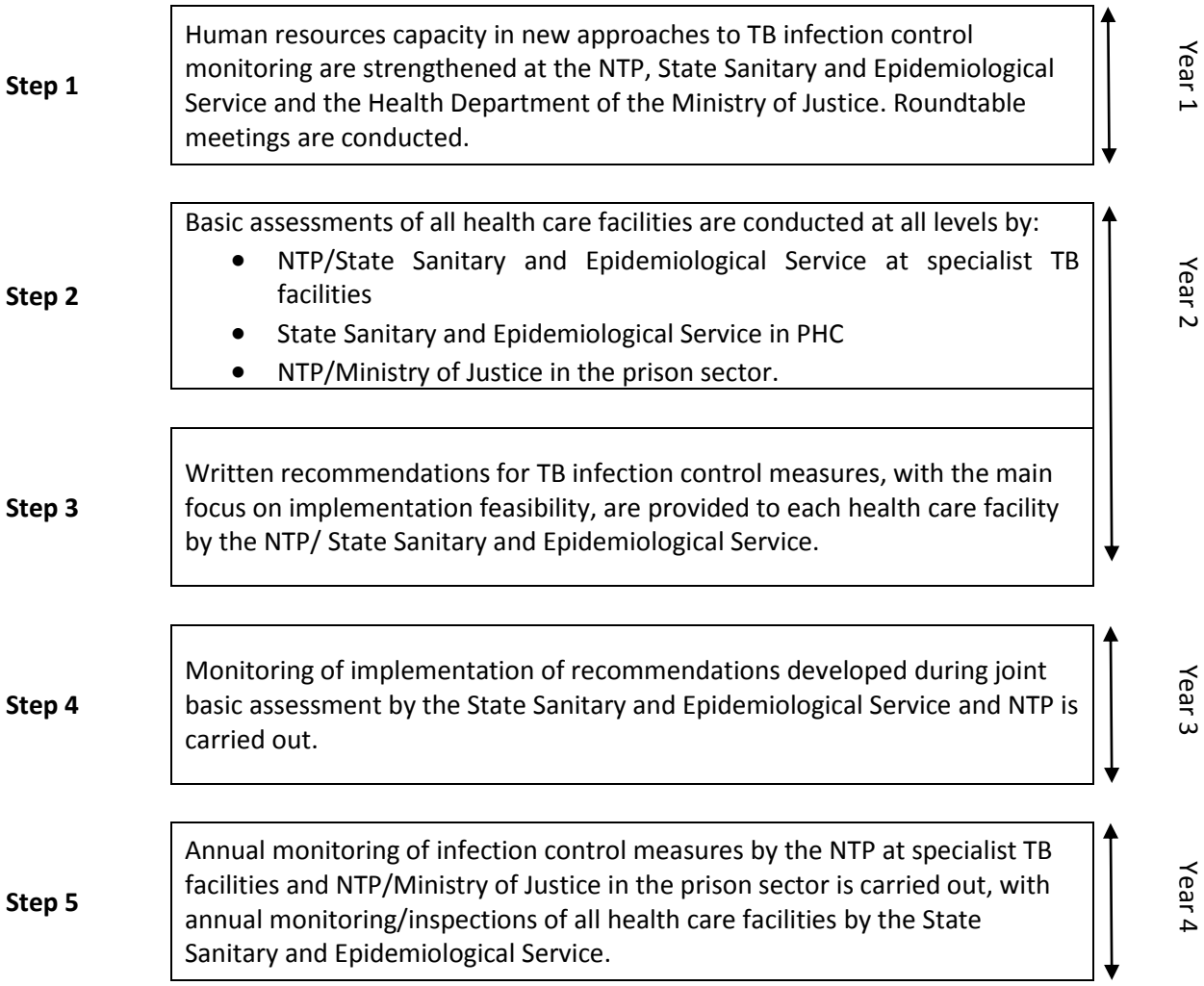
3.1.3.2 TB infection control monitoring process and human resources development at the State Sanitary and Epidemiological Service

NTP's main role is implementation of national and facility-level infection control measures (detailed activities are outlined in the national TB infection control implementation plan); this needs further strengthening, with routine monitoring. Current State Sanitary and Epidemiological Service monitoring processes reflect its formal role and are rather inspection-based, guided by existing regulatory documents.

TB infection control monitoring process and human resources development at the State Sanitary and Epidemiological Service: recommendations
• In addition to NTP monitoring, it is recommended that joint NTP/State Sanitary and Epidemiological Service basic facility assessments be carried out using standardized toolkits, with detailed post-assessment recommendations provided for all facilities. Monitoring should serve a supportive, rather than inspection, role. Recommendations should reflect novel evidence-based approaches outlined in the new TB infection control guideline. Heath care facilities should be granted reasonable time to implement the recommended measures. Implementation processes should be strengthened by annual NTP monitoring visits and supervision visits by the State Sanitary and Epidemiological Service. • PHC, which is currently a major gap area in relation to implementation of TB infection control measures, requires special attention from the State Sanitary and Epidemiological Service through monitoring visits and further support. Novel approaches to airborne infection control should be introduced.

Fig. 15 sets out a proposed monitoring approach for TB infection control in the country for the next four years; this is provided in the TB infection control monitoring toolkit draft *(12)*, developed with WHO technical assistance, and needs further discussion, development and approval from involved institutions.

Fig. 15. Proposed monitoring approach for TB infection control



Source: NTP *(12).*

3.1.3.3 TB surveillance among health care workers

The current surveillance system for TB disease is linked to overall disease surveillance among health care workers and is controlled by the State Sanitary and Epidemiological Service. All health care workers and supporting staff working in health care facilities have to undergo mandatory health evaluation twice a year. Each person has a so-called sanitary book in which approval is recorded by the epidemiologist after each evaluation. TB screening is conducted via fluorography and results are filed in the book by a chest radiologist.

Twenty-two TB cases were found among personnel of health care facilities in 2012, based on the State Sanitary and Epidemiological Service registry. Distribution of cases by job title is shown in Table 8 and Fig. 16.

Several important findings emerge from these data.

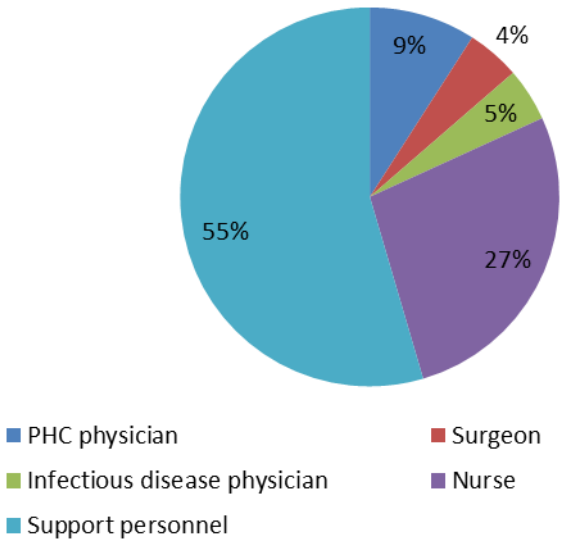
- None of the TB doctors working at specialist TB facilities in 2012 were identified with disease but two cases were reported in PHC facilities, highlighting the possible high risk of infection transmission in PHC facilities.
- Nurses comprised the staff group at highest risk of contracting TB.
- Fifty-five per cent of TB cases occurred among support staff working in health care facilities.

Table 8. TB cases among health care facility personnel by job title, 2012

Job title	Cases (n)
PHC physician	2
Surgeon	1
Infectious disease physician	1
Nurse	6
Cleaner	3
Accountant	1
Engineer	1
Cook	2
Electrician	1
Janitor	2
Guard	1
Driver	1
Total	**22**

Source: NTP, unpublished data, 2012.

Fig. 16. TB surveillance data among personnel in percentages, by job title



Source: NTP, unpublished data, 2012.

Interviews with health care workers at primary level and TB specialist facilities revealed that most TB cases among staff that were identified in their institutions during the previous five years had been diagnosed through passive detection after symptom onset, rather than through screening.

TB surveillance among health care workers: recommendations
• TB surveillance among health care workers needs further strengthening to ensure its effectiveness. In addition to fluorography, TB physicians need to be involved in regular screening programmes (confidential consultations). • TB surveillance data should be kept at NTP's central registry and further analysed. • A national indicator on TB surveillance among health care workers should be developed and monitored.

3.1.3.4 TB infection control measures at PHC facilities

The review identified an absence of airborne infection control measures at PHC facilities. No triage, separation or cough-monitoring processes are implemented. Patients in waiting areas of city PHC facilities are not segregated, wait in usually unventilated corridors and comprise a mix of children and older people. Such areas pose a high risk of infection transmission, including TB.

TB infection control measures at PHC facilities: recommendations
• Steps should be taken to improve airborne infection control measures at PHC facilities, following the national TB infection control action plan. • The steps should focus on interventions such as limiting crowding, implementing cough triage and monitoring processes, ensuring adequate separation and promoting personal protection. • Standard operating procedures focusing on effective implementation should be developed for each of these measures.

3.1.3.5 TB infection control environmental measures

Engineering control measures, such as mechanical ventilation and upper-room ultraviolet germicidal irradiation (UVGI) systems, have been installed in several facilities providing TB services. As was noted by other consultations, the monitoring level of TB infection control environmental measures and overall understandings of their function are rather limited. Cooling coils have been used on several occasions in inpatient wards as a source of mechanical ventilation, limiting the use of natural ventilation and facilitating recirculation of infected air within the TB department. Installation and maintenance of upper-room UVGI systems was seen to be inadequate in most cases, with dosage of ultraviolet irradiation exceeding 0.3µw/cm^2 in many facilities, raising concerns about possible health complications for staff and patients.

TB infection control environmental measures: recommendations
• A focal point (engineer) responsible for maintenance of equipment should be appointed and trained through appropriate international training programmes. • In-service training on the role, proper use and maintenance of engineering control measures should be provided for general staff in health care facilities.

3.2 Case-finding and diagnosis/laboratory network

3.2.1 Diagnostic algorithm

Currently, two diagnostic algorithms are in use for PTB:

- diagnosis of TB among TB suspects from the non-MDR–TB pilot regions
- diagnosis of TB among TB suspects from the MDR–TB pilot regions.

TB suspects in non-MDR–TB pilot regions are diagnosed by clinical evaluation, chest X-ray and smear microscopy. TB is diagnosed if sputum smears are positive; otherwise, the patient receives unspecific antibiotics (ampicillin, gentamycin or ceftriaxon) for 10 days. If clinical improvement is seen, TB is ruled out: if there is no improvement, additional sputum-smear examination is carried out. If smears remain negative, the case is presented to the regional phthisiatric consilium, which decides on the basis of clinical and radiological data whether anti-TB therapy should be started.

TB suspects in pilot regions are categorized by 11 anamnestic criteria (Box 1), either in a group of patients with increased risk of drug-resistant TB or with lower risk. Patients of the first group get an Xpert MTB/RIF assay test and conventional culture and, if positive, DST. Specimens of the second group are not tested with Xpert MTB/RIF assay, but conventional culture and DST are done. The review observed, however, confusion among doctors on how to categorize patients to respective risk groups.

Box 1. Criteria recommended by the NTP to assess the risk of drug-resistant TB

1. Category I, II and III patients who remain sputum-smear-positive after the intensive phase or have other signs of unfavourable progress of treatment.
2. Re-treatment cases for whom there are no DST data.
3. MDR–TB contacts or patients from MDR–TB risk groups (defaulters, contacts of patients who died of TB, etc.).
4. Prison inmates with suspicion of TB.
5. Patients with progression of TB disease.
6. TB patients who have had nonstandardized treatment regimens.
7. HIV-infected patients in the case of suspected TB and confirmed diagnosis of TB without information on drug resistance.
8. Health care personnel and personnel from the prison system suspected of TB.
9. Labour migrants suspected of TB.
10. Pregnant women and women after delivery.
11. Sputum-smear-negative patients after the diagnostic algorithm has been ineffective.

Source: NTP *(13).*

Results of the national TB DRS in 2011 showed that about one third of TB patients had MDR–TB: all TB suspects should therefore be considered to be at risk of drug-resistant TB. New diagnostic algorithms have been developed by the NTP with technical advice from the Expanding Access to New Diagnostics for TB (EXPAND–TB) Project and the Supranational Reference Laboratory in collaboration with other international partners. Respective algorithms are displayed in Annex 6. They differ from currently used algorithms in three ways:

- the decision tree has been simplified: all diagnostic TB patients are considered at risk of drug-resistant TB and undergo the same diagnostic work-up;
- clinical doctors decide on the diagnostic work-up by defining the patient's category (for instance, new or re-treatment case) and the purpose of the analyses (diagnostic or treatment control): laboratory experts decide which tests are most appropriate on the clinical data; and

- Xpert MTB/RIF and MTBDRplus (line probe assay Genotype MTBDRplus version 2, Hain Lifescience, Germany, for the detection of *Mycobacterium* TB complex (MTBC) including isoniazid and ripamficin resistance) assays are becoming key tests in the diagnostic work-up for all TB suspects.

The new algorithm for initial diagnosis of TB suspects starts with microscopy and Xpert MTB/RIF assay/MTBDRplus. As soon as either test turns positive, culture is inoculated. As long as Xpert MTB/RIF assay/MTBDRplus indicate no rifampicin resistance, first-line drugs DST is performed from a positive culture. If Xpert MTB/RIF assay, MTBDRplus or phenotypic DST indicate rifampicin resistance, second-line drugs are also tested. DOTS should be continued if the phenotypic DST does not confirm rifampicin resistance. Otherwise, second-line drug treatment should be started, taking into consideration the results of the second-line drug DST.

Sputum-smear microscopies are performed for patients under DOTS treatment immediately after completion of the intensive phase (at month two or three) and at five and eight months after the therapy starts. Xpert MTB/RIF assay/MTBDRplus and culture are performed if smears are positive. Treatment is continued if no resistance is detected, but the duration of treatment might be elongated. If resistance is detected, second-line drug DST is performed and the regimen adjusted to the susceptibility of the pathogen.

MDR–TB patients are followed-up by culture every month for the complete intensive phase of treatment. From the continuation phase, culture is controlled every third smear microscopy every sixth month until 36 months after completion of MDR–TB treatment. Regimen needs are adjusted according to the susceptibility of the pathogen if culture and/or smears become positive; this is determined by Xpert MTB/RIF assay/MTBDRplus and second-line drug DST.

NTP, EXPAND–TB and the Supranational Reference Laboratory have developed new forms and registers for requesting laboratory diagnostics, transferring specimens or cultures between laboratories and registration, reporting and recording laboratory results. These forms accurately reflect the new decision trees and facilitate data management.

The new algorithms and forms were endorsed by the Ministry of Health in February 2013, but implementation is pending. First training on implementation for clinicians and laboratory experts is planned for August 2013. UNDP and GFATM offered to finance a three-day training event for the districts of Dushanbe and the DRSub, and USAID and Project HOPE for training in the oblasts of Khatlon and Sugd. EXPAND–TB and the Supranational Reference Laboratory offered technical assistance for training and further implementation at a meeting in the NRL on 27 July 2013. Project HOPE confirmed that it would include a monitoring and evaluation component and follow-up training in their budget application for year four of the USAID Quality Project.

The new algorithms for TB diagnostics will most likely significantly boost the detection rate of TB and MDR–TB and prevent many misdiagnoses due to the higher specificity of molecular tests compared to microscopy.

Diagnostic algorithm: recommendations
• High priority should be given to the implementation of the new algorithms in all MDR–TB pilot regions by the end of 2013 (short-term priority).
• All forms and registers should be printed in sufficient quantity to ensure their availability in the pilot regions (short-term priority).

- At least two follow-up reviews should be organized to monitor all clinical, laboratory and data management experts in relation to adherence to the new algorithms (short-term priority).

3.2.2 The laboratory network

The TB laboratory network is hierarchically organized, consisting of the NRL at the top level, three culture laboratories at medium level (the National Public Health Reference Laboratory in Dushanbe, the oblast reference laboratory of Kulyab, which serves the Khatlon oblast, and the reference laboratory of Digmoy, serving the Sugd oblast) and 72 microscopy laboratories at the base. Six have already implemented Xpert MTB/RIF assay and an additional five will do so in the near future. Table 9 describes the TB laboratory network in the country.

Table 9. TB laboratory network

Laboratory	Type of tests performed	Function
Supranational Reference Laboratory: Gauting, Germany	DST to first- and second-line drugs	NRL monitoring NRL certification (external quality assurance) Training of NRL staff
NRL, located in the NCTPTS	Ziel-Nilson smear microscopy/LED Inoculation (MGIT960 and Löwenstein-Jensen) Hain molecular tests	TB diagnosis for NCTPTS DST to first- and second-line drugs for country Methodical and organizational guidance for the country's laboratory service Preparation of a request for reagents and consumables for NRL External quality assurance for oblast-level cultural laboratories
National laboratory at National Centre for TB Control	Ziel-Nilson smear microscopy/LED Inoculation (MGIT960 and Löwenstein-Jensen) Hain molecular tests	TB diagnosis for Dushanbe and DRSub External quality assurance for all microscopy laboratories of the country Development of application for centralized supply of reagents and consumables for all microscopy centres of the country
Bacterioscopy laboratory of the Public health Reference Laboratory Municipal TB Control Centre, Dushanbe	Ziel-Nilson smear microscopy	TB diagnosis for Dushanbe External quality assurance of sputum microscopy at PHC laboratories in Dushanbe Centralized supply of reagents and consumables to PHC laboratories in Dushanbe

Laboratory	Type of tests performed	Function
Oblast laboratory of Kulyab Oblast TB Centre	Ziel-Nilson smear microscopy/LED Inoculation (MGIT960 and Löwenstein-Jensen) Xpert MTB/RIF	TB diagnosis for the oblast TB centre Inoculation for MDR–TB cases from pilot sites External quality assurance for the district laboratories (13 microscopy centres of Khalton oblast) Development of application for centralized supply of reagents and consumables to 13 district microscopy centres
Oblast-level bacterioscopy laboratory of the Khatlon Oblast TB Control Centre, Kurgan-Tube	Ziel-Nilson smear microscopy/LED Xpert MTB/RIF	TB diagnosis for the oblast TB centre External quality assurance for 14 district laboratories in Khalton oblast Development of application for centralized supply of reagents and consumables to district microscopy centres
Oblast laboratory of Sugd Oblast TB Centre, located at Degmoi TB Hospital	Ziel-Nilson smear microscopy/LED Inoculation (Löwenstein-Jensen), MGIT960 Xpert MTB/RIF	TB diagnosis for the oblast TB control centre Inoculation for MDR–TB cases from pilot sites External quality assurance of sputum-smear microscopy of 23 district-level microscopy centres of Sugd oblast Development of application for centralized supply of reagents and consumables to district-level microscopy centres
Oblast-level bacterioscopy laboratory of GBAO Oblast TB Control Centre, Khorog city	Ziel-Nilson smear microscopy/LED Inoculation (Löwenstein-Jensen) is planned to be launched in 2013	TB diagnosis for the oblast TB control centre External quality assurance of sputum smear microscopy for eight district-level microscopy centres of GBAO Centralized supply of reagents and consumables to district-level microscopy centres
Oblast-level microscopy laboratory of TB facilities	Ziel-Nilson smear microscopy	TB diagnosis for district-level and PHC facilities Referral of sputum samples/patients for the oblast-level laboratories for other investigations
PHC laboratories	Ziel-Nilson smear microscopy	TB diagnosis for district-level facilities Referral of sputum samples/patients for the oblast-level laboratories for other investigations

The network has developed very positively since the 2009 review. The NRL has been fully reconstructed and upgraded to biosafety level (BSL) 3 (following the WHO biosafety manual of 2004 *(14)*) by the German Development Bank with technical support from EPOS Health Management and the Supranational Reference Laboratory. Kulyab's culture laboratory has been

refurbished with GFATM funds and is fully functioning. The newly constructed premises of the BSL2 laboratories of Dushanbe city (National Public Health Reference Laboratory) will be commissioned in the near future. Refurbishment of the BSL2 laboratory in Khujant/Digmoy is planned for 2014/2015 by the German Development Bank with technical support from EPOS and the Supranational Reference Laboratory.

The network of microscopy laboratories has been partly consolidated by reducing the number from 97 in 2009 to 88 in 2013. For unknown reasons, new microscopy laboratories were opened recently in three districts, although they are not yet officially recognized by the Ministry of Health. The function and responsibilities of some of the laboratories within the network are not yet well defined, particularly those of the new National Public Health Reference Laboratory in Dushanbe city.

The laboratory network: recommendations
• A ministerial decree defining the functions and responsibilities of each TB laboratory in the network, including the spectrum of analyses to be performed, districts to be covered, microscopy centres to be monitored and reports to be generated, should be issued (medium-term priority). • The consolidation of the microscopy network should be continued by reducing the number to a maximum of one laboratory per district, simultaneously developing a functioning transportation and logistics system (long-term priority). If a reliable and sustainable nationwide transportation and logistics system becomes available, the number of microscopy laboratories could potentially be further reduced to the 11–15 centres equipped with Xpert MTB/RIF assay. • Once the new diagnostic algorithms are fully implemented, molecular tests (Xpert MTB/RIF assay/MTBDRplus or others) should be used for every TB suspect, with smear microscopy used in treatment follow-up and monitoring. Analyses should be centralized in larger laboratory centres (low priority).

3.2.2.1 The NRL in NCTPTS

The NRL was reconstructed between 2010 and 2011. It now covers more than 450 m^2, of which approximately 60 m^2 are used as teaching rooms: three rooms (together comprising ~40 m^2) are used as offices, three (~50 m^2) as warehouses, ~20 m^2 each for media preparation and cleaning, ~10 m^2 each for male and female changing accommodation and ~10 m^2 as a polymerase chain reaction–I room. Approximately 120 m^2 has been installed as a BSL3 laboratory consisting of two rooms connected by a 20 m^2 intermediary room for incubators and autoclaves, a 10 m^2 microscopy room and a 10 m^2 anteroom (Annex 7). Room R5 of the BSL3 area serves for decontamination and inoculation and R1 for mycobacterial growth indicator tube (MGIT) (used in the BACTEC™ MGIT™ 960 system (BD, United States)) incubation, DST and MTBDRplus hybridization.

MTBDRplus and MTBDRsl are the only molecular tests performed in the laboratory. Their work steps are conducted in a three-room/four-compartment concept, with the master mix being prepared in R16, outside the BSL3 area, and the DNA being prepared in the left biosafety cabinet of R5. DNA is added to the master mix in a closed DNA workbench with an ultraviolet sterilizer in R5, and hybridization is performed in R1.

Three biosafety cabinets-IIA are connected to the ventilation system via air ducts with pressure equalizer. Equipment is clean, and incubators and refrigerators are controlled daily and are functioning well.

One biosafety cabinet indicated an alarm due to low velocity (measurement with anemometer yielded 0.24–0.28 m/s) and high pressure in the chamber. The room ventilation system was not capable of carrying all air from the cabinets. These errors probably indicate that all filters are blocked and need to be changed.

The display of the destruction autoclave is defective and needs to be changed. One BACTEC™ MGIT™ 960 machine had a memory problem following an electricity shutdown and does not allow analysis of DST. The air conditioning system of R5 is leaking into the room, probably due to drainage tubes being blocked by growth of algae.

The NRL in NCTPTS: recommendations
• Filters types (F3, F9 and high-efficiency particulate air) of room ventilation systems should be changed, with checks to ensure the ventilation system functions properly afterwards.
• Condensation water from the air conditioning system should be drained into containers and emptied on a daily basis.
• The display of the Systec V120 autoclave should be changed.
• The full software package for the MGIT machine should be reinstalled.
• Consideration should be given to moving the hybridization out of the BSL3 area in case the negative controls give false-positive signals.

3.2.2.2 TB culture laboratory in the National Public Health Reference Laboratory

The construction of the new National Public Health Reference Laboratory was completed with GFATM funding and technical assistance from Foundation Mérieux, Lyon, France. The new premises will be commissioned in August 2013. The laboratory building covers approximately 300 m^2 consisting of two BSL3 laboratory rooms of ~15 m^2 each, six BSL2 laboratory rooms of 15–25 m^2 each, and anterooms, hallways and waste rooms amounting to~30 m^2. It also houses a spacious media preparation room, cleaning room, rather small warehouse (~10 m^2), meeting room and two offices.

Most equipment, technical and biosafety installations are of a very high standard even compared to European laboratories of this kind, but biosafety cabinets in the BSL3 area reventilate into the room, which is not fully in line with the 2012 WHO recommendations for biosafety in TB laboratories *(15)*.

Maintenance will consume high sums annually, raising concerns about sustainability. GFATM has allocated a budget line for three years, but the Government is obliged to find sources to cover ongoing maintenance costs following completion of GFATM funding.

The laboratory's function for the health system has not yet fully been defined. Plans are in place to use it for TB cultures for Dushanbe city and the DRSub. The official name of the institution suggests that other dangerous pathogens requiring high BSL will be analysed there, such as HIV, influenza, *Salmonella typhi*, *Yersinia pestis*, *Brucella* species, *Leptospira* species, *Burckholderia pseudomallei* and *Histoplasma* species. Most of these services are not chargeable according to Tajik health law and will not contribute to covering the laboratory's high running costs.

A room plan of the Public Health Reference Laboratory in Dushanbe City is shown in Annex 8.

TB culture laboratory in the National Public Health Reference Laboratory: recommendations

- The National Public Health Reference Laboratory should be used for general microbiology diagnostics, culturing specimens of urine, stool, pus, respiratory and other body fluids to recover and identify potentially infectious pathogens such as *Staphylococci* (including *S. aureas*), *Streptococci* (pneumococci), Neisseria (meningococci) and enterobacteria (*E. coli*, *Salmonella* species) and determining their susceptibility to unspecific antibiotics. This would help to finance the laboratory by generating money under Decree 600, which allows charging for services rendered for diseases other than those defined as social.
- A general microbiology department would perfectly complement the purpose of the analysis of high-risk pathogens as they frequently are found incidentally in unspecific cultures and could immediately be transferred to the BSL3 area for further analyses. Most of the small equipment and consumables are identical, ensuring their use and preventing expiry dates being breached.
- High-quality microbiology services are urgently needed in Dushanbe and there is also a need to significantly increase the quality of all health services (inpatient and outpatient) dealing with infectious diseases throughout the country. Comparable laboratories in Europe charge between €2 and €4 per culture plate. Material costs are estimated to range below €1. After subtraction of staff and running costs, 55% of the remaining sum could be used for maintenance and refurbishment of the National Public Health Reference Laboratory, which would significantly relieve the Ministry of Health budget.
- Attempts should be made to find an international partner university to support implementation of a high-quality microbiology service, including training of clinical bacteriologists and technicians.
- The biosafety cabinet should not be used in the BSL3 area for works with high concentrations of TB bacteria (by, for instance, opening positive culture tubes).

3.2.2.3 Khujant/Digmoy and Kulyab culture laboratories

The Khatlon oblast's culture laboratory is housed in the oblast TB hospital in Kulyab and that for Sugd oblast in the TB hospital in Digmoy, near the oblast capital of Khujant. Both laboratories have recently been refurbished and equipped by UNDP and GFATM. They fulfil basic BSL2 requirements and perform bright-field microscopy, Xpert MTB/RIF assay and TB culture.

Workload and outcomes of TB cultures in the regional culture laboratories of Khujant and Kulyab in 2012 are shown in Table 10.

In total, 2521 specimens were cultured, 57% of them in Khujant (Sugd oblast) and 43% in Kulyab (Khatlon oblast): 789 cultures were positive (31%), most from sputum-smear-positive specimens (696; 88%). The relative rate of positive cultures was higher in Kulyab (425; 39%) than in Khujant (364; 26%). By contrast, the relative proportion of positive cultures among sputum-smear-positive specimens was far higher in Khujant (70%) than in Kulyab (43%).

