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Extensive review of tuberculosis prevention, control and care in Kazakhstan

10–16 May 2012

ABSTRACT

The notification rate of TB cases in Kazakhstan is among the highest in the WHO European Region. WHO was requested to organize a review of the Kazakh Tuberculosis Programme, which took place from 10 to 16 May 2012. The reviewers made a number of recommendations to improve the programme. The main focus should be on: expansion of the programmatic management of drug-resistant TB, introduction and roll-out of molecular diagnosis of TB and MDR-TB, expansion of ambulatory treatment of patients, and home-based care and day-care treatment including all eligible patients, particularly sputum-smear-negative patients (as well as sputum-smear-negative MDR-TB patients). Hospitalization practices need to be rationalized in order: (i) to prevent the spread of drug resistance, and (ii) to use the available resources more efficiently by reallocating the funds saved by reducing the number of hospitals to expand ambulatory treatment, social support for patients and the number of health-care providers. Examples of the involvement of civil society organizations and provision of an integrated continuum of care (transfer of released patients from prison to civilian sector) need to be expanded across the country.

Keywords

CONTROL
DELIVERY OF HEALTH CARE
NATIONAL HEALTH PROGRAMS
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TUBERCULOSIS, MULTIDRUG-RESISTANT

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Acknowledgements

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Abbreviations

ACSM	advocacy, communication and social mobilization
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
BCG	bacille Calmette-Guerin
C+	culture-positive
C-	culture-negative
CDC	United States Centers for Disease Control and Prevention
CPT	co-trimoxazole preventive therapy
DOTS	the basic treatment package that underpins the WHO Stop TB Strategy
DRA	drug regulatory authority
DST	drug-susceptibility testing
EQA	external quality assurance
GDF	Global Drug Facility
GLC	Green Light Committee
GMP	good manufacturing practice
IDU	injecting drug user
IEC	information, education and communication
IPT	isoniazid preventive therapy
KNCV	Royal Netherlands Tuberculosis Association
KZT	Kazakh tenge (currency)
LJ	Löwenstein-Jensen
LPA	line probe assay
MDR-TB	multidrug-resistant TB
MGIT	mycobacterial growth indicator tube
MTB+	*M. tuberculosis* positive
MTB-	*M. tuberculosis* negative
NAC	National AIDS Centre
NCTP	National Centre for Tuberculosis Problems
NRL	national TB reference laboratory
NTLR	national TB laboratory register
NTP	National Tuberculosis Programme
OTBD	oblast TB dispensary
PLHIV	people living with HIV
PSI	Population Services International
SES	State Sanitary-Epidemiological Service
SLD	second-line drugs
SSM	sputum-smear microscopy
SS-	sputum-smear-negative
SS+	sputum-smear-positive
STD	sexually transmitted disease
TST	tuberculin skin test/testing
USAID	United States Agency for International Development
UVGI	ultraviolet germicidal irradiation
XDR-TB	extensively drug-resistant TB

Drug abbreviations

Am	amikacin
Amx	amoxicillin
Amx/Clv	amoxicillin/clavulanate
Clr	clarithromycin
Clv	clavulanate
Cm	capreomycin
Cpf	ciprofloxacin
Cs	Cycloserine
E/EMB	ethambutol
Eto	ethionamide
Gfx	Gatifloxacin
H/INH	Isoniazid
Km	Kanamycin
Lfx	levofloxacin
Lzd	Linezolid
Mfx	moxifloxacin
Ofx	Ofloxacin
PAS	*p*-aminosalicylic acid
Pto	protionamide
R/RIF	Rifampicin
S	streptomycin
Thz	thioacetazone
Z/PZA	pyrazinamide

Executive summary

At the request of the Minister of Health of Kazakhstan and on the instructions of the WHO Regional Director for Europe, the TB and multidrug-resistant/extensively drug-resistant TB (M/XDR-TB) programme of the WHO Regional Office for Europe conducted an extensive programme review of TB prevention, control and care in Kazakhstan from 10 to 16 May 2012.

Kazakhstan has the highest notification rate of TB cases in the WHO European Region. In 2011, the country reported around 23 000 TB cases (including 18 000 new and relapse cases), which is equivalent to 144 per 100 000 population. In the same year, 3700 MDR-TB cases were detected (out of an estimated 5400 MDR-TB cases among notified TB cases).

A team of 15 international experts conducted the review, divided into four teams which visited Almaty City, Almatinskaya Oblast, Akmolinskaya Oblast and South Kazakhstan Oblast. The teams reviewed all technical reports, surveillance data, national reports and epidemiological data, and interviewed staff in the governors' offices, chief oblast doctors, chief TB physicians, health-care staff, the State Sanitary-Epidemiological Service, staff in polyclinics, the TB laboratory services, HIV/AIDS centres, narcotics centres, members of nongovernmental organizations and country coordination mechanisms and patients.

TB prevention, control and care interventions were assessed on the basis of the six building blocks of the health system defined by WHO: service delivery, health workforce, information, medicines, financing and governance.

The reviewers made a number of recommendations to improve the programme. The main focus should be on: expansion of the programmatic management of drug-resistant TB, introduction and roll-out of molecular diagnosis of TB and MDR-TB, expansion of ambulatory treatment of patients, and home-based care and day-care treatment including all eligible patients, particularly sputum-smear-negative patients (as well as sputum-smear-negative MDR-TB patients). Hospitalization practices need to be rationalized in order: (i) to prevent the spread of drug resistance, and (ii) to use the available resources more efficiently by reallocating the funds saved by reducing the number of hospitals to expand ambulatory treatment, social support for patients and the number of health-care providers. Examples of the involvement of civil society organizations and provision of an integrated continuum of care (transfer of released patients from prison to civilian sector) need to be expanded across the country.

Key achievements

- Kazakhstan has made significant improvements in its TB control programme, building on WHO recommendations.
- Diagnosis and treatment of TB and MDR-TB are conducted according to WHO recommendations.
- Generally, TB control activities have been very well integrated into primary health care services. Default prevention and control measures are fully functioning.
- The national budget for TB control has been increased severalfold, with a rapid scale-up of treatment for MDR-TB patients.
- Infection control measures have been significantly improved in recent years.

- Human resources for TB are well-trained and organized within the national system of human resources for health.
- The country has a robust recording and reporting system, with the potential for sound monitoring and evaluation.
- There are excellent examples of involvement of nongovernmental organizations and other partners in TB prevention and control, even in the penitentiary services.
- There is a high coverage of testing for HIV among TB patients.

Key challenges

- There are high levels of drug-resistant TB. In 2011, there were 7408 MDR-TB cases and 440 XDR-TB cases (according to data provided by the national TB control programme).[1]
- Rapid molecular diagnosis of MDR-TB is not yet available, although the country is planning to introduce it soon.
- The large-capacity TB hospital infrastructure shapes the service delivery model, which is outdated and still reliant on almost universal hospitalization of all TB patients, including sputum-smear-negative cases, at least for the intensive phase of treatment. These practices are not only highly inefficient in terms of resource use, but pose a serious threat in terms of nosocomial transmission of TB and further development and amplification of drug resistance.
- Ambulatory treatment in primary health care services is not functioning to its full potential and does not include all sputum-smear-negative patients and MDR-TB patients (for example patients needing injections are not treated in some polyclinics).
- There is still a waiting list for MDR-TB patients to be treated in the prison service.
- Social support for patients is not standardized and largely depends on the availability of funds from each oblast.
- There are few nongovernmental organizations working on TB, and hardly any TB patient associations.
- A significant gap in human resources for TB control should be expected in the next 5–10 years, taking into account the current deficit of young physicians specializing in TB, the ageing of current TB staff and new procedures for TB specialization after 2014.
- There is no cross-border TB control and care mechanism in place. (Discussion with other neighbouring countries and implementing a package of cross-border control and care is needed. WHO can provide technical assistance and assist in negotiations.)
- State Sanitary-Epidemiological Service regulations on infection control are still outdated and practice is mainly focused on disinfection of patients' houses. This practice is not evidence-based and is costly and ineffective for TB prevention; it also adds to the stigma experienced by TB patients in the community.
- Insufficient integration of services, namely: early diagnosis of TB at HIV services, late initiation of antiretroviral therapy in people living with HIV with active TB, lack of opioid substitution therapy in TB hospitals) challenge health outcomes in TB patients with co-

[1] *Global tuberculosis report 2012*. Geneva, World Health Organization, 2012 (http://www.who.int/tb/publications /global_report/en/, accessed 5 July 2013).

conditions (HIV-infected injecting drug users. Opioid substitution therapy is not practised in TB hospitals because the Ministry of Health has not adopted regulations for its use.

Main recommendations

1 A national MDR-TB action plan needs to be developed based on the Consolidated Action Plan to Prevent and Combat Multidrug- and Extensively Drug-Resistant Tuberculosis in the WHO European Region 2011–2015.[2]

2 Molecular diagnosis of TB and MDR-TB should be started and expanded as soon as possible, including development of the supply mechanism for consumables for the Xpert MTB/RIF assay.

3 Ambulatory treatment of patients, home-based care and day-care treatment need to be expanded to include all eligible patients, particularly sputum-smear-negative patients (as well as sputum-smear-negative MDR-TB patients).

4 Hospitalization practices need to be rationalized in order to prevent further spread of drug resistance and to use the available resources more efficiently by reallocating the funds saved by reducing the number of hospitals to expand ambulatory treatment, social support for patients, and health-care providers.

5 Existing examples of involving civil society organizations and provision of an integrated continuum of care (transfer of released patients from prison to civilian sector) need to be expanded across the country.

6 TB/HIV collaborative activities need to be strengthened.

7 Patient associations and support groups should be developed and integrated into the national TB response.

8 Standard criteria and guidelines for the provision of palliative care centres should be developed for MDR-TB and XDR-TB patients who are not cured.

9 Dynamics of human resources for TB control for the next 5–10 years should be assessed with an estimate of the potential gap versus the needs, and measures should be taken to ensure that adequate resources are available.

[2] *Roadmap to prevent and combat drug-resistant tuberculosis. The Consolidated Action Plan to Prevent and Combat Multidrug- and Extensively Drug-Resistant Tuberculosis in the WHO European Region 2011–2015.* Copenhagen, WHO Regional Office for Europe, 2011 (http://www.euro.who.int/en/what-we-publish/abstracts/roadmap-to-prevent-and-combat-drug-resistant-tuberculosis, accessed 20 March 2013).

1. Introduction

At the request of the Minister of Health of Kazakhstan and on the instructions of the WHO Regional Director for Europe, the TB and multidrug-resistant/extensively drug-resistant TB (M/XDR-TB) programme of the WHO Regional Office for Europe conducted an extensive programme review of TB prevention, control and care in Kazakhstan from 10 to 16 May 2012. The previous extensive programme review had taken place in 2007; in the meantime, the country had hosted several technical assistance missions each year by the Regional Office and its partners, including a Green Light Committee (GLC) Europe mission in 2011.

Kazakhstan has the highest notification rate of TB cases in the WHO European Region. In 2011, the country reported around 23 000 TB cases (including 18 000 new and relapse cases), which is equivalent to 144 per 100 000 population. In the same year, 3700 MDR-TB cases were detected (out of an estimated 5400 MDR-TB cases among notified TB cases).

The reviewers made a number of recommendations to improve the programme. These are shown in this report in the relevant sections, with a more detailed list in Annex 1. The main focus should be on: expansion of the programmatic management of drug-resistant TB, introduction and roll-out of molecular diagnosis of TB and MDR-TB, expansion of ambulatory treatment of patients, and home-based care and day-care treatment including all eligible patients, particularly sputum-smear-negative patients (as well as sputum-smear-negative MDR-TB patients). Hospitalization practices need to be rationalized in order: (i) to prevent the spread of drug resistance, and (ii) to use the available resources more efficiently by reallocating the funds saved by reducing the number of hospitals to expand ambulatory treatment, social support for patients and the number of health-care providers. Examples of the involvement of civil society organizations and provision of an integrated continuum of care (transfer of released patients from prison to civilian sector) need to be expanded across the country.

1.1 Process

With the assistance of the WHO country office and in close coordination with the national TB control programme and partners including the United States Agency for International Development (USAID), CDC and the Global Drug Facility (GDF), a team of 15 international experts conducted the country programme review (programme in Annex 2). The team was divided into four teams which visited Almaty City, Almatinskaya Oblast, Akmolinskaya Oblast and South Kazakhstan Oblast. They reviewed all technical reports, surveillance data, national reports and epidemiological data, and interviewed staff in the governors' offices, chief oblast doctors, chief TB physicians, health-care staff, the State Sanitary-Epidemiological Service, staff in polyclinics, the TB laboratory services, HIV/AIDS centres, narcotics centres, members of nongovernmental organizations and country coordination mechanisms and patients (list of people met in Annex 3). The Akmolinskaya Oblast team had a meeting with the prison health authorities. The South Kazakhstan team visited the prison TB services. The oblasts and sites to be visited were suggested by the review team and agreed with the national TB programme. The review team spent three days on the field visit and one full day on visiting the national TB centre, the national reference laboratory and the academic and medical education centres.

TB prevention, control and care interventions were assessed on the basis of the six building blocks of the health system defined by WHO: service delivery, health workforce, information, medicines, financing and governance.

2. Background information

The Republic of Kazakhstan is situated in central Asia and Europe. It is the ninth largest country in the world, covering an area of 2 727 300 km^2. The country has a population of 16.6 million people belonging to 131 different ethnicities, the largest of which are Kazakh (63.1%) and Russian (23.7%), followed by Uzbek (2.9%), Ukrainian (2.1%), Uyghur (1.4%), Tatar (1.3%), German (1.1%) and other ethnicities (4.5%).[1] The average population density is less than six people per square kilometre. The official languages are Kazakh and Russian.

Astana City (population: 709 000) has been the capital of Kazakhstan since 1997. Otherwise, the biggest cities are the former capital, Almaty (population 1 438 000), Shymkent (630 000) and Karagandy (472 000).

Kazakhstan is divided into 14 oblasts and the two independent cities of Astana and Almaty. All oblasts and the two independent cities are further subdivided into rayons.

Kazakhstan is an upper-middle-income country with a per capita gross domestic product of US$ 11 245 in 2011. The economy has recovered well from the economic and financial crisis that occurred after the country's independence in 1991, and, more recently, the global financial crisis in 2008/2009. The economy is growing well thanks to the country's vast natural resources and the recent increase in oil prices. Agriculture remains one of the biggest employers in the country, with almost one third of the entire population working in this sector. Poverty rates have been decreasing substantially over recent years, from 46.7% in 2001 to 6.5% in 2010. However, there is a large difference in poverty rates between urban and rural areas. Education is universal and mandatory; in 2009, the adult literacy rate was 99.7% (United Nations and World Bank data).

2.1 Health-care system

Kazakhstan's health-care system is based on the former Soviet Semashko model of health care. The basic principle of this system is that health should be easily accessible and free of charge for the entire population; the system is generally characterized by common organizational principles and centralization; priority of child and maternal care; unity of prevention and treatment; elimination of the social causes of disease; public involvement in health activities. Necessary reforms in health-care financing and infrastructure were set out in the Law on the Health-Care System of 2003. Health has since been recognized as one of the major priorities for socioeconomic development in the State Health-Care Development Programme.

The health-care system is hierarchically organized through the Ministry of Health, which sets out the strategy for health care and protection, approves normative and legal acts on health, plans national budget expenditure and is responsible for health information, recording and reporting. Health care is administered mainly by the health administrations of the 14 oblasts and Almaty and Astana Cities, which operate most of the hospitals and polyclinics in the country. The rayons are subordinate to the oblast administrations and provide primary and basic secondary care. Residents are assigned to polyclinics (or health-care posts in rural areas), which are responsible for preventive and primary health care. Polyclinics, sanatoria and hospitals are usually State-owned and operated, whereas some health care organizations such as hospitals or large polyclinics are now legally permitted to act independently and manage their own funds *(1)*.

[1] Figures from early 2010. Source: Agency of Statistics of the Republic of Kazakhstan.

Parallel health-care systems exist within some of the ministries and State institutions, such as the Ministry of Internal Affairs and Ministry of Defence, or for employees of the Kazakh railways and several other national companies.

The health-care system in Kazakhstan is traditionally supported by SES, which is administered in a separate and independent vertical structure, from the national to the rayon level. Traditionally, SES is responsible for communicable disease prevention and control, immunization, environmental health, work safety and food/water safety.

2.2 TB prevention, care and control

2.2.1 TB prevention

Traditionally, TB prevention in Kazakhstan is organized collaboratively between SES, the primary health care service and the TB control services.

Bacille Calmette-Guerin (BCG) vaccination is administered to infants four to five days after birth by nurses trained and licensed for BCG vaccination. Children who are tuberculin-skin-test-(TST) negative at the age of six to seven years are revaccinated. In 2011, BCG was administered to a total of 492 000 children. BCG coverage was 97.9% of all neonates and 98.7% of children suitable for revaccination.

Active TB case-finding remains an important milestone of TB prevention in Kazakhstan. Mass TST screenings are organized for all children aged six to seven years and annual TST screenings are conducted for children considered at risk of TB at the ages of 7–17 years. Children diagnosed with latent TB infection are started on isoniazid preventive therapy (IPT).