Of the 1103 sputum-smear-negative specimens, only 93 (8%) showed growth, 77 of which (83%) were in Kulyab. The contamination rate was within expected limits (1–3%) in Kulyab, but higher (7%) in Khujant.

Generally, culture results in 2012 were highly inconsistent: while the contamination rate was good in Kulyab, the low proportion of positive cultures among sputum-smear-positive specimens suggested overdecontamination. The contamination rate was too high in Khujant, but its overall positivity rate was much better than in Kulyab; in turn, the positivity rate among sputum-smear-negative specimens was 14 times higher in Kulyab (28%) than in Khujant (2%).

Table 10. Cultures performed in the regional culture laboratories of Khujant and Kulyab, 2012

Microscopy	Culture	Khujant (Sugd oblast)		Kulyab (Khatlon oblast)	
		n	%	n	%
Sputum-smear-positive	Positive	348	24	348	32
	Negative	149	10	453	41
Sputum-smear-negative	Positive	16	1	77	7
	Negative	816	57	194	18
	contaminated	98	7	22	2
Total		**1 427**	**100[a]**	**1 094**	**100**

[a] Percentage does not amount to 100% due to rounding.

Buildings of the Sugd oblast TB centre in Digmoy are run down. Governmental negotiations between Germany and Tajikistan reached an agreement that the TB hospital in Digmoy will be refurbished. The TB culture laboratory will be part of the project and will receive a new ventilation system, even though it has recently been refurbished with GFATM funding.

The final draft of the room plan designed by the Supranational Reference Laboratory is shown in Annex 9. Contracts have been signed and the tender period is due to start in the autumn of 2013 with construction planned for 2014 and 2015. While construction works are going on, the laboratory will move into the current radiology department, which has recently been refurbished by GFATM and meets basic BSL2 requirements.

Laboratory rooms in Digmoy in current use are clean and tidy. The autoclave, purchased with GFATM funds, has never been functional; a new autoclave has been included in the tender of the German Development Bank refurbishment project. Default temperatures of incubators were set to 37 °C, while real temperatures were indicated as 38.2 °C in one of the two machines. Internal temperature is not yet measured with separate thermometers. Löwenstein-Jensen media are well prepared, with long slants and thin tongues. Culture tubes were incubated in the upright position standing in MGIT racks, but the order of the tubes in the racks was rather random and not consecutive by specimen numbers. Specimens and culture results were also recorded in random order, hampering rapid identification of culture results.

3.2.2.4 Xpert MTB/RIF assay laboratories

Six laboratories are currently equipped with Xpert MTB/RIF assay machines (Table 11): the two culture laboratories of Digmoy and Kulyab (UNDP/GFATM pilots); the city TB dispensaries of Khujant and Kurgan-Tube (Project HOPE pilots); the district TB dispensary of Rasht; and the children's TB hospital of Dushanbe (Médecins sans Frontière project). Five further Xpert MTB/RIF assay machines are planned for installation in the near future: one each for the districts of Yovon and Kanibadom and three in Dushanbe. A twelfth machine might be provided in 2014 for the Yovon district. Together with the MTBDRplus assays being implemented in the NRL and National Public Health Reference Laboratory, 5.3 million (around two thirds) of the Tajik population could be able to access rapid TB diagnostics, including molecular resistance-testing for rifampicin (Table 12).

Overall, 2245 Xpert MTB/RIF assay tests were performed in 2012 in the two regional laboratories of Digmoy and Kulyab, corresponding to 43 per week (Digmoy 26, Kulyab 17)

(Table 11). Numbers and results were not available for the other four Xpert MTB/RIF assay laboratories. The Kulyab laboratory yielded higher rates of MTBC positive results (53%) than Khujant (37%), mainly due to a higher percentage of sputum-smear-positive specimens (40% versus 35%) and a higher positivity rate among sputum-smear-negative specimens (20% versus 7%). More than a third (35%) of all MTBC were rifampicin-resistant, with a higher rate in Kulyab (39%) than Khujant (31%). Xpert MTB/RIF assay remained negative in approximately 5% of sputum-smear-positive specimens, which can most likely be explained by the microscopic finding of non-tubercle *Mycobacteria*.

Table 11. Xpert MTB/RIF assay in Sugd and Khatlon oblasts

Specimens	Number	Xpert MTB/RIF assay result									
		MTBC positive	% of all	Rr[a]	% of MTBC	Rs[b]	% of MTBC	Nega-tive	% of all	Invalid	% of all
Total	2 245	973	43	339	35	634	65	1 239	55	61	3
Sputum-smear-positive	834	790	95	279	35	511	65	41	5	3	0
Sputum-smear-negative	1 411	167	12	51	31	116	69	1 194	85	50	4
Khujant (Sugd oblast)											
Total	1 345	499	37	156	31	343	69	802	60	57	4
Sputum-smear-positive	472	441	93	142	32	299	69	30	6	1	0
Sputum-smear-negative	873	57	7	13	23	44	77	770	88	48	5
Kulyab (Khatlon oblast)											
Total	900	474	53	183	39	291	61	437	49	4	0
Sputum-smear-positive	362	349	96	137	39	212	61	11	3	2	1
Sputum-smear-negative	538	110	20	38	35	72	65	426	79	2	0

[a] Rr = rifampicin resistant.
[b] Rs = rifampicin sensitive.

Table 12. Location of Xpert MTB/RIF assay machines and population covered by rapid diagnostics

Organization	Machine number	Place of installation	District	District population	Number of patients:	
					screened by sputum-smear microscopy	tested by Xpert MTB/RIF assay
Sugd region						
GFATM	1	Regional TB centre, Digmoy	Ghafutov	321 600	647	2 715
			Taboshar	14 500	128	
			Qayroqqum	41 000	126	
			Chkalov	28 900	163	
			Mashchoh	103 300	1 023	
			Rasulov	115 300	628	
	2	City TB centre	Panjakent	254 900	932	932

Project HOPE	3	TB centre, Konibodom city	Komibodom	183 600	1 007	2 196
			Isfara	234 500	1 189	
	4	City TB centre, Khujand city	Khujand city	164 100	1 998	3 113
			Spitamen	118 000	793	
			Ghonchi	141 400	322	
Kulyab zone, Khalton region						
GFATM	5	TB centre, Danghara	Danghara	125 000	601	1 097
			Temurmalik	59 700	496	
Kurgan-Tube zone, Khatlon region						
Project HOPE	6	Regional TB centre, Kurgan-Tube city	Kurgan-Tube city	75 400	1 414	1 827
			Vakhsh (Kurgan-Tube city)	163 000	413	
Ecom/PH[a]	7	TB centre, Yovon	Jomi	138 500	784	1 420
			Yovon	183 000	636	
RRS						
USAID/KNCV	8	TB centre, Rasht district	Rasht	105 000	241	1 131
			Tojikobod	38 1000	330	
			Jirgatol	56 300	288	
			Tarildara	19 800	3	
			Nurobod	66 900	269	
Médecins sans Frontière	9	Children's TB hospital, Dushanbe	Paediatric cases and contacts		900	900
EXPAND-TB	10 11 12	RCTC microscopy centre, Dushanbe city	Shahrinav	98 300	332	7 323 (12 187)[b]
			Gisar	249 300	665	
			Tursun-zade	246 900	385 (673)[b]	
			Rudaki	404 000	882 (673)[b]	
			Prison (Dushanbe city)	10 000	104 (289)[b]	
			Dushanbe	73 900	4 955 (9 555)[b]	
Population covered by Xpert: 3 579 300 (44.9%)				**Total: 21 722 (27 259)[b]/year**		
EXPAND-TB[c]		City TB centre, Kulyab city	Kulyab city	96 000	2 341	3 846
			Kulyab district	1 015 600	73	
			Hamadoni	125 600	480	
			Vose	181 100	952	
		NRL, Machiton	Vahdat	285 700	1 301	1 301
Population covered by Hain: 1 704 000 (21.4%)				**Total: 5 147/year**		
				Total population covered: 5 283 300 (66.3%)		

[a] The provision of Xpert MTB/RIF assay machines and cartridges by Ecom to Yovon TB Centre is yet to be confirmed and would not be before early 2014. If this works, Project HOPE would relocate their Xpert MTB/RIF assay machine from Yovon to Panjakent, enabling 100% coverage of pilot districts. If the Ecom donation does not go through, Panjakent would be the only pilot district uncovered by molecular testing.

[b] According to TB-REACH project targets.

[c] Tested using Hain tests.

Source: data provided by UNDP Tajikistan for the year 2011.

According to these very preliminary data, three times more TB cases may be diagnosed ad hoc once Xpert MTB/RIF assay is used for every TB suspect.[3]

Cartridges were out of stock in Digmoy from April–July 2013. The Khujant city TB dispensary partly compensated for this deficit by performing tests for the prison-sector TB facility. Patients from the oblast TB hospital and districts did not have access to rapid tests during this period. The causes could not be clearly identified, but perhaps include late stock requests from the laboratory, procurement delay and problems with customs clearance.

Xpert MTB/RIF assay data are not yet reported to and/or centrally registered by the RCTC, mainly due to lack of special report forms and structures. Neither the laboratory network coordinator nor the NTP management had an overview of throughput of cartridges, numbers of TB patients diagnosed and percentages of rifampicin-resistant TB identified by Xpert MTB/RIF assay. Major concerns regarding further roll-out of Xpert MTB/RIF assay in the country were expressed by NTP management because of:

- sustainability: the Ministry of Health will most likely not be able to cover diagnostic costs through the state budget (this issue is discussed in more detail below); and
- gaps in treatment availability: the number of treatment kits for MDR–TB patients is limited and scaling-up diagnostic capacity will probably lead to the numbers of MDR–TB patients exceeding treatment capacity; patients left untreated may pose social and ethical challenges to the TB control system, for which the NTP and Ministry of Health do not yet feel prepared.

Xpert MTB/RIF assay laboratories: recommendations
• Despite existing concerns, the Xpert MTB/RIF assay laboratory network should continue to develop as planned by NTP management and laboratory experts from EXPAND–TB.
• Data from pilot regions should be analysed in relation to the numbers of patients diagnosed per Xpert MTB/RIF assay machine, with numbers of MDR–TB patients being diagnosed in 2014 and 2015 estimated. These data should be made transparent to donors and NGOs and funds sought to fill identified gaps (discussed further below).
• All Xpert MTB/RIF assay data should be reported to the RCTC using a similar reporting process to that for microscopy data. Reports should go first to the TB laboratory network commissioner, who will compile and prepare the data for further reporting to the RCTC.
• Causes of cartridges recently running out of stock in Digmoy should be explored and a strategy to prevent similar events in future developed.

3.2.2.5 Microscopy laboratories

Eighty-nine laboratories performed smear microscopy in 2012 (Table 13), of which 14 also performed other analyses such as culture, DST, Xpert MTB/RIF assay or MTBDRplus.

The infrastructure of most microscopy laboratories is basic, consisting of single rooms with two or three wooden desks partly covered with plastic tablecloths. Surfaces cannot be disinfected. Rooms are naturally ventilated through windows, which are usually closed in winter as

[3] Using the percentages in Table 10 as an example, given approximately 5% yield of smear microscopy, 500 cases out of 10 000 suspects would be positive in smear microscopy, of which 475 (95%) would be confirmed as TB by Xpert MTB/RIF assay. Of the 9500 smear-negative cases,1140 (12%) would be additionally identified by Xpert MTB/RIF assay. In total, 1615 cases would be diagnosed ad hoc compared to 500 using smear microscopy only. Thirty-five per cent (565) would show rifampicin resistance.

temperatures drop. Ventilation becomes inefficient in summer, when temperatures are hot. Sputum collection rooms in some facilities were found to have no ventilation, while patients in other facilities would be asked to collect sputum in the laboratory room when weather conditions were bad.

Table 13. Microscopy laboratories by region

Oblast/sector	Population	Labs	Total patients	Total patients ss+[a]	Total slides	Total ss+	%	Dx[b] slides	Dx slides positive	%	Dx PHC	Dx PHC ss+	%
Dushanbe	739 000	9	4 989	334	13 347	801	6	9 727	453	5	2 893	93	3
DRSub	1 664 000	17	9 178	1 291	22 139	2 590	12	14 807	1 655	11	1 681	129	8
Sugd	2 407 600	25	15 136	1 098	37 930	2 417	6	32 160	1 570	5	7 954	308	4
Khatlon (Kurgan-Tube)	1 921 000	15	10 818	1 146	26 750	2 538	9	17 307	1 602	9	2 153	177	8
Khatlon (Kulyab)	616 200	12	10 659	896	23 046	1 906	8	15 822	1 286	8	3 036	161	5
GBAO	176 200	8	1 726	69	4 371	114	3	3 528	118	3	352	11	3
Prison		3	5 475	547	14 463	1 223	8	13 275	1 078	8	169	15	9
Total	**7 524 000**	**89**	**52 506**	**4 834**	**127 583**	**10 366**	**8**	**93 351**	**6 684**	**7**	**18 069**	**879**	**5**

Note: data from laboratories include test results of specimens from prisons.

[a] ss+ = sputum-smear-positive.

[b] Dx = diagnosis.

Source: regional laboratories, unpublished data, 2012.

The mean population covered by one TB microscopy laboratory was 87 488, with up to six-fold differences between regions (GBAO 22 025, Kulyab 51 350, Dushanbe 82 111, Sugd 96 304, DRSub 97 882, Kurgan-Tube 128 067). The mountainous areas of GBAO need greater numbers of laboratories to overcome logistical challenges, but it is more difficult to explain why the subregion of Kulyab needs almost double the relative number of DRSub and Sugd or 2.5 times that of Kurgan-Tube.

Almost 128 000 smears from 52 506 patients were read in 2012, including 35 014 diagnostic and 17 355 follow-up cases (Table 11). The average workload was 24 slides a week per laboratory (four per day). Nine per cent of TB suspects and 8% of smears were positive. Positivity rate was highest for follow-up cases (9.6%) and lowest for diagnostic cases in PHC facilities (5%).

Internal quality control is performed using one positive and one negative control smear per week instead of including controls in every run of staining. Control results are not recorded. External quality control is performed through regular monitoring visits by staff from regional or national reference centres. Re-checking of slides revealed 22 false-positive smears (0.2%) for the whole country, which is considered a very good result.

Microscopy laboratories: recommendations

- Biosafety precautions in low-risk TB laboratories should be enhanced by: never using sputum collection rooms; asking patients to collect sputum outdoors or in well ventilated rooms inside the hospital; ensuring laboratory rooms are well ventilated, with 6–12 air exchanges per hour; and making sure all surfaces are able to be disinfected (medium-term priority).
- A positive, as well as a negative, control smear should be used in every staining run. Staining should be repeated if acid-fast bacilli brightness is weak in the positive or visible in the negative control. Results should be recorded on special forms available from the NRL.

3.2.2.6 Diagnostic tests implemented in the network

Diagnostic TB laboratories in Tajikistan perform a wide spectrum of diagnostic tests and analyses, including:

- bright-field and fluorescence microscopy after Ziehl-Neelsen and auroamine O staining, respectively;
- nucleic acid amplification technique for the detection of MTBC and rifampicin resistance in clinical specimens (Xpert MTB/RIF assay and MTBDRplus);
- solid culture on Löwenstein-Jensen medium and liquid culture in MGIT;
- differentiation of *Mycobacterium* species from positive cultures using Genotype CM (Hain Lifescience, Germany);
- identification of *Mycobacterium* TB species using MGIT TBc-ID rapid test (BD, United States) and Genotype MTBC; and
- first- and second-line drug DST using the proportional method and MGIT.

All methods are endorsed by WHO. The spectrum of diagnostic tests is well chosen and sufficient for modern TB diagnostics in high-incidence, high-MDR–TB countries.

Microscopy and Xpert MTB/RIF assay seemed to be being performed with reasonable quality. The NRL recorded good performance in relation to the MGIT TBc-ID rapid test and Genotype MTBDR MTBC, while Genotype MTBDR plus suffered from high background on some days based on data from record review. This problem, which had previously been identified by partners from the Supranational Reference Laboratory and EXPAND–TB, was linked to a single laboratory technician and could be eliminated by retraining. Interpretation and recording results of Genotype MTBDRplus still raise problems such as misinterpretation, transfer errors and false allocation of test results to patients.

Microscopy and first- and second-line drug DST were externally assessed by the Supranational Reference Laboratory in 2012 and 2013 and showed sufficient quality using the proportional method and MGIT, but head-to-head comparison of molecular and phenotypic DST results showed significant discrepancies in daily routine work, demonstrating that DST quality still needs further improvement.

The greatest room for improvement was observed with TB culture in the Digmoy and Kulyab TB laboratories. Correlation of microscopy and culture outcomes revealed up to 57% culture-negative results from smear-positive specimens: this rate should be below 10%. Notably, the review visit to the Khujant culture laboratory found problems had been experienced in identifying small colonies of *Mycobacteria*. Out of 32 cultures checked after 2.5 weeks of growth, 19 showed tiny colonies, but none had been spotted. The use of magnifying lenses would most likely improve outcomes. Little training has so far been provided for decontamination, culture-reading and interpretation, partly explaining why differentiation of artefacts in Löwenstein-Jensen media from small colonies still constitutes a big challenge.

Comparison and integrated interpretation of results from different types of tests (such as microscopy, Xpert MTB/RIF assay, MTBDRplus, culture and DST) help to reveal quality deficiencies. Skills and knowledge in how to combine test results in this way are not yet well developed in any of the laboratories visited during the review.

Diagnostic tests implemented in the network: recommendations
• Investment should be made in training and monitoring for better performance in TB culture diagnostics. Staff require intensive training in decontamination, inoculation, culture-reading and interpretation, with magnifying lenses supplied to support culture-reading. • Culturing should be closely monitored to ensure it is performed in a uniform way and with consistent quality across laboratories (medium-term priority). • Combinations of test results should be analysed for each patient separately and cumulatively for all results over defined periods of time. Weaknesses in test performance or interpretation can be identified by comparing results with similar meanings from different tests (such as detection of MTBC by microscopy and Xpert MTB/RIF assay and detection of rifampicin resistance by Xpert MTB/RIF assay and DST). Special training should be provided to build capacity in this area (long-term priority).

3.2.3 Management/governance of the TB laboratory network

The head of the National Public Health Reference Laboratory chaired the TB laboratory network until recently. Experience since the opening of the new NRL premises in September 2011 showed that the multitude of associated tasks and responsibilities were too much for one person.

NTP management therefore decided to appoint three separate people to the positions of the head of the NRL, the microscopy network commissioner and the TB laboratory network commissioner, respectively. Eligible candidates for the three positions have been identified and informed, but not yet inaugurated by official order.

The roles and responsibilities of the head of the NRL are already clear and are determined by the unit's daily work, but those of commissioners for the microscopy and TB laboratory networks are not yet well defined. A still incomplete and unverified list of tasks is shown in Table 14, including proposals on how to attribute responsibilities to the three commissioners (a fuller list is shown in Annex 10).

The microscopy network is managed by the head of the RCTC laboratory. She regularly visits and monitors the regional microscopy centres of Khujant, Kulyab and Kurgan-Tube and supervises monitoring activities within the respective regions. Checklists are used for monitoring visits, but there is as yet no standard systems for dealing with deviations and weaknesses detected during visits, implementing and following up improvement measures, measuring the success of interventions and ensuring their sustainability.

All microscopy results are reported from the districts to the oblast and from there to the microscopy centre where they are entered into a central microscopy database. Performance indicators (such as smear positivity rates and weekly workload per laboratory expert) are recorded.

The Xpert MTB/RIF assay and culture laboratory networks, which have only been in existence for a short time, lack a structured governance framework. The laboratories are not regularly monitored, data and results are not entered in central databases, performance indicators are not calculated and standards have not yet been defined.

Table 14. Excerpt of proposals on appointment of roles and responsibilities of network commissioners

	Network commissioner	Microscopy commissioner	Head of NRL
NRL			
Operational management of NRL			X
Development of standard operating procedures for the network			X
Microscopy – procurement			
Preparation of procurement plan and submission to procurement coordinator		X	
Microscopy – monitoring and evaluation			
Monitoring of oblast laboratories		X	
Microscopy – training			
Training staff in microscopy laboratory		X	
Culture – monitoring and evaluation			
Monitoring of oblast laboratories	X		
Culture – cooperation with partners			
Interaction with national and international partners regarding culture laboratories	X		
Network procurement coordinator			
Collection of all procurement plans of microscopy, culture laboratories, DST etc.	X		
Logistics coordinator			
Technical assistance with development and implementation of logistical solutions for all districts	X		
Network equipment and maintenance coordinator			
Central equipment register	X		

Management/governance of the TB laboratory network: recommendations

- Each network commissioner should be inaugurated into his or her position by official orders, with roles, responsibilities and competences within the NTP defined by written directives (proposals are set out in Table 14 and Annex 10) (short-term priority).
- The management and governance of networks of laboratories performing cultures and molecular tests should be strengthened (medium-term priority).
- Quality indicators for all kinds of laboratories, including standard improvement measures to be taken if major deviations are detected, should be developed. Indicators for monitoring the success of improvement measures should be considered for inclusion (long-term priority).

3.2.4 Financing/budgeting

NTP management expressed major concerns about sustainability regarding the further roll-out of Xpert MTB/RIF assay in the country. Using Xpert MTB/RIF assay will raise diagnostic costs significantly compared to microscopy, mainly due to the relatively high costs of consumables (US$ 9.95 per cartridge plus costs related to customs and logistics). Support from the EXPAND–TB, TBCARE, USAID Quality and TB REACH projects partly expires between 2014 and 2015 and it is not yet clear whether other donors will fill the gaps. The Ministry of Health will

probably not be able to cover all diagnostic costs from the state budget. This is a worrying situation that leads to questions about the full costs of TB diagnostics in Tajikistan.

TB control is partly financed through the oblasts, with taxes collected regionally. The Ministry of Health directly finances TB control in Dushanbe and the DRSub, including NTP management structures, the National Public Health Reference Laboratory and the NCTPTS (within the NCTPTS and NRL budget). Of all costs related to TB laboratory diagnostic services, the state budget covers primary education of technicians and doctors, salaries and running costs of buildings. Other items are mostly financed by donors.

Table 15 provides examples how active donors (co)finance different aspects of TB laboratory services. Most donors are transparent about financial contributions given to the Tajik health service, but questions on how much international money is flowing into TB laboratory diagnostics and how much from state funds could not be answered, probably due to the fact that this has not yet been analysed.

Table 15. Examples of financial support for TB laboratory services

Item	GFATM	USAID	KfW[a]	EXPAND – TB	TB REACH
Infrastructure	X		X		
Consumables and reagents	X		X	X	
Xpert MTB/RIF assay	X	X		X	X
Human resources capacity-building (training, guidance, incentives, etc.)	X	X	X	X	X
External quality control (Supranational Reference Laboratory, in-country external quality assurance, monitoring, etc.)	X	X	X	X	
Quality management system (handbooks, standard operating procedures, forms, etc.)	X	X	X	X	
Policies and guidelines	X	X			
Logistics and transportation	X				
(Tele-)communication	X				

[a] KfW = Kreditanstalt für Wiederaufbau [German Development Bank].

With the exception of the National Public Health Reference Laboratory in Dushanbe City, all TB laboratories are run under the financial administration of a hospital, TB dispensary or polyclinic. There is no official statement to define laboratory services' financial needs, so health facilities allocate different levels of budget. The annual public health budget for laboratory diagnostics is therefore unknown.

Financing/budgeting: recommendations

- An independent expert panel consisting of economic and laboratory service specialists should be authorized to analyse the yearly budget spend on TB laboratory diagnostics. This review should separately consider all different budget lines, such as infrastructure, equipment, maintenance, human resources, human resource capacity-building, consumables and reagents, and logistics and communication. Its report should enable health managers to estimate the annual costs of single laboratories of different risk levels and mean costs of individual laboratory analyses, such as smear microscopy, Xpert MTB/RIF assay, culture and DST. It should also make transparent which

items are financed (and to what extent) by the state budget and how much funding is being received by international agencies (medium-term priority).

- A budget plan based on the analysis of existing costs should be developed for the upcoming five years. The plan should consider stepwise extension of laboratory services due to new diagnostic tools and algorithms that make diagnostics more efficient and increase the number of drug-resistant TB cases identified. It should also disclose financial gaps due to expiring funds or increasing costs (long-term priority).
- The stepwise allocation of a separate budget line for TB laboratory services should be considered. As a first step, medium- and high-risk TB laboratories (culture, DST) should be included in a separate budget as they provide services for patients from different districts and oblasts, receive most funding from international partners and presumably create the highest costs. Xpert MTB/RIF assay centres (as a second step) and microscopy laboratories (as a third) should be transferred to this new management structure to facilitate the establishment of central procurement and maintenance plans and help to attract international donors to cover potential financial gaps (long-term priority). A financial management mechanism for TB laboratories needs to be developed.

3.2.4.1 Procurement

Procurement of laboratory equipment, consumables and reagents is highly diversified. Stains for TB microscopy are centrally purchased and distributed to regional laboratories under the TB microscopy commissioner's coordination. Consumables for culture are purchased by UNDP on behalf of the NTP. Materials for DST and MTBDRplus are provided by EXPAND–TB and Xpert MTB/RIF assay cartridges are procured by all agencies dealing with this technique through their own procurement mechanisms (Table 13).

Customs clearance remains a great challenge for all organizations supporting TB diagnostics. Reagents for DST and molecular diagnostics delivered by EXPAND–TB, for example, were delayed by customs for several months. Shelf-life was reduced to little more than six months when the materials were delivered, probably leading to waste of valuable test kits.

Project HOPE, the Supranational Reference Laboratory and EXPAND–TB have initiated standardization and optimization of warehouse management through training, but only a few laboratories could participate. Staff turnover has led to the loss of newly acquired skills, explaining why storage and warehouse management remains quite incoherent within the laboratory network.

Procurement: recommendations

- A central body should be developed under the NTP to manage procurement planning (identifying needs and creating order) for laboratory equipment, consumables, reagents and other items. Procurement procedures should be standardized as much as possible. A central register of all materials, including respective specifications for tender procedures, preferred procurement partners and special forms required for procurement with respective donor organizations dealing with specific items, should be developed (medium-term priority).
- Customs clearance should be facilitated to prevent lengthy clearance processes and expiration of laboratory consumables and reagents (long-term priority).

3.2.5 Infection control measures, bio- and work safety

Protecting personnel from laboratory-acquired TB is ethically imperative, managerially prudent and economically beneficial. As soon as people do not feel safe inside laboratories, staff turnover

increases. Continued loss of well trained specialists and the consequent need to appoint new staff consume resources, arguably more than are used in ensuring sufficient laboratory biosafety through providing adequate infrastructure, furnishings, equipment and consumables and maintaining laboratory installations and equipment according to international standards. WHO guidelines for biosafety in TB laboratories *(15)* are still relatively new, however, and it cannot be expected that all requirements would be fulfilled.

Some findings regarding biosafety were presented above. Infrastructure, furnishings and equipment of moderate- and high-risk (culture and DST) TB laboratories fulfil biosafety requirements provided maintenance is performed properly (see below). Surfaces that cannot be disinfected and rooms that cannot adequately be ventilated throughout the year frequently limit biosafety in low-risk (smear microscopy and Xpert MTB/RIF assay) laboratories.

As has been shown, sputum collection rooms without adequate ventilation are still in use in some facilities. Aerosol formation during laboratory work (from, for instance, smear preparation) is prevented in many, but not all, laboratories by, for example, cleaning loops in alcohol sand before heat sterilization. Filtering face-piece (FFP–3) respirators were available in most laboratories, but staff were obviously not well trained in their use.

National policies and guidelines on biosafety exist and lie within the responsibility of the State Sanitary and Epidemiological Service. Most TB diagnostics policies are outdated and do not take into consideration new technologies such as modern autoclaves, international standards like the WHO laboratory biosafety manuals *(14,15)*, new laboratory methods (including molecular biological tests) and modern knowledge on disinfection of *Mycobacteria*.

Infection control measures, bio- and work safety: recommendations
• The infrastructure of TB microscopy laboratories should be adjusted to meet biosafety requirements by replacing wooden surfaces with plastic that can easily be disinfected and assuring sufficient ventilation (minimum six air exchanges per hour) in a direction opposite to the laboratory workers (medium-term priority).
• The country's policies on biosafety, infection control, disinfection and laboratory design should be revised to comply with new international recommendations and standards (long-term priority).
• Staff should be trained in, and monitored on the practice of, prevention of aerosol production, proper use of respirators and correct disinfection of hands and surfaces (medium-term priority).

3.2.5.1 Maintenance

Medium- and high-risk TB laboratories use many pieces of high-tech equipment, the effective functioning of which determines staff safety to a large extent. Ventilation, biosafety cabinets and autoclaves are considered the most sensitive equipment directly affecting biosafety in the laboratory.

Yearly maintenance is mandatory, but despite this, none of the equipment in culture laboratories and the NRL had been professionally maintained or checked for more than 18 months at the time of the review.

The Ministry of Health has recently signed a temporary contract with an engineering company (Med Technica) with the aim of ensuring preventive and corrective maintenance of most laboratory equipment. This can be considered an important step forward.

Maintenance: recommendations

- Verification is required that the company commissioned to maintain laboratory equipment has qualified specialists trained in, and officially certified for, the maintenance of biosafety cabinets, room ventilation systems and autoclaves.
- Supervision should be in place to ensure engineers perform maintenance properly using appropriate well maintained and calibrated equipment (such as particle generators and counters for biosafety cabinets and ventilation systems) and following manufacturers' instructions.

3.2.5.2 Logistics, transportation and communication

A well functioning logistical system is the most promising instrument for further increasing TB laboratory diagnostics' efficiency, quality, speed and economy in Tajikistan. Many experts argue that new machines can reduce DST time from six to two weeks and modern molecular tests reduce the detection of rifampicin resistance from two weeks to 90 minutes. This is correct from a purely technical point of view, but the value of such new expensive tools is negated if the specimens do not reach the laboratory and the laboratory report does not reach the doctor in time due to lack of transport.

Currently, clinical specimens reach laboratories via a patient, nurse or doctor travelling from the respective PHC centre to the nearest TB laboratory. If necessary, specimens are then further transported by technicians or doctors to the next Xpert MTB/RIF assay laboratory, from there to the next culture laboratory, and from there to the NRL. Laboratory reports are expected to diffuse in similar ways from central laboratories to those on the periphery. It is therefore no surprise that only a minority of DST reports ever reach the patient's chart, as the review's experience in four polyclinics and two TB facilities suggests. Logistics – the reliable and timely transportation of materials, specimens and reports and active communication – are clearly crucial for effective networking of diagnostic services.

An ideal logistical model is provided by the TB dispensary of Pendjikent district, under the direction of Dr Khudoiberyev. Xpert MTB/RIF assay and culture diagnosis is provided by the oblast TB laboratory in Digmoy, more than 250 km away. The TB dispensary has an agreement with local taxi companies. To ship specimens to the oblast TB laboratory, Dr Khudoiberyev commits them to a taxi driver who is already travelling that way with a passenger. Specimens are adequately packed in special transportation boxes. After collecting the passenger, the taxi driver delivers the specimens to the door of the TB centre (dropping the box), waits for laboratory reports and then continues the journey with the empty box. Despite the long distances, several taxis or minibuses travel through Digmoy every week on their way to the oblast capital. Unfortunately, this smart, inexpensive and sustainable system is so far unique in Tajikistan.

Transport between the NRL and Dushanbe and Kurgan-Tube, respectively, is functioning relatively well, with NTP cars being used through financial support from GFATM.

Logistics, transportation and communication: recommendations

- A universal transportation system linking TB laboratories with clinical facilities should be developed, using inexpensive and sustainable public transport. Examples include contracting a countrywide public transportation agent, such as Asian Express, to make connections to larger cities through buses, minibuses or taxis. Locations that are not connected by Asian Express could follow the example of Pendjikent and seek individual solutions with smaller transportation companies (medium-term priority).

3.2.5.3 External quality assurance and monitoring

Monitoring visits and external quality assessment of smear microscopy laboratories had been functioning for approximately one year at the time of the review. Under the supervision of the TB microscopy centre in the RCTC, regional laboratories monitor all smear microscopy facilities in their respective districts using standardized approaches, questionnaires and checklists. The RCTC laboratory controls the regional centres in relation to their smear microscopy and monitoring activities. The Supranational Reference Laboratory controls the NRL in relation to microscopy, culture and DST. So far, no external quality assurance system has been established for culture, Xpert MTB/RIF assay or MTBDRplus diagnostics in the country.

External quality assurance and monitoring: recommendations

- An external quality assurance system for culture and Xpert MTB/RIF assay laboratories should be established in the country. Technical assistance could be provided by, for instance, the Supranational Reference Laboratory by preparing and shipping test panels (medium-term priority).

3.2.5.4 Quality management system

The NRL, with technical assistance from the Supranational Reference Laboratory, has implemented standard operating procedures and forms for all methods, tests and equipment and biosafety and warehouse management. All documents have the same format as those of the reference laboratories of Kyrgyzstan and Uzbekistan, facilitating cross-border exchange. Drafts of Russian-language quality management documents have been developed by the Supranational Reference Laboratory and can be downloaded from an online data depository to which all partners have access. Other Tajik laboratories do not yet use standard operating procedures.

Project HOPE, under the USAID Quality project, is currently developing a policy document defining how to structure a laboratory quality management system. Provided that it considers all requirements of ISO 15189:2012, the booklet could potentially serve as the basis for a quality management handbook for the TB laboratory network.

Quality management system: recommendations

- Standard operating procedures should be implemented in all TB laboratories, with the NRL defining content, forms and other quality management documents. The form and structure of quality management documents should be identical in all network laboratories.
- TB specialists' compliance with procedures described in respective standard operating procedures should be monitored (long-term priority).

3.2.5.5 Important aspects of the pre-analytic phase

The pre-analytic phase covers the period from the doctor's decision for testing to the start of analysis in the laboratory. Specimen collection, labelling, storing, transportation, requesting the analysis, receipt of the specimen in the laboratory, registering and transferring to the workplace – all this falls into the pre-analytic phase, which is considered crucial to the quality of the material and correct connection between analysis and patient.

Clinical specimens reach the laboratory with request forms filled in by nurses and signed by doctors. Smear microscopy is requested on form TB–05, culture and DST on TB–06A. No request forms exist for molecular tests such as Xpert MTB/RIF assay or MTBDRplus; if needed, doctors simply add them to the sheet. Approximately one third of requests are incorrect.

Most errors occur with incomplete patient data or referring doctors/institutions, missing specifications of requested analyses or use of the wrong forms. These errors provoke confusion and misunderstandings and result in reports not reaching the referring doctors, not answering their question or not referring to the right patients. EXPAND–TB and Supranational Reference Laboratory experts have developed a new single request form prompting all the information needed for correct laboratory requests. It will be introduced alongside the new diagnostic algorithm.

Most health facilities and laboratories possess functioning refrigerators and special containers in which they transport specimens under cooled conditions.

Important aspects of the pre-analytic phase: recommendations
• Forms TB–05 and TB–06 should be completely replaced by the new TB laboratory request and transfer forms. Only laboratory requests on this new form should be accepted after training for staff and an interim phase of approximately two months, after which any other forms should not be accepted. Referring doctors should be contacted immediately if inaccurate requests are submitted and asked to resubmit using the new forms (short-term priority).
• Use of the forms by clinical doctors should be monitored after initial training. A failure-management system (a tally list, for example, counting errors per referring institution) should be implemented with targeted retraining for the sites producing most errors (medium-term priority).

3.2.5.6 Important aspects of the post-analytic phase

The post-analytic phase starts with the final validation of laboratory results by the clinical microbiologist and ends with the transmission of the report to the referring doctor. The phase involves:

- technical approval and documentation by the laboratory technician
- medical review and validation by the laboratory doctor
- verbal reporting of urgent results
- production and transmission of a written laboratory report.

Microscopy results are reported on form TB–05. Laboratory technicians report Xpert MTB/RIF assay and culture results to the chief doctors of the responsible TB dispensaries using private prepaid cell phones, regardless of whether the specimen had been referred from the dispensary or from another district health department. The chief doctor is expected to report the results to the polyclinic or health facility responsible for the patient. Written reports are put into special post boxes for each district, from which they are eventually collected by district TB doctors and forwarded to the patients' primary doctors.

The results of almost a third of Xpert MTB/RIF assay, MTBDRplus, culture and DST assays never reach the referring doctors. The following reasons were identified during the field missions:

- the information chain from the laboratory to the referring doctors might be interrupted, most likely at the TB dispensary link;
- technical devices for rapid reporting of laboratory results, such as fax or electronic means, are scarce; and

- the costs of the private cell phones are not reimbursed to the technicians, demotivating them from reporting results.

Important aspects of the post-analytic phase: recommendations
• The provision of institutional mobile phones to every Xpert MTB/RIF assay, MTBDRplus, culture and DST laboratory should be considered as a short-term solution to enable reliable transmission of laboratory results (short-term priority). • Project funds should be sought to allow reliable and rapid transmission of laboratory data to referring institutions via the Internet, USB SIM card, fax modems or a central upload/download server (long-term priority). • Laboratory results should be reported directly to the referring institution/doctor. Consideration should be given to sending copies of positive results of all TB patients to the responsible TB dispensary to keep TB doctors informed (medium-term priority).

3.2.6 Data management

Microscopy data from all TB laboratories are entered into one central access database in the RCTC laboratory. Data reach the RCTC partly in paper form and partly as electronic Microsoft Excel or Word files on mobile flash drives. For some reason, only diagnostic cases are included in this access file, with follow-up data missing. Xpert MTB/RIF assay, MTBDRplus, culture and DST results are not yet recorded in a central datafile.

Data management: recommendation
• All diagnostic laboratory data (not only microscopy data, but also results from molecular tests, culture and DST) should be included in one central database. Regional laboratories should report data in electronic files and in the same format, preferably Microsoft Excel or comma-separated values (CSV) files (medium-term priority).

3.2.7 Human resources development

Two national institutions contribute to the education of laboratory doctors in Dushanbe: the State Medical University and the Institute for Postgraduate Medical Education.

Medical doctors graduate from the State Medical University after five years of education. They can then attend a supplementary four-month programme specializing in microbiology and laboratory medicine. Biologists can follow a similar programme and graduate as microbiologists in medicine. The Institute for Postgraduate Medical Education offers advanced professional education programmes for technicians or biologists specializing in laboratory medicine. Students can graduate after four months as medical laboratory technicians and after a further 20 months as laboratory doctors. Approximately 60 medical colleges situated in almost all larger cities educate nurses, but only a few offer special programmes for laboratory technicians. Approximately 400 technicians graduate per year.

Despite this relatively high number of laboratory specialists, the NTP described severe difficulties recruiting staff for TB laboratories. Fifty-eight new technicians and microbiologists were employed in the 3.5 year period from 2010, but 30% have now left (Table 16). The reasons for recruiting difficulties and the high loss of well trained TB laboratory staff have so far not been thoroughly investigated. It will most likely be a mixture of reasons, including low salary, risk of infection, difficult work and overstretched laboratory management.

Table 16. Examples of staff turnover in higher-level laboratories

		2010		2011		2012		2013	
Oblast	**Laboratory**	**In[a]**	**Out[b]**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Dushanbe	RCTC	9	1	2	0	3	1	1	2
Vahdat	NRL	5	0	1	1	7	3	8	1
Kurgan-Tube	Zonal laboratory	2	2	2	2	3	1	0	0
Kulyab	Zonal laboratory	3	0	1	0	2	0	0	0
Digmoy	Regional laboratory	5	2	1	1	3	0	0	0

[a] Number of new staff in the respective year.
[b] Number of staff leaving the laboratory.

Human resources development: recommendations

- A laboratory human resources capacity-building plan, including a strategy on how to increase the number of laboratory graduates per year from medical colleges, the State Medical University and the Institute for Postgraduate Medical Education, should be developed. Partnerships should be pursued with universities from industrialized countries in, for example, western Europe to support the education of laboratory specialists.
- The whole spectrum of reasons leading to high staff turnover in TB laboratories should be analysed and documented, with deficits leading to the main two or three reasons for staff leaving being mitigated.

3.2.8 Histopathology, X-ray and others

Radiological examination is always performed alongside laboratory tests. Miniature mass radiography is most affordable in rural areas, but chest X-ray is increasingly used. Most rural health facilities do not have the potential for radiographic examination and patients are sent to district centres (PHC centres or TB dispensaries).

Computerized tomography is available only at oblast level and in the capital, but it is not free for TB patients, including children, and therefore seldom used. Bronchoscopy is available only for selected patients who are able to pay for the procedure and is not available in TB services.

3.2.8.1 EPTB

EPTB accounted for 27% of all new cases in 2011, which is usual for Tajikistan. The proportion of EPTB cases among children aged 0–14 years was as high as 69% (393 of 569). Many improvements in confirmation of extrapulmonary and paediatric cases have been seen in recent years, particularly in Dushanbe. Sputum induction, gastric lavage and nasopharyngeal swabs are used for children, with fine-needle biopsy with peripheral lymph node or other accessible tissue involvement (such as joints, vertebral column and liquor). The samples are sent for pathohistological and bacteriological examination.

Bacteriological confirmation of all EPTB cases in seven out of 14 DOTS points at PHC centres in Dushanbe in 2012 was on average 10% (27 of 248), which is a good achievement. EPTB cases are increasingly being confirmed by histological examination at the oncology centre in Dushanbe.

EPTB: recommendation

- Bacteriological and histological confirmation of extrapulmonary and paediatric TB cases should be increased.

3.3 Treatment

3.3.1 TB hospital capacity and activity indicators

The NTP indicates that quality implementation of a countrywide DOTS strategy would decrease the need to use TB hospital beds to full capacity. The number of beds required is further reduced when the implications of Tajikistan's practice of basing calculations of the average length of stay on 320 days per year (not the international standard of 365) is taken into account; this reduces the required number of beds by 12%.

The TB hospital bed situation before the establishment of the NCTPTS (2008–2010) was 2235 beds for adults and 395 for children. The large TB sanatorium sector is not included, as no clear figures are available. The plan to rationalize net bed occupancy in TB services is shown in Table 17, which demonstrates a 32% reduction (from 2630 to 1800: 26% for adults, from 2235 to 1645, and 61% for children, from 395 to 155) without any district TB hospital closures.

Table 17. Rationalization plan for net bed occupancy in TB services and new recommendations

Oblast	Population in thousands (2008)	Number of beds[a]	Number of beds after reduction 2015[a]	Number of beds after revised rationalization[a]
NCTPTC	**–**	**700 (100)**	**420 (30)**	**390 (30)**
Dushanbe city	**670.2**	**100 (50)**	**100**	**(50)**
Dushanbe subordinated districts (rayons)	**943.3**	**180**	**120**	**120**
Rasht	94.4	15	10	10
Gissar	233.9	60	30	30
Rudaki	324.0	60	40	40
Tursunzade	227.3	30	25	25
Nurabad	63.7	15	15	15
Khorog (GBAO)	**219.2**	**60 (20)**	**60**	**60 (10)**
Sugd oblast	**2 113.9**	**595 (105)**	**355 (70)**	**280 (20)**
"Digmoy" Khujant	155.3	370 (50)	220 (30)	200
Zafarabad	56.8	20	10	0
Isfara	221.0	40	25	25
Mastcho	96.7	25	15	15
Penjikent	228.9	50 (15)	40 (10)	40
Istaravshan	211.1	50 (30)	25 (20)	0
Kanibadam	174.7	40 (10)	20 (10)	0
Khatlon oblast	**2 549.5**	**995 (120)**	**745 (55)**	**530 (30)**
Khatlon-Kulyab zone		470 (50)	355 (10)	245
City of Kulyab	92.9	200 (30)	170 (10)	130 (15)
Vose	171.7	65 (20)	65	65
Dangara	114.2	40	20	0
Hamadoni	122.6	80	40	0
Farhor	131.4	50	30	30
Temurmalik	57.0	15	10	0
Shurabad	49.2	20	20	20
Khatlon-Kurgan-Tube zone		525 (70)	390 (45)	285
Kurgan-Tube	70.4	160 (20)	135 (5)	160 (15)
Vaksh	146.0	50	40	0

Oblast	Population in thousands (2008)	Number of beds[a]	Number of beds after reduction 2015[a]	Number of beds after revised rationalization[a]
Jilikul	88.4	30 (10)	20 (10)	0
J. Rumi	150.4	80 (25)	60 (20)	60
A. Jomi	127.7	20 (5)	15 (5)	15
Kabodiyon	137.9	20	10	10
Khuroson	85.1	10	10	0
Kumsangir	100.5	50	30	20
Pyandj	94.3	40 (10)	25 (5)	0
Shaartuz	97.1	40	20	20
Yavan	165.4	25	25	0
Tajikistan	**7 139.8**	**2 630 (395) 100%**	**1 800 (155) 68%**	**1 430 (130) 54%**

[a] Number of beds for children in brackets.
Source: columns 2–4: Ministry of Health *(9)*; column 5: Dr Albert Neher, Independent Consultant, Munich, Germany, unpublished data, 2012.

Given the progress in TB control achieved since 2009 (such as integration of so-called core DOTS in PHC, which allows initiation of treatment for most smear-negative TB patients in an outpatient setting), a further revision of the rationalization plan is strongly recommended. The following lists some relevant points.

- A 30-bed department for pulmonary diseases has been established in NCTPTS, making 390 TB beds available, including 80 for MDR–TB (adults) and 30 for children (20 for MDR–TB).
- Rationalization in the Digmoy oblast TB hospital in Khujant, Sugd oblast has been revised due to availability of space in the building selected for refurbishment. This suggests that only 200 beds (plus four intensive care beds) will be planned instead of the originally envisaged 220. These include 20 beds for children and 56 for MDR–TB patients in a separate two-storied building.
- Decree No. 191 of 12 October 2010 implies that district TB hospitals in Zafarabad (20 beds), Istravshan (50) and Kanibadam (40) will be closed after Digmoy's refurbishment.
- A German Development Bank mission to Khatlon oblast in August 2012 also visited the two regional TB hospitals in Kurgan-Tube and Kulyab, eight district TB hospitals and the children's TB hospital in Dushanbe. It recommended the closure of district TB hospitals in Dangara (40 beds), Khamadoni (80) and Temurmalik (15) in Kulyab zone and those in Vaksh (50), Jilikul (30), Khuroson (10), Pyandi (40) and Yavan (25) in Kurgan-Tube zone due to poor building and infection control conditions. These 190 TB beds will be replaced with strong integration of DOTS in PHC.

Findings during this review included the following.

- In Sugd oblast, 1551 patients at regional level and 442 at district received inpatient treatment in 2010; the respective numbers for 2011 were 1485 and 437. Assuming a two-month hospitalization phase for re-treatment and smear-positive TB cases and a one-month average inpatient stay for extrapulmonary and smear-negative PTB cases, this amounts to the need for only 280 beds throughout the region.

- A bed-occupancy rate of only 35% (163/465) was found in TB hospitals in Khatlon oblast, but patients still faced unnecessarily long hospitalization periods: young smear-negative patients, for instance, had two months of inpatient treatment.
- The oblast TB hospital in Kurgan-Tube had a bed-occupancy rate below 10%; it had been only 36% at the time of the German Development Bank mission in August 2012 (Dr Albert Neher, Independent Consultant, Munich, Germany, unpublished data, 2012). The hospital is in poor condition and lacks a compound. X-ray facilities and the TB laboratory are located in different places outside the hospital, which is not convenient for patients.
- The new 60-bed TB hospital in Kurgan-Tube, financed by GFATM in collaboration with the Ministry of Health and inaugurated by the President of the Republic of Tajikistan on 7 July 2013, has sanitary facilities such as toilets and showers installed in only one side of the building. Partitioning into two different wards seems inappropriate, so the recently installed vitreous wall should be removed and patient allocation reconsidered. The patients' lounge is quite luxurious and comfortable. A farm with chickens, horses and vegetables is in place to provide food and possibly the opportunity for activity for patients.
- The review found 78 patients (47 of 65 with smear-positive PTB) in the 210-bedded (40 out of commission) Kulyab oblast TB hospital, which amounts to a bed-occupancy rate of 46%.

Overall, 1430 TB beds, including 130 for children and 256 for MDR–TB (100 in NCTPTS, 60 Kurgan-Tube, 30 Kulyab, nine Vose and 57 Digmoy) will be available in the public sector after the revised rationalization plan; 140 TB beds in the prison sector also have to be taken into account.

Important points that may warrant further revision of the TB hospital rationalization plan include:

- NCTPTS' excellent experience;
- the agreed plan to refurbish the Digmoy Hospital;
- Decree No. 191;
- the results of the German Development Bank TB study from September 2012; and
- clear mapping of the remaining TB hospital infrastructure at district level to allow patients from remote areas access to hospital care.

TB hospital capacity and activity indicators: recommendations

- The bed rationalization plan from 2000 should be reviewed, basing estimations of the need for TB hospital beds on actual findings and compliance with infection control measures (Table 17, last two columns on right), which show a further 20% reduction of TB beds (from 1800 to 1430) with the closure of 11 district TB hospitals.
- In Sugd oblast, 280 TB beds will be sufficient after the closure of the district TB hospitals in Zafarabad, Istravshan and Kanibadam referred to in Decree No. 191.
- The new TB hospital in the Kurgan-Tube zone of Khatlon oblast should be used only for MDR–TB patients (after provision of sufficient second-line drugs). TB beds in the old oblast TB hospital in Kurgan-Tube should be reduced to 100, resulting in a total of 285 in the zone.

- In the Kulyab zone of Khatlon oblast, 245 TB beds in four facilities will be sufficient. TB beds for MDR–TB patients should be increased from 10 to 30 in the oblast TB hospital (after provision of sufficient second-line drugs), resulting in 100 beds for drug-sensitive TB patients.

3.3.2 TB hospital performance

Generally, the review observed that TB doctors in some hospitals do not provide adequate explanation to patients on different aspects of TB. The weeks (or even months) of inpatient stay should be used to provide intensive health education to patients – displaying posters is not sufficient.

Patients diagnosed with MDR–TB in a few of the hospitals visited by the review were discharged to initiate or continue their second-line drug treatment in PHC facilities. This should be avoided at this early stage of second-line drug treatment to prevent further amplification of drug-resistant TB.

3.3.3 Treatment regimen

DOTS started in 2002, with 100% coverage being achieved by 2007. The NTP has been strengthening treatment and care delivery in outpatient services in recent years: since 2011, the policy has been to provide treatment mainly at TB or PHC centres due to the poor conditions and perceived nosocomial TB infection risk of TB inpatient facilities. Outpatient services have been strengthened through existing TB services and governmental, NGO and community-based organizations.

RCTC data suggest an increasing trend in TB ambulatory treatment from the first day of treatment, from 9.6% in 2009 to 39.2% in 2011 and 45.3% in 2012. A clear treatment guide exists and DOTS is generally recognized and followed by PHC and TB specialists, including basic diagnostic tests and approaches for drug-susceptible TB, its treatment regimen, dosages (treatment standards, reflecting WHO recommendations on category I and II), side-effect management, case-holding and aspects of treatment adherence and evaluation. Treatment cards assessed during the review were in good order, with a high degree of accuracy and completeness, and progress towards integration and cooperation among specialist TB service institutions/facilities and other TB-relevant facilities and entities of the health system, such as PHC, paediatrics, TB/HIV services and prison health services, has been reasonable. PHC involvement in TB case detection, contact-tracing and quality provision of directly observed therapy is, however, neither sufficiently comprehensive nor systematic; TB patients are still often considered as belonging to specialist TB services. Similarly, further integration is required between TB and mother and child health services.

No interruption to anti-TB drug supply was observed during the review. First- and second-line drugs are included in the national essential drugs medicines list and selection of all anti-TB drugs is based on national TB treatment guidelines, fully complying with WHO recommendations (Table 18).

Patient kits are used for drug-susceptible TB treatment, which is helpful in assuring good-quality treatment implementation throughout the course, particularly in view of the fact that a high percentage of TB treatment is administered in PHC settings on an outpatient basis. Nurses in specialist TB services were found to have a good level of knowledge about TB, including its diagnosis and treatment, but perhaps need training on identification and (first) management of side-effects of treatment and stigma reduction. Generally, nurses at PHC level have basic

knowledge about TB and would benefit from additional training about TB in their community outreach activities.

Table 18. First and second-line drugs currently used in tuberculosis network

First-line drugs	Second-line drugs
HRZE 75/150/400/275 (isoniazid/rifampicin/pyrazinamide/ethambutol)	Capreomycin (1 gr vial)
HRZ 30/60/150 (isoniazid/rifampicin/pyrazinamide)	Amikacin (500 mg/2 ml)
HR 150/75 (isoniazid/rifampicin)	Levofloxacin (250 mg)
HR 60/60 (isoniazid/rifampicin)	Moxifloxacin (400 mg tablets)
HR 60/30 (isoniazid/rifampicin)	Prothionamide (250 mg tablet)
E 400 (ethambutol)	Cycloserin (250 mg tablet)
E 100 (ethambutol)	*P*-aminosalicylic acid (4 g sachets)
H 100 (ethambutol)	
H 300 (isoniazid)	
Z 400 (pyrazinamide)	
S 1.0 (streptomycin)	

Treatment regimen: recommendations

- Further expansion of ambulatory treatment should be accelerated to maximize outreach to patients (particularly in rural areas) and strengthen and foster home-based care and day-care treatment, including all eligible patients (sputum-smear-negative and MDR–TB).
- Achievements in directly observed therapy should be maintained and more active involvement of PHC-level staff, particularly nurses, ensured. To help achieve this, PHC's role in TB prevention, treatment and care should be defined. PHC staff should be clear about their roles and responsibilities and be accountable to TB centres. Similarly, a clear and accountable collaborative plan between TB and mother and child health services should be developed and defined.
- In-service training and strengthened supervision should be provided for PHC providers in rural areas involved in case management of TB and drug-resistant TB.

3.3.4 Management of MDR–TB cases

3.3.4.1 Drug-resistant TB case-finding, diagnosis and management

The Green Light Committee of the Stop TB partnership approved the first pilot project for management of patients with drug-resistant TB in Tajikistan in 2009. Since then, management of drug-resistant TB cases has expanded in a stepwise fashion (Table 19).

By 2013, diagnosis of drug-resistant TB had been carried out in only 23 of 66 districts due to a gap between the theoretical capacity to diagnose the cases and the availability of second-line drugs. It was estimated that 48.6% of the population had access to diagnosis and treatment of drug-resistant TB at the end of 2012; by the end of 2013, it is expected that this will rise to 67.8% as population density is higher in districts where management of drug-resistant TB has been launched. Full coverage is expected to be reached by 2014.