Radiological screening is organized as follows: annual X-ray/fluorography screening is conducted on a mandatory basis for defined risk groups. Individuals are assigned to risk groups either on the basis of high TB risk (former TB cases, homeless people, former prison inmates, HIV-positive people, health-care professionals) or on the basis of frequent contact with large population groups (such as students, soldiers, people working as teachers or in the food industry). Individuals with radiological findings indicative of TB consequently undergo sputum smear and culture investigation.

Individuals are registered in risk groups at polyclinics, and medical staff in the polyclinics ensure that screening is regularly performed. Further, periodical population screenings are organized in areas with reported high rates of TB using mobile X-ray (fluorography) units. These mass screenings are conducted independently of the individual risk of TB. A plan is developed by SES on a regular basis for selecting areas for population screening. The polyclinics and SES are jointly responsible for conducting such screening. In 2011, nearly 7.69 million fluorographic examinations were made for active TB case-finding in Kazakhstan, compared to 2.91 million in 1999. Of the TB cases notified in 2011, 52.8% were identified via active case-finding by the measures described above.

Contact investigation is routinely conducted for sputum-smear-positive TB cases. TB physicians and SES representatives visit the households of TB cases. Household and other close contacts are invited to the TB dispensary for clinical examination, TST and X-ray/fluorography. Contacts are followed up at six-month intervals for one year in order to exclude latent TB infection or active TB.

Strengthening prevention of TB transmission is an important aspect of TB control in Kazakhstan. An infection control group has been established in 2011 by request of the Ministry of Health in order to assess the risk of hospital infection and the situation of infection control in the oblasts (see Section 4.2.4, Infection control, for further information). Hospital infection control measures such as respirators, gloves, protective clothing and ultraviolet (UV) lamps are provided in health-care facilities and laboratories throughout the country.

2.2.2 TB health care and control

The Ministry of Health has overall responsibility for TB control in the country. It discharges this function through the Central Unit of the National Tuberculosis Programme, represented by NCTP, involves the Ministry of Justice and other governmental entities and collaborates with nongovernmental organizations and international partners in the planning, implementation, monitoring and evaluation of activities. The NCTP is the leading national anti-TB institution that provides supervisory, educational, treatment and diagnostic, consultative and highly specialized TB services for the population of Kazakhstan. TB is regarded as a socially significant disease with a substantial negative impact on society.

TB control in the country is organized within a vertical system, with NCTP at the national level and an extensive network of 309 TB facilities at the oblast and rayon level (as at 2011). At the oblast level, TB managers actively involve primary health care services, which are part of TB control. Facilities include 65 TB dispensaries, 61 TB hospitals, 30 TB sanatoria and 153 smaller TB units. In 2011, a total of 1480 TB physicians were employed in TB health-care institutions.

The primary health care system is widely involved in TB detection and care at the municipal level. Primary health care doctors are responsible for TB detection and completion of treatment of TB patients following their discharge from hospital. In rural areas, this role is played by *feldshers* (medical assistants) at *feldsher*-obstetric health points. Special systems of control and monetary benefits support primary health care involvement.

Rayon TB dispensaries form the basic management units for TB care and control. They are closely linked with primary health care services (polyclinics and health posts). TB dispensaries are responsible for diagnosing TB patients and organizing patient referral to TB hospitals for treatment, and for ensuring follow-up and ambulatory care of TB patients. Rayon TB dispensaries further act as basic recording and reporting units. They are responsible for recording new and retreatment TB cases diagnosed in the rayon and regularly reporting TB cases and treatment outcomes to the oblast TB dispensaries (OTBD), which act as supervising units. The OTBD provide sputum culture and DST for TB patients and directly report to NCTP at national level.

Inpatient care is provided in (disease-specific) TB hospitals. In some oblasts there are hospitals dedicated to a certain category of patients, including those for sputum-smear-positive, sputum smear-negative, MDR-TB cases, so called chronic TB cases, and children. The majority of hospitals host a mix of cases. Extrapulmonary TB cases are treated only at oblast level (at the OTBD). There are also treatment facilities for symptomatic (palliative) and forced treatment. TB sanatoria serve as medical, preventive and social-care institutions, for children after exposure to TB, children and adults with latent TB infection and children and adults in convalescence after anti-TB treatment.

TB cases in Kazakhstan are identified via passive and active case-finding (see above). Upon suspicion of TB, individuals undergo clinical, radiological and sputum-smear examination at the primary health care level (polyclinics, health-care posts). TB suspects are further referred to the rayon TB dispensaries, where the diagnosis is confirmed and TB cases are registered for treatment. Culture and DST are conducted in laboratories at oblast level. A central doctoral commission at the oblast level periodically reviews patient files and confirms the diagnosis of TB, the treatment regimen provided, changes in the regimen and the treatment outcome. Patients are treated during the intensive phase of treatment in rayon and oblast hospitals. Severe cases can be referred to an NCTP TB hospital at national level. Notification of TB is mandatory. Separate TB treatment facilities exist within the penitentiary system under the supervision of the Ministry of Justice.

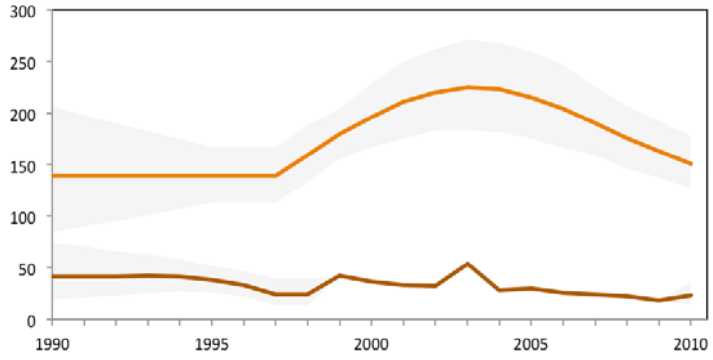
As well as implementing the DOTS strategy (the basic treatment package that underpins the WHO Stop TB Strategy), Kazakhstan has adopted the International Standards for Tuberculosis Care *(2)*. Standard and mandatory recording and reporting of TB cases and monitoring of treatment outcomes form an integral part of TB control throughout the country (see Section 6, Information).

2.2.3 Epidemiological situation of TB[2]

TB incidence and mortality (2010 estimates)

There were an estimated 24 000 incident cases of TB (uncertainty range: 20 000–28 000) in Kazakhstan in 2010, equivalent to a rate of 151 (127–177) per 100 000 population. After a substantial increase during the late 1990s and early 2000s, TB incidence peaked in 2003 and has been decreasing since then almost to mid-1990 levels (Fig. 1). Kazakhstan currently ranks fifth in the WHO European Region for the estimated number of incident TB cases, behind the Russian Federation, Ukraine, Uzbekistan and Romania. It ranks fourth by estimated incidence per 100 000 population. In 2010, an estimated 3600 (2200–5800) people not infected with HIV died from TB, 23 (14–36) per 100 000 of the population (Fig. 1).

Fig. 1. Estimated TB incidence (orange) and mortality (brown) per 100 000 population, Kazakhstan, 1990–2010[a]



[a] Grey areas represent uncertainty intervals.

TB case notification (overall)

In 2011, a total of 23 075 TB cases were notified (143.9 per 100 000 of the population). A full breakdown of TB case notification in Kazakhstan is shown in Table 1.

[2] Data reproduced in this section were obtained from the National Tuberculosis Database operated by NCTP.

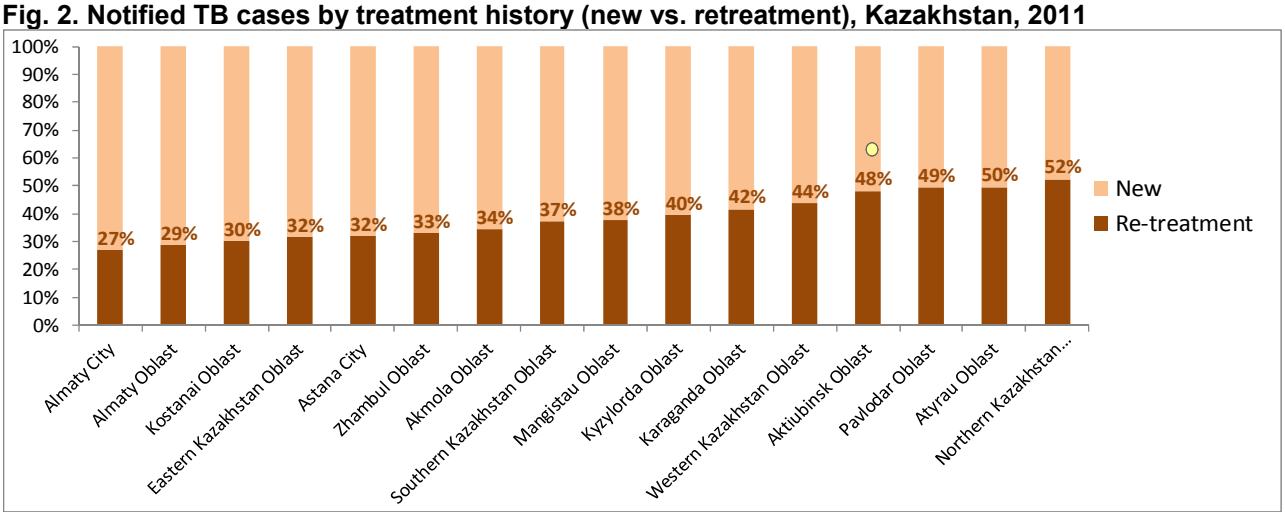
Table 1. TB case notification in Kazakhstan, 2011

	Total Cases		New cases				Re-treatment cases		
	Number	Rate	Smear-positive	Smear-negative	Smear unknown / not done	Extra-pulmonary	Relapse	After default	After failure
Akmola Oblast	1150	155.8	263	424	1	66	152	31	50
Aktiubinsk Oblast	1153	160.4	124	382	9	83	249	16	7
Almaty Oblast	2016	119.1	543	666	9	215	393	3	26
Atyrau Oblast	1148	223.6	210	346	0	22	280	42	24
Western Kazakhstan Oblast	933	149.4	95	365	6	59	159	8	18
Zhambul Oblast	1233	118.1	242	475	3	103	230	11	19
Karaganda Oblast	1926	142.5	328	569	55	170	247	102	89
Kostanai Oblast	1358	153.2	307	513	0	126	156	49	42
Kyzylorda Oblast	1145	166.0	263	332	2	95	224	79	23
Mangistau Oblast	735	164.7	143	265	0	50	108	6	11
Southern Kazakhstan Oblast	2788	114.8	413	879	12	445	405	78	112
Pavlodar Oblast	1344	179.0	137	448	10	86	291	21	21
Northern Kazakhstan Oblast	1051	163.4	141	301	18	43	360	5	37
Eastern Kazakhstan Oblast	2264	159.6	391	939	9	205	332	38	58
Astana City	1481	216.5	235	640	0	129	91	72	41
Almaty City	1350	96.1	322	548	16	99	181	6	28
KAZAKHSTAN	23075	143.9	4157	8092	150	1996	3858	567	606

Cases by treatment history

Of the 23 075 TB cases notified, 14 395 (62.4%) were new (i.e. not previously treated) cases and 8680 (37.6%) were retreatment cases. Of all retreatment cases, 44.4% were relapse cases, 6.5% retreatment cases after treatment default, 7.0% retreatment cases after treatment failure and 42.0% other retreatment cases.[3] The proportion of retreatment cases varied across the oblasts between 27.0% and 52.1% of all TB cases notified (Fig. 2).

Fig. 2. Notified TB cases by treatment history (new vs. retreatment), Kazakhstan, 2011



Cases by site of disease

Of the 14 395 new TB cases notified, 12 399 (86.1%) were pulmonary TB cases and 1996 (13.9%) were extrapulmonary TB cases. The proportion of extrapulmonary TB cases varied across the oblasts between 3.8% and 25.4% of all new TB cases notified.

[3] "Other retreatment" includes smear-negative retreatment cases after treatment success and extrapulmonary retreatment cases.

Cases by bacteriology

Among the 12 399 new pulmonary TB cases notified in 2011, TB was bacteriologically confirmed in 6161 cases (49.7%). Of the bacteriologically confirmed cases, 4157 were sputum-smear-positive, corresponding to 33.5% of all new pulmonary TB cases. An additional 2004 new pulmonary TB cases were confirmed only by TB culture. Bacteriological confirmation of TB was more frequent among the 8304 retreatment pulmonary TB cases notified in the same year. The rate of bacteriologically confirmed TB (sputum smear or culture) was 71.7%, and 58.3% (4845/8304) were sputum-smear-positive. Tables 2 and 3 provide an overview of bacteriological confirmation of new and retreatment pulmonary TB cases notified in 2011.

Table 2. Sputum-smear and culture results among new pulmonary TB cases, Kazakhstan, 2011

	CULTURE RESULTS							
	Positive		Negative		Unknown / Not done		TOTAL	
Smear-positive	3289	(79.1%)	676	(16.3%)	192	(4.6%)	4157	(100.0%)
Smear-negative	1915	(23.7%)	5712	(70.6%)	465	(5.7%)	8092	(100.0%)
Smear-unknown	89	(59.3%)	36	(24.0%)	25	(16.7%)	150	(100.0%)
TOTAL	**5293**	**(42.7%)**	**6424**	**(51.8%)**	**682**	**(5.5%)**	**12399**	**(100.0%)**

Table 3. Sputum-smear and culture results among retreatment pulmonary TB cases, Kazakhstan, 2011

	CULTURE RESULTS							
	Positive		Negative		Unknown / Not done		TOTAL	
Smear-positive	3753	(77.5%)	832	(17.2%)	260	(5.4%)	4845	(100.0%)
Smear-negative	1008	(30.6%)	2002	(60.9%)	279	(8.5%)	3289	(100.0%)
Smear-unknown	101	(59.4%)	52	(30.6%)	17	(10.0%)	170	(100.0%)
TOTAL	**4862**	**(58.6%)**	**2886**	**(34.8%)**	**556**	**(6.7%)**	**8304**	**(100.0%)**

Bacteriological confirmation of TB varied considerably across the oblasts: between 20.4% and 44.6% of new pulmonary TB cases and between 45.4% and 76.6% of retreatment pulmonary TB cases were sputum-smear-positive (Fig. 3a, 3b).

Among all sputum-smear-positive pulmonary TB cases, the proportion of cases with a positive culture result (Tables 2 and 3) varied across the oblasts between 54.6% and 92.8% (Fig. 4). The proportion of negative culture results varied between 5.4% and 41.4% of all sputum-smear-positive TB cases (Fig. 5). High rates of sputum-smear-positive but culture-negative cases in some oblasts suggest that there may be problems with the storage or processing of culture samples. The varying practices and yields of active TB case-finding in the oblasts is considered a major underlying determinant of bacteriological confirmation of new TB cases in Kazakhstan (Fig. 5a, 5b).

Fig. 3a. Bacteriological confirmation of notified pulmonary TB cases by oblast, 2011: new pulmonary TB cases

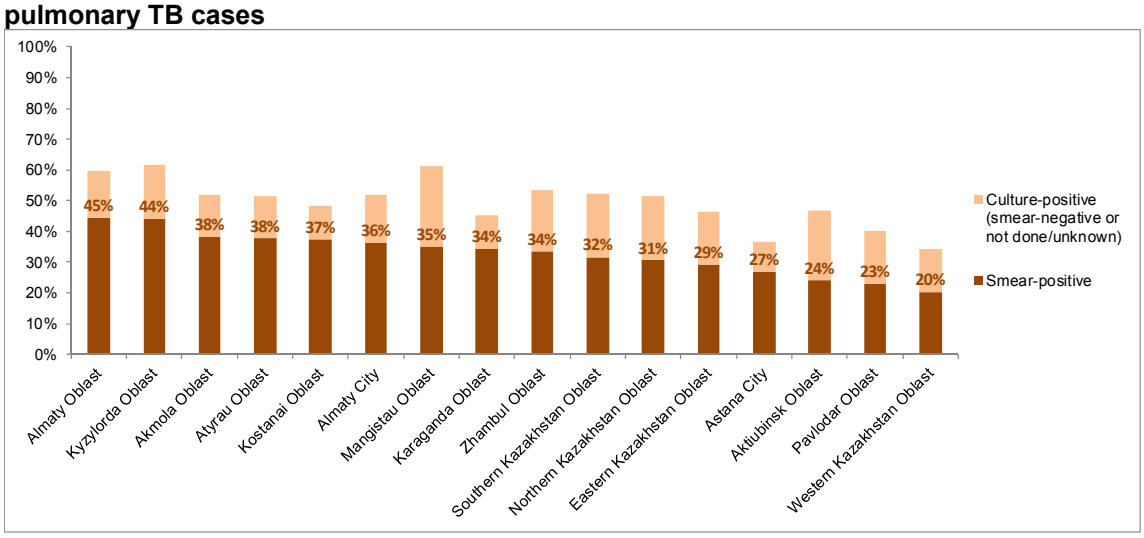


Fig. 3b. Bacteriological confirmation of notified pulmonary TB cases, by oblast, 2011: retreatment cases