The time to diagnosis and then to treatment of drug-resistant TB in the MDR–TB pilot sites has become significantly shorter after rapid technique implementation in 2012, but patients in districts where drug-resistant TB management has only recently been initiated have been on the

waiting list for long periods (sometimes a few years). At the time of the review, the waiting list had 233 MDR–TB cases: treatment courses procured under GFATM support finished in March 2013, and the next shipment was expected in July. The 2013 decree of the Ministry of Health outlined the latest expansion of drug-resistant TB diagnosis and treatment, demonstrating that as second-line drugs will not be available for all drug-resistant TB patients, patients with failures of category I and II treatment can only restart treatment with the Category II regimen without DST. At the time of the review, 43 districts had no access to DST and, consequently, second-line drugs.

Table 19. MDR–TB patients diagnosed and started treatment

Year	Diagnosed M/XDR–TB cases	Treatment courses provided[a]
2009	141	52
2010	333	245
2011	721	380
2012	772	536[b]
2013	800[c]	390[d]
2014	1 020[c]	800[e]
2015	1 020[c]	800[e]

[a] Not necessarily diagnosed in given year.
[b] GFATM round 8.
[c] Estimated.
[d] 200 (GFATM round 8), 50 (GFATM rolling continuation channel), 140 (Médecins sans Frontière estimated over two years).
[e] Transitional funding mechanism.

The Central Medical Consilium, which reviews drug-resistant TB cases throughout treatment, convenes weekly. It recommends that rifampicin-resistant cases commence treatment as soon as the Xpert MTB/RIF assay or Hain test result shows resistance to rifampicin or to rifampicin and isoniazid. Combinations of standardized treatment regimens are used, followed by an individualized regimen after the DST to first- and second-line drugs becomes available. The standardized treatment regimen includes, as a minimum: pyrazinamide, a fluoroquinolone (commonly levofloxacin), injectable amikacin or kanamycin, prothionamide, cycloserine and *p*-aminosalicylic acid. Ethambutol is added if sensitivity remains. The injectable option usually continues until two negative cultures have been obtained, but not for less than eight months. Total duration is approximately 20 months, with an intensive phase plus 18 or 12 months of continuation after culture conversion. The injectable continues until completion of treatment in case of resistance to fluoroquinolones.

Treatment success among patients with drug-resistant TB receiving the category IV treatment regimen was 71.2% in 2009 and 61.6% in 2010. These results are comparable to those of MDR–TB projects worldwide *(17,18)* (Table 20).

Three consiliums are in place: one in NCTPTS (the Central Medical Consilium), one in Kulyab district and one newly established in Sugd oblast. Drug-resistant TB cases diagnosed in prisons are referred to the respective consilium in civilian services. A few problems related to understanding of the meaning of cultures and DST and side-effects of management were identified among the clinicians in the newly established consilium in Sugd oblast, signalling a

need for in-service training and monthly supervision visits. The other sites are generally doing well.

Table 20. Treatment outcomes for patients with drug-resistant tuberculosis, 2009–2012

Year[a]	Enrolled	Treatment success	%	Failed	%	Died	%	Defaulted	%	Still on treatment	%
2009	52	37	71.2	6	11.5	7	13.5	2	3.8	0	0.0
2010	245	151	61.6	34	13.9	35	14.3	25	10.2	0	0.0
2011	380	123	32.4	26	6.8	51	13.4	32	8.4	148	38.9
2012	536	10	1.9	5	0.9	41	7.6	33	6.2	447	83.4

[a] Cohort analysis for treatment outcomes for 2011 and 2012 was not completed by the time of the review.

3.3.4.2 XDR–TB

Ninety-six XDR–TB cases have been diagnosed since 2009. XDR–TB cases comprised 30.8% of those enrolled to the first MDR–TB cohort (Table 21). Treatment success for those who commenced in 2009 and 2010 was 62.5% and 23.3% respectively. The country lacks second-line drugs of the fifth group *(19)* to treat XDR–TB cases, except for linezolid, which is used in the Médecins sans Frontière project, and amoxicillin/clavulanate and clarithromycin, procured for only a few cases with GFATM support or self-purchased by patients. Management of XDR–TB cases outlined in national guidelines on drug-resistant TB promote an individualized regimen that includes all first-line anti-TB drugs towards which *M. tuberculosis* will still be sensitive; capreomycin, moxifloxacin, amoxicillin/clavulanate and cavulanate are seldom added. In case any of the second-line injectables remains sensitive, they are kept in the treatment regimen (three times per week) until the end of treatment.

Table 21. Treatment outcomes for patients with XDR–TB

Patients	2009		2010	
	n	%	n	%
MDR–TB patients with DST to second-line drugs	52	100	131	100
Confirmed XDR–TB	16	30.8	30	22.9
Treatment success	10	62.5	7	23.3
Failed	5	31.3	18	60.0
Died	1	6.3	5	16.7

3.3.4.3 Polydrug-resistant TB

Polydrug-resistant TB cases are treated using WHO-recommended treatment regimens. Cases are included in the MDR–TB cohort for evaluation when second-line drugs are used (mostly drug-resistant TB cases), but it was pointed out that due to low reliability of the DST from the NRL, the standard MDR–TB regimen is often used at the start and adjusted after the definite DST arrives from the Supranational Reference Laboratory. Using rather more second-line drugs is recommended in regimens for polydrug-resistant cases at least until the NRL's proficiency testing shows better results.

3.3.4.4 Drug-resistant TB among children

Treatment of paediatric MDR–TB cases started in 2011(19 cases) with GFATM support. Management of drug-resistant TB among children has been supported by Médecins sans Frontière since 2012 through provision of second-line drugs for children with confirmed or

suspected MDR–TB and contacts found during contact-tracing around the paediatric index case. Médecins sans Frontière is also supporting laboratory diagnostics (including sputum induction for collection of biological material and rapid test assays (Xpert MTB/RIF) in Dushanbe and shipment of samples for DST to the NRL in Gauting) and providing psychosocial support.

Children with MDR–TB from all over the country are eligible for Médecins sans Frontière support, but patients who are not from the supported oblasts (Dushanbe and Kulyab) are enrolled on treatment only if they can move to the Médecins sans Frontière project site for the entire treatment course to ensure proper treatment follow up. Thirty-two MDR–TB paediatric cases had been enrolled in the project. The country's standard treatment regimen was used. Six XDR–TB paediatric cases were diagnosed: half were put on linezolid and the other half were expected to commence the drug soon.

3.3.4.5 Treatment follow up

The national drug-resistant TB guideline lists the tests to be included in follow up of treatment progress and monitoring of side-effects. Follow up of treatment progress is achieved through monthly smears and cultures during the intensive phase and quarterly until the end of treatment. DST is repeated if the case culture is still positive every three months. Chest X-ray is performed every six months or more often if necessary.

Tests for monitoring side-effects of anti-TB treatment include all those recommended by the WHO 2008 guidelines *(19)* except for the test of thyroid stimulating hormone level, which is not supported by the GFATM and which instead is estimated based on symptoms and complaints. Side-effects of treatments are carefully recorded (Table 22) and analysed to enable procurement planning for auxiliary drugs, mainly from the GFATM but also the Ministry of Health. Auxiliary drugs and tests for follow up of side-effects are free of charge for patients during hospital and outpatient treatment.

Table 22. Side effects of anti-TB drugs recorded during treatment of MDR–TB cases

	Year			
Side-effects	**2009**	**2010**	**2011**	**2012**
Gastrointestinal				
Nausea, vomiting	23	120	263	428
Diarrhoea	0	10	33	78
Abdominal pain	–	–	49	137
Gastritis	–	–	31	160
Hepatitis	–	–	7	16
Anorexia	–	–	35	53
Renal toxicity	–	5	15	17
Central nervous system toxicity				
Sleep disturbances	11	–	19	110
Headache	9	32	81	368
Arthralgia	15	92	93	254
Depression	–	–	18	41
Seizures	–	–	10	7
Psychosis	3	–	5	36
Ototoxicity				
Hearing impairment	0	8	20	113

Vertigo	0	–	92	220
Tinnitus	–	–	17	114
Electrolyte disturbances/ electrolyte wasting	–	–	0	0
Allergic reactions				
Allergy	–	39	52	73
Rash	7	–	25	53
Peripheral neuropathy	–	63	9	85
Visual impairment	2	1	21	23
Hypothyroidism	–	–	0	0
Cardiovascular disturbances	–	2	4	11
Pain at the injection site	–	–	0	33
Total	**70**	**372**	**899**	**2 430**

3.3.4.6 Treatment modality

The national guidelines on drug-resistant TB include hospitalization and discharge criteria. In addition, the Ministry of Health issued Decree No. 571 on outpatient treatment of MDR–TB patients on 16 July 2009 in response to hospitals' poor physical conditions and high likelihood of nosocomial infection due to the inability to implement infection control measures. Among other issues, the decree promotes outpatient treatment for drug-resistant TB cases from day one (Table 23).

Table 23. Patient hospitalization at the start of drug-resistant TB treatment

Year	2009 (%)	2010 (%)	2011 (%)	2012 (%)
Patients hospitalized at the start of treatment	90.4	73.5	60.8	54.7
Patients involved in outpatient treatment from day one	9.6	26.5	39.2	45.3

Tajikistan has three modes of drug-resistant TB treatment delivery: hospital, clinic and ambulatory/community-based. Community-based care provided by trained lay and community health workers has been successfully implemented in pilot districts.

Hospitalization is decided on a case-by-case basis by the central or regional medical commission for drug-resistant TB. Sputum-smear-negative drug-resistant TB patients could be hospitalized for a short period (1–2 weeks) to receive TB-related education and allow side-effect management to be initiated. Sputum-smear-positive patients can start treatment immediately as outpatients but may be hospitalized if they have severe conditions, are terminally ill, have concomitant or psychiatric conditions, or need surgery, palliative care or isolation. Hospitalization may also be considered if the patient is homeless, it is not possible to provide clinic- or community-based directly observed therapy, or nonadherence is likely.

Eligibility criteria for hospital discharge are as follows:

- the patient is not experiencing any uncontrolled or severe adverse drug reactions or a condition that prevents moving his or her care to a local health facility (such as renal failure or the need for oxygen);

- the patient can attend a local health facility for daily treatment or will have access to a trained community treatment supporter for MDR–TB treatment; and
- two consecutive monthly smears are negative (the MDR–TB register is the source document for this).

3.3.4.7 Surgery

A 40-bedded department of thoracic surgery has been established in the NCTPTS. Beds are assigned as follows: 10–15 for unspecific thoracic surgery; 10–15 for thoracic TB-related surgery; 10–15 for bone TB; and a few (as needed) for bone TB in children. Of the 12 surgeons, nine perform operations (thoracic, bones/spine and urogenital); 146 operations were performed in 2012, of which 94 were orthopaedic and 52 thoracic. Minor surgical manipulations are performed only by surgeons, so there were also 241 thoracic drainages, 1589 thoracic punctures, 582 punctures of abdomen and joints and 42 of spine. Perioperative mortality (death within two weeks of a surgical procedure) was zero, which is unusual compared to, for example, rates within the European Union.

Patients receive anti-TB drugs based on drug sensitivities prior to and after surgery. Surgery is decided after 2–6 months of conservative treatment, with treatment generally continuing for 18 or 12 months.

Criteria for surgery are outlined in the national guidelines for management of drug-resistant TB and are as follows. The patient:

- fails to demonstrate clinical or bacteriologic response to chemotherapy after 3–6 months of treatment;
- has a high likelihood of failure or relapse due to a high degree of resistance or extensive parenchymal involvement, regardless of smear and culture status;
- experiences morbid complications of parenchymal disease, such as haemoptysis, bronchiectasis, bronchopleural fistula or emphysema;
- has recurrence of positive culture status during category IV therapy; and/or
- relapses after completion of category IV therapy and is under consideration for further chemotherapy.

Priority for consideration for surgery goes to patients with:

- persistent or severe haemoptysis;
- high levels of resistance;
- localized surgical disease (such as cavities or destroyed lung tissue) and positive cultures; and/or
- the appearance of localized cavities or damaged lung tissue on chest X-ray (these patients undergo an evaluation for surgical resection of the damaged lung or cavity).

Treatment: recommendations
• Resource mobilization should be continued to ensure sustainability of drug-resistant TB-related activities, particularly provision of second-line drugs.

- In-service training and technical assistance on drug-resistant TB issues should be provided to oblast consiliums and MDR–TB coordinators (training is planned for Sugd oblast in 2013, then continued according to the expansion plan).
- In-service training and supervision of PHC providers in rural areas involved in management of drug-resistant TB should be strengthened (training is planned for Sugd oblast in 2013, then continued according to the expansion plan).

3.4 Patient-centred approach

3.4.1 Patient and community involvement

Former patients' involvement in TB policy definition, awareness-raising and care is generally low across the country. Inpatients at the hospitals visited by the review had varying degrees of knowledge on TB symptoms and treatment. Communication between doctors and patients remains an issue in settings where knowledge is relatively low. Lack of appropriate communication with patients is often related to low staff motivation, low salaries, lack of time and insufficient skills in communicating in a patient-friendly manner. Interpersonal communication and counselling training for health personnel piloted by Project HOPE and the KNCV Tuberculosis Foundation aims to address these shortcomings.

Client assessment techniques are a foreign concept and have not yet been implemented in Tajikistan. Client assessment consists of assessing patients' feedback on the quality of medical information, treatment and services received during their stay in a TB facility. Simple questionnaires can be completed by patients before they leave hospital. Answers to the questionnaire should be reviewed on a regular basis and discussed among staff with the aim of improving patients' experiences during treatment.

3.4.2 Patient adherence and psychological support

The NTP and Ministry of Health issued a decree in 2009 promoting outpatient drug-resistant TB care, but patients with drug-sensitive TB are still hospitalized for prolonged periods. Various approaches have been piloted by the NTP and partners to ensure patient adherence to lengthy and difficult second-line drug treatment. Sustainability remains a challenge for all approaches, as they are fully donor-dependent.

Psychosocial support for outpatients is provided by some NGOs in a few pilot districts, but inpatients do not have access to these services. A decree on psychosocial support was signed by the NTP Manager on 15 July 2013: a team of psychologists will be selected for training by the KNCV Tuberculosis Foundation and their services ultimately will be piloted for outpatients in Dangara and Temurmalik districts.

Project HOPE (under the USAID Quality project) has piloted treatment support groups (TSGs) for outpatients in seven districts since the beginning of 2012. TSGs are organized once a month and act as a forum for exchange in which patients and their families can share concerns and ask questions. They have shown positive results, particularly in terms of improved treatment adherence. One of the pilot sites showed treatment success rates among new TB cases rising from 70% in 2011 to 82% in 2012, with defaulters decreasing from 5% to 3%. As a result, the Ministry of Health signed a decree on TSGs on 15 June 2013, providing a legal basis for roll-out at national level.

The review did not identify patient groups in which former TB patients are active. An HIV patient group exists, but no TB patient is included. Many NGOs nevertheless involve former TB or HIV patients in their outreach activities: indeed, one NGO in Kulyab is staffed solely by HIV patients. TSGs, cultural activities and events involving patients are usually organized by NGOs.

Small grants were made available with GFATM support to seven NGOs for provision of TB-related care. Volunteers working under the guidance of TB and PHC service providers (TB centres, PHC facilities or healthy lifestyle centres, depending on the district) were involved in TB case-finding (population education on TB-related issues) and follow-up treatment. National legislation forbids volunteers from being involved in giving treatment, but they are able to conduct supportive visits to patients.

The NTP, with GFATM support, launched a small pilot aiming to involve more volunteers in provision of directly observed therapy. Drugs were stored in a box at the patient's home, with the volunteer retaining the key. Volunteers visited patients daily and observed them taking their medicines. Similar pilots have been supported by NGOs such as Sino, the World Food Programme (WFP) and Caritas Luxembourg.

Patient adherence and psychological support: recommendations

- A patient-centred approach to TB care should be gradually adopted in Tajikistan. Patients must systematically be consulted, involved and empowered to participate in decisions on their treatment to improve adherence.
- A decree on rolling-out interpersonal communication and counselling training for health staff at national level should be issued to address communication gaps between health care workers and patients. Curriculums and experiences from pilot projects are available. Directors of TB facilities should also follow specific training on the concept of patient-centred approaches.
- Client assessment techniques and patient questionnaires should be developed and introduced in inpatient facilities.
- Psychosocial support is a crucial component of TB/MDR–TB treatment to ensure completion of complicated treatment regimens and enable psychosocial rehabilitation after treatment. Psychologists and social workers need to be trained and made available in inpatient facilities.
- Few activities are available to patients in TB hospitals. Social and vocational activities should be organized in TB dispensaries and hospitals to avoid depression and treatment failure.
- The TSG decree should be implemented in full at national level and the creation of TSGs in all districts supported.
- Patients should be empowered to be equal partners in TB responses through supporting the creation of patient associations and ensuring the sustainability of patient engagement by including reference to patients in formal regulations, such as decrees.
- Food support is an important incentive that greatly contributes to treatment adherence. An urgent alternative to the sudden interruption of international support to food packages needs to be found.

3.4.3 Social support

Social support (food packages consisting of flour, peas, salt and oil) between 2003 and 2013 was provided by the WFP under the GFATM round 8 grant to all TB and MDR–TB patients three times during treatment. The WFP also had some internal funds for social support that were used

to support two family members of the patient (11 000 beneficiaries in 2012). Unfortunately, the project will come to an end in December 2013 as funding will be stopped by the GFATM. The WFP is willing to continue providing food packages (limited to oil and flour) to all TB patients three times during treatment, but funding is uncertain.

The GFATM will continue to provide food for MDR–TB patients during hospital stays and prisoners with TB/MDR–TB in the south of the country. Prisoners with TB/MDR–TB in the north receive additional food from Caritas Luxembourg. The Ministry of Health budget for food in TB hospitals will be increased by 10% from 2014 and TB hospitals in Machiton, Digmoy, Zargar and Kulyab have subsidiary farms in which they produce vegetables, fruit, meat, eggs, milk and kumiss (fermented mare milk).

The patients' charter for TB care has been translated into Russian and Tajik and was disseminated throughout the country in 2012. Posters of the charter (in Tajik) emphasizing that TB treatment is free of charge were displayed on the walls of most of the facilities visited. It is not clear whether doctors and nurses use these materials to communicate and inform patients about their treatments and rights.

3.5 Special populations

3.5.1 TB in children

The NTP TB treatment and management guide and associated materials include the diagnosis and management of TB in children, which reflect WHO recommendations concerning dosages and composition of treatment regimens. Importantly, revaccination has been discontinued. The national policy on TB in children and guidelines on prevention and treatment approved in 2011 clearly accord with WHO guidelines *(18)* and the international roadmap for childhood TB *(20)*; they are currently under revision to include treatment of childhood MDR–TB. Treatment outcomes for children with TB are shown in Table 24.

Table 24. Treatment outcomes for children with TB

Cases	Number	%
Total number of cases registered	568	100.0
Cured and treatment completed (success rate)	525	92.4
Died	7	1.2
Failed	12	2.2
Defaulted	17	3.0
Transferred out	7	1.2
Not evaluated	0	0.0

In 2012, 360 paediatric TB cases (aged 0–14 years) were notified (5.5% of the adult caseload). This figure is less than that expected for overall population size (which would be around 10–15%) and suggests that TB case-finding among children needs improvement. There were 136 TB cases among 0–4-year-olds in 2011 (24% of all paediatric cases) and 433 in the 5–14 group (76%). This age distribution does not correspond to the estimation that two thirds of paediatric cases will be in the 0–4 group and one third in 5–14-year-olds, suggesting a relative underdiagnosis and/or underreporting of TB in the vulnerable and difficult-to-diagnose 0–4 group.

Intersectoral collaboration involving TB specialist services, PHC, paediatrics and maternity and vaccination-related services exists and features in policy and programme documents, but paediatric health workers' collaboration with TB services (and vice versa) is neither systematic nor comprehensive (patient files, for instance, are not systematically shared or exchanged). The same applies to collaboration between TB specialist services and antenatal care.

Policy and guidance exists at national level for prophylactic treatment of children who have been in contact with smear-positive TB cases (see also section 3.1.1). It is of concern, however, that the practice of sending children (contacts and paediatric TB cases in the continuation phase of their treatment) to sanatoria continues; this should be discontinued on social and infection control grounds. Intensive follow up of children in contact with people with MDR–TB is not yet fully implemented.

TB in children: recommendations
• The practice of admitting children with TB to sanatoria should be discontinued by the end of 2014.
• Children who are TB contacts should be prioritized as a high-risk group for active case-finding activities.
• A robust and systematic follow-up approach (quarterly symptomatic assessment) should be introduced for children who are contacts of MDR–TB cases.
• Knowledge and capacity in relation to TB diagnosis and treatment in children should be further developed, particularly among PHC workers (including nurses) and community workers, to enable currently underdiagnosed children to receive quick and accurate diagnosis and commence treatment without delay.
• Maternal and child care and the NTP should develop a plan to improve collaboration and achieve full integration of services, fully covering TB prevention, treatment and care in children and clearly detailing terms of reference of all involved players in TB and paediatric services, including data- and file-processing activities.

3.5.2 TB in prison

Tajikistan has 19 prison institutions, including five pre-trial detention facilities (also known as SIZOs), three open prisons and 11 detention centres for medium- to long-term prisoners, with approximately 9 000 inmates and a yearly turnover of 17 200. Approximately 70% (14) are situated in the south. Prison medical services in the south and north (Sugd) oblast are independent of each other and report to the medical unit of the Department of the Prison System under the Ministry of Justice.

The central prison hospital has 350 beds, including an isolation unit for TB and drug-resistant TB (maximum 100 beds, 40 of which are for MDR–TB) (Table 25). The hospital is located 11 km from Dushanbe and serves 13 prisons, including three SIZOs, two detention centres, one prison for young offenders and one for women. A new TB department was completed in 2013 with GFATM support but is not yet operational. The original plan was for 100 beds, but this was reduced to 45 to comply with regulations on space per person. The current facility for TB patients will be used for palliative TB care for those failing or refusing treatment (only one inmate refused MDR–TB treatment in 2012).

Table 25. Facilities with TB units in the prison system, 2013

Facilities	Total	TB	M/XDR–TB
Hospitals with TB departments			
Central prison hospital under Correctional Colony #3/13 (Vahdat)[a]	350	100	40
Branch of central prison hospital, Correctional Colony #3/5 (Khujant)	100	40	15
Total	***450***	***140***	***55***
TB outpatient departments			
TB isolator under Correctional Colony #3/4(Dushanbe)		50	
TB isolator under Correctional Colony #3/8 (Nurek)		25	
TB isolator under Correctional Colony #3/3 (Khujant)		25	12
TB isolator under Correctional Colony #3/2 (Dushanbe)		30	
TB isolator under Correctional Colony #3/6 (Yovon)		25	
TB isolator under Correctional Colony #3/7 (Dushanbe)		24	
SIZO N1 (Dushanbe)		10	
Total		***189***	***12***

[a] The building has been finalized for TB patients with a capacity of 100 (45) beds.

The central hospital's branch in Khujant, Sugd oblast has 100 beds, 40 of which are for TB patients (15 of them for MDR–TB). Of the remaining four facilities, two have TB isolator units: these have been refurbished with support from Caritas Luxembourg, which has been implementing a TB project in the prison service since 2006.

The prison service has two smear microscopy laboratories, with most of the facilities being served by civic laboratories. Those in the south access the NRL, which performs cultures, DST and rapid diagnostics (Xpert MTB/RIF assay and Hain test); those in the north access the oblast culture laboratory in Sugd (culture and rapid diagnostics (Xpert MTB/RIF assay)). The NRL provides DST for the north.

X-ray equipment is available in colonies 3/5 and 3/4. The remainder are covered by mobile X-ray equipment procured with GFATM support or that of civic services (Kulyab, Khorok).

Food provision in the TB/MDR–TB department in the prison service is somewhat better than that found in civic services (approximately US$ 4–5 per day per patient). Inmates with TB in the south receive food support from the GFATM and from Caritas Luxembourg in the north.

Strengths of provision in the prison service include the following.

- Ministry of Health policies and guidelines apply to the prison service, with a legal framework specifically outlining TB control.
- TB-related activities in the Ministry of Justice are integrated within the NTP activity plan, including laboratory services, clinical consultation, drug procurement, recording and reporting, monitoring and supervision, and training.
- The yearly budget for provision of TB-related care is allocated by the ministries of justice and finance. Support is provided by international partners such as Caritas Luxembourg (from 2005), the GFATM (from 2006) and WHO.
- The structure of TB-related services in the prison service is clearly outlined. The TB coordinator is sited in the medical unit of the Department of the Prison Service and staff functions and responsibilities are defined in the guideline for TB control in the service.

- Access to TB and drug-resistant TB diagnosis and rapid diagnosis and treatment is universal. Bacteriological confirmation among new PTB cases was 65.7% (83 out of 127) in 2012, which is considered good for the prison service, with regular active case-finding. Biological material is sent for culture following DST (Table 26) to confirm EPTB cases, but outcomes in 2012 were disappointing as none of the cases were bacteriologically confirmed. Inmates belong to the priority group for rapid diagnostic tests and the Xpert MTB/RIF assay or Hain test is always done: choice of method depends on the availability of consumables and doctors' preferences.
- Treatment success among new sputum-smear-positive patients in 2011 was 59.1% (39 of 66) and 67.9% (38 of 56) among re-treatment cases. Treatment failure, death (both due mainly to MDR–TB) and default were 12.1%, 13.6% and 15.2% respectively for new sputum-smear-positive patients and 12.5%, 8.9% and 10.7% for re-treatment cases.
- Treatment success among MDR–TB patients starting treatment in 2012 (the first year of management of such cases) was 52.5% (11 of 21). This is a rather good achievement, considering that the cohort included patients who had been waiting for drugs for several years. Preliminary treatment success among patients who started treatment in 2011 was 77.7% (eight successfully treated and six still on treatment out of 18 patients).
- Follow up of TB or MDR–TB treatment after release is supported by Caritas Luxembourg. Only one patient defaulted out of 18 released prisoners in 2012, four of whom were on MDR–TB treatment.
- Voluntary counselling and testing is offered to all inmates at entry and also when TB is diagnosed. IPT is provided for nine months when HIV infection is diagnosed.
- Implementation of TB infection control measures is reasonably advanced. An infection control plan is in place, personnel have been trained, patients are isolated according to their category, ventilation is provided via open windows and respirators are available (and used) when appropriate.
- Staff in the central prison hospital demonstrate a good understanding of TB and drug-resistant TB-related issues.
- Recording and reporting is of good quality, and information, education and communication activities have been implemented with partner support (GFATM before 2013 and Caritas Luxembourg after).

Table 26. Notified TB cases in the prison system, 2012

	Pulmonary cases								EPTB	Total
	New cases		Re-treatment cases							
			Relapse	Default		Fail	Other			
Notified	SS+[a]	SS-[b]	SS+	SS+	SS-	SS+	SS+	SS-		
Out of them:	61	66	20	5	2	1	12	19	20	206
sent for culture	61	66	20	5	2	1	12	19	18	204
culture positive	43	10	7	4	0	0	10	0	0	74
culture negative	8	44	9	1	0	0	2	10	10	84
culture contamination	10	12	4	0	2	1	0	9	8	46
DST done	43	10	7	4	0	0	10	0	0	74
MDR–TB confirmed	9	0	7	4	0	1	10	0	0	31

[a] SS+ = sputum-smear positive.
[b] SS– = sputum-smear negative.

The system also faces challenges, including the following.

- Funding of TB-related activities is donor-dependent, with the Ministry of Justice having a limited budget.
- The system has a significant human resource deficit of medical and non-medical staff, with only 35 health care worker posts in the central prison hospital (18 for doctors and 17 for nurses, only half of which are filled). One TB doctor oversees the 100-bedded TB department (the same situation will persist when the new department comes on stream).
- Knowledge of drug-resistant TB issues in the Sugd oblast facilities is low. The impact of culture, DST and rapid test results on case management is unclear and recording and reporting needs to be strengthened.
- Recommendations on provision of TB-related care in the prison system seldom reach key decision-makers in the system.

TB among prisoners: recommendations
• Consideration should be given to forwarding this review's findings and recommendations for further actions to the Ministry of Justice via the CCM platform.
• Technical assistance and in-service training on diagnosis and treatment of drug-resistant TB should be provided to the TB team in the Sugd prison TB department.
• Recording and reporting in the Sugd prison TB department should be improved.

3.5.3 TB among migrants

Detailed information on TB among migrants is limited, but a 2009 International Organization for Migration (IOM) survey (unpublished) estimated that 700 000–900 000 people leave Tajikistan in search of work each year. Most (74.5%) are male, aged 18–39 years and commonly come from rural areas (76%). The Russian Federation is the usual destination of seasonal workers, who leave in spring and return in autumn.

Working and living conditions are usually hard. Workers share a single room with up to 30 peers or live at the working place. The hard living and working conditions, overcrowding and stress associated with immigration are probable triggers for reactivation of previous TB infection and heightened susceptibility to risk factors. Access to medical (including TB) services is limited, as migrant workers are unlikely to hold health insurance that is valid in the host country and have to pay for services. Access is even worse for undocumented migrants due to fear of legal consequences. Diagnosis and treatment of TB is therefore a challenge, meaning some will revert to self- or incomplete treatment or may default.

3.5.3.1 Regional cooperation

Regional cooperation among governments of central Asian countries and the Russian Federation was established in 2011. The aim is to coordinate action through existing and proposed regional bodies and committees to address underlying issues of how to improve differing legal statutes, non-standard migrant procedures and special efforts to deal with human rights and medical coordination issues.

A working group on medical, social and legal issues of labour migrants, refugees and their families coming to the Russian Federation from Commonwealth of Independent States countries was established on 15 April 2010 within the framework of an IOM project on labour migration

in central Asia and the Russian Federation, the regional mechanism for coordination of health issues for migrants under the umbrella of the Eurasian Economic Commonwealth. The organizations dealing with migration in the countries are:

- Belarus: Ministry of Health, Ministry of Labour and Social Protection, Ministry of Internal Affairs, Ministry of Foreign Affairs;
- Kazakhstan: Ministry of Health, Ministry of Labour and Social Protection, Ministry of Internal Affairs, Ministry of Foreign Affairs;
- Kyrgyzstan: Ministry of Health, Ministry of Labour and Social Protection, Ministry of Internal Affairs, Ministry of Foreign Affairs;
- Russian Federation: Ministry of Health, Ministry of Labour and Social Protection, Ministry of Internal Affairs, Federal Migration Service; and
- Tajikistan: Ministry of Health, Ministry of Labour and Social Protection, Ministry of Internal Affairs, Ministry of Foreign Affairs, the Migration Service.

The Ministry of Health signed an agreement on acknowledgement of the certificate of health screening of migrant workers with these countries on 15 October 2010. The minimum package includes TB, HIV, hepatitis B, syphilis, psychological diseases and drug addiction. It is expected that the agreement will be ratified by the respective governments in 2013. Currently, most of the oblasts/republics in the Russian Federation acknowledge the health certificate, which is valid for six months. The agreement states that if any of the listed diseases are diagnosed, the patient will be managed according to host-country law. In the Russian Federation, this means migrant workers diagnosed with TB are deported to the country of origin within 15 days of diagnosis.

The Ministry of Health established 10 clinical expert commissions for predeparture medical health assessments after the agreement was signed. The commissions carry out health screening, including for TB, and issues the certificates (Decree No. 619, 3 November 2011; Decree No. 66, 3 November 2011). People who are suspected of having any of the diseases in the package are referred to a relevant facility for further investigation: only two people were referred for further investigation in 2012. The proportion of people appearing at the commissions is very small compared to the total number of migrants (Table 27).

Table 27. Number of people who received health certificates at clinical expert commissions, 2012

Area	Immigration	Emigration
Sugd oblast	1 612	966
Khatlon oblast	2 313	400
Rasht district	700	100
Nurobod district	80	20
Tajikobad district	127	50
Tavildara district	59	0
Jirgita district	30	0
Ragun district	50	0
Dushanbe	357	738
Total	**5 328**	**2 274**

Source: based on data from the Centre for Migrants' Health.

TB cases among Tajik labour migrants are recorded at central level by the NTP (variable in the OpenMRS[4] and also in a separate spreadsheet). The proportion of migrants with TB among all TB cases in 2009 was 17.9%; in 2012, it was 13.3% (922 out of 6929 cases notified).The approximate number of migrants screened for TB countrywide in 2010 was 34 000; the equivalent for 2012 was not available.

Observation suggested that clinicians use different definitions of migrant workers. They consider a person to be a migrant worker if he or she has been working abroad during the last six months (in reality, anything between six months and three years is reported by clinicians). Tajik migrant workers diagnosed with TB in host countries are commonly deported back to Tajikistan. In the case of the Russian Federation, such people cannot reapply to work there within five years, even if successfully treated.

The minimum package of health screening has been established to prevent the spread of possible infection(s), including TB and HIV. Migrants have to present the health certificate to authorities in the host country to obtain residence and a work permit. If the host country does not recognize the health certificate of the country of origin, workers have to pay a significant fee (up to US$ 120 in the Russian Federation); they rarely have such funds and are therefore forced to stay and work illegally.

3.5.3.2. Migrant workers coming to Tajikistan

Relatively few migrant workers come to Tajikistan and the current migrant worker population poses no major problems. Regulation of health screening of migrant workers coming to Tajikistan is the same as for those going out: the same health certificate is requested for residence and work permit.

3.5.3.3 The IOM

The IOM has established 45 so-called friendly cabinets in Tajikistan to provide advice and support to migrants and their families. The cabinets are supported by the IOM and various partners, including the GFATM. They provide specialist services for skin diseases and gynaecology and refer people to TB services when TB is suspected. TB screening is not, however, provided free of charge. People suspected of having HIV infection are referred to the HIV/AIDS centre, where they are entitled to free-of-charge voluntary counselling and testing if they present a coupon issued by the friendly cabinet.

A network of NGOs and civil societies works with migrants on HIV/AIDS-related care. Two NGOs, Ahtari baht and Anis, were involved in TB-related activities (raising awareness and supporting case-finding and directly observed therapy) using small grants provided by USAID though the IOM Dialogue project in 2012. They will continue their work in 2013 with new targets to cover 10 000 migrants. The NGOs involve outreach workers (receiving a fee of US$ 50 per month) and volunteers (with quarterly incentives).

3.5.3.4 The burden of TB among migrants

The TB rate per 100 000 population was calculated among migrants, the overall population and overall males in respective age groups.

In 2012, 922 TB cases (new and re-treatment) were diagnosed among migrants (undocumented and workers). Gender and age distribution among migrants and the total number are not known:

[4] Electronic medical record system.

the low estimate is 700 000 and high 1.5 million. The estimated notification rate among migrants was similar to, or lower than, the overall population or overall males (Table 28), which could be a sign of underdiagnosis among this population. There is a need for improved data collection on the number of migrants and TB cases to determine the burden of TB among this target group.

Table 28. Notification rate per 100 000 among migrants: overall population and overall males, 2012

Age groups	Total population	Males, general population[a]	Migrants (low)	Migrants (high)
15–64[b]	117.9	135.8	–	–
25–54[c]	114.0	134.1	–	–
All migrants	–	–	131.7[d]	61.5[e]

[a] The migrants are predominantly male.
[b] United Nations population estimates for 2011 were used for working age.
[c] The 24–54 age group was calculated separately. United Nations population estimates for 2011 were used.
[d] Estimated migrant population: 700 000.
[e] Estimated migrant population: 1.5 million.

Strengths of country programmes related to migrants include:

- regional cooperation among governments of central Asian countries and the Russian Federation;
- the legal framework developed in Tajikistan for pre- and post-immigration screening and migrant workers;
- operational procedures for referral of migrant workers and their family members to, for instance, TB and HIV services: clinical expert committees established for predeparture medical health assessment and friendly cabinets on return home;
- TB services defining "migrant worker" as a variable and recording and reporting accordingly (922 in 2012); and
- the NGO and volunteer network supporting PHC and TB services in case-finding among this group.

Country programme challenges include:

- lack of formalization of the agreement signed between the Ministry of Health and countries to acknowledge the certificate of health screening of legal migrant workers;
- incomplete data on migrant workers, including those with TB;
- the need to strengthen TB case-finding among migrant workers and their family members;
- inconsistent definitions of "migrant worker" followed by TB services for recording purposes;
- provision and continuation of treatment (at least in the intensive phase) for Tajik migrant workers diagnosed with TB abroad; and
- infection risks posed by deportation of people with TB back to the country of origin.

TB among migrants: recommendations

- Advocacy among the countries of the Eurasian Economic Commonwealth to formalize the agreement on the minimum package for cross-border health care, including TB control and care, should continue.
- Recording and reporting on migrant workers and TB infection among them should be strengthened to support necessary programmatic actions.
- The definition of a migrant worker should be used the same way by clinicians and IOM staff when recording information.

4. Health workforce

Human resources were assessed during the previous national TB programme review in 2009 and in the report of the mission on TB, HIV/AIDS and health system strengthening. The recommendations gave priority to strengthening human resources, creating a strategic plan for resource development that reflects the actual needs of the TB control programme and coordinating the fragmented training activities supported by different donors. Outcomes of the current review show that some recommendations have been implemented but others have not been addressed sufficiently, so offers suggestions on how human resource development for TB control can be strengthened.

4.1 Human resources for TB prevention, control and care

Human resources for TB services at national, oblast and district levels are currently supervised by heads of TB institutions and are well managed as part of the health system. Staff turnover is very high, with staff shortages due to lack of motivational incentives, low wages, lack of social protection and an ageing medical workforce, each of which makes the TB specialty less attractive to young people in health care.

The Presidential Decree on measures to strengthen the level of social protection of the population, increase the salaries of civil servants, employees of budgetary institutions and organizations and enhance pensions and scholarships makes provision for a salary increase for health workers of 20% in 2013 (in accordance with regulations on payment of wages). Salaries for employees in the health sector will be calculated on a base of 190 SM (about US$ 32) rather than the current 157 SM. Government figures show, however, that inflation in the first seven months of 2013 was 5%, so the increase will be unlikely to stop health personnel from leaving the sector in pursuit of better jobs and salaries.

Medical workers in the prison system also face difficult working conditions, although their salaries are higher due to their military status.

Approaches to attracting young doctors to the TB specialty include combining TB and pulmonology departments (and consequently specialties) at the State Medical University, but no comprehensive strategy is in place to achieve this goal. A draft regulation on a 100% of salary infection-risk allowance for medical staff working with TB/MDR–TB was submitted to the Government in 2012 but has not yet been approved due to lack of funds. Local administrations in some rural areas provide different types of incentives, including provision of accommodation and offering double salary (using money saved from vacant posts).

No comprehensive short-, medium- and long-term human resource development planning to ensure an adequate and competent workforce for TB control currently exists. A needs assessment of PHC medical staff is required and should be part of a human resources policy. A designated training focal point has been appointed to the NTP on a part-time basis, but the post focuses mainly on training rather than planning and monitoring human resources.

Clear standard job descriptions for different categories and levels of staff involved in TB control in NTP institutions at different levels (from national to district) are not in place, despite being recommended by the 2009 review. Knowledge of job descriptions and compliance make performance indicators for regular appraisal and internal audit challenging.

TB-related responsibility has been included in job descriptions for PHC workers, but it is not clear whether regular attestation includes knowledge and performance in accordance with job descriptions.

4.2 Staff development and training

The main State Medical University and Institute for Postgraduate Medical Education provide postgraduate training on TB for doctors. The national system of medical education is undergoing reform in line with international standards: as was stated above, the TB and pulmonology departments at the State Medical University and Institute for Postgraduate Medical Education were combined to make the specialty more attractive to young specialists and ensure fair distribution of doctors across urban and rural areas.

TB training starts in year 5 (96 hours over a two-week block) and the TB module is obligatory during internship for all doctors. A one-year internship on TB and pulmonology features in year 6, when students are dispersed to districts/cities to gain experience but without contact with TB pulmonology departments. Clinical specialization follows a two-year course that aims to train high-level TB specialists and managers.

Postgraduate education includes four months' primary specialization (579 hours) and a one-month postgraduate course (attestation course) that all TB doctors have to undergo every five years. These courses are provided in the departments of both institutions and cost US$ 500 and US$ 100 respectively.

Training curricula include modern principles of TB diagnosis, treatment and care, TB programmatic issues, WHO recommendations, national practical guides and Ministry of Health orders and regulations. Training materials and modules were updated in 2009 but need to be revised regularly to ensure they reflect developments. Curricula for training nurses and laboratory technicians on TB control need to be updated.

The Ministry of Health adopts a national training plan annually, mainly consisting of short courses on TB for PHC specialists that are supported by international agencies to ensure coordination and avoid duplication. All training is coordinated by the human resource focal point at the NTP, which provides training for PHC doctors and nurses on TB control through three-day modules. Many training modules on aspects of TB control, including management of TB/HIV coinfection, laboratory management and TB infection control, have been developed with technical assistance from international agencies.

These courses do not have official postgraduate training status and do not count as education hours for TB doctors' attestation and professional qualification categories. No formal system exists within education institutes for regularly monitoring training effectiveness and outcomes or to enable the NTP to collect feedback on training quality.

Limited management skills in general, and human resources management in particular, were noted by the review. TB and PHC staff demonstrated good knowledge of TB treatment and care but insufficient understanding of Ministry of Health orders and sanitary control recommendations. The main national information materials and guides on TB control were available in only some of the facilities visited.

Health workforce: recommendations

The NCTPTS should:

- widen the responsibility of the training focal point in the NTP by establishing an institutional mechanism for planning and monitoring human resources;
- develop checklists and organize regular feedback on training quality from the NTP to the medical education system to ensure that training corresponds with NTP needs;
- revise the TB textbook to reflect the national TB guideline and latest WHO and international recommendations; and
- develop mechanisms for regular follow up on training outcomes and effectiveness.

The NCTPTS and Ministry of Health should:

- assess the potential human resource gap for TB control after 2014 (due to the impact of medical specialist education reform and ageing of current TB staff);
- develop an action plan for human resource development (with short-, medium- and long-term interventions) to ensure human resources for TB control; this should include promoting careers in TB medicine among interns and developing social protection packages and incentives for TB doctors;
- support the action plan with a budget, a clear timeframe and responsible institutions, and monitor on a regular basis;
- assess the impact of current performance-based payment mechanisms, in collaboration with partners (including WHO);
- revise and update the curriculum for physicians (at under- and postgraduate education institutions) and nurses to bring them into line with the national TB guideline and latest WHO and international recommendations;
- develop job descriptions for TB managers at all levels of TB control services;
- integrate partner-supported training courses on TB control in the national system of postgraduate medical education; and
- revise/update TB-related curricula at all levels of medical education to ensure the latest developments and international recommendations are reflected.

5. Information

5.1 Surveillance

5.1.1 Structure of surveillance

The national guideline on monitoring and evaluation of tuberculosis control interventions *(21)*, which includes the organization and management of the NTP, training plans and forms and information flows for surveillance and monitoring and evaluation, is the core document. It describes how TB surveillance in Tajikistan is implemented through a vertical system of TB specialist structures consisting of three reporting levels: district, intermediate-aggregation and central.

There are 66 service-delivery sites, with TB coordinators from districts submitting quarterly reports to four intermediate-aggregation levels at oblast TB control centres: Kulyab, Kurgan-Tube, Sugd and GBAO. Service-delivery sites in DRSub (14 TB centres) and the Dushanbe City TB Centre report immediately to the central-level RCTC. The four intermediate-aggregation level facilities receive reports from districts, aggregate quarterly reports and forward them to the RCTC. Data from 19 prison facilities are aggregated by the prison system's medical department and forwarded to RCTC, which aggregates data from all reporting units and submits quarterly reports to the Ministry of Health and the State Sanitary and Epidemiological Service. RCTC shares TB/HIV-related data with the National Centre for AIDS Prevention. Annual reports are submitted to the National Centre of Medical Statistics.

The review found that while all expected reports from each service-delivery site had been received and data had been aggregated at national level, only Kulyab district and the prison system aggregated reports before submitting to central level. Other intermediate levels had only managed to collect and forward reporting forms due to lack of human resources and capacity.

In parallel to the NTP recording and reporting system, TB cases are reported via separate paper-based reporting forms to the State Sanitary and Epidemiological Service, which receives data from district level on the notification of all infectious TB patients and the number of TB contacts.

Reporting of TB deaths from the vital registration system is an essential component of TB surveillance, but information on TB mortality was not submitted through the system between 2005 and 2011. Only 405 TB deaths based on vital registration system data were reported to the global TB database in 2012. This is even lower than those based on cohort analysis from all TB cohorts and indicates that vital registration system information remains unreliable and needs to be improved. This, however, is out of the NTP's scope.

5.1.2 Standard case definitions

The review found that standard case definitions were in line with WHO guidelines. The national guideline for TB control clearly defines case definitions, differentiating between laboratory-confirmed and clinical cases, new and previously treated cases (including relapses, failures, returnees after default and other), and pulmonary and extrapulmonary cases.

As was indicated in section 3.5.3, some confusion on defining migrant workers was found. The surveillance system routinely captured data related to TB notification among migrant workers, considering them as a vulnerable group, but there was no clear definition of migrant workers and different sites categorized patients' migration status differently.

5.1.3 Recording and reporting, data management

As was indicated above, the TB surveillance system in Tajikistan is paper-based. All service-delivery sites systematically use standardized TB data-collection forms and tools and all TB cases from all parts of the country, including the prison system, are included. Individual data are captured for each TB case in the treatment card (form TB–01), which serves as a source of information for the TB district register (TB–03) (see Box 2 for a selection of standard forms used for recording and reporting TB). The latter is used to prepare the aggregated quarterly report of notifications, treatment outcomes and smear conversions after the intensive phase of treatment.

Box 2. Selection of standard forms used for recording and reporting TB

Recording forms (in chronological order of completion)

TB–15: register of patients with lung pathologies

TB–05 and TB–05Y[a]: sputum microscopy request form

Register of sputum collection

TB–04: microscopy laboratory register

TB–03 and TB–03Y: TB treatment registers for TB cases

TB–01 and TB–01Y: individual treatment card for TB cases

TB–09: referral form of TB patients

TB–06Y: laboratory register of culture and DST results

Reporting forms

TB–07 and TB 07Y: quarterly reporting of notified TB and MDR–TB cases

TB–01A[b]: quarterly report on TB/HIV coinfection

TB–10, TB–10A, TB–10Y: quarterly reporting of sputum conversion after intensive phase

TB–08, TB–08A, TB–08Y: quarterly reporting of treatment outcomes

Additional forms relate to laboratory stock, consumables, ordering, drug management, human resources and bed occupancy.

[a] MDR–TB.

[b] AIDS.

In parallel to district TB–03Y registers, an aggregated paper-based MDR–TB register is maintained at oblast level (intermediate-aggregation level) and a general TB–03Y register for all Tajikistan is maintained at RCTC. Data are entered to this register via phone communications between RCTC and district coordinators.

Most of the forms are used systematically, but it was noted during the review that lack of printed laboratory request forms (TB–05 and TB–05Y) meant that some patient data were sent to the laboratory on paper, without the accompanying necessary information. Because of this, essential patient-related data (such as name, history and purpose of examination) were incomplete or

incorrect in the laboratory register and electronic register, which caused difficulties in establishing reliable laboratory and drug-resistance surveillance.

Only districts involved in MDR–TB treatment programmes provide notification reports through TB–07Y. Districts not involved do not provide such reports even if a MDR–TB patient is detected. Such cases are therefore not accounted for in the national surveillance report. In addition, it was found that rifampicin-resistant/MDR–TB status is not recorded in registers when it is not possible to recruit the patient into the MDR–TB treatment programme because of drug shortages. This leads to an underestimation of notifications and affects estimates of routine surveillance. It was also noted that oblasts and districts do not yet provide MDR–TB treatment outcome reports (TB–08Y); these currently are prepared at central level only.

A few standard forms did not have important recommended variables, which caused some surveillance challenges. Laboratory request forms (TB–05, TB–05Y) and laboratory registers (TB–04, TB–04Y) had no field for recording the patient registration group, so surveillance and crosschecking of notification of TB and MDR–TB cases was impossible. Notification of TB patients (TB–07) by age groups did not follow the latest recommendations: age distribution was provided only for new sputum-smear-positive cases, but these are very rare in childhood TB. This information, which is required by the WHO global database, was taken from State Sanitary and Epidemiological Service (form A31) reports. All such issues will be resolved, however, with the adoption of new WHO recording and reporting recommendations, including the field required for new diagnostic methods (Xpert MTB/RIF assay and LPA) (TB–04 and TB–05).

Printing of forms depends on support from donor agencies: according to the GFATM, about US$ 25 000 is spent annually on printing recording and reporting forms.

5.1.3.1 Electronic recording and reporting

NTP has been operating the OpenMRS electronic register since November 2011 with financing from GFATM (through WHO as subrecipient) and Interactive Research and Development technical support. This provides an open-source, real-time entry register for regular and MDR–TB cases. The MDR–TB module was established in November 2011, followed by training for 17 local data-entry specialists from Dushanbe, Penjikend, Rudaki, Kurgan-Tube, Kulyab, Khujant and the prison system. A module for regular TB cases was launched in November 2012 and patient data for the period 2007–2012 are being entered retrospectively by RCTC. According to the NTP, OpenMRS was established at district level in Penjikent, Dushanbe, Rudaki and the prison system and, at oblast level, in Sugd and Kurgan-Tube zone of Khalton oblast in 2012.

Each patient on the electronic register has a numeric identifier consisting of eight digits for regular TB and seven for MDR–TB cases. The first two digits indicate district (or prison if a detainee), the next two year of registration, and the final three or four digits are for the patient's serial number.

The MDR–TB module contains a large set of variables, including:

- patient information (name, surname, address, sex, date of birth, weight);
- enrolment status (date of enrolment, category of patient by previous history, TB drug used, outcome of treatment);
- treatment status (treatment schemes, change dates, dosage);
- visits and hospitalization status;

- laboratory results over time, including microscopy, culture and first and second-line DST results; and
- HIV status, CD4 count and ART treatment.

The database allows searches for patients by name and identifier to generate WHO-standard reports (notification, conversion and treatment outcome) disaggregated by districts, allow export of data into other spreadsheet programs and generate nonstandard reports through cohort-builder features. It is password-protected and authorization is granted for varying degrees of access to different users.

Only predefined options for most variables (sex, geographic location, case type, previous history, previous use of TB drugs, microscopy, laboratory and DST results), appearing as a drop-down menu, are allowed during data entry to minimize errors. Restrictions to values within plausible ranges feature for fields that are entered manually (date of birth, weight). It is only possible to enter numbers into numeric fields and dates into date fields. The system allows detection of duplicate patients and identifiers. Database back-up is performed automatically daily, after midnight.

District TB registers (TB–03Y) are the main source of information for the electronic register. They are transported twice a month to oblast TB dispensaries for data entry. An illustrated manual for data-entry staff provides step-by-step instructions. As of August 2013, 1352 MDR–TB cases (total number recruited by end of December 2012 was 1212) and 23 333 regular TB cases were entered into the electronic database (versus 45 361 of all TB cases registered between 2007 and 2012).

The review noted the following challenges related to OpenMRS maintenance.

- Many patients in the electronic recording system have records that are either incomplete or have not been updated for a long time, including information relating to treatment outcome, regimen and laboratory results. Fields related to HIV, CD4 counts and ART are not completed at all. Errors related to identifiers and duplicate entries were spotted.
- Generated standard reports (including treatment outcomes) are incorrect because of some design problems. Labelling of standard reports in English and Russian versions do not match (the English one is incorrect).
- Some predefined fields make no sense and need to be removed: one option provided for DST results, for instance, reads “INTERMEDIATE TO TUBERCULOSIS DRUG”.
- The NRL and other laboratories are not engaged in contributing data to the electronic register. Laboratory results from the NRL to treatment sites usually encounter considerable delays, with further time required to enter available results into the database.
- Monitoring of accuracy and promptness of data entry at MDR–TB treatment sites is not carried out regularly. There is no standard operating procedure on accuracy and missing-data checks. Corrections are not recorded.
- Electricity cuts in winter cause problems for data entry.

At the time of the review, OpenMRS use was limited due to errors in generation of quarterly reports, incomplete data and/or delayed data entry. It was not being used to generate reports for supervision or analysis.

5.1.4 Data quality assessment

TB reporting in Tajikistan is a legal requirement and is strongly and systematically enforced. TB treatment is available only at public health facilities and over-the-counter sale of TB drugs is prohibited. These are important factors in ensuring that all diagnosed TB cases are reported to the national system.

Rapid assessment of data quality by cross-linking TB registers, however, identified common patterns of shortcomings in the surveillance system that led to undernotification of TB cases, consequently affecting data quality. Detected TB cases were not recorded and notified if the patients died following diagnosis or were diagnosed as rifampicin-resistant/MDR–TB by Xpert MTB/RIF assay before the start of regular TB treatment. Another group of patients diagnosed at oblast-level laboratories were not found in their local district (rayon) TB registers, indicating that they were missed by the TB control system. It was estimated that the proportion of detected TB cases not notified to the national reporting system was above 10%.

TB treatment outcomes in new sputum-smear-positive and MDR–TB cases were generally accurate and correctly classified. The overall difference between reported and re-counted and verified treatment success rates in a sample of facilities visited was only 3%. The overall validity of treatment-outcome reporting, however, was affected by shortfalls in notifications. If all detected TB cases who died or were diagnosed with MDR–TB were included in the TB treatment cohort analysis, much lower treatment outcomes would be expected.

A minimum set of variables (age, sex, laboratory confirmation, site of disease and previous treatment history) was reported for all notified TB cases. Subtotals of the number of notified TB cases by age group, sex and case type matched the total number of reported TB cases in quarterly reports submitted from districts, indicating internal consistency and data completeness.

Accuracy of notification of MDR–TB cases is the most challenging area in surveillance in Tajikistan. The NTP annual report, which is based on quarterly MDR–TB notification reports (TB–07Y), is not complete, as only regions covered by MDR–TB programmes submit quarterly reports. Information provided by the NRL seems inaccurate, as existing documentation and data management are weak. The NTP reported 694 MDR–TB and 260 rifampicin-resistant cases detected in 2012 to the WHO global TB database, but total notified cases according to quarterly notification reports was 734 confirmed MDR–TB cases and 773 according to NRL surveillance reports.

Year-on-year change in TB notifications disaggregated by administrative level, laboratory confirmation and history of previous treatment indicates considerable variability above the expected value, which is unusual for TB epidemiology. This suggests gaps in TB diagnosis, reporting and access to health services in general.

Despite monitoring and evaluation guidelines clearly outlining the procedure and tools to implement routine monitoring of data quality, there was no evidence that data quality assessment is carried out and checklists for data quality controls are used during monitoring visits.

5.1.5 Human resources and training in surveillance

A focal-point person responsible for the maintenance of registers and preparation of reports and statistics is appointed in each district. Treatment registers and quarterly reports are completed by TB doctors and laboratory registers by laboratory staff. In most cases, staff involved in

surveillance are trained on taking up their position, with refresher training organized every second year with support from international organizations.