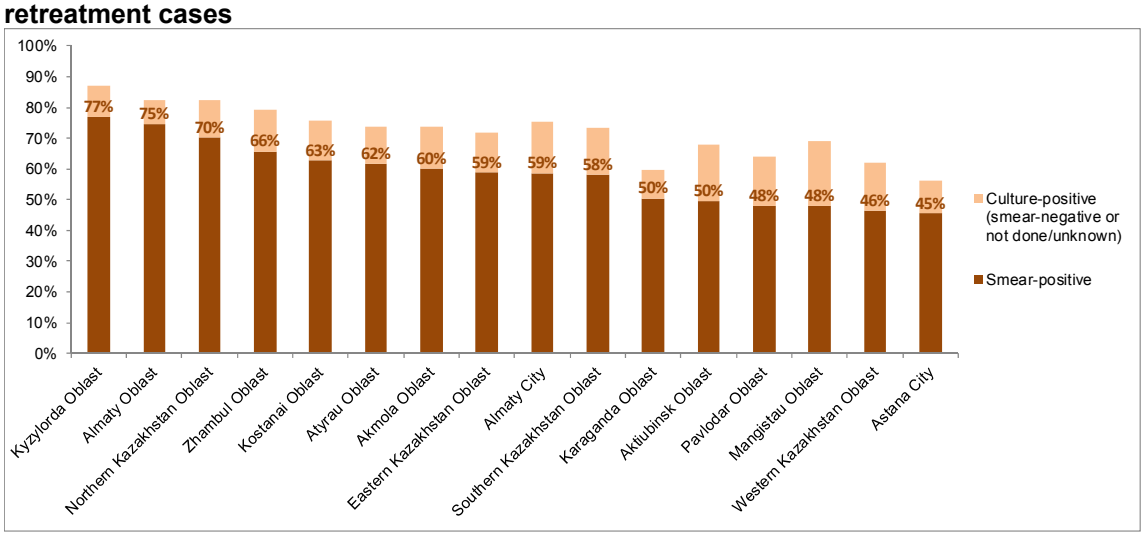


Fig. 4. Culture results of sputum-smear-positive TB cases (new and retreatment combined), by oblast, Kazakhstan, 2011

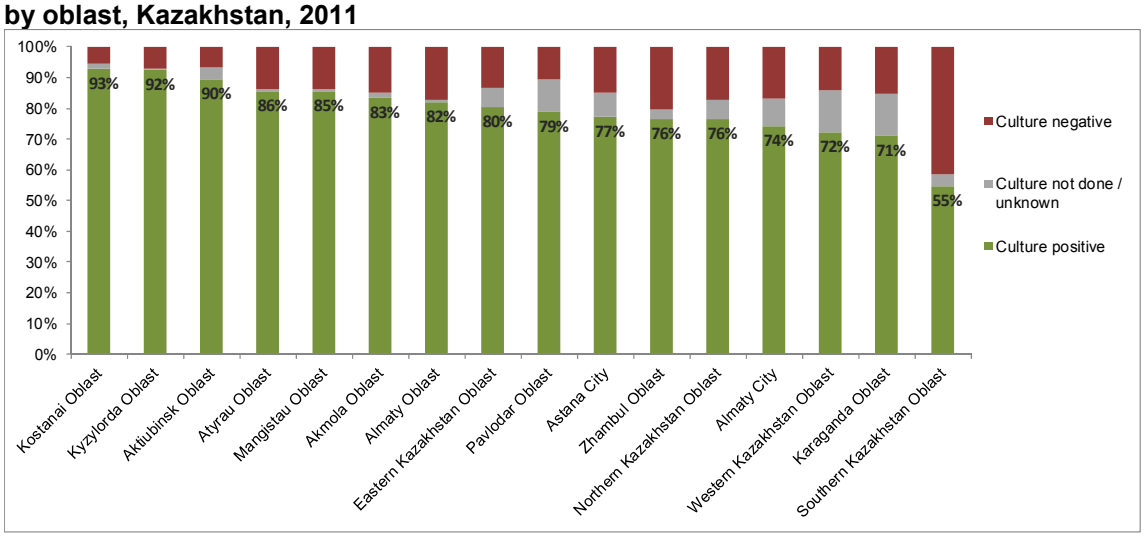


Fig. 5. Correlation between the proportion of new cases identified via active case-finding (screening) and the proportion of new pulmonary TB cases confirmed by sputum-smear microscopy (Fig. 5a) and by any laboratory method (sputum-smear microscopy or culture, Fig. 5b) in the oblasts of Kazakhstan, 2011

Fig. 5a (slope: -0.48; P=0.029; R^2=0.32)

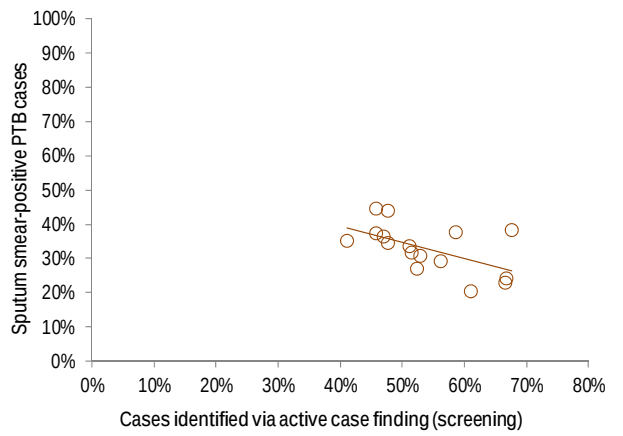
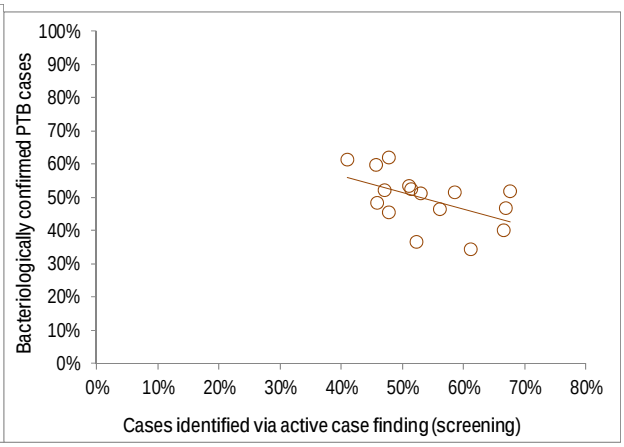


Fig. 5b (slope: -0.51; P=0.035; R^2=0.28)

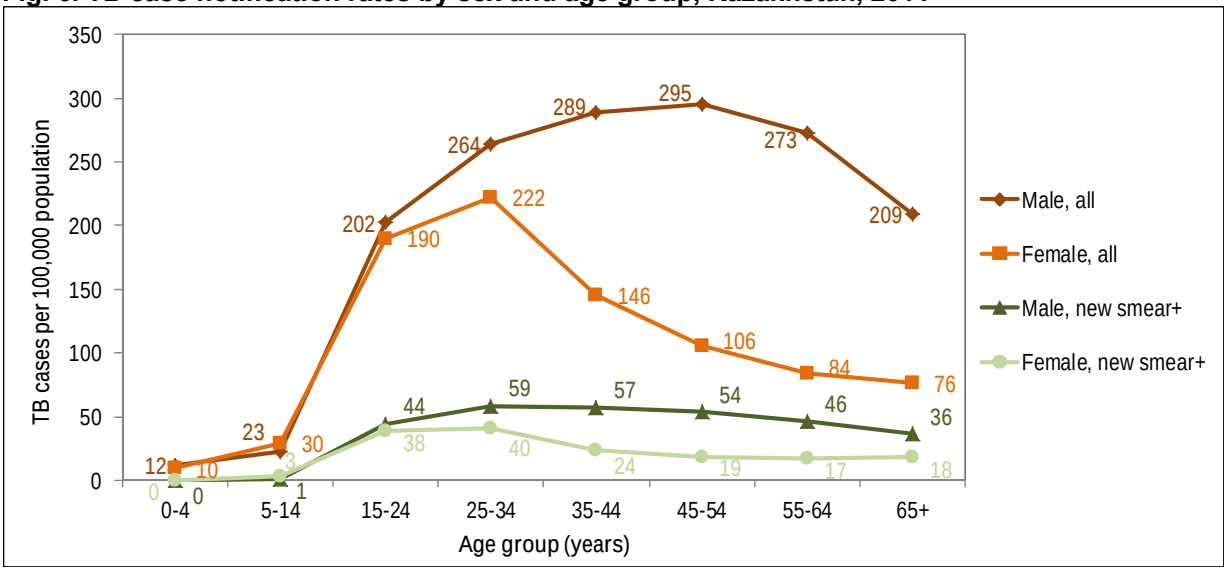


Case notification by age and sex

Of all TB cases notified in 2010, 59.7% were males, and 3.1% were children aged 0–14 years. TB case notification rates were similar among males and females up to 15–24 years of age. Among females, case-notification rates reached a peak in the age group 25–34 years and declined thereafter. Rates among males continued to increase with age, were highest in the age group 45–54 years, and declined thereafter (Fig. 6).

The rates of new smear-positive TB cases were low, especially among children. Trends across all age groups were similar to those for all case notification rates (Fig. 6).

Fig. 6. TB case notification rates by sex and age group, Kazakhstan, 2011



Drug-resistant and multidrug-resistant TB

Kazakhstan is among the 15 highest MDR-TB-burden countries in the Region, with 5500–6800 MDR-TB cases estimated among notified TB cases in 2010. It is estimated that 14% of all notified new cases and 45% of notified retreatment cases are multidrug-resistant. DST in respect of first-line drugs is mandatory for all new and retreatment cases. DST coverage in 2011 was high, with DST results available for 93.8% of culture-confirmed new and 93.6% of culture-confirmed retreatment pulmonary TB cases notified (Table 4). There was relatively little variation in DST coverage among culture-confirmed TB cases across the oblasts – 86.5–97.7% among new and 86.9–98.8% among retreatment cases. However, compared with the overall number of pulmonary TB cases, DST coverage is low, given that only 42.7% of new pulmonary TB cases and 58.6% of retreatment pulmonary TB cases are culture-positive (see Tables 2 and 3).

Table 4. Culture and DST coverage, detected vs. estimated MDR-TB cases, Kazakhstan, 2011[a]

	New cases		Re-treatment cases		Total cases	
	N	%	N	%	N	%
PTB cases notified	12399	-	8304	-	20703	-
- with a culture result	11717	94.5%	7748	93.3%	19465	94.0%
- culture-positive	5293	42.7%	4862	58.6%	10155	49.1%
Culture-positive PTB cases with DST result available	4963	93.8%	4551	93.6%	9514	93.7%
MDR-TB cases detected among notified PTB cases	1453	11.7%	2286	27.5%	3739	18.1%
MDR-TB cases estimated among notified PTB cases	1700	14.0%	3700	45.0%	5400	26.1%

[a] The estimated numbers of MDR-TB cases are based on the estimated proportions of MDR-TB among new and retreatment cases: the figures are not yet officially confirmed by WHO.

An overview of DST results among new and retreatment pulmonary TB cases is shown in Fig. 7a. The absolute number of MDR-TB cases detected increased by more than 30% between 2009 and 2011 (Fig. 7b) and is expected to increase further during the forthcoming years. This increase is attributable to an increase in DST coverage (Fig. 7b), rather than an increase in MDR-TB prevalence. New diagnostic tools such as the WHO-endorsed GenoType MTBDR*plus* (Hain) and the Xpert MTB/RIF assay are currently rolled-out or in the pilot stage. However, countrywide data are not yet available. These new tests will further increase the number of MDR-TB cases detected, with important implications for the provision of second-line drugs in the country.

Fig. 7a. DST results among culture-positive TB cases, Kazakhstan, 2011

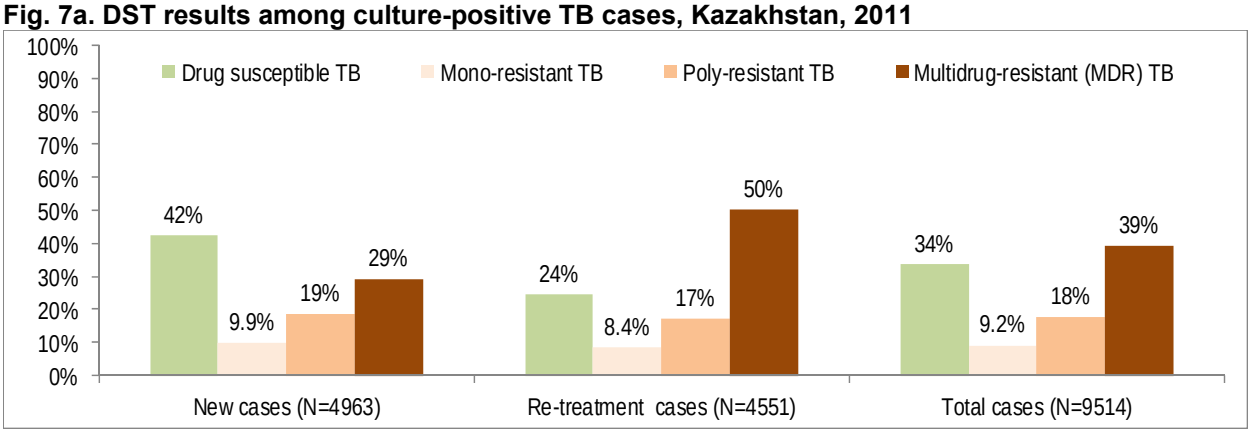
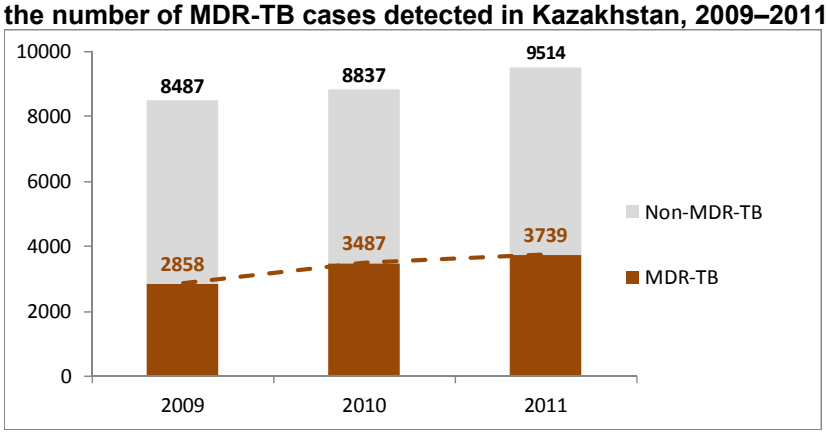


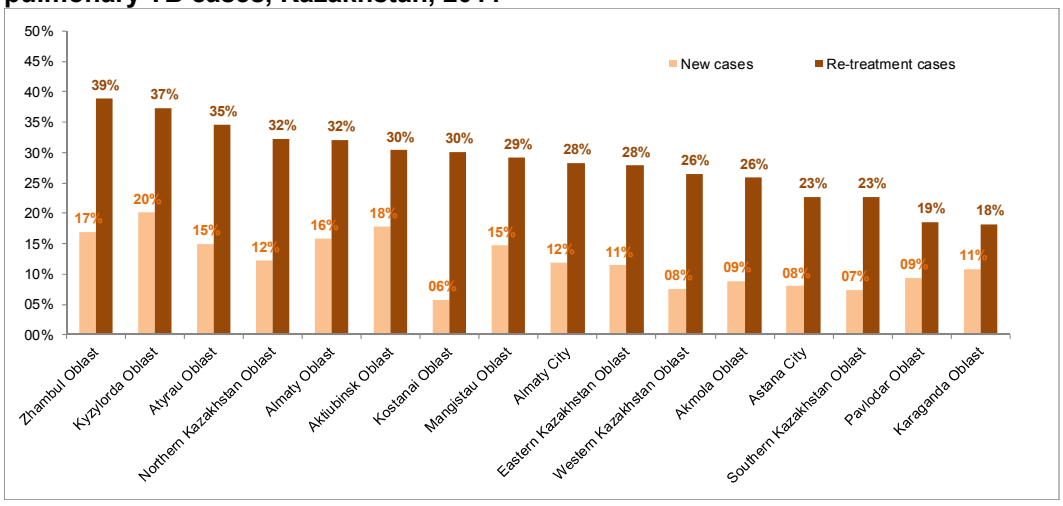
Fig. 7b. Trends of DST coverage among pulmonary TB cases and the number of MDR-TB cases detected in Kazakhstan, 2009–2011



Note: Bold black numbers on top of the bars show the total number of pulmonary TB cases with a DST result available.

Detection of MDR-TB is still below the estimated figures: In 2011, 11.7% of new pulmonary TB cases (vs. estimated: 14%) and 27.5% of retreatment cases (vs. 45%) were detected (Table 4). The number of MDR-TB cases detected varied considerably across the oblasts, between 5.7% and 20.1% of new pulmonary TB cases and between 18.2% and 38.8% of retreatment pulmonary TB cases (Fig. 8). This variation is considered to be mainly attributable to the variation of culture coverage and confirmation in the country (see Section 6.1.7, Drug-resistance surveillance).