At oblast level (except at DRSub), people are appointed to aggregate the reports and forward cumulative data to RCTC. Cohort-analysis meetings in each oblast every six months serve as an effective means of promoting ongoing capacity-building for oblast surveillance staff. Working groups of meeting participants from RCTC, international organizations, donors, local stakeholders and surveillance staff capture data from the primary source documents and prepare quarterly reports in a transparent and participatory manner. This approach was the key factor in the observed high level of accuracy of surveillance data in Tajikistan, especially for treatment outcomes.

The NTP is planning to introduce new recording and reporting forms from January 2014. As a first step in transitioning to the new system, core monitoring and evaluation and surveillance staff at national level were trained on new recording and reporting forms and definitions in June 2013, with support from the KNCV Tuberculosis Foundation. Plans are in place to scale-up the training to peripheral-level surveillance staff. Participants received Russian-language WHO training materials.

5.1.6 Laboratory surveillance

Sputum-smear microscopy remains the cornerstone of TB diagnosis and surveillance in Tajikistan. All TB suspects are tested by smear microscopy. The proportion of PTB patients with unknown sputum-smear status has been zero in the last four years. Laboratory surveillance is implemented through a network of 92 smear-microscopy laboratories located in polyclinic facilities and dispensaries at district level. The average number of sputum-smear laboratories per 100 000 population is 1.1, indicating that Tajikistan meets the target set for countries by the Global Plan to Stop TB to maintain at least one smear laboratory per 100 000 population *(22)*. Ninety laboratories were covered by an external quality assessment mechanism in 2012, but only 66 (73.3%) had an acceptable performance.

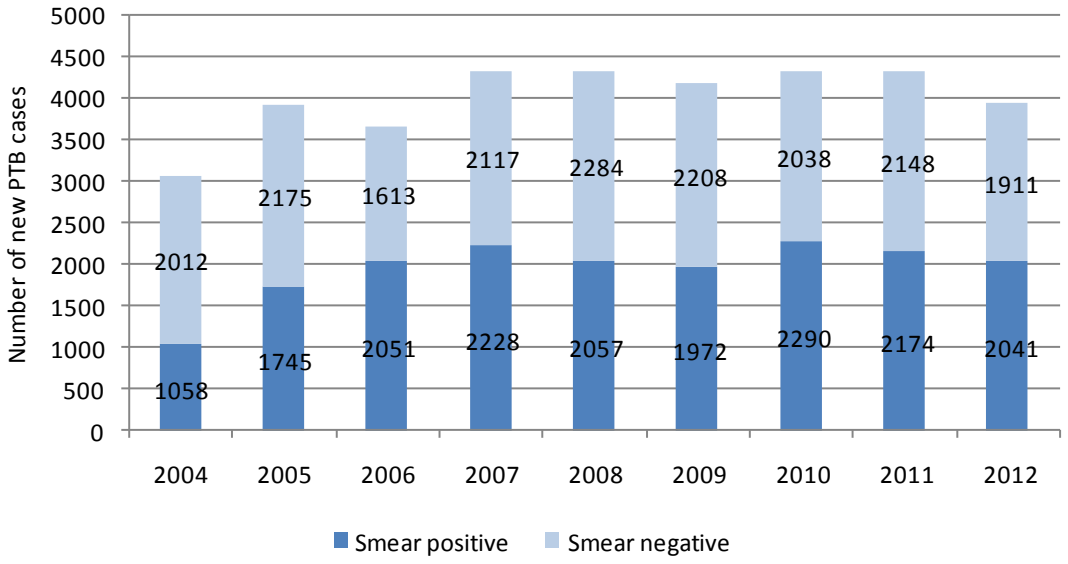
The proportion of smear-positive new PTB cases in Tajikistan gradually increased from 34% in 2004 to 53% in 2010 and has remained stable during the last three years (Fig. 17). Achievement of 52% smear-positive cases among all new PTB cases in 2012 is very close to the 53% target set by the national TB control performance framework and is much higher than the Regional average of 38%.

Culture examination is provided in three laboratories. Only patients from the regions covered by the MDR–TB treatment programme have routine access to culture.

5.1.7 Drug-resistance surveillance

Tajikistan is one of the 27 MDR–TB high-burden countries globally. Routine countrywide surveillance is not yet in place and drug-resistance prevalence estimations still rely on periodic surveys. According to the first drug-resistance survey carried out in 2008/2009 in Dushanbe and Rudaki district, the MDR–TB prevalence among new cases was 17.9% (95% confidence interval (CI); 10.9–23.8) (23 of 139) and 61.6% (95% CI; 52.5–70.1) (77 of 125) among previously treated patients *(23)*.The second nationwide survey conducted in 2010 with a sample of 919

Fig. 17. Trend in microscopy confirmation among new PTB cases, 2004–2012



Source: NTP, unpublished data, 2012.

patients found MDR–TB in 12.5% of new cases and 53.6% of previously treated. Despite a notable difference between the two study estimates, it is not possible to draw a conclusion on trends in drug resistance, given that the CIs of the studies overlap.

Conventional DST is available only at the NRL. Six Gene Xpert MTB/RIF assay machines serve the TB population in 15 selected districts and the prison sector, which are covered by the MDR–TB treatment programme. The current case-detection algorithm suggests that the Xpert MTB/RIF assay is performed routinely for all new and previously treated cases in the MDR–TB programme targeted areas. Sputum samples of rifampicin-resistant cases identified by Xpert MTB/RIF assay are then taken (or culture isolate is transported) for first-line drug DST at the NRL.

Routine drug-resistance surveillance becomes very complicated with this diagnostic algorithm, as the isolates of rifampicin-susceptible cases are not subjected to conventional drug-resistance testing. The pool of patients with drug-resistance results is therefore not representative of the entire TB population. NRL DST results should not be used to assess drug-resistance trends over time when using the current diagnostic algorithm, unless precise actions are taken to account for all detected new TB cases. The results of routine DST for 2013 extracted from NRL databases are presented in Table 29.

According to the NRL drug-resistance survey database, the strains of 53.7% of new and 31.2% of previously treated patients were fully sensitive to all four first-line drugs tested.[5] The highest rate of monoresistance was observed for streptomycin, which had the overall highest level of resistance for new (41.0%) and previously treated (62.9%) cases. Multidrug resistance was observed in 287 of 1001 (28.7%) new cases (95% CI; 25.9–31.6) and 377 of 765 (49.3%) previously treated cases (95% CI; 45.7-52.9).

[5] Cases not identified as new cases were categorized as previously treated.

Table 29. Drug resistance patterns among TB patients with DST results at NRL, 2012 (n =1766)

Resistance to specific drugs	New		Re-treated		Total	
	N	%	N	%	N	%
Total patients with culture results	1 400		1 104		2 504	
Total patients with DST results	1 001		765		1 766	
Sensitive to all	538	53.7	239	31.2	777	44.0
Total monoresistance	**116**	**11.6**	**80**	**10.5**	**196**	**11.1**
H[a]	28	2.8	20	2.6	48	2.7
R[b]	3	0.3	3	0.4	6	0.3
E[c]	3	0.3	3	0.4	6	0.3
S[d]	82	8.2	54	7.1	136	7.7
Total multidrug resistance (H+R)	**287**	**28.7**	**377**	**49.3**	**664**	**37.6**
H+R	10	1.0	12	1.6	22	1.2
H+R+E	7	0.7	6	0.8	13	0.7
H+R+S	105	10.5	124	16.2	229	13.0
H+R+E+S	165	16.5	235	30.7	400	22.7
Resistance to H and other drugs	**57**	**5.7**	**64**	**8.4**	**121**	**6.9**
H+E	2	0.2	1	0.1	3	0.2
H+S	52	5.3	55	7.2	107	6.1
H+E+S	3	0.3	8	1.0	11	0.6
Resistance to R and other drugs	**1**	**0.1**	**3**	**0.4**	**4**	**0.2**
R+E	0	0.0	0	0.0	0	0.0
R+S	1	0.1	2	0.3	3	0.2
R+E+S	0	0.0	1	0.1	1	0.1
Other combined resistance	**2**	**0.2**	**2**	**0.3**	**4**	**0.2**
E+S	2	0.2	2	0.3	4	0.2
Any resistance						
Any resistance to H	372	37.2	461	60.3	833	47.2
Any resistance to R	291	29.1	383	50.1	674	38.2
Any resistance to E	182	18.2	256	33.5	438	24.8
Any resistance to S	410	41.0	481	62.9	891	50.5

[a] Isoniazid.
[b] Rifampicin.
[c] Ethambutol.
[d] Streptomycin.
Source: NTP *(24).*

Of 1489 TB cases with known DST results and sex, 821 were male and 659 female (317 and 256 MDR–TB cases respectively). The proportion of MDR–TB cases among males and females was identical (38%), suggesting no association between sex and multidrug resistance (odds ratio (OR) = 0.99; 95% CI; 0.79–1.23; *P* = 0.926).

Seven (25%) of 28 children with DST results and 687 (41%) of 1674 patients above 15 years were multidrug resistant. Adults therefore had two times higher odds of harbouring MDR–TB, but MDR and age association was not statistically significant (OR = 2.1; 95% CI; 0.8–5.8; *P* = 0.087) because of the small number of children.

Routine sentinel surveillance of drug resistance is undermined by unreliable classification of cases by history and poor data management at central level. The former is related to the inappropriate use of sputum culture and request forms, which the review found were either not used at all or completed insufficiently to supply the laboratory with necessary information. Doctors requesting DST probably are not aware that information from the laboratory request

forms is used for surveillance purposes. The NRL database spreadsheet is user-friendly but poorly managed: patient identifiers were missing and the same patients were recorded several times. Cleansing of duplicate entries is challenging, as patients are recorded several times in different ways with incomplete surnames, addresses, ages and treatment histories. The lack of a predefined value set for each variable means the same information (such as a test result) can be entered in different ways, sometimes in different languages and with different orthography. The review found that this complicated database analysis. In contrast, the DST database in Kurgan-Tube was completed accurately, consistently and completely.

Drug-resistance surveillance: recommendations

- The NTP should work to build capacity at intermediate-aggregation/oblast levels in Kurgan-Tube, GBAO and Sugd to aggregate surveillance data before forwarding it to central level, as outlined in the national monitoring and evaluation guideline.
- NTP should provide a clear, time-bound definition of “migrant worker” to improve the reliability of surveillance related to notifications among migrant populations.
- NTP should take appropriate action (including cascade training, revision approval and printing and distribution of forms) to move to new case definitions and revise recording and reporting forms. A field for information on previous treatment (new versus previously treated) should be included in request forms and laboratory registers to enable an alternative (laboratory) source of surveillance. NTP should make sure that the breakdown of age group in form TB–07 includes all incident TB cases.
- Printed laboratory request forms should be available to TB doctors referring for sputum examinations. NTP should mobilize and sensitize TB doctors requesting laboratory examinations to record correctly the type of patient and purpose of testing.
- Detected MDR–TB cases in all districts should be recorded in the TB register and be notified, regardless of the availability of treatment, to ensure reliable notification.
- Districts involved in MDR–TB treatment should submit an annual report on outcomes, as outlined in the national monitoring and evaluation guideline.
- NTP should monitor timelines and completeness of data entered into OpenMRS. Standard operating procedures on accuracy crosschecking (including checks for duplicate entries) and detection of missing data should be developed. All errors detected and corrected should be recorded in the logbook and feedback should be provided to field data-entry personnel.
- The OpenMRS database needs some fine-tuning to rectify the cohort analysis, restrict the entry of patient identification to a specific number of digits and values, remove unnecessary options for entry (drug-resistance survey results) and flag missing and wrong values.
- Culture and DST laboratories should contribute to OpenMRS to facilitate in-time reporting of laboratory results. Laboratory focal-point persons for electronic data management should be assigned, enhancing authorization access and training.
- An action plan to gradually scale-up electronic recording and reporting surveillance to countrywide coverage should be developed, with training and sustainability needs reflected.
- A system should be established to secure the flow of information between laboratories and TB centres to ensure that diagnosed TB cases are not lost. Detected TB patients who die before the start of treatment should be recorded in TB registers and be notified to ensure accurate notification for surveillance purposes and contact investigation.
- All districts should submit quarterly reports on MDR–TB notifications.

- A mechanism for collection of reliable data on TB mortality should be established.
- The frame of OpenMRS users should be expanded.
- The NRL database should be upgraded by introducing predefined options in a drop-down menu to avoid the chance of entering the same information in different ways.
- NRL data-entry staff should receive appropriate training.
- A system to avoid double-counting should be introduced.
- A national standard and benchmarks for systematic and regular appraisal of the quality (that is, the completeness, promptness, consistency and validity) of TB programme data at national and subnational level should be developed, including regular data-quality reports.

5.2 Monitoring and evaluation

5.2.1 Monitoring and evaluation of TB control performance

TB control programme progress at national level is summarized in annual progress reports prepared by RCTC, detailing NTP key interventions for the reporting year, the epidemiological situation and trends, results from monitoring field visits, the status of goal, output and input indicators and an evaluation of programme progress against the targets set by the monitoring and evaluation guideline for 2010–2015 (Table 30).

The NTP annual progress report is comprehensive, covering infection control, drug management, training, special populations, ASCM and monitoring and supervision, but is very descriptive, lacking in-depth analysis, outlines of challenges and explanations for nonachievement of specific targets. The analytical part of routine surveillance data is insufficient to highlight gaps and achievements in TB case detection and diagnosis at oblast and national levels. The annual report produces no relevant findings on surveillance for informed decision-making and action-planning and does not include information about financing of TB control.

The performance framework for 2010–2015 was developed jointly by the NTP and local and international stakeholders, including UNDP, Project HOPE, KNCV Tuberculosis Foundation, Caritas Luxembourg and WHO. Most indicators in the framework are drawn from the international monitoring and evaluation guidelines, but not goal-level indicators (such as estimated TB incidence and mortality). For several years, WHO has not recommended the use of estimates to assess programme performance due to the uncertainty they produce. Instead, directly measureable indicators should be used.

Most of the indicators in the performance framework have definitions and technically sound data sources. There are exceptions, however: the mortality rate per 100 000 population, for example, is calculated from cohort analysis reports instead of the vital registration system, and incidence and notification are used interchangeably depending on the source of the notification report. Many important indicators related to infection control, drug management, the surveillance system and childhood TB are not included or are mainstreamed within the framework.

All indicators have at least one annual target, but some are unclear, with unexplained increases and decreases across the years. The most challenging issue for the monitoring and evaluation plan is that it is not linked to a clear budget.

Table 30. Performance of TB control programme

Indicators	Baseline 2008	Target 2012	Achievement 2012	Conclusion
New bacteriologically confirmed TB case detected by DOTS	2 044	3 280	2 041	Not achieved
New TB cases detected in prison system	127	200	148	Not achieved
Treatment success rate of new sputum-smear-positive TB cases	82.7%	85% (2 174/2 558)	79.6% (1 732/2 174)	Not achieved
Treatment success rate of new sputum-smear-positive cases in prison system	50% (30/60)	73% (101/139)	73.3% (102/139)	Achieved
Treatment success rate in MDR–TB patients[a]	NA[b]	50%	62%	Achieved
Number and percentage of microscopy laboratories with external quality assurance	44% (43/97)	95% (87/92)	98% (90/92)	Achieved
Proportion of new smear-positive PTB cases among all new PTB cases	32%	53%[c] (1 804/3 280)	51.6% (2 041/3 952)	Not achieved
Number of TB patients who received food packages	2 500	7 500	12 505	Achieved
Number of TB health workers trained in voluntary counselling and testing	–	20	–	NA
Number and percentage of TB patients tested for HIV out of total registered TB patients	2 545	70% (5 670/8 100)	95.2% (5 221/5 480)	Achieved
Number of TB health care providers trained in MDR–TB management	0	78	110	Achieved
Number of detected laboratory confirmed MDR–TB patients	50	750[d]	770[e]	Not achieved
Number of PHC providers trained in practical approach to lung health	0	65	20	Not achieved
Number of PHC providers trained in DOTS	0	24	135	Achieved

[a] Not in the report.
[b] Not applicable.
[c] There is a discrepancy between the reports and monitoring and evaluation plan (55% versus 53% respectively).
[d] There is a discrepancy between the reports and monitoring and evaluation plan (870 versus 750 respectively).
[e] Recorded as 674 in report submitted to WHO.

5.2.2 Monitoring of treatment outcomes

Definitions of treatment outcomes in Tajikistan are in line with international recommendations. The review identified that if newly detected TB patients were found during the course of treatment to harbour MDR–TB strains, their outcome was classified as "failed" in the TB–03 register and they were recruited into the MDR–TB treatment programme (if available). However, the introduction of the WHO-recommended Xpert MTB/RIF assay rapid diagnostic tools made the DST for rifampicin available before the start of treatment, allowing patients immediately to start second-line treatment without being entered into the district TB register. These patients were not counted in the TB treatment cohort. Additionally, patients detected with rifampicin-resistant TB who did not have access to second-line treatment were not registered.

These approaches led to underreporting of failure cases and overestimation of treatment success among regular TB cohorts. The new WHO recording and reporting guidelines state that all TB patients commencing any TB treatment need first to be entered into the district TB register (to ensure correct notification); if MDR–TB is detected and treatment is available, they should be

moved to the MDR–TB register, without being counted in the regular TB treatment cohort. If MDR–TB treatment is not available, they need to be counted in the regular TB treatment cohort with a treatment outcome of "failure".

5.2.3 Field supervision of TB programme performance

The RCTC monitoring and evaluation team was established in 2006. Eighteen NTP specialists, among them a director, four clinicians, six laboratory specialists, one statistician, a coordinator for TB/HIV, three drug-management specialists, one ACSM and one food-distribution specialist, monitor supervisory visits of the TB control programme from central level. Monitoring teams also exist at oblast level, consisting of 3–4 specialists in each oblast (except DRSub). All monitoring team members attend training organized by Project HOPE. Project HOPE and UNDP monitoring and evaluation specialists are also involved in visits, all of which are closely coordinated by RCTC.

Project HOPE currently finances supervisory visits to 37 districts and the remainder are funded by UNDP. The GFATM provided minivans for RCTC and oblast monitoring teams to facilitate the visits. The expense of fuel for the vans is expected to be covered by the oblasts. NTP prepares a schedule of visits every six months and submits it to UNDP and Project HOPE to cover per diem transportation costs. Sixty-six trips were planned and approved by the Ministry of Health for the January–June 2014 period.

The monitoring and evaluation guideline clearly outlines the scope, procedure and tools for supervisory visits and includes a checklist for clinical, laboratory and drug management and infection control. Teams provide written feedback to facilities at the end of visits with recommendations and a timeline for improvement. Monitoring visits are also used for in-service training.

The NTP and international stakeholders regularly organize cohort-analysis workshops in each oblast to share the findings of supervisory visits and assess progress of the TB control programme at oblast level. Local government (khukumat) representatives and local health care providers attend. Participants work in group sessions to review local source documents (TB–03 and TB–04 registers), perform crosschecking of registers to ensure completeness and timely initiation of TB treatment, prepare quarterly reports, evaluate progress indicators against standards and benchmarks and agree further actions.

Challenges observed during the review's field visits included:

- standard checklists were not used by supervisory teams and checklists with feedback were available at none of the facilities visited;
- supervisory monitoring reports were long and often unfocused, with important aspects of monitoring missing – no reports, for example, provided information about data crosschecking and verification; and
- monitoring visits tend to be highly donor-dependent, with the NTP budget allocation for monitoring being insufficient for purpose.

Monitoring and evaluation of TB control performance: recommendations
• The monitoring and evaluation plan, performance indicators and targets should be revised, with a set of comprehensive indicators that accurately reflect performance and progress towards national and international targets for TB control developed.
• In addition to describing achievements of indicators against the targets and implemented activities, NTP annual progress reports should present information about challenges faced, reasons for target nonachievement and concrete recommendations and/or action plans to address gaps. NTP experts should follow WHO guidance (specifically the assessment of surveillance data workbook *(25)*, which provides step-by-step instructions on assessing data) when analysing the TB epidemiological situation and trends.
• Staff capacity should be built in relation to indicators, measurements and analysis.
• Feedback on performance should be based on WHO-recommended standard analysis (such as that of the assessment of surveillance data workbook *(25)*).
• The national monitoring and evaluation plan should contain activities and measurable, time-bound, standard indicators and targets related to access to culture and first- and second-line drug DST.
• Standard checklists approved by the Ministry of Health should be used consistently during regular supervisory visits to ensure that all aspects subject to monitoring are carried out (such as regular crosschecking of registers and assessment of data accuracy). This will save time and facilitate the rapid provision of clear written feedback at the end of the visit.
• NTP should continue to organize cohort analysis, which is one of the best ways for the TB programme to involve stakeholders and health providers in open dialogue and assess progress and gaps at oblast level. However, to ensure sustainability, khukumats should assume responsibility for organizing and financing cohort analysis, at least for local participants.
• Better use of existing TB programme data should be made by prioritizing and establishing a plan for programme data evaluation on subjects of relevance to decision-making in TB control.

5.2.4 Surveillance system output documentation

Comprehensive surveillance data are submitted annually to the global TB database and are used to produce the global TB report and annual regional TB surveillance and monitoring reports. The review noted that data supplied by Tajikistan were relatively complete, with minor exceptions: the only missing data were for MDR–TB/HIV association and treatment outcomes in children.

There is no national-level report specifically on TB surveillance in Tajikistan, although key surveillance outputs are summarized in the RCTC annual report. The 2012 RCTC report includes an overview of data for TB epidemiology and control, three-page narrative descriptions of current status and four surveillance-related graphs presenting information on incidence, mortality, notification by smear status and treatment outcomes. The narrative part consists of two sections: detection and treatment, and treatment outcomes for patients from the 2011 cohort. The analysis of routine surveillance data lacks clear structure and illustrations to highlight key conclusions and priorities in TB case detection and diagnosis at oblast and national level.

The RCTC team should follow the standard definitions of internationally accepted indicators, especially for incidence and mortality, to strengthen annual surveillance documentation. The surveillance report should be well structured and should include sections on TB burden

(incidence, mortality, HIV/TB and MDR–TB), prevention, control and financing. The team should use standard methods of analysis of trends to avoid misinterpretation; specifically, the percentage of annual change in notification rates (or absolute numbers) should be disaggregated by TB treatment history, site, bacteriological confirmation and age groups to assess for unusual (above 10%) year-on-year fluctuations. Such an analysis would help in assessing the effectiveness of initiatives such as the roll-out of Xpert MTB/RIF assay and LED microscopy, introduction of new algorithms and training of laboratory staff, and identify problems related to quality of detection and human resources at oblast level. Surveillance output indicators should be evaluated against the WHO surveillance-system standards and benchmarks, with planned actions based on the findings. The annual report should be widely shared among stakeholders and health authorities.

6. Pharmaceutical management

6.1 Selection

The selection of anti-TB drugs is based on national TB treatment guidelines. Stop TB first-line drugs patent kits are used for treating susceptible TB. This seems to offer a good solution, considering that most patients are treated in outpatient settings (including PHC facilities) and it is much easier to manage kits at that level, where drug-handling experience may be low.

MDR–TB patients are treated using a standardized regimen that typically includes the following second-line drugs: amikacin (or capreomycin), levofloxacin (or moxifloxacin), protionamide, cycloserine and *p*-aminosalicylic acid. These are selected for treatment of drug-resistant TB. Group 5 anti-TB drugs typically are not selected for procurement (exceptions include linezolid, which is used in the Médecins sans Frontière project).

Tajikistan has been a GDF paediatric grant beneficiary since 2007. The paediatric formulations of fixed-dose combination anti-TB drugs are selected according to WHO's advice on treatment of TB in children *(18).*

6.2 Procurement and availability

All first- and second-line TB drugs are procured by international partner organizations with financial support from donors, including the following.

- Project HOPE: round 3 rolling continuation channel of the GFATM grant procures all first- and second-line drugs for 300 MDR–TB patients (over a three-year period) through the GDF. The grant finishes in 2016.
- UNDP procured first- and second-line drugs under the GFATM round 8 grant (the last order of second-line drugs for 110 MDR–TB patients should arrive in October 2013). UNDP will continue procurement of second-line drugs under the GFATM transitional funding mechanism for 1600 patients through the GDF over two years (800 treatment courses per year).
- KNCV Tuberculosis Foundation is implementing the USAID-funded project TB Care 1, which recently procured second-line drugs for 50 patients through the GDF for the pilot sites.
- Médecins sans Frontière procures and provides second-line drugs for children with MDR–TB and their household source contacts in Dushanbe.
- Paediatric formulations of first-line drugs are provided by the GDF through a grant.

Ancillary drugs for managing side-effects of anti-TB drugs are mainly procured by partner organizations (those for the prison sector are provided by Caritas Luxembourg).

In general, the Government does not allocate budget for procurement of anti-TB drugs, which raises serious concerns about the sustainability of an uninterrupted supply after the completion of donor-supported programmes. No clear transition plan to ensure uninterrupted supply of quality-assured anti-TB medicines after completion of current donor-supported programmes is in place.

Governments (central and local) provide some funding to TB facilities for procurement of medicines and health commodities (other than anti-TB drugs), including ancillary drugs for treating side-effects. Procurement of medicines and other health commodities is decentralized: the Ministry of Health provides funds for procurement of medicines only to the central institutions. Two such institutions exist in TB: the RCTC and the NCTPTS. Other TB and PHC facilities treating TB patients are funded by local government and process their own procurement. In future, when anti-TB drugs will be procured with government funds, this arrangement might not be optimal for ensuring uninterrupted supply of quality-assured anti-TB drugs.

Several positive trends demonstrate that the Government is committed to allocating funding for procurement of medicines to NTP. The Ministry of Health has decided recently to use special funds to procure amikacin for treating MDR–TB patients; the NTP has some second-line drugs left in stock after patient defaults or deaths, and the newly procured amikacin will enable them to complete the full package of second-line drugs for full-course treatment for around 100 MDR–TB patients. It has also proposed that the Ministry of Finance increase the central budget for procurement of medicines (other than for anti-TB drugs) and other commodities for central TB institutions by 6.7 times for the next fiscal year (FY14), from 187 724 SM to 1 268 000 SM. Ministry of Health officials have stated that the NTP is one of its three main financing priorities and suggested that its funding (including funding for anti-TB drugs) will gradually increase.

Currently, all drug-susceptible patients are ensured provision of first-line drugs, but financial resources are insufficient to provide second-line drugs for all detected drug-resistant TB patients. At the time of the review, 233 MDR–TB patients were on a waiting list. Some geographic areas (43 districts) that are not supported by international organizations do not have access to DST, so drug-resistant TB patients are not detected. Demand for second-line drugs will increase with strengthening of detection of drug-resistant TB.

No interruption to supply of anti-TB drugs was recorded, and no expired drugs were observed during site visits.

Loose ethambutol is used in Tajikistan for treatment of drug-susceptible (mainly with category II regimen) and drug-resistant TB (for treatment of patients who remain susceptible to ethambutol). Previously, however, ethambutol was quantified and procured only for drug-susceptible TB. Ethambutol for drug-resistant TB is being accessed from the stock available for drug-susceptible patients. Taking into account the current number of drug-resistant TB patients and expected expansion, the stock of ethambutol was low at the time of the visit. Accelerated procurement of ethambutol is therefore recommended. This issue was discussed at a meeting of the drug management thematic working group, at which it was agreed that Project HOPE will proceed with an accelerated order of ethambutol.

Procurement and availability: recommendations
• Centralized procurement of anti-TB drugs with Government funds should be assured after donor support finishes.
• Consideration should be given to continuing use of GDF services by the Government for procurement of anti-TB drugs to ensure that quality complies with international standards.

6.3 Storage and distribution

Customs clearance, storage at central and oblast levels and distribution of anti-TB drugs from central to oblast level is conducted by the Republican Medicines and Medical Commodities Procurement Centre (RMMCPC), which is contracted and funded by UNDP, Project HOPE and KNCV Tuberculosis Foundation for these services. Paediatric drugs provided through the GDF grant are stored at the NCTPTS.

RMMCPC is a state self-sustained facility with branches in all four oblasts. The facility's storage conditions meet international standards and are equipped with adjustable racks, trays and automatic loaders. Temperature conditions and humidity levels comply with standards and are maintained by regularly monitored electronic devices. The warehouse is equipped with a cold-chain system. Safety of storage is maintained by video surveillance cameras and alarm and fire-protection systems.

RMMCPC and its branches have an electronic stock-management information system. Among other functionalities, the system provides warnings about approaching expiration dates. A FEFO (first expiry, first out) system is followed for all anti-TB drugs. RMMCPC is also licensed to serve as a medicine storage warehouse for customs: separate storage space allocated for this purpose is securely locked and sealed by customs. Anti-TB drugs arriving in the country are transported by customs to the RMMCPC either on arrival or the next day and stored in the dedicated space. After customs clearance, they are moved to a different space in the same building, where there are stored and managed by RMMCPC. This arrangement means that anti-TB drugs are stored in the proper conditions from arrival. There are no major issues (bureaucratic or other) with customs clearance. On average, the whole process from arrival in the country to storage at RMMCPC takes about 12 days.

Currently, there is no Government budget line allowing RMMCPC to provide services to NTP. This problem must be solved by the time anti-TB drugs are procured with Government funds, or best practice in utilizing RMMCPC services, storage of anti-TB drugs in proper conditions (at central and oblast level) and their timely and proper distribution could be put at risk.

Several central-, oblast- and district-level sites were visited by the review. Medicines storage conditions are good in NCTPTS and Dushanbe TB dispensary, but staff dealing with drug storage in rural areas, despite being well aware of storage requirements for anti-TB drugs, find it is not always possible to comply with all. The main concern relates to high temperatures in storage rooms, which are not air-conditioned in summer (the recommended maximum storage temperature for most anti-TB medicines is 25 °C). *P*-aminosalicylic acid, which requires cold chain, was kept in refrigerators in all sites visited, but it is recommended that formulations that do not require cold chain (which are available through GDF) be procured in future. This would allow savings of some resources and effort related to compliance with cold-chain requirements and would also maintain the quality of drugs when power shortages occur, which is a problem in some oblasts.

Distribution is implemented through a mixed push/pull system: NTP receives quarterly reports from the regions and forms a distribution plan. Similar analysis is carried out by partners procuring and providing anti-TB drugs, who also develop a distribution plan that is then coordinated and agreed with NTP. RMMCPC delivers the medicines from the central warehouse to their branches and regional warehouses according to the approved distribution plan. Medical facilities are responsible for ordering supplies and transporting the medicines from the regional

warehouses after their order is approved by the regional drug coordinator. All medical facilities treating children order and transport paediatric anti-TB drugs from NCTPTS. Regional warehouses and TB treatment facilities are required to have a three-month buffer stock of medicines.

A large stock of *p*-aminosalicylic acid with a short shelf-life (November 2013) was observed in Sugd oblast during the visit. Calculations of the number of current and projected MDR–TB patients showed it was impossible to use this amount before the expiration date. Further detailed analysis showed, however, that expiration in Sugd oblast could be avoided by redistribution of medicines to other regions. The drug management thematic working group discussed this issue and a plan for redistribution of *p*-aminosalicylic acid was developed.

6.4 Management and coordination

A thematic working group has been set up to coordinate drug management activities and address the issues posed by several actors being involved in the supply of anti-TB drugs. The group includes representatives from NTP and all partner organizations involved in anti-TB drug supply. Among other activities, it discusses and coordinates actions on issues related to TB pharmaceutical management, such as forecasting, ordering and distribution, and redistribution of drugs.

A full-time drug manager is in place at the NTP and each oblast has regional drug managers. NTP uses a spreadsheet to track stock and use of anti-TB drugs by different facilities: information entered into the spreadsheet is provided by facilities on a quarterly basis, but some data are inaccurate and not all facilities provide them to schedule.

6.4.1 Logistics management information system for anti-TB drugs

Instructions for a logistics management information system (LMIS) for first-line drugs (approved by the Ministry of Health in 2006) and second-line drugs (2013) have been introduced with support from Project Hope, UNDP and GFATM. They include the scope of work for staff responsible for drug management at different levels, formal procedures for ordering, distributing, receiving, storing and dispensing anti-TB drugs, and samples of paper forms used for drug management purposes, with instructions on their use. The review observed that staff at different levels were knowledgeable about LMIS requirements and used corresponding forms properly.

Standard operating procedures on inventory management and distribution providing detailed guidance for staff in the national centres (HIV/AIDS, TB and malaria) were developed and approved in 2013 with UNDP support.

6.5 Regulation

The Service for State Supervision of Pharmaceutical Activities serves as the drug regulatory authority in the country. It seems to be well aware of the needs and challenges of the TB programme and tries to support the NTP.

The service is the authorized state body for registration. Registration is required for all drugs imported to Tajikistan. The registration process can take from two to six months, depending on the completeness of the registration dossier, availability of samples and working standards. It costs US$ 2000, with reregistration costing US$ 1000. It is possible to obtain a waiver in special circumstances, such as in emergencies and for humanitarian supplies. As most drugs supplied to

Tajikistan through the GDF are not registered in the country, a waiver mechanism is used for their importation.

The service is also responsible for the quality-assurance and quality-control system for pharmaceuticals. Five quality-control laboratories have been set up (one in Dushanbe and four in oblasts). UNDP provided technical and financial support to develop a quality-assurance plan for GFATM-funded medicines.

Selling first-line drugs on the free market is prohibited. The review did not observed any first-line drugs being sold in pharmacies. The current national list of essential medicines, approved in 2011, includes all first- and second-line anti-TB medicines.

Among medicines supplied to Tajikistan through the GDF, only paediatric formulations of anti-TB drugs manufactured by Macleods Pharmaceuticals Limited are currently registered in the country. It is recommended that work be taken forward with GDF and manufacturers to facilitate registration of quality-assured anti-TB drugs supplied by the GDF: a waiver mechanism for registration might not be applicable when the Government takes responsibility for procurement of anti-TB drugs, so if quality-assured (including WHO prequalified) drugs are not registered, the country may lose access.

6.5.1 Human capacity

Several international partners have invested in developing drug-management human capacity over the years. Personnel in most of the civilian-sector sites visited seemed knowledgeable and accustomed to the daily routine of managing anti-TB medicines. Further support is needed to help prison-sector personnel to develop their drug-management capacity.

7. Financing

7.1 TB financing and expenditure

NTP reports to WHO in 2012 indicated that total expenditure on TB by the Government and external donors was about US$ 16 million. External donors and other grants provided approximately US$ 11.5 million, accounting for 72% of total funding (Table 31).

Table 31. Expenditure and sources of funding (in US$) for NTP, 2012

Budget item	Government	GFATM	Other grants	Total	%
First-line drugs		461 823	0	461 823	2.93
Wages for staff working in TB control	2 597 382	839 524	0	3 436 906	22.04
Programme management and supervision	10 000	114 888	0	124 888	0.80
Laboratory supplies and equipment		401 363	0	401 363	2.57
Practical approach to lung health	50 000	22 300	0	72 300	0.46
Public–public, public–private DOTS		17 946	0	17 946	0.12
Collaborative TB/HIV activities		29 613	0	29 613	0.19
Second-line drugs for MDR–TB		1 280 000	0	1 280 000	8.21
Management of MDR–TB (excluding second-line drugs)		252 892	0	252 892	1.62
Community involvement		165 048	0	165 048	1.06
ACSM	45 000	53 479	0	98 479	0.63
Operational research		30 283	0	30 283	0.19
Surveys to measure TB burden and impact of control		12 820	0	12 820	0.08
All other budget lines for TB	1 602 690	2 253 177	5 355 384	9 211 251	59.06
Total	**4 305 072**	**5 935 156**	**5 355 384**	**15 595 612**	**100.00**
Percentage	**27.60%**	**38.06%**	**34.34%**	**100.0%**	

Source: NTP, unpublished data, 2012.

At the time of preparation of this report, the NHA reported national aggregate financial data only up to 2011; share of the total and public health expenditure can therefore only be calculated to this date.

NTP expenditure in 2011 was US$ 27 million (Table 32), which was almost twice that of 2012. The difference can partly be attributed to reduced external-donor funding to the NTP: the GFATM reduced expenditure on second-line drugs from US$ 8 million in 2011 to US$ 1.3 million in 2012, with other donors decreasing funding for other items in the NTP budget. These reductions contributed to a funding decline of more than US$ 11 million between 2011 and 2012.

The share of external donor funding and other grants in total NTP expenditure in 2011 was more than 84%, against a government share of about 16%. Total NTP expenditure represented 7% of total health expenditure and 24% of total public expenditure on health. Government spending for TB that does not include donor funding was 3.8% of public expenditure on health and 1.13% of total health expenditure.

Table 32. Expenditure and sources of funding (in US$) for NTP, 2011

Budget item	Government	GFATM	Other grants	Total	%
First-line drugs	0	362 818	0	362 818	1.34%
Wages for staff working in TB control	2 521 707	1 259 985	0	3 781 665	13.97%
Programme management and supervision	0	112 412	250 000	362 412	1.34%
Laboratory supplies and equipment	0	2 027 581	44 000	2 071 581	7.65%
Practical approach to lung health	0	42 039	7 000	49 039	0.18%
Public–public, public–private DOTS	0		250 000	250 000	0.92%
Collaborative TB/HIV activities	0	98 093	602 583	700 676	2.59%
Second-line drugs for MDR–TB	0	8 155 707	0	8 155 707	30.12%
Management of MDR–TB (excluding second-line drugs)	0	770 728	94 000	864 728	3.19%
Community involvement	0	378 358	250 000	628 358	2.32%
ACSM	0	336 318	250 000	586 318	2.17%
Operational research	0	39 237	15 000	54 237	0.20%
Surveys to measure TB burden and impact of control	0	44 842	250 000	294 842	1.09%
All other budget lines for TB	1 730 790	1 515 975	5 666 001	8 912 766	32.92%
Total	**4 252 497**	**15 144 093**	**7 678 584**	**27 075 147**	**100.00%**
Percentage	**15.71%**	**55.93%**	**28.36%**	**100.00%**	**-**

Source: NTP, unpublished data, 2011.

These indicators illustrate that while TB expenditure is prioritized within total and public health spending (mainly due to the high level of external donations in recent years), the relatively high share of public expenditure on health stems from the very low central government spending. It should also be noted that TB facilities and medical professionals have limited opportunities compared to other health service providers to access private financing from patients through official fees or unofficial payments. Financing TB specialists' salaries is unquestionably the biggest problem, as medical professionals are unable to access any additional financial resources, making the profession unattractive to the next generation of professionals.

NTP funding is very fragile due to the high proportion of external donations, which fluctuates markedly (as seen in Tables 31 and 32). The Government finances salaries by raising resources through local government taxation, which can cause high inequity in access to financial resources. It is nevertheless positive that TB services are free at the point of use in PHC and specialist care.

TB facilities linked to outpatient centres that provide other health services for which they can charge fees may be in a better position, as providers can use part of the collected fees for renovations and salary increases. The infrastructure is especially poor in some district hospitals due to inability to meet renovation costs through lack of resources, which arises as a result of limited local government resource-collection capacity or low central government budget allocations.

Other challenges to NTP financing may cause bottlenecks in improving performance in case-finding and ensuring adequate quality during treatment. These include:

- lack of incentives to increase case-finding activity at PHC level, although current PHC reforms are creating a strong momentum for change;
- lack of an appropriate financing mechanism for transportation of sputum collection, resulting in some cases in PHC doctors having to meet the cost of fuel from their own private resources; and
- TB hospitals having to apply to external donors for food supplies but still being unable to meet patients' nutrition needs, meaning some patients have to make provision for themselves.

The review found that although a comprehensive financial data collection system managed by the NTC is in place, it is essential to address some of the potential limitations of data collection on health financing and take steps to institutionalize the TB subaccount of the NHA (compiled in 2010). The published subaccount on TB (Tables 33 and 34) show significant differences in the sum reported to WHO for 2010, which indicate that NTP expenditure was nearly US$ 10 million. In contrast, the subaccount for 2011 reported total TB spending of US$ 21 million. Although there were methodological dissimilarities in the two data collections, this difference still seems high.

Table 33. Expenditure and sources of funding for NTP, 2010

	All funding sources (external and public)		
Health care by function	**SM**	**US$**	**%**
Services for curative care	1 5719 196.95	3 571 489.55	16.31
Services for rehabilitative care	788 492.53	179 149.92	0.82
Services for long-term nursing care	0.00	0.00	0.00
Ancillary services for health care	4 622 534.46	1 050 265.71	4.80
Medical goods dispensed to outpatients	0.00	0.00	0.00
Total personnel expenditure on health care	**21 130 223.94**	**4 800 905.17**	**21.92**
Prevention and public health services	8 768 627.54	1 992 281.27	9.10
Health administration and health insurance	2 435 535.84	553 367.38	2.53
Total collective expenditure on health	**11 204 163.39**	**2 545 648.65**	**11.62**
Total current expenditure on health	**32 334 387.33**	**7 346 553.82**	**33.55**
Capital formation on health care provider institutions	**45 818 211.71**	**10 410 154.21**	**47.53**
Total expenditure on health	**78 152 599.04**	**17 756 708.03**	**81.08**
Health-related functions (excluding capital formation of health care provider institutions)	**18 237 058.84**	**4 143 561.87**	**18.92**
Education and training of health personnel	4 063 816.83	923 321.93	4.22
Research and development in health	761 417.93	172 998.42	0.79
Administration and provision of social services in kind to assist living with disease and impairment	11 085 735.38	2 518 741.14	11.50
Total estimated expenditure on TB (= total expenditure on health + health-related functions)	**96 389 657.88**	**21 900 269.89**	**100.0**

Source: Government of the Republic of Tajikistan *(26).*

Table 34. Expenditure and sources of funding for NTP; total estimated expenditure breakdown by financing source and financing agent (US$)

Financing sources	Financing agents			Total
	Government sector	Private sector	Rest of the world/ external organizations	
Public funds	4 128 637.79	0.00	0.00	4 128 637.79
Private funds	0.00	0.00	0.00	0.00
Rest of the world funds	0.00	0.00	17 771 632.10	0.00
Total	**4 128 637.79**	**0.00**	**17 771 632.10**	**21 900 269.89**

Source: Government of the Republic of Tajikistan *(26).*

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Annex 1

REVIEW TEAM AND PROGRAMME

Review team

Member	Affiliation
Masoud Dara	WHO Regional Office for Europe
Martin van den Boom[b]	WHO Regional Office for Europe
Kristin Kremer[a]	WHO Regional Office for Europe
Arax Hovhanessyan[a]	Independent consultant, Yerevan, Armenia
Nestani Tukvadze[a]	National Centre for Tuberculosis and Lung Diseases, Tbilisi, Georgia
Harald Hoffmann[a]	WHO Supranational Reference Laboratory of Tuberculosis, Gauting, Germany
Kai Blondal[b]	Reykjavik Health Care Services, Iceland
Archil Salakaia[b]	Management Sciences for Health, Boston (MA), United States
Szabolcs Szigeti[b]	WHO country office in Hungary
Albert Neher[a]	Independent consultant, Munich, Germany
Fanny Voitzwinkler[a]	Global Health Advocates, Brussels, Belgium
Sevim Ahmedov[a]	United States Agency for International Development, Washington (DC), United States
Sayohat Hasanova[b]	WHO country office in Tajikistan

[a] Member of Group 1 for field visits.
[b] Member of Group 2 for field visits.

Review programme
Day 1: 15 July 2013

Presentations	Meetings with:
• Overview of the Health system in Tajikistan (Bakhtigul Akazieva, WHO Health Policy adviser) • Follow-up of the previous mission's recommendations (2009), joint Green Light Committee and Global Drug Facility recommendations, and status of the programme (Bobokhojaev Oktam, National TB Programme (NTP) Director)	• Ministry of Health • NTP • Jeff Lémaire, EXPAND–TB Project • Jamilya Ismoilova, advocacy, communication and social mobilization (ACSM) focal point, Project HOPE,

Days 2–5: 16–19 July
Field work: Group 1

Khatlon Oblast (Kurgan-Tube)	
Visits	**Meetings with:**
J. Rumi district Khatlon regional tuberculosis (TB) centre	• Director of the Khatlon regional TB centre and his team • Mehrinisso Shohnazarova, nongovernmental organization (NGO) Akhtari bakht, working on HIV and TB prevention (including migrants) • Khatlon regional health care authorities

Kulyab region	
Visits	**Meetings with:**
Kulyab city TB centre Kulyab regional TB centre Kulyab TB hospital (including multidrug-resistant TB (MDR–TB) ward)	• Olimov Ahmadjon, Director of Kulyab city TB centre • Jumaev Rahmatullo, Director of Kulyab regional TB centre • Juraev Shamsiddin, MDR–TB focal point • Bahodur Haitov, NGO Nakukor, and TB patients • Kholmurodova Idimo, NGO Anis • Mastona Ergasheva, AIDS NGO Jovidon
Vose district	
Visits	**Meetings with:**
District and rural outpatient centres where supervised TB treatment is being carried out Vose TB hospital (including MDR–TB ward) Dangara TB hospital Dangara TB centre	• Zainiddin Olimov and volunteers of the Red Crescent Society project

Field work: Group 2

Sugd oblast	
Visits	**Meetings with:**
Istaravshan district TB centre (with directly observed therapy (DOT) and MDR–TB treatment) Khujand city TB centre Khujand city polyclinic #4 Khujand city polyclinic # 5 (DOT and paediatric care) Oblast TB hospital Central TB prison hospital, Khujand Oblast AIDS centre Oblast TB laboratory, Degmai Matcha district TB centre and TB hospital District TB laboratory Rural health centre, Faizi Sulton Rural health house, Oburdon	• regional health care authorities • oblast Finance Department and Health Finance Department (to discuss health financing reform) • Mahmadaminov Abdujabor, Director of oblast TB centre • Nozimahon Murodi, NGO Chashmai Hayot • NGO Dina and Antispid, NGO Alternativa, and people living with HIV

Day 6: 20 July

Visits	**Meetings with:**
Dushanbe TB laboratory Centre for Migrants' Health	• Ismailov Jahongir, NTP TB reporting and recording focal point • Mukarama Mamatova, NTP focal point for ACSM • Bobokhojaeva Masuda, NGO Nabzi Solim • Mirova Dilorom, Tajikistan Red Crescent • Firuz Davlatov, Republican Centre for Tuberculosis Control (RCTC) TB infection control focal point • A. Narzullaev, Health Reform and

Visits	Meetings with:
	International Relations Department, Ministry of Health • Miraliev Salohiddin, Health Policy Unit, Ministry of Health; and Bakhtigul Akazieva, WHO Health Policy adviser • F. Shapirov, Accountancy Department, Ministry of Health • S. Haphizov, Economic and Budget Planning Department, Ministry of Health • Bobokhojaev Oktam, NTP Manager

Day 7: 22 July

Visits	Meetings with:
Republican TB hospital (Macheton) Dushanbe city TB centre Polyclinic with DOT service Paediatric TB hospital	• Saidahtam Rustamov, Head, republican TB hospital (Macheton) • Timurov Abumuslim, Head of Dushanbe city Health Department and his team • Sirojiddinova Umrinisso, Chief Physician, paediatric TB hospital • Sarah Quinnell, Medical Coordinator, Médecins sans Frontière Tajikistan • Abdullo Mahmadov, NTP monitoring and evlauation focal point and Project HOPE, United Nations Development Programme (UNDP) and Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) monitoring and evlauation focal points • Khushvacht Ismonov, NTP MDR–TB focal point • Firuz Davlatov, NTP TB infection control focal point • Jafarov Navruz, Deputy Head of Service, State Sanitary and Epidemiological Service • Gulnora Jalilova, NTP drug management focal point • Oktam Bobokhojaev, NTP Director • Saidov Dilshod Murodovich, Head of Department for Budgeting of Social Sector, Ministry of Health • former TB patients and religious leaders

Day 8: 23 July

Visits	Meetings with:
New public health laboratory Children's TB hospital	• Oktam Bobokhojaev NTP Manager, re monitoring and evaluation plan of action • A. Marupov, Procurement Unit • Nurov Rustam, Head of Health

Visits	Meetings with:
	Department, Ministry of Justice; Sharipov Saidkul, Head of TB hospital; Abdurakhmon Shokarimov, Head of TB Department, Ministry of Justice; Saidullo Saidaliev, Caritas Luxembourg (re TB control in the prison system) • Obidjon Norov, Project HOPE; Farukh Ilnazarov, UNDP; Médecins sans Frontière focal points for drug management (re drug management) • Ruziev Murodali, Director of AIDS Centre; TB and HIV focal point at AIDS centre; Zakirova Kurbongul, focal point on management of TB and HIV coinfections in TB service (re TB/HIV coinfection) • Oktam Bobokhojaev, Firuz Davlatov, Rian Ruiz , Jeff Lémaire (TB laboratory): • Meeting with international partners: Tedla Mezemir (UNDP/GFATM Grant Manager); Zumrad Makhsumova (TB Grant Manager); Ulugbek Aminov (UNDP/GFATM HIV Grant Manager); Timur Aptekar (Project HOPE); Alisher Machmudov, Roza Adilbekova (United States Agency for International Development); Mavluda Makhmudova (KNCV Tuberculosis Foundation); Gafur Khojimuradov (German Development Bank); Sarah Quinnell (Médecins sans Frontière); Malohat Shabanova (World Food Programme); Rukhshona Kurbanova (International Organization for Migration)

Day 9: 24 July

Briefing the Ministry of Health, Ministry of Justice, embassies and relevant development partners on the main findings and recommendations of the review.

Annex 2

PEOPLE AND STAKEHOLDERS MET BY REVIEW TEAM

Ministry of Health and its structures	
Rahmonov Sohibnazar	Deputy Minister of Health
Marupov A.	Head, Procurement Unit, Ministry of Health
Haphizov Saidali	Economic and Budget Planning Department, Ministry of Health
Miraliev Salohiddin	Health Policy and Analysis Unit, Ministry of Health
A. Narzullaev	Health Reform and International Relations Department, Ministry of Health
Bobokhojaev Oktam	Director, Republican Centre for Tuberculosis Control
Mahmadov Abdullo	Focal point of monitoring and evaluation, Republican Centre for Tuberculosis Control
Davlatov Firuz	Deputy and tuberculosis infection control focal point, Republican Centre for Tuberculosis Control
Zakirova Kurbongul	Main Tuberculosis Specialist, Ministry of Health; focal point for management of TB/HIV coinfection, Republican Centre for Tuberculosis Control
Jalilova Gulnora	Focal point for drug management, Republican Centre for Tuberculosis Control
Sirojiddinova Umrinisso	Head of Tuberculosis Department, State Medical University; focal point for training, Republican Centre for Tuberculosis Control
Sharipova Firuza	Focal point for multidrug-resistant tuberculosis and tuberculosis surveillance, Republican Centre for Tuberculosis Control
Ismonov Khushvacht	Focal point for multidrug-resistant tuberculosis, Republican Centre for Tuberculosis Control
Ismailov Jahongir	Focal point for tuberculosis surveillance, recording and reporting, Republican Centre for Tuberculosis Control
Kosimova Guljamol	Head, National Microscopy Laboratory, Republican Centre for Tuberculosis Control
Abdulloeva Mohonim	National Reference Laboratory on Tuberculosis
Marupova Lola	Director, Dushanbe City Tuberculosis Centre
Rustamov Saidahtam	Head, Republican Tuberculosis Hospital
Jafarov Navruz	Deputy of State Service, Sanitary and Epidemiological Surveillance
Ruziev Murodali	Head, Republican AIDS Centre
Nurlaminova Zukhra	Focal point for management of tuberculosis/HIV coinfection, Republican AIDS Centre
Kholnazarov Bahodur	Director, Service of State Control on Pharmaceutical Activity
Kuvvat Khakim	General Director, National Procurement Agency

Sugd oblast	
Madaminov Davron	Head, Oblast Tuberculosis Centre; Head, Sugd Oblast Tuberculosis Hospital
Dadabaeva Ulfat	Sugd oblast Khukumat representative, health and social sector
Pulatova	Head of Paediatric Tuberculosis Department, Sugd Oblast Tuberculosis Hospital
Jakubov Juma	Department of Health, Sugd Oblast Tuberculosis Hospital
Otabaev Atam	Head, Reanimation Department, Sugd Oblast Tuberculosis Hospital
Hamroev Halim	Head, Surgery Department, Sugd Oblast Tuberculosis Hospital
Ruziev Nasim	Head, Extrapulmonary Tuberculosis Department, Sugd Oblast Tuberculosis Hospital
Ruziev Bakhtier	Head, Pulmonary Surgical Department, Sugd Oblast Tuberculosis Hospital

Otamurodov Bobur	Head, Department for Re-treated Cases, and drug management focal point, Sugd Oblast Tuberculosis Hospital
Jimieva M.	Chief Nurse and Head of Drug Store, Sugd Oblast Tuberculosis Hospital
Alikhonova Khamida	Head, Bacteriological Laboratory, Sugd Oblast Tuberculosis Hospital
Khojaeva Dilbar	Head, Organization and Methodical Department (Reporting and Recording), Sugd Oblast Tuberculosis Centre
Bakaev Rashot	Head, Sugd Oblast AIDS Centre
Jabarov Abdujamol	Head of anonymous cabinet
Eshanova Mahbuba	Tuberculosis Doctor, Sugd Oblast AIDS Centre
Oripova Otunoi	Head, Dispensary Department, Sugd Oblast AIDS Centre
Juraev Abdushukur	Head, Khujand Polyclinic #5
Azimov Kayum	Chief Family Physician, Khujand Polyclinic #5
Bobjonova Musabeh	Deputy Head, Khujand Polyclinic #5
Kadirova Gani	Focal point for multidrug-resistant tuberculosis, Khujand polyclinic #5
Fozilov Orif	Head, Rural Health Center, Kalachai Kalon
Samiev Shoaslon	Feldsher, RHC Kalachai Kalon
Abdurahmonov Erkin	Head, Istaravshan District Tuberculosis Centre
Musulmonkulova Malohat	Focal point for drug management, Istaravshan District Tuberculosis Centre
Hisoev Bakhtier	Laboratory staff member, Istaravshan District Tuberculosis Centre
Afzalov Ikrom	Tuberculosis Doctor, Istaravshan District Tuberculosis Hospital
Shodiboeva Rohat	Director, Khujand City Tuberculosis Centre
Zokirova Gavhar	Nurse focal point for multidrug-resistant tuberculosis, Khujand City Tuberculosis Centre
Kodirova Daniya	Tuberculosis Doctor, focal point for multidrug-resistant tuberculosis, Khujand City Tuberculosis Centre
Usupova Mehri	Laboratory Specialist, Khujand City Tuberculosis Centre
Usarova Rafoat	Tuberculosis Doctor, Khujand City Tuberculosis Centre
Maksudi Okhuni	Head, Matcha District Tuberculosis Centre
Khojibekov Olimbek	Tuberculosis Doctor, Matcha District Tuberculosis Centre
Rahmatova Ozoda	Drug management focal point, Matcha District Tuberculosis Centre
Khushalieva Nargiza	Laboratory Specialist, Matcha District Tuberculosis Centre
Eshonov Kiromiddin	Head, RHC Faizi Sulton, Matcha district
Odinaeva Azizmo	Nurse, Head of Medical House #1, RHC Faizi Sulton, Matcha district