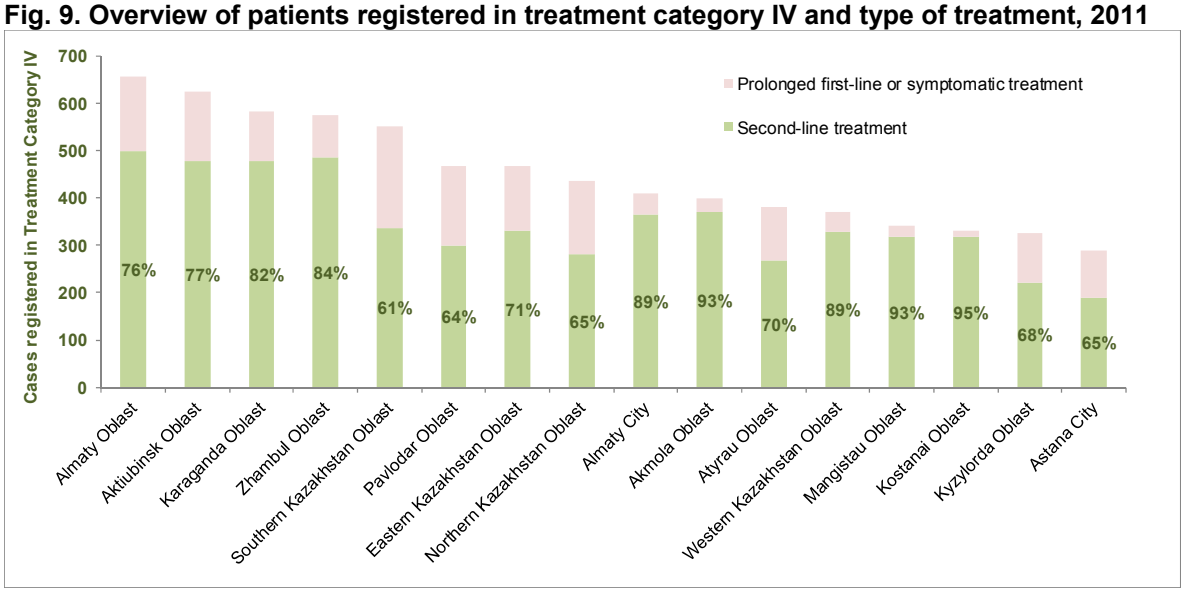
Fig. 8. Proportions of MDR-TB cases detected among notified new and retreatment pulmonary TB cases, Kazakhstan, 2011[a]



[a] All new and retreatment PTB cases, regardless of culture result.

A total of 7207 TB cases were registered under treatment category IV (MDR/XDR-TB cases). This treatment category includes laboratory-confirmed MDR/XDR-TB cases and those without confirmation, but after failure of first-line treatment. Of these, 5556 (77.2%) were started on a second-line treatment regimen in 2011 (2010: 5705). The remaining 1642 (22.8%) cases were treated with a prolonged first-line regimen or were subjected to symptomatic (palliative) treatment. An overview of the number of cases registered under treatment category IV and the type of treatment across the oblasts is shown in Fig. 9.

Fig. 9. Overview of patients registered in treatment category IV and type of treatment, 2011

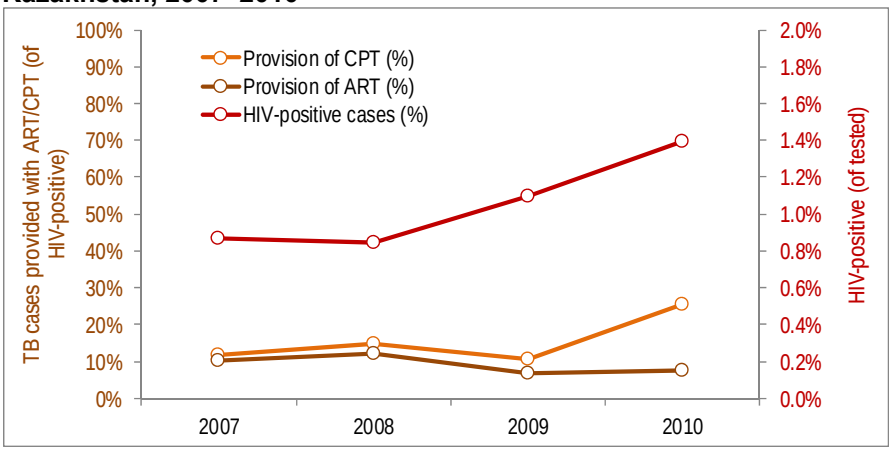


Note: Percentages denote proportions of cases started on second-line treatment.

TB and HIV coinfection

HIV testing coverage among notified TB cases is high: in 2010, a total of 23 854 people with TB were tested or knew their HIV status in Kazakhstan – 96% of all TB cases notified in the same year. Of all cases tested or with known HIV status in 2010, 333 (1.4%) were HIV-positive. The rate of notified TB cases with HIV coinfection increased slightly over the past years but remains at a low level (Fig. 10). Data on the provision of co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) over the past years suggest that both are currently not regularly provided for HIV-positive patients (Fig. 10). In 2010, only 85 (25.5%) of 333 HIV-positive TB cases were started or continued on CPT, and 22 (6.6%) were started or continued on ART.

Fig. 10. Proportion of HIV-positive TB cases, provision of CPT and ART, Kazakhstan, 2007–2010



2.2.4 Treatment outcomes

Data for the 2009 cohort of new sputum-smear-positive TB cases show that treatment success is mainly hampered by the high proportion of cases where treatment fails, most often due to drug-resistant or multidrug-resistant TB, while death and default rates are relatively low (Table 5).

Table 5. Treatment outcomes for different groups of TB cases in Kazakhstan, 2009 cohort (2008 for MDR-TB)

Cohort	Cases registered	Cases included in cohort analysis	% included	Cured	Completed	Died	Failed	Defaulted	Not evaluated
New Cases, smear-positive	5213	5355	103%	62%	0.4%	3.7%	30%	2.9%	1.5%
New Cases, HIV-positive	325	70	22%	43%	-	19%	23%	11%	-
Re-treatment cases	9371	9392	100%	22%	27%	9.1%	34%	5.7%	2.5%
MDR-TB cases	3310	2268	69%	63%	11%	5%	5%	4%	-

The number of HIV-positive TB cases included in cohort analysis is less than one quarter of all HIV-positive TB cases in 2009, and data suggest that the default rate is higher among these cases. Treatment success among MDR-TB cases included in the 2009 cohort was remarkably high at 74%. However, uncertainty remains about the criteria for inclusion in the cohort analysis (only 69% included: Table 5).

Notably, 1642 individuals registered in treatment category IV were not provided with second-line treatment in 2011, many of them being referred for symptomatic (palliative) care. It remains uncertain whether, and according to which criteria, these cases are included in or excluded from cohort analysis. Selection bias is likely if cases with severe disease or those with an assumed high risk of default are excluded from second-line treatment and subsequent cohort analysis.

2.2.5 Regulation of TB care delivery system

NCTP has issued Guidelines for Tuberculosis Control in the Republic of Kazakhstan, the Guide on Management of Cases of Multidrug Resistance in the Republic of Kazakhstan and the Guide for the Organization of TB Care in the Penal System of the Republic of Kazakhstan. These documents outline a number of key interventions for improved TB control, such as increasing the involvement of primary health care in TB case detection, referral, follow-up, information and educational activities at community and family level; upgrade of the existing TB surveillance, recording and reporting system to international standards; and scaling-up of diagnosis and treatment of drug-resistant TB cases according to evidence-based, internationally accepted guidelines.

The organization and responsibilities of different health-care institutions and providers are described in several regulatory documents recently endorsed by the Ministry of Health of the Republic of Kazakhstan, in particular Ministry of Health Decree No. 131 of 14 March 2011, Decree No. 218 of 25 April 2011 and Decree No. 404 of 17 June 2011.

These orders stipulate that TB control interventions are implemented by a cooperative effort of primary health care providers and specialized TB services; in particular, Decree No. 218 stipulates that primary health care providers are engaged in: 1) early detection by sputum-smear microscopy and mass miniature radiography among risk groups; 2) follow-up treatment under direct observation; and 3) information and educational activities on TB in the population.

In practice, however, the TB care-delivery system in Kazakhstan is strongly dominated by specialized TB service institutions. At the same time, the regulations and procedures pertaining to administration and coordination of TB care are rather vague. In particular, the “Instruction on detection, registration, treatment and dispensary observation of TB in primary health care organizations and anti-tuberculosis organizations”, contained in Annex 4 of Decree No. 218, states that treatment of TB patients should be carried out in two stages. The first stage (intensive phase) is

carried out mainly in hospital, although the possibility of ambulatory treatment is considered by the physician consultative committee. The second stage (continuation phase) is carried out predominantly in ambulatory or sanatorium conditions; the possibility or necessity of treatment in hospital is again decided by the committee. No criteria for hospitalization are stipulated by the Instruction; it merely stipulates that "hospitalization levels (rayon, inter-rayon, oblast and republican levels) are defined by the health-care administrations in the territories, taking into account the existing structure of TB service institutions with observance of infection control measures and taking into account epidemiological status", with division into the following groups:

1. TB patients without bacterioexcretion;
2. TB patients with bacterioexcretion of *M. tuberculosis* sensitive to first-line drugs;
3. TB patients with MDR-TB and XDR-TB receiving anti-TB drugs;
4. TB patients with MDR-TB and XDR-TB receiving symptomatic treatment;
5. TB patients on "forced treatment".

Further, the Instruction states that the priorities for hospitalization at rayon level are limited noncomplicated forms of TB with bacterioexcretion and extended and complicated forms of TB without bacterioexcretion or serious concomitant diseases. At oblast and republican level, priorities for hospitalization are complicated, extended forms of TB disease with or without bacterioexcretion, and patients with MDR-TB and XDR-TB.

Currently, strong emphasis continues to be placed on inpatient (hospital) treatment of TB cases. Although exact information on the proportion of cases who are hospitalized is not available, on the basis of the number of cases and hospital discharges it is possible to conclude that the vast majority of patients with TB undergo treatment in specialized TB hospitals. The next section describes the structure of specialized TB services and presents an analysis of performance of inpatient TB facilities.

2.2.6 Structure of specialized TB services

Kazakhstan has an extensive network of TB facilities. At the beginning of 2012, there was a total of 309 specialized TB service institutions in the country. Their types and countrywide numbers during the last four years, as well as distribution by region, are presented in Tables 6, 7.

Table 6. Number and type of specialized TB service institutions, Kazakhstan, 2009–2012

Type of facility	Beginning of 2009	Beginning of 2010	Beginning of 2011	Beginning of 2012
TB dispensaries	64	65	62	65
TB hospitals	72	67	64	61
Inpatient TB departments in general health-service facilities	15	13	20	6
Subtotal 1: acute inpatient facilities	**151**	**145**	**146**	**132**
TB cabinets	118	122	122	147
Subtotal 2: acute inpatient and outpatient facilities	**169**	**167**	**168**	**179**
TB sanatoria	31	31	30	30
TOTAL: all TB institutions	**300**	**298**	**298**	**309**

In addition to the listed institutions in oblasts, the NCTP functions as the only central (republican-level) institution. In the regions, there are oblast-level TB dispensaries, and the other institutions function at rayon or town level, although in a number of instances, inter-rayon

Table 7. Number and type of specialized TB service institutions by oblast, Kazakhstan, at the beginning of 2012

No.	Oblast	TB dispen-saries	TB hospi-tals	TB depart-ments	Subtotal 1: acute inpatient facilities	TB cabinets	Subtotal 2: acute inpatient and outpatient facilities	TB sana-toria	TOTAL: all TB insti-tutions
1	Akmola	4	0	1	**5**	17	**22**	0	**22**
2	Aktobe	1	5	1	**7**	15	**22**	2	**24**
3	Almaty Oblast	2	7	1	**10**	23	**33**	2	**35**
4	Atyrau	3	5	0	**8**	1	**9**	2	**11**
5	East Kazakhstan	5	4	1	**10**	15	**25**	3	**28**
6	Zhambyl	6	6	0	**12**	4	**16**	1	**17**
7	West Kazakhstan	1	9	0	**10**	8	**18**	2	**20**
8	Karaganda	5	0	1	**6**	16	**22**	7	**29**
9	Kyzyl-Orda	9	0	0	**9**	0	**9**	2	**11**
10	Kostanay	3	6	0	**9**	20	**29**	2	**31**
11	Mangistau	1	4	0	**5**	3	**8**	1	**9**
12	Pavlodar	1	11	0	**12**	6	**18**	1	**19**
13	North Kazakhstan	5	0	0	**5**	8	**13**	0	**13**
14	South Kazakhstan	14	4	1	**19**	0	**19**	3	**22**
15	Almaty City	4	0	0	**4**	4	**8**	2	**10**
16	Astana City	1	0	0	**1**	7	**8**	0	**8**
	TOTAL	**65**	**61**	**6**	**132**	**147**	**279**	**30**	**309**

arrangements (“regional” within oblasts) are also in place, which in most cases refer to hospitalization of patients from rayons without TB beds. There is no major difference in status and mode of work between dispensaries and hospitals, as most of TB hospitals at the rayon level carry out outpatient consultative functions as well. Outpatient TB cabinets exist in rayons without TB inpatient facilities and are organizationally part of the central rayon polyclinic.

As a result of the efforts to expand TB service infrastructure, initiated at the end of the 1990s, the number of acute inpatient TB facilities (TB dispensaries, TB hospitals and TB departments in general-profile hospitals at rayon level) increased from 118 in 1999 to 151 in 2008. During the four years that followed, the number of acute inpatient facilities decreased to 132 at the beginning of 2012, owing to the closure of several TB hospitals and departments at rayon level. However, these changes took place in a few oblasts only (mainly Aktobe, North Kazakhstan, Karaganda and East Kazakhstan oblasts), while in other territories the structure of TB services remained unchanged or merely underwent minor changes.

Currently, there are 13 798 specialized hospital beds for TB (including NCTP), or 83.1 TB beds per 100 000 population. This figure is the highest in the countries of the former Soviet Union and, indeed, the entire world. TB hospital bed capacity was highest in 2007 (equivalent to 97.2 per 100 000 population); in 2011, the network underwent some consolidation, with a reduction of about 900 beds countrywide (Fig. 11). Tables 8 and 9 present TB bed structure by profile for the last three years and distribution of bed capacity across the oblasts.

Despite the overall reduction in the number of beds over recent years (mostly in 2011), the number of beds for treatment of drug-resistant cases increased (830 beds were reprofiled for this purpose in 2009–2011, while the total number of beds for adults decreased by 740 during the same period). The number of beds for MDR-TB patients increased from 800 in 2006 to 2645 in 2012.

Fig. 11. Total number of TB hospital beds and rate per 100 000 population, Kazakhstan, 2000–2011

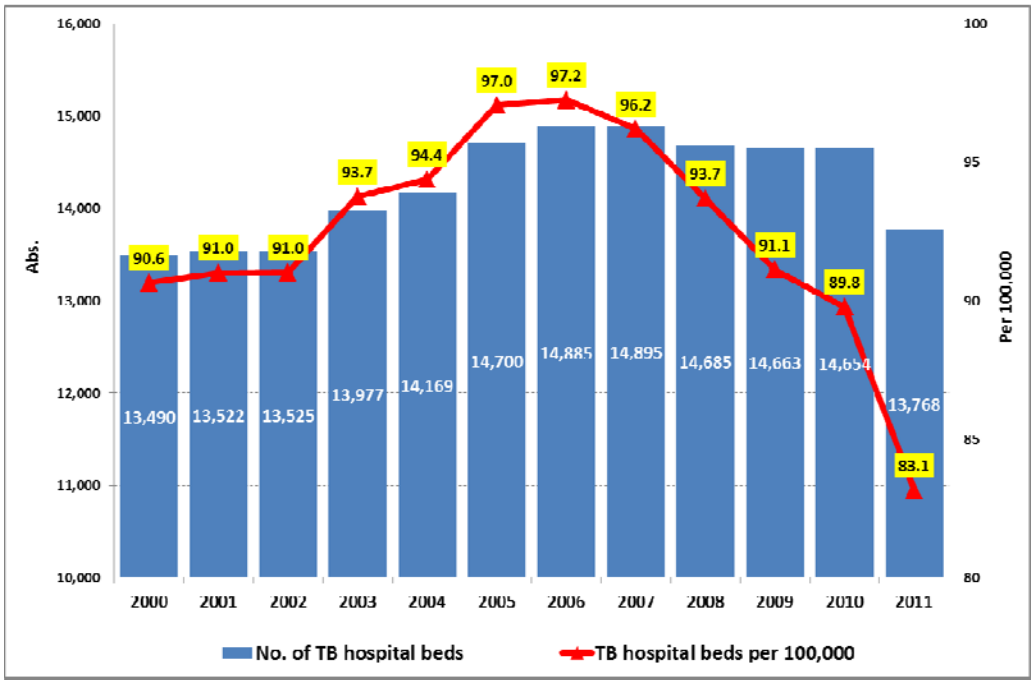


Table 8. Number of TB hospital beds by profile, 2009–2011

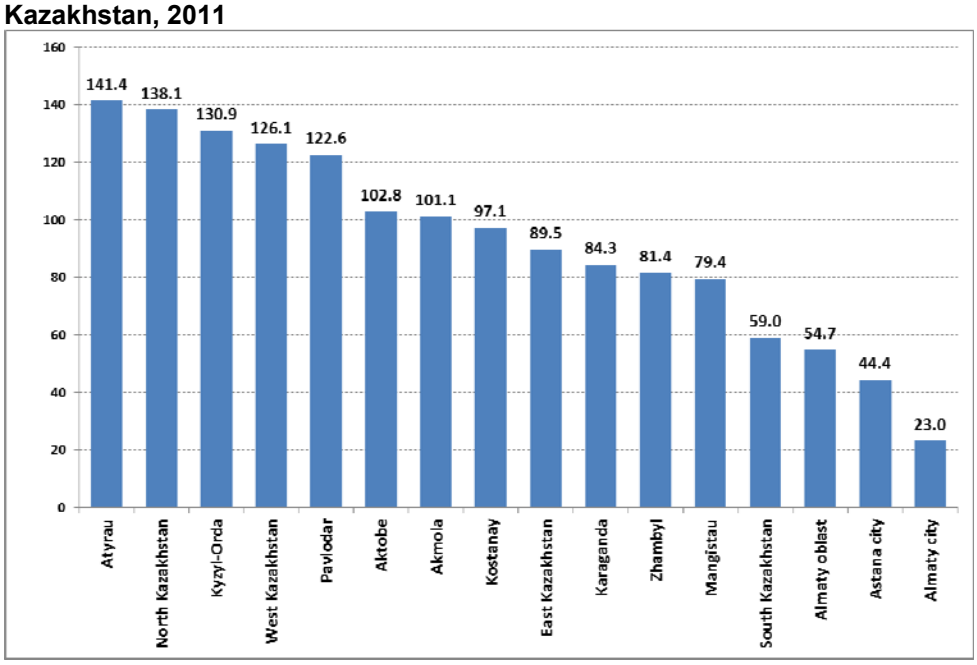
Hospital beds	2009	2010	2011	Change 2009–2011
Total number of TB hospital beds (absolute number) including:	14 663	14 654	13 768	– 895
- for adults	13 418	13 449	12 678	– 740
- for children	1 245	1 205	1 090	– 155
- for MDR-TB	1 895	2 100	2 725	830
- for “forced treatment”	550	640	610	60
- for symptomatic treatment of “chronic” patients	970	1 010	800	– 170