Khatlon oblast	
Ibragimov A	Deputy Head, Oblast Health Department
Shakarshoeva M	Deputy Head, Oblast Health Department
Kamolov Sukhrob	Head, Oblast Tuberculosis Centre; Head, Khatlon Oblast Tuberculosis Hospital
Sanginov Abdulmajid	Department Head, Oblast Tuberculosis Centre; Head, Khatlon Oblast Tuberculosis Hospital
Jumaev Rahmatullo	Director, Kulyab Regional Tuberculosis Centre
Karimov Anvar	Head, Multidrug-resistant Tuberculosis Department, Kulyab Regional Tuberculosis Centre
Davlatov Akram	Director, Khatlon Oblast HIV/AIDS Centre
Norkulov Tursunpulod	Focal point for monitoring and evaluation, Khatlon Oblast HIV/AIDS Centre
Nematov A	Head of J. Rumi District Tuberculosis Centre
Olimov Ahmadjon	Director, Kilyab City Tuberculosis Centre
Mirzoev Safarali	Director, Vose District Tuberculosis Centre
Atoev Abdurahmon	Vose District Tuberculosis Hospital

Mirzoev Safar	Rural health house – Korez
Alovudinov T	Rural health centre (ambulatory) – Jarteppa
Mahmadaliev Gulmahmad	Director, Dangara Tuberculosis Hospital and Dangara Tuberculosis Centre

International agencies	
Ursu Pavel	WHO Representative/Head of WHO country office Tajikistan
Akkazieva Baktygul	Health System Adviser, WHO country office Tajikistan
Makhsumova Zumrad	Tuberculosis General Manager, UNDP/GFATM Project Implementation Unit
Ilnazarov Farukh	Drug management focal point, UNDP/GFATM Project Implementation Unit
Rian Ruiz	Laboratory Consultant, UNDP/GFATM Project Implementation Unit
Karimov Mahmadlatif	Laboratory Specialist, UNDP/GFATM Project Implementation Unit
Bikmetova Flura	Tuberculosis Specialist, UNDP/GFATM Project Implementation Unit
Muhamedovna Hanifa	Tuberculosis Specialist, UNDP/GFATM Project Implementation Unit
Aptekar Timur	Programme Manager, Project HOPE
Norov Obidjon	Tuberculosis Specialist, Project HOPE
Ismoilova Jamilya	Regional ACSM Specialist/Deputy Programme Manager, Project HOPE
Adilbekova Roza	Tuberculosis Director, USAID Quality Health Care Project
Anjir Elnazarova	ACSM Specialist, USAID Quality Health Care Project
Makhmudova Mavluda	Country Director, KNCV/USAID/TB CARE
Shabanova Malohat	Senior Programme Assistant, World Food Programme
Kurbanova Rukhshona	Migration Health Programmes Coordinator, International Organization of Migration Mission in Tajikistan
Geoffroy Veronique	Manager for Health and Education Programmes, European Union Delegation to Tajikistan
J-F Lémaire	EXPAND–TB Project
Saidaliev Saidullo	Caritas Luxembourg, Tajikistan
Quinnell Sarah	Medical Coordinator, MSF Tajikistan
Wint Thu Naing	MSF Tajikistan
Olimov Zainiddin	Red Crescent Society Representative, Tajikistan

Other ministries and agencies	
Nurov Rustam	Head of Health Department, Ministry of Justice
Sharipov Saidkul	Head of Prison Hospital, Ministry of Justice
Abdurakhmon Shokarimov	Head of Tuberculosis Prison Hospital, Ministry of Justice
Saidov Dilshod Murodovich	Head of Department for Budgeting of Social Sector, Ministry of Finance

Nongovernmental organizations	
Bobokhojaeva Masuda	NGO Nabzi Solim, Dushanbe
Mirova Dilorom	Tajikistan Red Crescent, Dushanbe
Nozinakhon Murodi	Manager, NGO Chashmai Khaet, Sugd oblast
Rahimova Zarina	Deputy Manager, NGO Chashmai Khaet, Sugd oblast
Mahmudov Saidmansur	Manager, NGO Said, Sugd oblast
Ishkuatova Albina	Outreach Worker, NGO Said, Sugd oblast; member of Sugd oblast country coordinating mechanism

Shohnazarova Mehrinisso	NGO Akhtari bakht, Khatlon oblast
Alimova Kurbongul	NGO OrzuPlus, Khatlon oblast
Sharipova Malohat	
Bahodur Haitov	Head, NGO Nakukor, Khatlon oblast
Kholmurodova Idimo	Head, NGO Anis, Khatlon oblast
Ergasheva Mastona	NGO Jovidon, Khatlon oblast

Annex 3

PUBLICATIONS REVIEWED

Ayé R, Wyss K, Abdualimova H, Saidaliev S. Factors determining household expenditure for tuberculosis and coping strategies in Tajikistan. Trop Med Int Health 2011;16:307–13.

Habib A. Implementation of DR–TB recording and reporting system in Dushanbe and Kulyab, Republic of Tajikistan: monitoring visit report. Copenhagen: WHO Regional Office for Europe; 2012.

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Mosneaga A (2010). Methods: survey to review the health system, tuberculosis control, assessment of diagnostics and treatment, main barriers to proper care and financial barriers to patients. Dushanbe: Ministry of Health/WHO Regional Office for Europe/Global Fund to Fight AIDS, Tuberculosis and Malaria.

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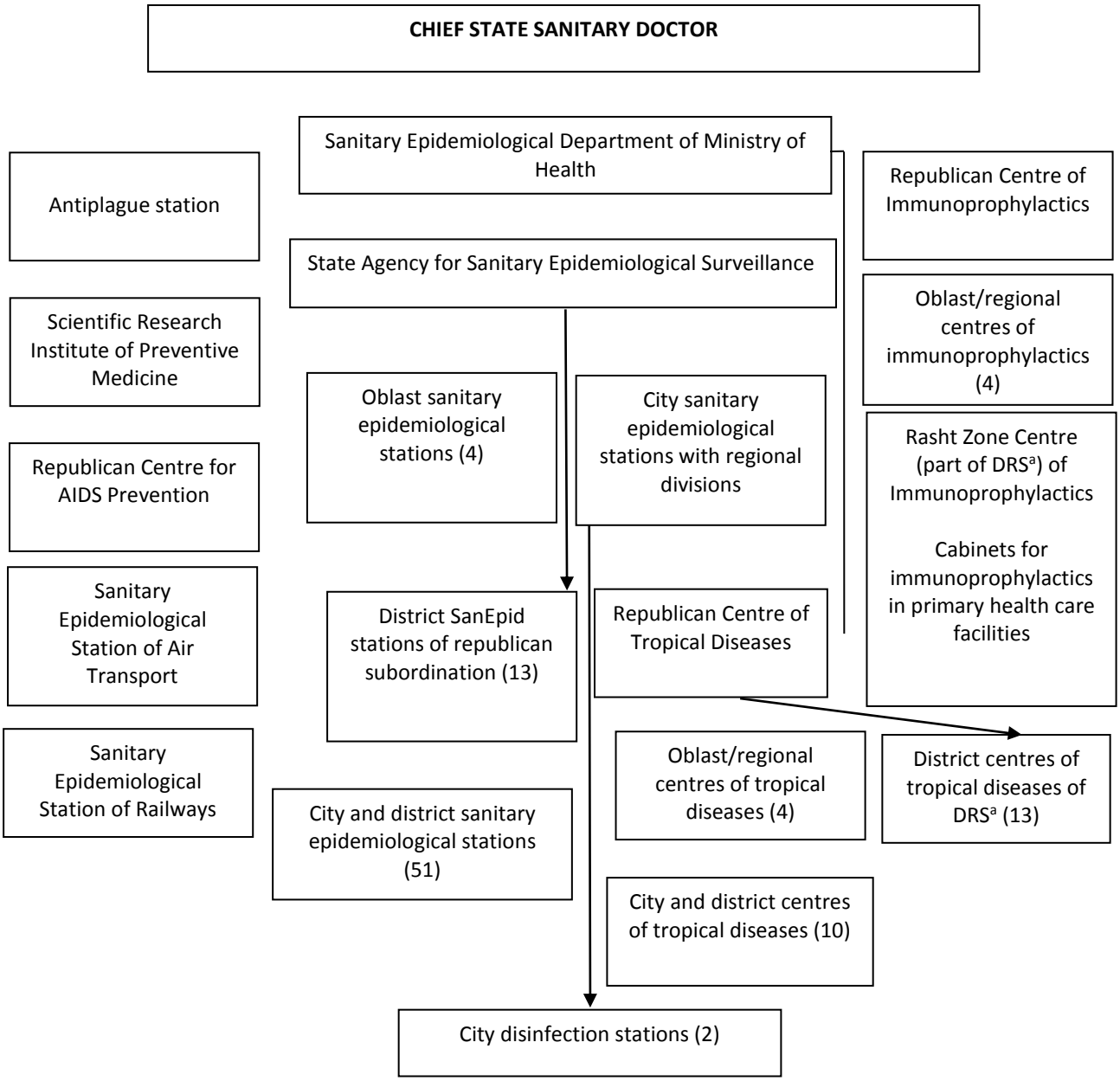
The team also reviewed a large number of unpublished sources, including mission, programme and consultant reports relevant to TB in Tajikistan.

Annex 4

STRUCTURE OF STATE SANITARY AND EPIDEMIOLOGICAL SERVICE



[a] Drug resistance survey.

Annex 5

STATUS OF ACTIVITIES PLANNED FOR 2013 UNDER NATIONAL TUBERCULOSIS INFECTION CONTROL ACTION PLAN

National-level issue	Activities	Status
Coordination	Define roles and responsibilities of National Infection Control Coordinator Identify four oblast infection control coordinators and define their roles Identify infection control coordinator for prison tuberculosis hospital	Pending
Legislation	Update exiting legislation for tuberculosis infection control	Pending
National and subnational regulatory framework for tuberculosis infection control	Print and distribute additional copies of national tuberculosis infection control guideline, including protocols to all levels of health care facilities (tuberculosis hospitals and dispensaries, primary health care facilities and the prison system) Develop general standard operating procedures for infection control and guidance for all three levels of health care facilities providing tuberculosis services, including prison settings	Ongoing Ongoing
Human resource development	Conduct training of trainers for four oblast coordinators, infection control coordinator for prison system and eight regional trainees from National Tuberculosis Programme and State Sanitary and Epidemiological Service Develop focused training materials for all personnel involved in providing tuberculosis services: physicians, nurses, laboratory personnel Include infection control module in tuberculosis/multidrug-resistant tuberculosis training plan and provide cascade training for all personnel providing tuberculosis services (physicians, nurses, laboratory personnel) at all levels Conduct onsite seminar (with discussion sessions) for prison sector health care workers Provide training/retraining of State Sanitary and Epidemiological Service epidemiologists on modern tuberculosis infection control assessment and monitoring approaches	Pending Pending Ongoing Pending Pending
Improve current surveillance system	Identify responsible person, develop central registry at National Tuberculosis Programme for collecting information on tuberculosis among health care workers in civic and prison sectors	Ongoing
Risk assessment	Identify pilot region Conduct basic risk assessment it pilot region of all inpatient and outpatient care facilities, primary health care centres and congregate settings with potential risk of tuberculosis transmission	Pending Pending
Advocacy for resource mobilization	Develop and distribute to health care facilities informative posters and leaflets for tuberculosis infection control targeting	Ongoing

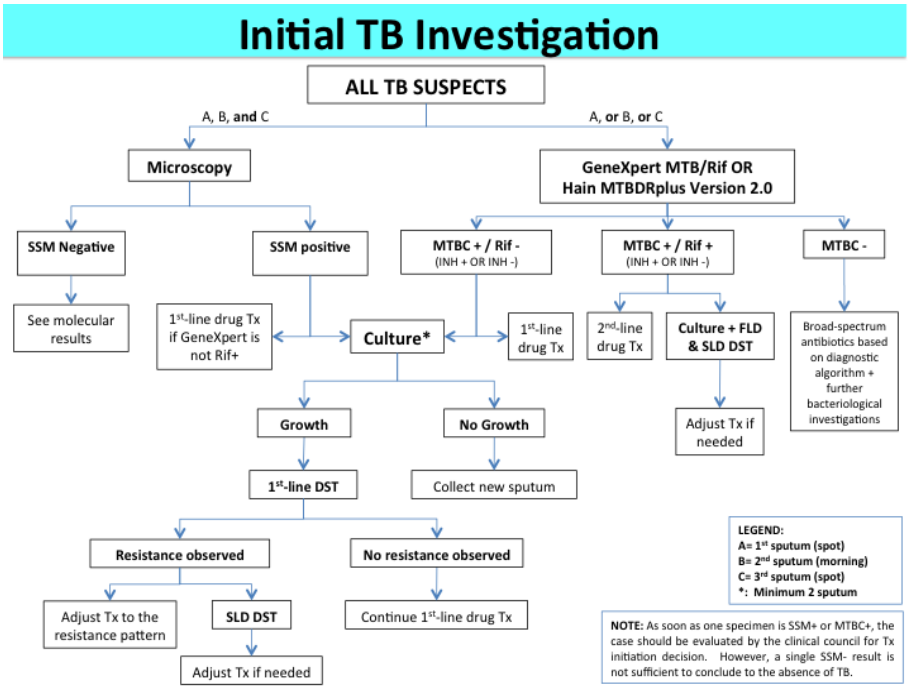
National-level issue	Activities	Status
	different groups: patients, family members, society, detainees	
	Organize roundtable and meetings with media and involve media in public education for tuberculosis infection control	Ongoing
	Organize interactive education seminars for detainees in prison sector	Pending
Develop monitoring strategy	Develop and approve new monitoring toolkit	Pending
Operational research	Define operational research questions and search for potential partners in developing operational research protocol (identifying funding needs)	Pending

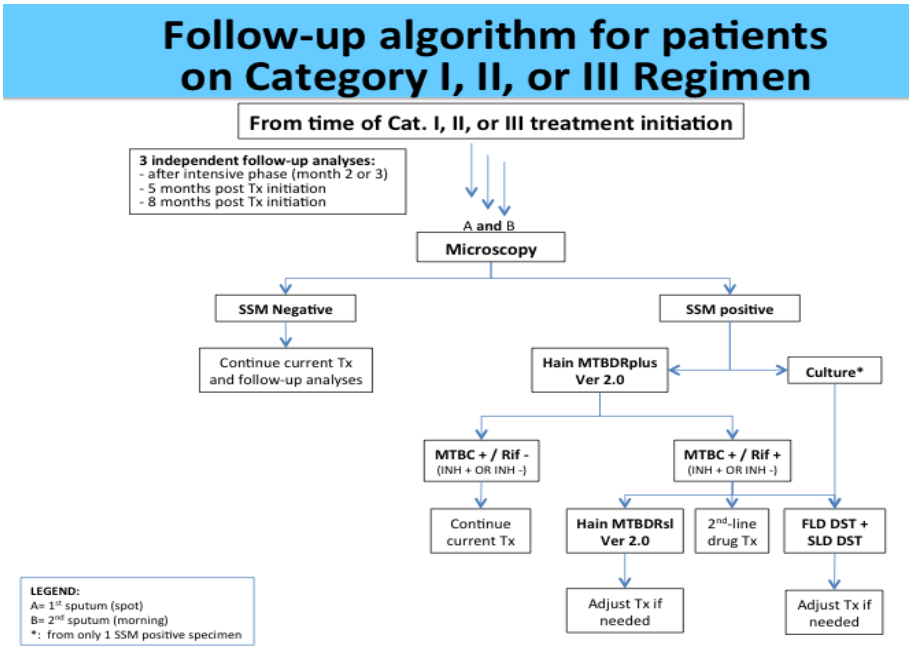
Facility-level issue	Activities	Status
Duration of hospitalization	Develop hospitalization criteria and monitor duration of hospitalization	Pending
Optimal use of existing spaces	Ensure proper use of existing spaces based on the tuberculosis infection control guideline and assessment recommendations	Ongoing
Facility infection control plans	Update infection control plans at central and regional tuberculosis facilities	Ongoing
Patient triage and separation process	Develop standard operating procedures in pilot region for patient triage and separation and appoint responsible person	Pending
Cough monitoring	Develop standard operating procedures in pilot region for cough monitoring and appoint responsible person	Pending
Natural ventilation	Develop standard operating procedures in pilot region for adequate use of natural ventilation and identify responsible people at facilities	Pending
Proper installation and maintenance of mechanical ventilation	Identify engineer, provide training abroad	Pending
	Provide adequate maintenance of mechanical ventilation at National Centre for Tuberculosis, Pulmonary Diseases and Thoracic Surgery and National Reference Laboratory	Pending
Upper-room ultraviolet germicidal irradiation in high-risk areas	Find out needs for ultraviolet germicidal irradiation fixtures in pilot region	Ongoing
	Conduct procurement of measurement equipment	Ongoing
Respirators	Procure respirators for health care workers	Ongoing
	Provide in-service training for staff on proper use of respirators	Ongoing
	Procure fit-testing equipment	Conducted
Surgical masks	Procure surgical masks for infectious patients	Pending

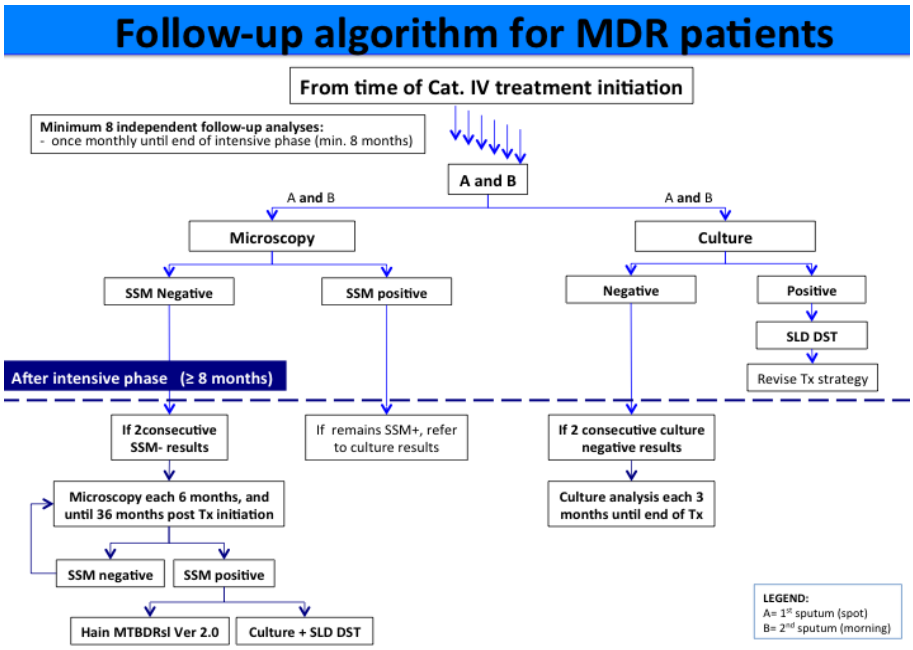
Annex 6

ALGORITHMS OF TUBERCULOSIS INVESTIGATION

These algorithims have been developed for the National Programme for Tuberculosis Protection of the Population of the Republic of Tajikistan for 2010–2015 and are reproduced here in their original form.







Abbreviations and acronyms in algorithms

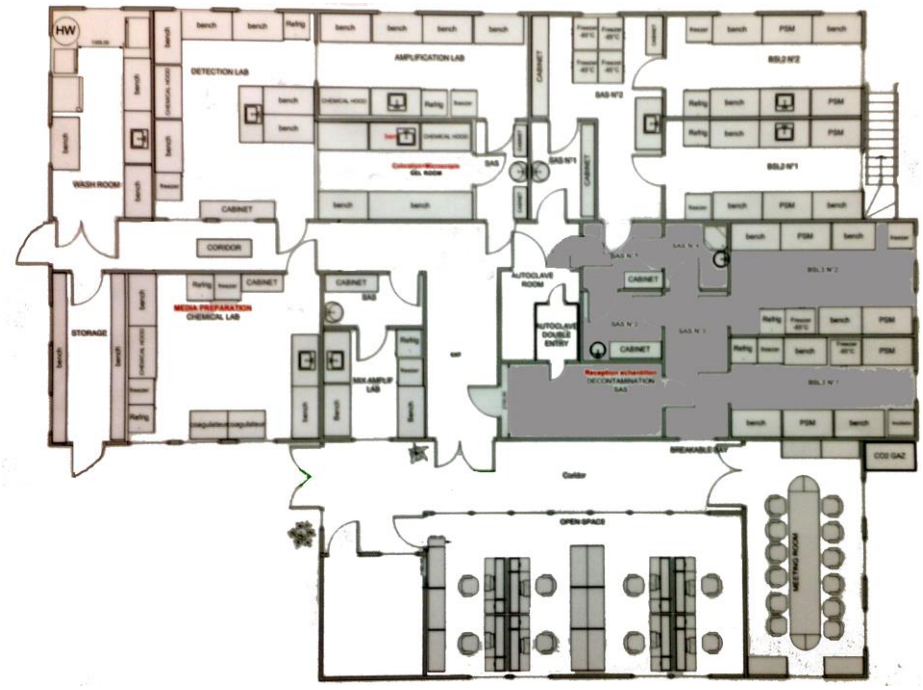
DST = drug-resistance survey
FDL = first-line drug
INH+ = isoniazid positive
INH– = isoniazid negative
MTBC+ = *Mycobacterium* TB complex-positive
MTBC– = *Mycobacterium* TB complex-negative
Rif+ = rifampicin positive
Rif– = rifampicin negative
SLD = second-line drug
SSM+ = sputum-smear microscopy positive
SSM– = sputum-smear microscopy negative
Tx = treatment

Annex 7

ROOM PLAN OF NATIONAL REFERENCE LABORATORY

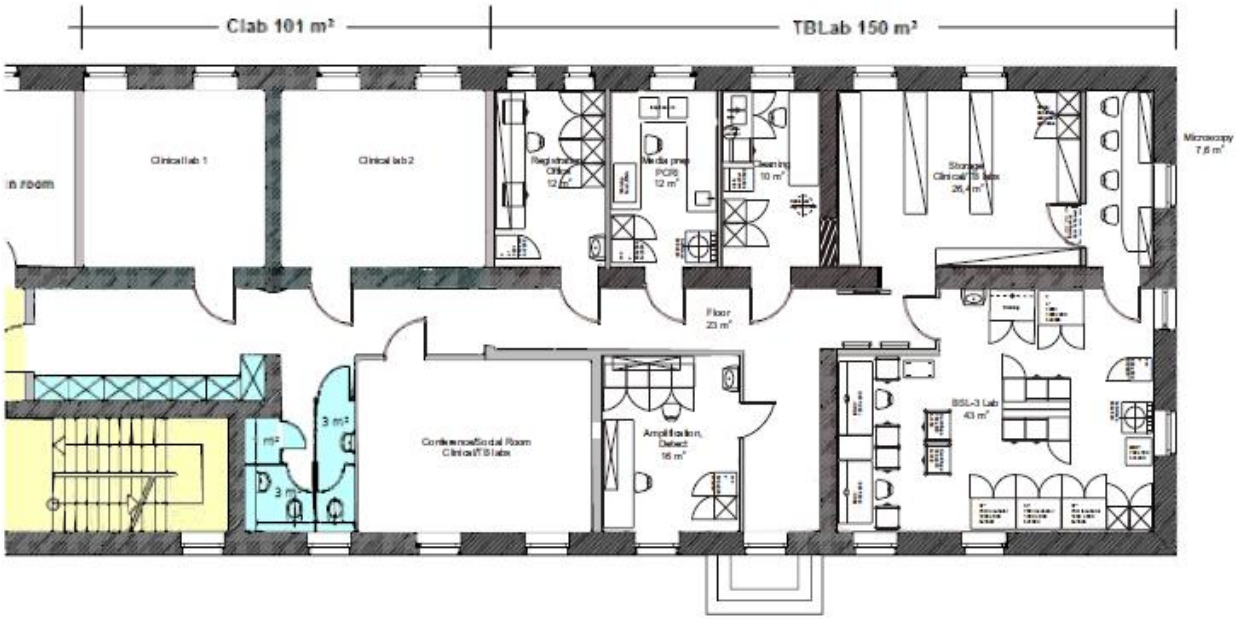
Annex 8

ROOM PLAN OF NATIONAL PUBLIC HEALTH REFERENCE LABORATORY



Annex 9

FINAL DRAFT OF THE ROOM PLAN OF THE SUGD REGIONAL TB LABORATORY IN DIGMOY AFTER REFURBISHMENT



Annex 10

PROPOSALS ON APPOINTMENT OF ROLES AND RESPONSIBILITIES OF THREE TUBERCULOSIS LABORATORY NETWORK COMMISSIONERS

	Network commissioner	Microscopy commissioner	Head of NRL
National Tuberculosis Reference Laboratory (NRL):			
operational management			X
development of standard operating procedures for the network			X
performance of external quality assurance provided by Supranational Reference Laboratory			X
Microscopy – procurement:			
preparation of procurement plan and submission to procurement coordinator		X	
check of delivery and confirmation of completeness		X	
distribution of goods to peripheral laboratories using trucks/cars from Republican Centre for Tuberculosis Control and/or central warehouse		X	
Microscopy – data management			
request microscopy data from oblast		X	
implementation and standardization of electronic microscopy reporting system		X	
transfer data on central microscopy database		X	
prepare microscopy report and forward to laboratory network data manager		X	
Microscopy – monitoring and evaluation:			
monitoring of oblast laboratories		X	
rechecking microscopy results of oblast laboratories		X	
provision of external quality assurance with panel of smears sent to all microscopy laboratories in the country		X	
supervision of implementation and use of network standard operating procedures		X	
supervision of external quality assurance of district by oblast laboratories		X	
data entry in special database and reporting of external quality assurance		X	
certification of oblast tuberculosis laboratories and supervision of certification of district laboratories		X	
Microscopy – training:			
training staff in microscopy laboratories		X	
Microscopy – cooperation with partners:			
interaction with national and international partners regarding microscopy		X	
attendance at meetings/conferences		X	
Xpert MTB/RIF assay – procurement:			

	Network commissioner	Microscopy commissioner	Head of NRL
supervision of procurement of consumables from partners		X	
Xpert MTB/RIF assay – data management:			
request Xpert MTB/RIF assay data from oblast		X	
implementation and standardization of electronic Xpert MTB/RIF assay reporting system		X	
transfer of data in central Xpert MTB/RIF assay database		X	
prepare Xpert MTB/RIF assay report and forward to laboratory network data manager		X	
Xpert MTB/RIF assay – monitoring and evaluation:			
monitoring of oblast laboratories		X	
supervision of implementation and use of network standard operating procedures		X	
Xpert MTB/RIF assay – training:			
training staff in Xpert MTB/RIF assay laboratory		X	
Xpert MTB/RIF assay – cooperation with partners:			
interaction with national and international partners regarding Xpert MTB/RIF assay		X	
attendance at meetings/conferences		X	
Xpert MTB/RIF assay – maintenance:			
preparation of requests for maintenance/calibration of Gene Xpert MTB/RIF assay modules		x	
HAIN – procurement:			
supervision of procurement of consumables from partners	X		
HAIN – data management:			
request of HAIN data from oblast	X		
implementation and standardization of electronic HAIN reporting system	X		
transfer of data in central HAIN database	X		
prepare HAIN report and forward to laboratory network data manager	X		
HAIN – monitoring and evaluation:			
monitoring of oblast laboratories	X		
supervision of implementation and use of network standard operating procedures	X		
HAIN – training:			
training staff in HAIN laboratories	X		
HAIN – cooperation with partners:			
interaction with national and international partners regarding HAIN	X		
attendance at meetings/conferences	X		
HAIN – maintenance:			
preparation of requests for maintenance of GeneHAIN modules	X		