Table 9. Number of TB hospital beds by oblast, Kazakhstan, 2009–2011

No.	Oblast	2009	2010	2011
1	Akmola	760	760	740
2	Aktobe	860	855	804
3	Almaty Oblast	1 035	1 035	1 035
4	Atyrau	880	835	760
5	East Kazakhstan	1 330	1 330	1 250
6	Zhambyl	775	856	856
7	West Kazakhstan	745	770	770
8	Karaganda	1 243	1 238	1 143
9	Kyzyl-Orda	1 085	1 085	925
10	Kostanay	990	945	855
11	Mangistau	425	430	425
12	Pavlodar	960	940	915
13	North Kazakhstan	810	860	810
14	South Kazakhstan	1 730	1 730	1 530
15	Almaty City	300	330	330
16	Astana City	320	320	320
	Republican institutions	415	335	300
	TOTAL	14 663	14 654	13 768

Hospital infrastructure provision is uneven across the region, as illustrated by Fig. 12, which shows the number of TB hospital beds by oblast. The average supply of beds in the three best-served oblasts is 2.1 times higher than that of the three lowest oblasts (excluding Astana and

Fig. 12. Number of TB hospital beds per 100 000 population, by oblast, Kazakhstan, 2011



Almaty cities). These substantial differences reflect historical factors in service development rather than the real needs and/or differences in disease burden. Notably, the most substantial reductions in the number of TB beds in 2011 took place in South Kazakhstan (200 beds) and Kyzyl-Orda (160 beds), the oblasts located on the opposite sides of the chart.

There are 30 TB sanatoria in the country, with an average annual capacity of 3465 places (of which 2655 are intended for children and 810 for adults). The number of sanatoria has stayed constant since 2000, while the number of places has decreased by 650. There are sanatoria in most regions of the country, except Akmolinskaya and North Kazakhstan oblasts and Astana City (Table 10). Analysis of the need for and performance of these facilities was beyond the scope of the mission and does not, therefore, form part of this report.

Table 10. Average annual number of TB sanatorium beds by oblast, Kazakhstan, 2009–2011

No.	Oblast	2009	2010	2011
1	Akmola	0	0	0
2	Aktobe	250	250	260
3	Almaty Oblast	335	335	335
4	Atyrau	135	135	125
5	East Kazakhstan	245	245	245
6	Zhambyl	210	80	80
7	West Kazakhstan	220	200	200
8	Karaganda	545	545	545
9	Kyzyl-Orda	300	300	300
10	Kostanay	300	300	300
11	Mangistau	50	50	50
12	Pavlodar	250	250	250
13	North Kazakhstan	0	0	0
14	South Kazakhstan	500	500	500
15	Almaty City	325	275	275
16	Astana City	0	0	0
	TOTAL	3665	3465	3465

3. Leadership and governance

3.1 Strategy and policy development

Like other former Soviet countries, Kazakhstan witnessed a sharp increase in TB notification and mortality rates in the early 1990s. As a consequence, the importance of strengthening TB control was acknowledged in the Head of State's Decree No. 3956 on "Primary measures for health improvement for the people of Kazakhstan" in 1998. In September 1998, the Government issued a decree on "Urgent Measures for Protecting the Population of the Republic of Kazakhstan from Tuberculosis". Following the Presidential and Government legislation, the Ministry of Health issued a decree on the implementation of the DOTS strategy in late 1998 which was based on key elements of pilot projects. In 2001, two decrees were issued, "On the Improvement of TB Medical Services for the Population of the Republic of Kazakhstan" and "On Status and Measures to Strengthen TB Control in the Republic of Kazakhstan", and a National TB Programme (2002-2006) was developed by NCTP. In 2004, a sectoral programme on strengthening TB control in Kazakhstan was approved by Government Decree No. 850. These documents form the basis of TB care, prevention and control in Kazakhstan.

Currently, the strategy to combat TB in Kazakhstan is based on the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan", the Message from the President of the Republic of Kazakhstan dated 28 February 2011, Decree No. 1263 of the Government of the Republic of Kazakhstan dated 21 December 2007 "On measures to protect people from tuberculosis in the Republic of Kazakhstan", and the Interagency Workplan for the Coordination of the Implementation of TB Control Activities for 2008–2012. The strategy is also based on Ministry of Health of Kazakhstan Decree No. 129 dated 10 March 2009 "On strengthening measures to prevent development of resistant forms of TB".

The organization and responsibilities of different health-care institutions and providers in TB case detection, diagnosis and case management are also described in a number of regulatory documents recently endorsed by the Ministry of Health (see Section 2.2.5 above).

In addition, TB/HIV activities are regulated by Decree No. 722 of 16 November 2009 "On integration of TB and HIV programmes" and the National TB/HIV Collaborative Plan. The Decree is currently being updated by the Working Group on TB/HIV, and the draft has been shared with the WHO mission representative for feedback.

3.2 Government and local authority commitment

3.2.1 National level

The government is fully engaged in TB prevention and control. There are strong indications of this commitment at the highest possible level. The government aims to rank among the 50 most developed countries in the world by 2020 and is aware that TB is a burden which hampers the achievement of this target. The Minister of Health, Dr Salidat Zekenovna Kairbekova, met the review team leader and USAID representative on 10 May 2012. She dedicated about an hour to discussing the problem of TB and had involved all her high-level officials in the meeting. Further evidence of a high degree of commitment is the significant increase in the resources allocated.

The Government has continuously increased funding for the procurement of first-line and second-line drugs and social support and has plans to take over all major obligations by the time

the Global Fund projects come to an end. This will allow the implementation of new interventions such as home-based treatment (the "Sputnik" programme), increase the budget for social care and allow for reorganization of/improvements in treatment conditions in hospitals. The need is particularly acute in respect of the management of drug-resistant TB requiring expensive drugs, laboratory equipment and consumables, as well as investment in infection control.

Since 2010, the Global Fund Country Coordinating Mechanism in Kazakhstan has been functioning well. Since receiving Global Fund Round 10 funding, the Country Coordinating Mechanism can better observe and monitor the programme and the budget. However, it still does not have a full overview of the national budget and sources of funding within the Ministry of Health budget (part of bilateral agreements with USAID, Global Fund, etc.). Coordination among all stakeholders and authorities is particularly needed at local/oblast level.

3.2.2 Oblast level

At the oblast level in all oblasts, there are strategic plans for health-care development for the period 2011–2015 and further until 2020, where TB control is one of the priority areas of action. As MDR-TB is an acknowledged problem in TB control, in many oblasts governors (*Hakimats*) have special support programmes to improve the management of DR-TB. Special attention is paid to building of human capacity, motivation of staff working with MDR-TB patients and adherence to TB treatment, especially during outpatient treatment.

At all sites visited, the *Hakimats* and health authorities reiterated their strong commitment to TB control. Local governors have allocated resources for renovation of infrastructure and address TB during their regular meetings and lectures. In several oblasts, the governors allocate resources as enablers and incentives for patients. Some examples from South Kazakhstan indicate that the Government's efforts to attract medical staff to rural areas have had a positive impact at the facilities visited. In 2011, the prison sector of South Kazakhstan Oblast received additional funding from the Government for renovation of a specialized TB colony and medical equipment amounting to over 430 million Kazakh tenge (KZT) (around US$ 2.9 million). Funding was allocated within the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan". In 2013, the TB colony expects additional funding from the government of KZT 218 million (around US$ 1.5 million), which it plans to spend on strengthening administrative infection control measures. Funding has already been allocated for the renovation of barracks and improvements in the living conditions of patients and working space of personnel, as well as for the administrative separation of patients according to sputum smear/culture and DST status. In addition, treatment with second-line drugs from Government sources will become available in 2012. At the same time, it would be desirable to provide social support with structured Government financing and allocate resources to strengthen the patient-centred approach, such as home-based care in cities and towns.

Recommendation

To the oblast governors.

- Ensure social support for patients to help them to improve their adherence to treatment.

3.3 Partnership and civil society involvement

The current mechanisms of collaboration between various stakeholders are mainly through the Country Coordinating Mechanism and its subgroups as well as through Project HOPE.

Coordination among all stakeholders and authorities is particularly needed at local and oblast levels. The Ministry of Health should ensure equitable representation and involvement of civil society and community-based organizations, when discussing and designing its national MDR-TB Action Plan, or any changes in decrees relating to health services.

There are many good pilot projects by nongovernmental organizations in collaboration with the TB service (injecting drug users (IDU) and TB, HIV/TB, ex-prisoners, migrants). The experience of the pilot projects can and should be replicated at national level. Most of the nongovernmental organizations working in TB or TB/HIV depend financially on the availability of international funds) such as the Global Fund, USAID and the European Community, and lack financial sustainability. National and oblast-level funding is crucial to sustain their social work. It was noted that few nongovernmental organizations work specifically on TB. More service integration is needed in other organizations. For example, there is an association of nongovernmental organizations in South Kazakhstan, which collaborates well with the TB service, has trained staff in TB prevention and other areas and caters successfully to groups such as people who use drugs, people living with HIV (PLHIV) and ex-prisoners. The association's activities include dissemination of information about TB and how and where to seek assistance, and sometimes staff accompany clients when they are tested. If TB is found, clients are (re)admitted to the programme once they are cured, while new clients have to bring a note from the TB service confirming that they do not have TB. It would be beneficial for this diverse target group if the association also became involved in supporting adherence to TB treatment.

Recommendations

To the Ministry of Health and to oblast administrations.

- Increase funding for the local association which runs social projects to combat TB and HIV/AIDS among vulnerable groups.

To NCTP (in relation to all civil-society organizations, not merely nongovernmental organizations that are part of the Country Coordinating Mechanism or subrecipients of the Global Fund).

- Create a national STOP TB partnership or an equivalent mechanism of coordination inclusive of all partners working on TB.
- Involve nongovernmental organizations in case detection, adherence to treatment, policy definition and monitoring and evaluation.

To the national STOP TB partnership or equivalent.

- Organize regular meetings between various ministries (Justice, Education, Health), NCTP, NAC, etc. to coordinate activities more effectively and change the current vertical approach.
- Collaborate with businesses (such as construction companies) in TB campaigns.

3.4 Patient and community participation

The mission noted low involvement of TB patients or ex-TB patients in TB policy definition, awareness-raising, TB care, peer-to-peer groups and similar activities.

Until recently, there were no patients' organizations working specifically on TB in Almaty. A new one registered recently was created by a former TB patient. Unlike PLHIV, TB patients are not activists; they do not actively approach the authorities for social support. TB patients should be encouraged by health staff and psychologists to take an active role in their own treatment and cure, and should be invited to share their experiences with other patients.

There is a clear need to create patient support groups to improve adherence to treatment and TB control and care generally.

Communities such as students and youth groups are mainly involved in information, education and communication (IEC) activities. In South Kazakhstan, the example of the nongovernmental organization "Jyldyz" was cited. This organization actively involved target groups in its activities and management. Although the organization is not directly or actively involved in TB-related activities, clients can start volunteering, and may then be promoted to outreach workers, social workers and coordinators. Volunteers have reportedly been trained in TB and TB/HIV issues. The organization has involved and employed ex-TB patients.

Recommendations

To the NCTP.

- Find possibilities for providing enablers and incentives for patients to involve them in TB control and care.
- Support the creation of patient associations and ensure sustainability of patient engagement by including references to them in the formal regulations (decrees) in order to empower patients to be equal partners in the TB response.
- Expand collaboration in TB prevention and care with youth organizations and community-based organizations and groups.

3.5 Links with other health interventions and health-sector reform

The USAID mission in the Central Asian republics has supported several studies in the field of TB in Kazakhstan. The "HIV and TB TRaC Study" evaluated risk behaviours associated with HIV transmission and utilization of HIV and TB prevention services among most-at-risk populations (sex workers, men who have sex with men, and injecting drug users) in Kazakhstan, Kyrgyzstan and Tajikistan (2010, implemented by Population Services International (PSI) Central Asian Republics within the USAID Dialogue on HIV and TB Project) *(3)*. A series of Dashboard decision-making sessions were conducted for all project partners and stakeholders: AIDS centres, TB centres, narcology centre and international and nongovernmental organizations. Another study (implemented in 2010 by Project Hope within the USAID Dialogue on HIV and TB Project) included focus group discussions and in-depth interviews on TB with people living with HIV, sex workers, injecting drug users and men who have sex with men *(4)*. Also currently under implementation in Kazakhstan, Kyrgyzstan and Tajikistan is the "HIV and TB Small-Scale TRaC Study" to provide evidence on risk behaviours associated with HIV transmission and utilization of HIV and TB prevention services among injecting drug users.

3.5.1 TB/HIV collaborative activities

Some progress has been achieved in addressing TB/HIV at country level. It includes development of TB/HIV guidelines, high coverage of TB patients with HIV testing and high coverage with CPT for PLHIV with TB. Besides this, five AIDS centres employ TB experts.

PLHIV are screened for TB, being referred to outpatient clinics according to their place of residence for clinical examination by a general practitioner, fluorography and sputum-smear microscopy. In the case of suspected TB, further assessment is done by a TB expert in a TB dispensary assigned according to the place of residence. However, neither AIDS centres nor outpatient clinics follow up the outcomes of PLHIV referral to TB services. It remains unknown whether the patient has reached the TB facility and what the test results were. Five AIDS centres out of a total of 21 have a TB expert on their payroll, who examines PLHIV for TB. However, there is no follow-up for those who did not get to the TB service for screening.

In 2011, out of 11 428 PLHIV registered at AIDS centres, 1160 (10%) were diagnosed with active TB. However, HIV experts believe there is underdiagnosis of TB, especially the extrapulmonary form, and underdiagnosis of TB as the cause of death among PLHIV. Only 40% of deaths (1471 out of 3653) are registered as death due to TB, while it is believed that about 60% of all deaths among PLHIV are attributable to TB. TB diagnoses are confirmed and decisions on TB treatment or prevention in PLHIV are made at weekly meetings of the physician consultative committee. HIV experts do not have data on prevalence of MDR/XDR TB among PLHIV. IPT is prescribed by TB experts, and PLHIV are later followed up at AIDS centres, but no quantitative data on the coverage, completeness or outcomes of IPT were supplied to members of the review mission.

Patients with active TB are screened for HIV. Blood samples are sent to a territorial AIDS centre, with the results available after one week. In case of HIV infection, an HIV expert is invited to the TB hospital to follow up the patient's HIV treatment and care.

ART is not provided for PLHIV with active TB who are hospitalized for TB treatment, but is provided after discharge from a hospital by clinicians in AIDS centres. This is not in line with the WHO guidelines *(5)*, which require initiation of ART in PLHIV with active TB as soon as TB treatment is tolerated and regardless of CD4 cell count or other criteria. In the Almaty City TB Dispensary, out of 14 hospitalized PLHIV with active TB, four had MDR-TB. All of them were treated by an HIV expert from the city AIDS centre and receive CPT, but ART has not been initiated. Currently TB and HIV experts do not discuss joint TB/HIV patient management, and TB doctors are not involved in the provision of any HIV care. According to additional information provided by NCTP, the issues of joint management of TB/HIV coinfection have been included in the draft decree on integrated management of patients with HIV/TB coinfection.

TB and HIV services for injecting drug users

The estimated number of IDU in Kazakhstan is 123 640, while 30 256 IDU are officially registered in narcological services across the country. As at 1 April 2012, 4209 drug-dependent people were registered at the narcological city dispensary in Almaty, of whom 96% (4055) were IDU. Heroin is the main illegal drug used in the country. However, only 118 patients (2.9%) receive opioid substitution therapy.

All outpatients at the narcological dispensary are referred to general practitioners for TB examination, but it is impossible to find out whether the patient actually consulted the doctor; there are no statistics about the number of patients who consulted a general practitioner and were screened and how many of them were diagnosed with TB. For inpatients of the narcological dispensary, TB screening is performed through universal X-ray. In the case of suspected TB, an

invited TB expert from a TB dispensary diagnoses TB and transfers the patient by car to a TB hospital.

Health-care workers from the dispensary believe that all IDU are offered HIV testing. However, the data indicate that, in 2011, out of 909 new registered IDU only 45% (412) were tested for HIV (in both inpatient and outpatient facilities). HIV test results are not made known to health-care workers because of a – likely incorrect – perception of confidentiality.

Nongovernmental organizations working with IDU are not in contact with the narcological service. Better collaboration between TB, HIV and narcological services and civil society is required.

Although there has been some progress in addressing TB/HIV at country level, there remain challenges and a need for improvement.

- PLHIV and drug-dependent people, especially IDU, are a high-risk group with regards to TB. However HIV, TB and drug-dependence treatment services lack integration. PLHIV from AIDS centres and drug-dependent outpatients of the narcological service are referred to outpatient clinics and then to the TB service for diagnosis rather than being dealt with at the AIDS centres or narcological dispensaries. There is no follow-up of the number of those who consulted the services and were diagnosed with TB or treated.
- Most PLHIV met by the review team members during the mission have an incorrect understanding of IPT. They had reportedly heard different messages about IPT from different specialists.
- There is no justification for having a group of TB experts (the physician consultative committee) to diagnose and decide on TB treatment/prevention for PLHIV. This can be done by one qualified physician.
- ART is provided for PLHIV with active TB only after discharge from hospital by clinicians in AIDS centres.
- The low proportion of patients in HIV care (it is estimated that only 50% of PLHIV registered at AIDS centres were seen for dispensary follow-up in 2011) and low level of adherence to ART (61% remain on ART after the first year of treatment in Almaty City) indicate poor health-system performance in providing care for chronically infected HIV patients, who may also have TB. The low proportion of patients in HIV care at AIDS centres has both individual and public-health implications. Late initiation and interruption of life-saving ART put patients at risk of TB and earlier death; they also contribute to the further spread of HIV infection, or TB/HIV in case of coinfection, and the development of drug-resistant strains of HIV.
- A CD4 count threshold below 350 cells/mm^3 in 36–52% of newly diagnosed HIV cases in 2011 (according to different sources) indicates late diagnosis of HIV. HIV testing practice identifies those who became infected several years ago, and it may be that those most at risk of HIV and most at risk of TB have poor access to HIV testing and counselling and further HIV care.
- A significant proportion of PLHIV with active TB are also IDU (in Almaty in 2011, out of 92 PLHIV with active TB, 73 were IDU and 72 were male). However opioid substitution therapy is not available at the AIDS centre, which jeopardizes adherence to TB treatment and ART and consequently contributes to the development of TB and ART drug resistance.

- HIV test results are not known to health-care workers in the narcological service because of an incorrect perception of confidentiality. This contributes to fragmented care for patients (treatment of the disease but not the whole person) rather than a comprehensive approach which includes consideration of all health-related conditions and needs.

Recommendations

Main recommendations

To the Ministry of Health, NCTP and NAC.

- Provide early diagnosis of TB for people living with HIV (PLHIV) in AIDS centres, monitor progress in detection of TB among PLHIV.
- Initiate ART for all TB patients as soon as TB treatment is tolerated. Monitor response to treatment and ensure access to opioid substitution therapy for IDU with active TB – this could be home-based care by a multidisciplinary team to support the patient.
- Initiate IPT for PLHIV diagnosed with latent TB and monitor treatment outcomes.
- Strengthen cooperation between OTBD and AIDS centres and revise the system for bilateral consultations in order to reduce risk of infection and follow patients up more closely.

Other recommendations

To the Ministry of Health, Ministry of Labour and Social Protection, NCTP and NAC.

- Integrate social services with health care – this will allow close follow-up of PLHIV for earlier diagnosis and treatment of TB and support for adherence to treatment for both TB and HIV.

To the Ministry of Health and NAC.

- Revise HIV testing policy and practice in order to increase access for those who are at most risk of HIV. Introduce proactive provider-initiated HIV testing and counselling and HIV rapid tests in outreach interventions for IDU, their sexual partners, men who have sex with men, sex workers, migrants and other risk groups in order to increase uptake of HIV testing and counselling. This will lead to an increase in early HIV diagnosis, enrolment in HIV care and access to TB diagnosis and treatment.

To the Ministry of Health, NAC and National Research and Clinical Centre on Medical and Social Problems of Drug Abuse.

- Provide immediate access to opioid substitution therapy for drug-dependent IDU at AIDS centres and TB hospitals.
- Introduce a comprehensive approach to treatment and care of patients with comorbidities and coexisting conditions, like TB, HIV, drug dependence, etc. Health-care workers in vertical systems should jointly provide treatment and care for their patients, taking into account their varying needs and addressing issues of time of treatment initiation, drug interactions, adherence to treatment and treatment outcomes.
- Improve monitoring of key health indicators – in particular, number of PLHIV seen for care (visit to AIDS centre at least once a year plus clinical/laboratory observation), retention in ART after 12, 24 and 60 months of ART initiation, number of MDR-TB/HIV cases, number of TB/HIV/IDU cases, mortality due to TB in PLHIV, including IDU. The

data are needed for managerial decisions to improve access to and retention in TB/HIV/drug dependence treatment and care, and treatment outcomes.

- Continuously build capacity of TB experts in HIV diagnosis and treatment as well as capacity of HIV experts in TB diagnosis and treatment.

To the NCTP and NAC.

- Include information about TB symptoms, transmissions and prevention in patient education for PLHIV.

3.6 Advocacy, communication and social mobilization

Understanding of and experiences with ACSM activities differ among stakeholders. Most of the people interviewed (NCTP, Almaty City, nongovernmental organizations) have experience with communication activities, such as developing IEC materials, organizing information campaigns and working with the media. Some have experience with social mobilization involving community leaders and volunteers in awareness-raising and TB care. The area where stakeholders had least experience was advocacy, especially political advocacy. They also had difficulty classifying their activities as advocacy. Some of the interviewees understood the need for NCTP and Ministry of Health officials to take ACSM seriously and provide funding for these activities, rather than having the activities depend only on nongovernmental organizations or pilot projects undertaken in conjunction with the Global Fund or other donors. Presidential commitment to the fight against TB was mentioned during the interviews, whereas other political support for anti-TB activities varies from one oblast/*Hakimat* to another, as shown by the social support provided and collaboration with civil-society organizations.

An ACSM strategy has been drafted for the period 2012–2015. This draft has been discussed among a small group of partners (Project HOPE, Kazakh Red Cross, PSI, etc.) and NCTP staff members and is to be included in the NCTP strategy after approval by the Ministry of Health. At the time of the mission, it was not clear where the budget to implement the full ACSM strategy would be obtained, but the interviewees expected that, once the strategy was approved, public funding could be requested. Monitoring and evaluation of ACSM has also been discussed and was being finalized at the time of the mission.

One national ACSM training course was organized by the HOPE Project in Almaty in July 2011 for around 20 participants from NCTP. An NCTP programme officer attended a USAID/PATH/HOPE project regional training course in Dushanbe, Tajikistan in January 2011. Currently there is no staff position for the ACSM focal point at NCTP, and ACSM activities are carried out by a staff member in addition to her normal duties.

In terms of IEC activities, celebrities were engaged in TB campaigning around World TB Day. “Patient schools” are organized inpatient facilities; their activities are monitored and they show good performance. There are five topics related to TB at the “patient schools”: TB and its transmission, DOTS, viral hepatitis, sexually transmitted diseases and treatment adherence and MDR-TB prevention. It was noted by the mission that there are various information materials, some duplicating one another or including obsolete information. This applied to the materials printed by the Healthy Lifestyles Centres, in the section on TB infection control, although Global Fund/USAID materials already included up-to-date information on this subject. It was also noted that IEC documents from the Healthy Lifestyles Centres are not always user-friendly, which could be solved by piloting the materials and soliciting feedback from the target group. No

brochures targeting migrants, IDU or people with TB/HIV were found in facilities in Almaty; whereas in Shymkent (South Kazakhstan) the nongovernmental organizations which were visited did have some materials targeting IDU. No IEC materials for children were found, except a brochure for parents on BCG vaccination.

Recommendations

To the NCTP/Ministry of Health.

- Adopt, fund and implement the ACSM strategy and related multiannual action plan.
- On the basis of the ACSM workplan, review the staffing needed by the NCTP for the implementation of ACSM activities – at least one staff member full-time. A coordinating team (such as a national Stop TB Partnership) should preferably be involved to mobilize the skills and responsibility needed to stimulate and manage ACSM activities.

To the NCTP/National Stop TB Partnership.

- Organize a rolling programme of ACSM training throughout the period of the workplan.
- Mobilize decision-makers at local and oblast level to support the TB response by ensuring sustainable financing and other necessary resources.
- Mobilize and train more TB champions (such as celebrities, parliamentarians, patients) to address both the general public and specific groups.
- Improve coordination on IEC materials between Healthy Lifestyles Centres and partners funded by the Global Fund.
- Develop materials for vulnerable and most-at-risk populations, using careful wording to avoid stigmatization.
- Develop an information campaign on TB for school-age children.
- Include patients and vulnerable groups in the development of IEC materials.
- Propose IEC sessions at work place (building site, markets, etc.).

3.7 Operational research

The following achievements have been made in the field of operational research (OR):

- the NCTP has a person responsible for operational research;
- some funding is available for OR (Kazakhstan Government, Global Fund, USAID);
- ethical review of research on human subjects is required in Kazakhstan and ethics committees (institutional review boards) exist, registered in accordance with international standards;
- educational and further collaboration opportunities are available;
- the electronic National TB Register is very comprehensive, with high-quality data;
- the NCTP has a plan for research work which is generally relevant to the current challenges facing the programme;
- the results of many OR projects have been translated into decrees and guidelines.

The following challenges remain:

- NCTP staff research capacity is limited by international standards, especially at oblast level;
- although NCTP staff are quite productive in terms of research (169 publications in 2009–2011), only seven articles appeared in the international peer-reviewed medical literature;
- the available research funding is not sufficient;
- routinely collected data have limited uses beyond surveillance.

Operational research capacity is mainly embedded in the NCTP. The NTP has a person responsible for OR (the Associate Director for Science at NCTP). Government funding of research work at NCTP on a contractual basis with the Ministry of Health amounted to KZT 59.935 million (approximately US$ 405 000) in 2012, with a projected increase to KZT 68 526 million in 2013 and KZT 76 608 million in 2014. The Global Fund (Round 8 grant) and USAID Central Asian Republics have provided funding for several OR projects. NTP has a plan of research work which seems to be generally relevant to the current challenges facing the programme. Importantly, the results of many research projects are translated into decrees and guidelines.

Research involving human subjects requires ethical approval. For research ethics clearance, Kazakhstan has several institutional review boards registered with the United States Office for Human Research Protections.

There are educational opportunities for building OR capacity in Kazakhstan. The Kazakhstan School of Public Health[4] of the Ministry of Health has four departments (Population Health and Social Sciences; Health Management and Economics; Hygiene, Epidemiology and Occupational Medicine; Information Technology and Evidence-Based Medicine) and a Training and Information Centre. The main activities of the School of Public Health include education, research, participation in international projects and expert consulting. Another long-term training opportunity is the Central Asia Regional Field Epidemiology Training Program (a two-year in-service training programme in applied epidemiology) which was established by the ministries of health of five central Asian republics (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan), CDC and USAID, with its headquarters in Almaty, Kazakhstan.[5] At least two graduates of this programme have worked for the NTP at the central level in Kazakhstan, but both of them have now left. In 2008, NTP staff were trained in data analysis using EpiInfo software, supported by USAID Kazakhstan and provided by Epco Hasker, Project HOPE.

NTP has several collaborators and consultants on research in-country and internationally (Institute of Molecular Biology and Biochemistry, Kazakhstan; National Centre for Biotechnology, Kazakhstan; KNCV Tuberculosis Foundation, Netherlands; Partners In Health, Harvard Medical School, Boston, MA, United States; Supranational Reference Laboratory, Borstel, Germany; Pasteur Scientific Research Institute for Epidemiology and Microbiology, Russian Federation; Laboratory of Nanotechnology, Research Institute of Physico-Chemical Medicine, Federal Medical and Biological Agency, Russian Federation; Department of Phthisiology, Moscow State University of Medicine and Dentistry, Moscow, Russian Federation).

[4] Kazakhstan School of Public Health, Ministry of Health [website]. Almaty, Ministry of Health, 2014 (http://www.ksph.kz, accessed 9 August 2014).
[5] Center for Global Health [website]. Atlanta, Centers for Disease Control and Prevention, 2010 (http://www.cdc.gov/globalhealth/FETP/pdf/Central_asia_factsheet.pdf, accessed 9 August 2014).

Routine recording and reporting and data management are well-organized and comply with international recommendations. Routine data-collection tools (individual patient-level data and aggregated reports) are consistent across the regions. Comprehensive sociodemographic and clinical data are collected for routine surveillance. Regional data are entered in electronic databases and transferred to NTP, where data are merged in the National TB Register. The National TB Register does not include data from the laboratory system or penitentiary sector. The quality of the data is good (see Section 6.1, Surveillance for a detailed assessment). Kazakhstan has an excellent laboratory infrastructure for OR. Conventional and new rapid molecular technologies to identify TB and anti-TB drug resistance are available; the Xpert MTB/RIF assay is being implemented.

NTP is productive in terms of research: in the last three years (2009–2011) the NTP staff had 169 publications (including methodological recommendations and conference abstracts) and presented their research findings at several international conferences (including conferences of the International Union Against Tuberculosis and Lung Disease in 2008 and 2010). NTP members registered 12 innovation patents in 2011. NCTP currently participates in two republican and one international research grant. However, because of somewhat limited scientific writing skills, only seven articles appeared in the peer-reviewed international medical literature in the last three years. For a list of publications by NCTP, see Annex 4.

Overall, NTP staff research capacity is limited by international standards, especially at oblast level. NTP has data managers, but no trained epidemiologists, statisticians, research assistants, health economists or behavioural scientists. There is no clear plan for building research capacity for the NTP staff.

No regulatory barriers to OR were identified. The main perceived barriers are lack of sufficient funding and experience/training of staff, as well as limited scientific writing skills. Also there is a perceived lack of communication and exchange of experiences with TB practitioners and researchers internationally. NCTP used to have an Academic Board where doctoral students could defend their PhD dissertations in phthisiology, but it was recently disbanded, so now students must study full-time for their PhD in an academic institution (Kazakhstan School of Public Health), which may serve as a disincentive for NTP staff (as previously a PhD degree was desirable for some NTP staff and could be completed by TB physicians while still working). Opportunities to be involved in international projects or attend international conferences were seen as good incentives for doing OR.

3.7.1 Specific OR conducted

In terms of specific topics of research work, since January 2012 NCTP has been working on a contractual basis with the Ministry of Health on a research topic entitled: “The development and introduction of new technologies, quality diagnosis and treatment of drug-resistant forms of TB” to be implemented in 2012□2014. This large project comprises five subprojects:

1. Molecular-genetic characteristics of *Mycobacterium tuberculosis* in patients with drug-resistant TB;
2. Effectiveness of the treatment of patients with polydrug-resistant TB;
3. Organizational, methodological and social factors increasing adherence of MDR-TB patients to treatment;
4. Development of a method of selective lung collapse in the surgical treatment of patients with XDR-TB;

5. Improving the effectiveness of treatment of patients with bone and joint TB and peripheral lymph node TB through the use of nanotechnology.

The main themes in NTP research work over the last three years have included the following: epidemiology and control of TB and M/XDR-TB in Kazakhstan, MDR-TB (predictors of primary resistance, study of treatment strategies for MDR and XDR-TB, outcomes of M/XDR-TB treatment, management of patients with alcoholism and IDU, social support, predictors of relapses after successful MDR-TB treatment), surgical aspects of treatment of MDR-TB and bone TB, genotyping of MTB, molecular methods of diagnosis of drug resistance, epidemiology of TB/HIV coinfection, TB in the penitentiary system (epidemiology, active case-finding, management, coordination with civilian sector), childhood TB (epidemiology, active case-finding, childhood contacts of MDR-TB cases, treatment and outcomes of MDR-TB, risk factors for mortality, relapses), TB morbidity among health-care workers, TB and diabetes, pharmacokinetics studies.

Results of several studies have had an impact on policy in Kazakhstan, which can be illustrated by several examples. A study on the organization of TB/MDR-TB care in prisons and coordination between penitentiary and civilian services to prevent treatment defaults after the release of TB patients from prison led to the adoption of decrees by the Ministry of Health (No. 810) and the Ministry of Justice (No. 141) "On rules of the organization of TB care for those in the institutions of the penitentiary system of the Ministry of Justice of the Republic of Kazakhstan". A study, supported by CDC Central Asia, which assessed differences in the relative preventive effectiveness of BCG vaccines produced by three different manufacturers and administered in 2002–2006 found that effectiveness varied by manufacturer, which had implications for national policy by indicating the use of a BCG vaccine with superior protection as it was likely to be a more cost-effective intervention. A study on assessment of criteria for childhood risk groups for TB screening led to methodological recommendations on the organization of early TB case detection in children and adolescents. Another study supported by CDC Central Asia demonstrated that DOTS implementation in Kazakhstan in 1998 contributed markedly to a decrease in TB mortality in Kazakhstan: DOTS appears to have helped avert approximately 17 800 deaths between 1998 and 2004, according to its documented impact.

Several OR studies were carried out or are being planned under Global Fund grants. "Tuberculosis Infection Control in Kazakhstan" conducted by the USAID ZdravPlus II Project and NTP in 2009 has been completed and the technical report was finalized after the end of the project; the findings and recommendations were taken into account and implemented by NTP. The "TB KAP Survey, Almaty Oblast" (2009) and the "TB Patient Satisfaction Survey, Kazakhstan" (ongoing) were conducted by Project HOPE.

Partners in Health conducted a study (supported by a Global Fund Round 8 grant) with the objective of improving the medical documentation used in the management of patients on category IV treatment. Unlike the existing form, the revised DOT category IV treatment form allows data to be collected on each dose of each anti-TB drug for MDR-TB patients, and on missed doses, changes in dose, discontinuation of a drug and adverse events. As a result of this study, a new form was developed and is now awaiting endorsement. Partners in Health is currently planning a study (under a Global Fund Round 8 grant) on TB, MDR-TB and TB/HIV coinfection among migrant workers with the aim of evaluating the effectiveness of control of TB/MDR-TB among migrants in metropolitan cities (Almaty and Astana).

Recommendations

To the NCTP.

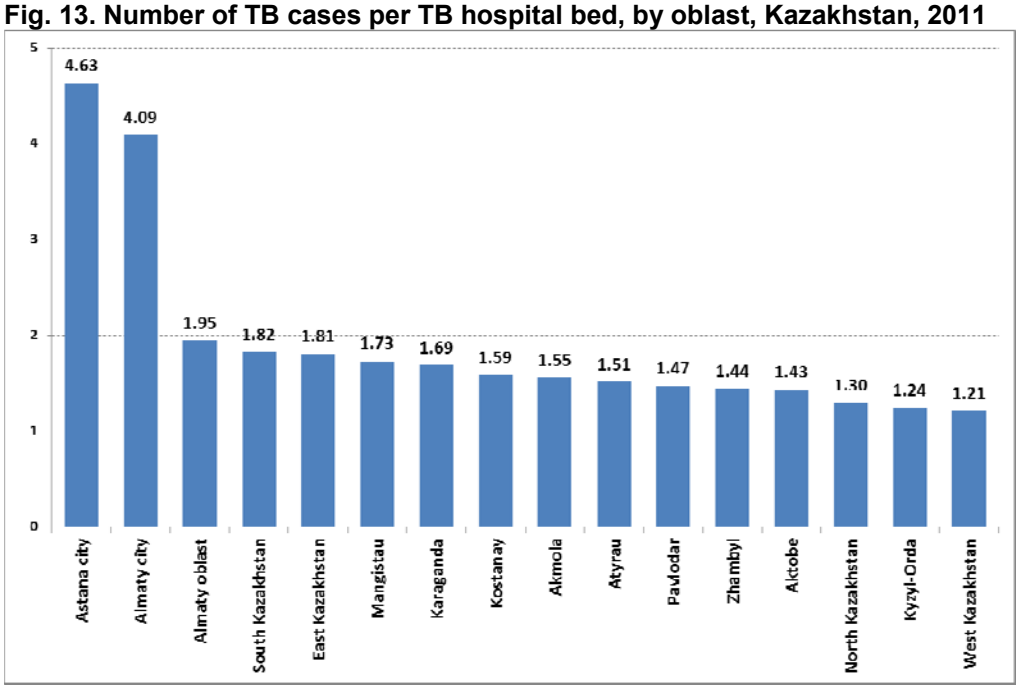
- Revise operational research priorities and the research agenda according to the results of the programme review – for a list of proposed priority topics, see Annex 5.
- Prepare a strategic plan for building human OR capacity for NTP and oblast staff. Organize training and ongoing OR support. Consider seeking external technical assistance for this task.
- Identify funding mechanisms to sustain OR capacity at NTP.
- Increase use of routinely collected data for OR.
- Aim to publish in international peer-reviewed journals in order to increase the impact of Kazakh OR internationally.

4. Service delivery

4.1 TB hospital capacity and activity indicators

The data on bed occupancy rates in TB hospitals show that the facilities are well occupied: 2009 – 89.7%, 2010 – 86.8%, 2011 – 92.4%. At the same time, in line with the overall decreasing TB notifications in the country over recent years, the number of patients per bed is very low and decreasing: there were just 1.79 TB cases for every TB hospital bed countrywide in 2011 and this ratio decreased even further to 1.70 in 2010 and to 1.68 in 2011. This is indicative of the fact that, despite recent reductions, hospital capacity is highly excessive in relation to the number of patients. Fig. 13 shows the level of this indicator by oblast.

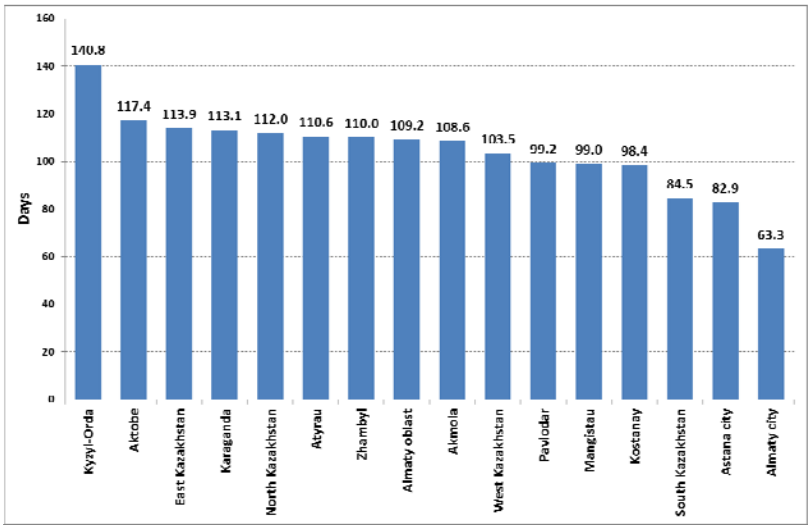
Fig. 13. Number of TB cases per TB hospital bed, by oblast, Kazakhstan, 2011



In all territories except the cities of Astana and Almaty, there are fewer than two TB cases per bed per year; six oblasts have fewer than 1.5 cases per bed, as low as 1.2–1.3 cases in West Kazakhstan, Kyzyl-Orda and North Kazakhstan.

Consequently, the duration of hospitalization for TB treatment in Kazakhstan is very long. The average length of stay for pulmonary TB (all forms) in adults in 2011 was as long as 104.0 days, or 3.5 months, and is basically the same as in 2010 (107.2 days) and 2009 (104.1 days). The longest hospital stays are documented in TB facilities in Kyzyl-Orda Oblast (140.8 days, or 4.7 months) and the shortest in Almaty City (63.3 days or 2.1 months) and Astana City (82.9 days, or 2.8 months) (Fig. 14).

Fig. 14. Average length of stay (days), pulmonary TB cases, adults and adolescents, by oblast, Kazakhstan, 2011



Treatment of children with TB requires special attention. According to current practices, although these are not explicitly regulated by any Ministry of Health decrees or other documents, children are hospitalized for the entire duration of treatment. The available data prove that the TB hospital capacities intended for children are highly excessive; Table 11 gives details of TB hospital beds for children by oblast for the last three years, compared with the annual numbers of paediatric TB cases during the same period.

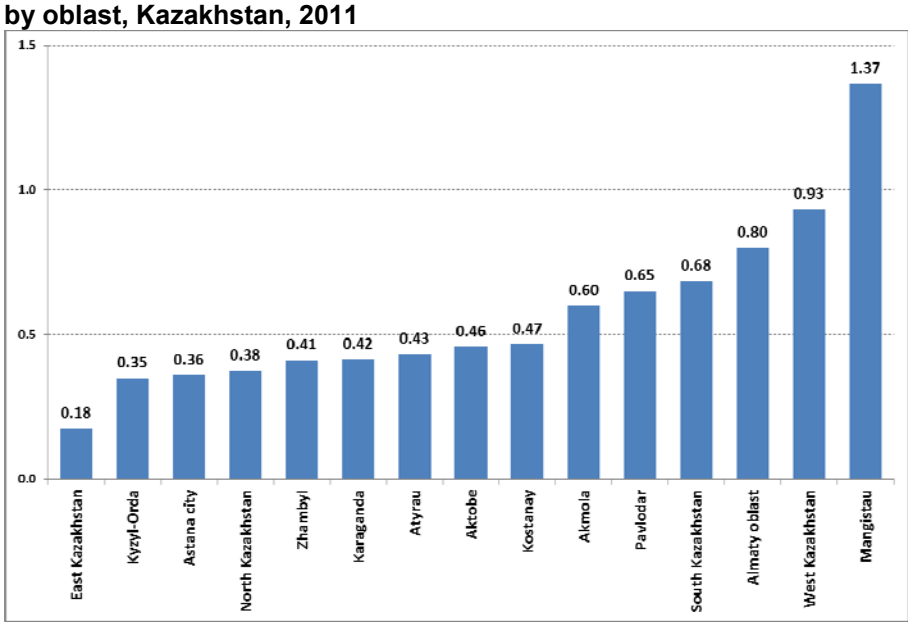
The number of TB cases in children has decreased steadily over the last decade (the rate of new TB cases in children declined from 57.6 per 100 000 in 1999 to 15.1 per 100 000 in 2011), but hospital capacity remained practically unchanged. In 2011, there were a total of 619 new paediatric TB cases, compared with 1090 paediatric TB beds countrywide, which makes the ratio of just 0.57 cases per bed per year (down from 0.65 in 2009 and 0.60 in 2010). In nine oblasts, this indicator was less than 0.5 in 2011 (actually as low as 0.18 in East Kazakhstan), and only Mangistau Oblast had more than one annual case per bed (Fig. 15).

The length of hospital stay for children is extremely high: in 2011, the countrywide average length of hospitalization of paediatric cases was 192.7 days (6.4 months), similar to 2010 (195.1 days) and 2009 (186.1 days). The highest level in 2011 was in Pavlodar Oblast (261.3 days or 8.7 months), and in eight oblasts it exceeded 200 days (Fig. 16).

Table 11. Number of paediatric TB beds and annual number of new TB cases in children by oblast, Kazakhstan, 2009–2011

No.	Oblast	Number of TB beds for children			Number of new TB cases in children		
		2009	2010	2011	2009	2010	2011
1	Akmola	50	50	50	34	33	30
2	Aktobe	80	80	70	55	39	32
3	Almaty Oblast	140	130	130	136	116	104
4	Atyrau	90	75	60	22	30	26
5	East Kazakhstan	120	120	120	72	24	21
6	Zhambyl	0	80	80	33	45	33
7	West Kazakhstan	60	60	60	27	59	56
8	Karaganda	80	75	65	71	33	27
9	Kyzyl-Orda	90	80	80	51	43	28
10	Kostanay	90	80	60	36	31	28
11	Mangistau	60	70	60	57	81	82
12	Pavlodar	80	40	40	29	30	26
13	North Kazakhstan	60	60	40	27	19	15
14	South Kazakhstan	130	90	95	93	83	65
15	Almaty City	0	0	0	32	31	28
16	Astana City	50	50	50	31	29	18
	Republican institutions	65	65	30			
	TOTAL	1245	1205	1090	806	726	619

Fig. 15. Number of new TB cases in children per paediatric TB hospital bed, by oblast, Kazakhstan, 2011

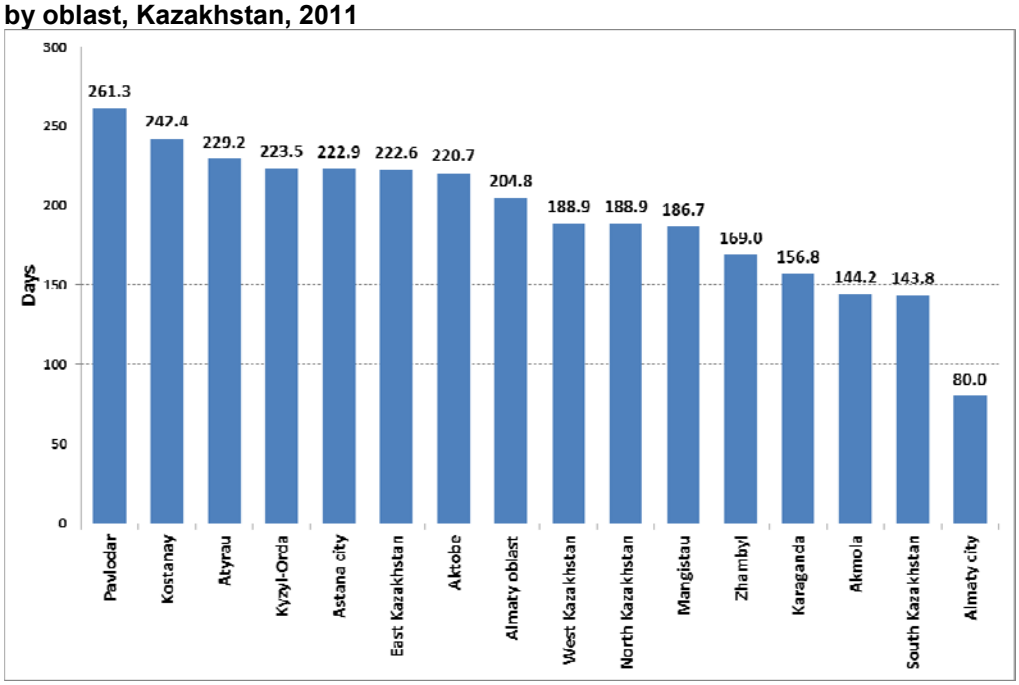


4.1.1 Appropriateness of capacity utilization and performance

This section presents an analysis of key indicators of hospital activity for 2010 for each inpatient TB facility except NCTP,[6] further aggregated at oblast level. These indicators include the number of hospital discharges, patient days spent in hospital (bed-days) and average length of stay, disaggregated by age categories (children, adolescents, adults) and main diagnosis according to the WHO *International classification of diseases*, 10th edition (ICD-10). For each diagnosis, all cases were analysed by three main groups: 1) ICD code A15 (Respiratory TB, bacteriologically and histologically confirmed); 2) ICD code A16 (Respiratory TB, not confirmed bacteriologically or histologically) and other TB forms (ICD codes A17–A19), and 3) non-TB diagnosis (any other ICD code). In addition, the analysis looks into surgical activity.

[6] Source: Ministry of Health/Republican Centre for Health-Care Development.

Fig. 16. Average length of stay (days), pulmonary TB cases in children, by oblast, Kazakhstan, 2011



Tables 12–16 present data on the number of discharges, bed-days and average length of stay for all cases, non-TB cases and TB cases (further subdivided into nonconfirmed cases and cases bacteriologically confirmed), hospitalized in TB facilities by oblast in 2010. The summary of key ratios relevant to appropriateness of hospital capacity utilization is given in Table 17.

Table 12. Number of discharges, bed-days and average length of stay in TB hospitals, all hospitalized cases, by oblast, Kazakhstan, 2010

No.	Oblast	Discharges					Bed-days	Average length of stay (days)
		Children (0–14)	Adolescents (15–18)	Adults (18+)	TOTAL	Per bed per year		
1	Akmola	46	79	2 379	2 504	3.29	230 181	91.9
2	Aktobe	71	111	2 094	2 276	3.99	275 501	121.0
3	Almaty Oblast	144	77	2 275	2 496	2.41	286 076	114.6
4	Atyrau	58	114	1 862	2 034	2.44	228 937	112.6
5	East Kazakhstan	108	105	3 535	3 748	3.07	367 775	98.1
6	Zhambyl	2	43	2 361	2 406	2.81	227 353	94.5
7	West Kazakhstan	51	123	2 246	2 420	3.14	232 719	96.2
8	Karaganda	108	85	2 888	3 081	2.62	348 073	113.0
9	Kyzyl-Orda	69	109	2 361	2 539	2.34	298 601	117.6
10	Kostanay	72	90	2 642	2 804	2.97	295 845	105.5
11	Mangistau	61	63	1 197	1 321	3.11	123 823	93.7
12	Pavlodar	48	69	2 744	2 861	3.04	282 373	98.7
13	North Kazakhstan	71	46	2 174	2 291	2.66	243 617	106.3
14	South Kazakhstan	271	186	6 130	6 587	3.81	527 993	80.2
15	Almaty City	0	5	1 236	1 241	3.76	111 807	90.1
16	Astana City	38	78	1 231	1 347	4.21	119 419	88.7
	TOTAL	1 218	1 383	39 355	41 956	3.03	4 200 093	100.1

The first important observation, based on the data in Tables 12–16, is that the total number of TB discharges in Kazakhstan in 2010 exceeded the total number of registered TB cases in the same year by 57.2% (discharges with TB diagnosis in the hospitals: 39 068; TB cases, all forms, reported by the NTP: 24 847). Across regions, it was only in Almaty and Astana Cities that the

Table 13. Number of discharges, bed-days and average length of stay in TB hospitals, cases with non-TB diagnosis, by oblast, Kazakhstan, 2010

No.	Oblast	Discharges					Bed-days	Average length of stay (days)
		Children (0–14)	Adolescents (15–18)	Adults (18+)	TOTAL	Per bed per year		
1	Akmola	4	0	91	95	0.13	3 339	35.1
2	Aktobe	5	3	150	158	0.28	4 647	29.4
3	Almaty Oblast	9	5	93	107	0.10	2 867	26.8
4	Atyrau	13	13	175	201	0.24	6 072	30.2
5	East Kazakhstan	7	3	371	381	0.31	8 712	22.9
6	Zhambyl	1	8	301	310	0.36	10 504	33.9
7	West Kazakhstan	9	6	90	105	0.14	5 130	48.9
8	Karaganda	17	2	216	235	0.20	8 220	35.0
9	Kyzyl-Orda	17	10	344	371	0.34	10 729	28.9
10	Kostanay	28	1	123	152	0.16	6 583	43.3
11	Mangistau	2	0	16	18	0.04	382	21.2
12	Pavlodar	5	2	172	179	0.19	4 635	25.9
13	North Kazakhstan	28	2	232	262	0.30	9 938	37.9
14	South Kazakhstan	156	7	106	269	0.16	24 451	90.9
15	Almaty City	0	0	3	3	0.01	33	11.0
16	Astana City	0	1	46	47	0.15	855	18.2
	TOTAL	301	63	2 529	2 893	0.21	107 097	37.0

Table 14. Number of discharges, bed-days and average length of stay in TB hospitals, TB cases, by oblast, Kazakhstan, 2010

No.	Oblast	Discharges					Bed-days	Average length of stay (days)
		Children (0–14)	Adolescents (15–18)	Adults (18+)	TOTAL	Per bed per year		
1	Akmola	42	79	2 288	2 409	3.17	226 842	94.2
2	Aktobe	66	108	1 944	2 118	3.72	270 854	127.9
3	Almaty Oblast	135	72	2 182	2 389	2.31	283 209	118.5
4	Atyrau	45	101	1 687	1 833	2.20	222 865	121.6
5	East Kazakhstan	101	102	3 164	3 367	2.76	359 063	106.6
6	Zhambyl	1	35	2 060	2 096	2.45	216 849	103.5
7	West Kazakhstan	42	117	2 156	2 315	3.01	227 589	98.3
8	Karaganda	91	83	2 672	2 846	2.42	339 853	119.4
9	Kyzyl-Orda	52	99	2 017	2 168	2.00	287 872	132.8
10	Kostanay	44	89	2 519	2 652	2.81	289 262	109.1
11	Mangistau	59	63	1 181	1 303	3.07	123 441	94.7
12	Pavlodar	43	67	2 572	2 682	2.85	277 738	103.6
13	North Kazakhstan	43	44	1 942	2 029	2.36	233 679	115.2
14	South Kazakhstan	115	179	6 024	6 318	3.65	503 542	79.7
15	Almaty City	0	5	1 233	1 238	3.75	111 774	90.3
16	Astana City	38	77	1 185	1 300	4.06	118 564	91.2
	TOTAL	917	1 320	36 826	39 063	2.82	4 092 996	104.8

number of discharges was lower than the number of cases in these regions. In two oblasts (West Kazakhstan and South Kazakhstan) the number of TB discharges was more than twice the number of TB cases registered in these territories, and in other six oblasts the figure was over 70% higher (Fig. 17). Lower ratios in Almaty Oblast and Almaty City may be partly explained by the proximity of the central level institution (NCTP), which is not accounted for in the above analysis.

Although a part of this difference may be attributed to the fact that some patients undergo hospital treatment in more than one institution, the hospital activity data (average length of stay per discharge in a specific facility) show that this is not significant and imply that there must be many unnecessary hospitalizations (of persons without active TB disease) and/or that there are cases of manipulation of diagnosis, facts of admission and length of stay in order to justify the use of capacity and the utilization of funds.

Table 15. Number of discharges, bed-days and average length of stay in TB hospitals, TB cases not confirmed bacteriologically (pulmonary SS/C-,[a] extrapulmonary), by oblast, Kazakhstan, 2010

No.	Oblast	Discharges					Bed-days	Average length of stay (days)
		Children (0–14)	Adolescents (15–18)	Adults (18+)	TOTAL	Per bed per year		
1	Akmola	36	61	1 098	1 195	1.57	89 307	74.7
2	Aktobe	61	76	887	1 024	1.80	117 270	114.5
3	Almaty Oblast	131	50	834	1 015	0.98	113 589	111.9
4	Atyrau	39	72	738	849	1.02	84 024	99.0
5	East Kazakhstan	91	75	1 546	1 712	1.40	139 107	81.3
6	Zhambyl	1	33	1 232	1 266	1.48	135 898	107.3
7	West Kazakhstan	36	102	1 113	1 251	1.62	115 002	91.9
8	Karaganda	90	73	1 642	1 805	1.53	220 825	122.3
9	Kyzyl-Orda	44	76	870	990	0.91	128 070	129.4
10	Kostanay	42	49	841	932	0.99	103 849	111.4
11	Mangistau	58	41	510	609	1.43	52 625	86.4
12	Pavlodar	39	53	1 220	1 312	1.40	126 696	96.6
13	North Kazakhstan	33	30	701	764	0.89	68 189	89.3
14	South Kazakhstan	114	139	4 609	4 862	2.81	358 328	73.7
15	Almaty City	0	2	153	155	0.47	11 507	74.2
16	Astana City	37	74	851	962	3.01	91 403	95.0
	TOTAL	852	1 006	18 845	20 703	1.49	1 955 689	94.5

[a] Pulmonary SS/C- = pulmonary TB, sputum-smear/culture-negative.

Table 16. Number of discharges, bed-days and average length of stay in TB hospitals, TB cases confirmed bacteriologically, by oblast, Kazakhstan, 2010

No.	Oblast	Discharges					Bed-days	Average length of stay (days)
		Children (0–14)	Adolescents (15–18)	Adults (18+)	TOTAL	Per bed per year		
1	Akmola	6	18	1190	1214	1.60	137 535	113.3
2	Aktobe	5	32	1057	1094	1.92	153 584	140.4
3	Almaty Oblast	4	22	1348	1374	1.33	169 620	123.4
4	Atyrau	6	29	949	984	1.18	138 841	141.1
5	East Kazakhstan	10	27	1618	1655	1.36	219 956	132.9
6	Zhambyl	0	2	828	830	0.97	80 951	97.5
7	West Kazakhstan	6	15	1043	1064	1.38	112 587	105.8
8	Karaganda	1	10	1030	1041	0.88	119 028	114.3
9	Kyzyl-Orda	8	23	1147	1178	1.09	159 802	135.7
10	Kostanay	2	40	1678	1720	1.82	185 413	107.8
11	Mangistau	1	22	671	694	1.63	70 816	102.0
12	Pavlodar	4	14	1352	1370	1.46	151 042	110.2
13	North Kazakhstan	10	14	1241	1265	1.47	165 490	130.8
14	South Kazakhstan	1	40	1415	1456	0.84	145 214	99.7
15	Almaty City	0	3	1080	1083	3.28	100 267	92.6
16	Astana City	1	3	334	338	1.06	27 161	80.4
	TOTAL	65	314	17 981	18 360	1.32	2 137 307	116.4

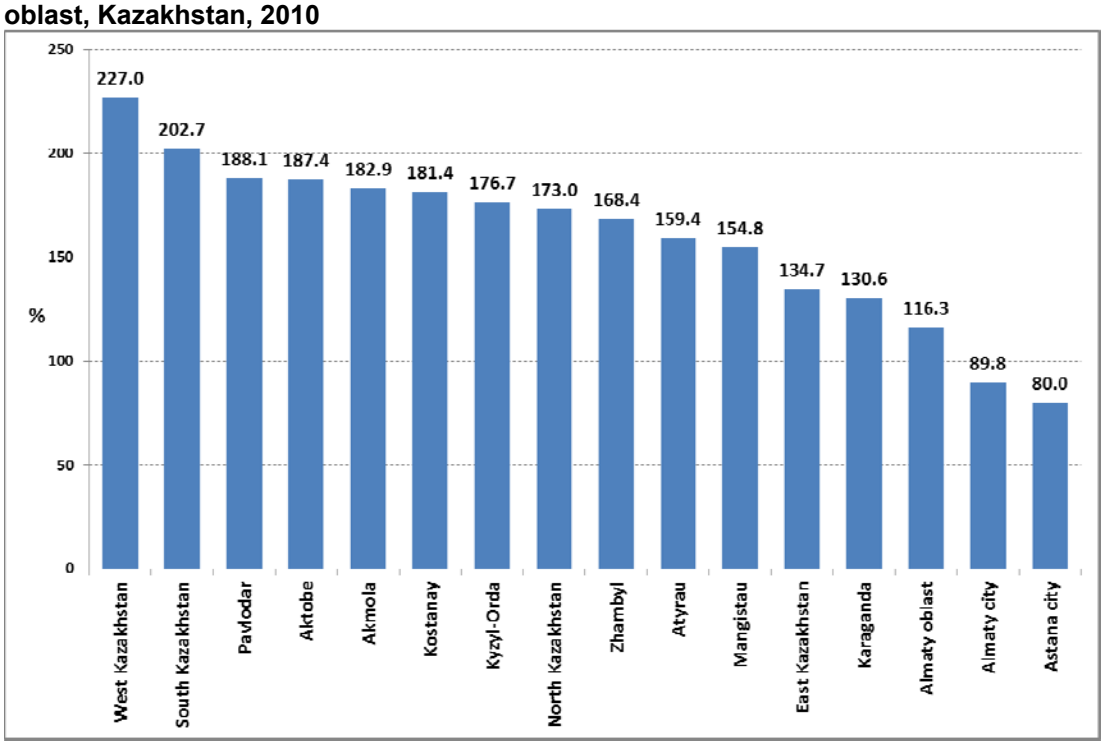
Fig. 18 presents the distribution of all discharges from Kazakhstan's TB inpatient facilities by type of ICD-10 diagnosis, which shows that, in 2010, bacteriologically confirmed TB cases (confirmed by microscopy and/or culture) accounted for less than half (49.2%) of all discharges, while 43.9% were sputum-smear/culture-negative TB cases and 6.9% were cases with a diagnosis other than TB.

Some patients admitted to specialized TB facilities are not TB cases. Among all discharges from the TB facilities, the proportion of non-TB cases was 6.9% of all discharges and 2.5% of bed-days. In five oblasts, however, non-TB cases accounted for 10% of discharges or more; the highest levels are in Kyzyl-Orda (14.6%) and Zhambyl (12.9%).

Table 17. Key indicators of appropriateness of hospital capacity utilization in TB hospitals, by oblast, Kazakhstan, 2010

No.	Oblast	No. of TB discharges as % of registered TB cases	Non-TB as % of all cases		TB not confirmed bacteriologically as % of all TB cases	
			Discharges	Bed-days	Discharges	Bed-days
1	Akmola	182.9	3.8	1.5	49.6	39.4
2	Aktobe	187.4	6.9	1.7	48.3	43.3
3	Almaty Oblast	116.3	4.3	1.0	42.5	40.1
4	Atyrau	159.4	9.9	2.7	46.3	37.7
5	East Kazakhstan	134.7	10.2	2.4	50.8	38.7
6	Zhambyl	168.4	12.9	4.6	60.4	62.7
7	West Kazakhstan	227.0	4.3	2.2	54.0	50.5
8	Karaganda	130.6	7.6	2.4	63.4	65.0
9	Kyzyl-Orda	176.7	14.6	3.6	45.7	44.5
10	Kostanay	181.4	5.4	2.2	35.1	35.9
11	Mangistau	154.8	1.4	0.3	46.7	42.6
12	Pavlodar	188.1	6.3	1.6	48.9	45.6
13	North Kazakhstan	173.0	11.4	4.1	37.7	29.2
14	South Kazakhstan	202.7	4.1	4.6	77.0	71.2
15	Almaty City	89.8	0.2	0.0	12.5	10.3
16	Astana City	80.0	3.5	0.7	74.0	77.1
	TOTAL	157.2	6.9	2.5	53.0	47.8

Fig. 17. Number of TB discharges as percentage of the total number of all registered TB cases, by oblast, Kazakhstan, 2010



In 2010, the number of noninfectious TB cases (not confirmed bacteriologically) as a proportion of all TB cases was high, at 53.0% of discharges and 47.8% of bed-days in all TB hospitals. The average length of stay for these cases was high, at 94.5 days (3.2 months) countrywide, with the longest hospital stays in Kyzyl-Orda and Karaganda Oblasts, which exceeded four months (Fig. 19).

Fig. 18. Structure of hospitalization (discharges) in TB hospitals by type of diagnosis, Kazakhstan, 2010

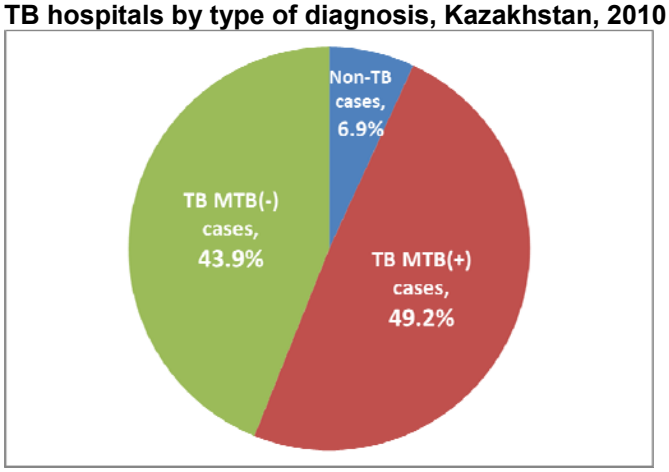
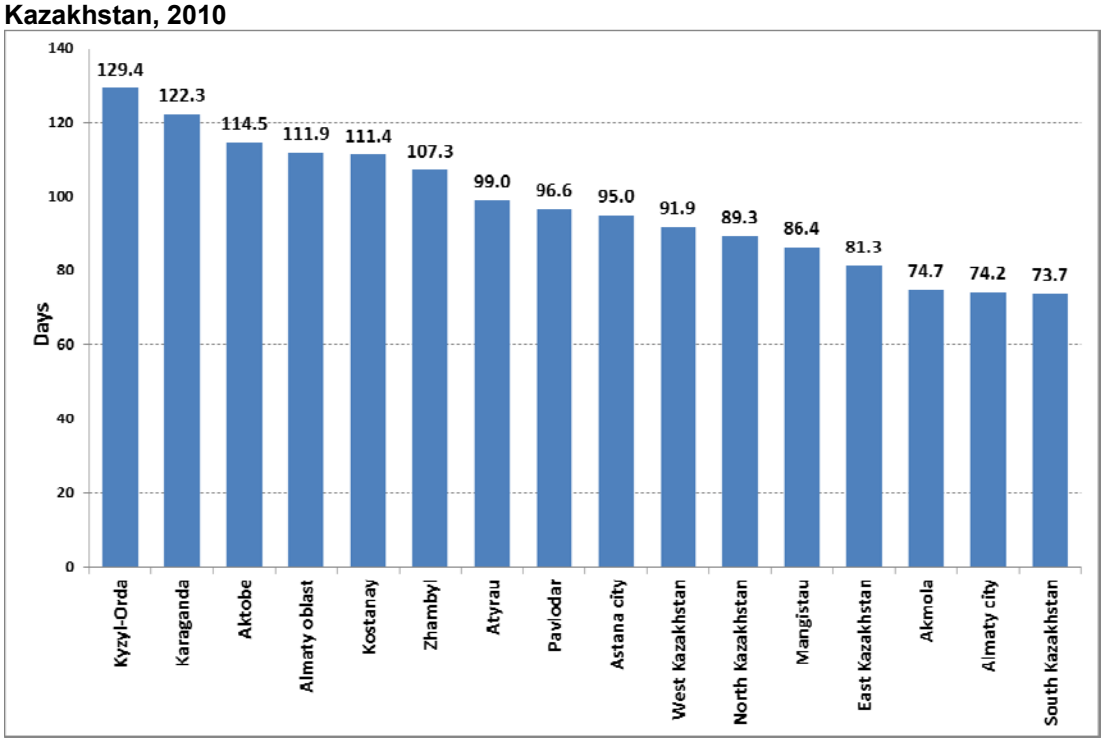


Fig. 19. Average length of stay (days), TB cases not confirmed bacteriologically, by oblast, Kazakhstan, 2010



In total, there were just 1.32 confirmed bacteriologically TB cases hospitalized per bed per year in the country, with the lowest rates in South Kazakhstan, Karaganda and Zhambyl Oblasts, all three having fewer than one such case per bed per year (Fig. 20). The average length of stay of these cases in 2010 was 116.4 days (3.9 months), with the highest levels of over 4.5 months in Atyrau, Aktobe and Kyzyl-Orda Oblasts (Fig. 21).

In 2010, the figure for discharges of children countrywide (not including NCTP) was 1218. Out of these, however, almost one quarter of cases (301 or 24.7%) had a non-TB diagnosis, mostly in South Kazakhstan, North Kazakhstan and Kostanay Oblasts, where 38.9–57.6% of children admitted to TB hospitals did not have TB (Fig. 22).

Fig. 20. Number of hospitalized bacteriologically confirmed TB cases per hospital bed per year, by oblast, Kazakhstan, 2010

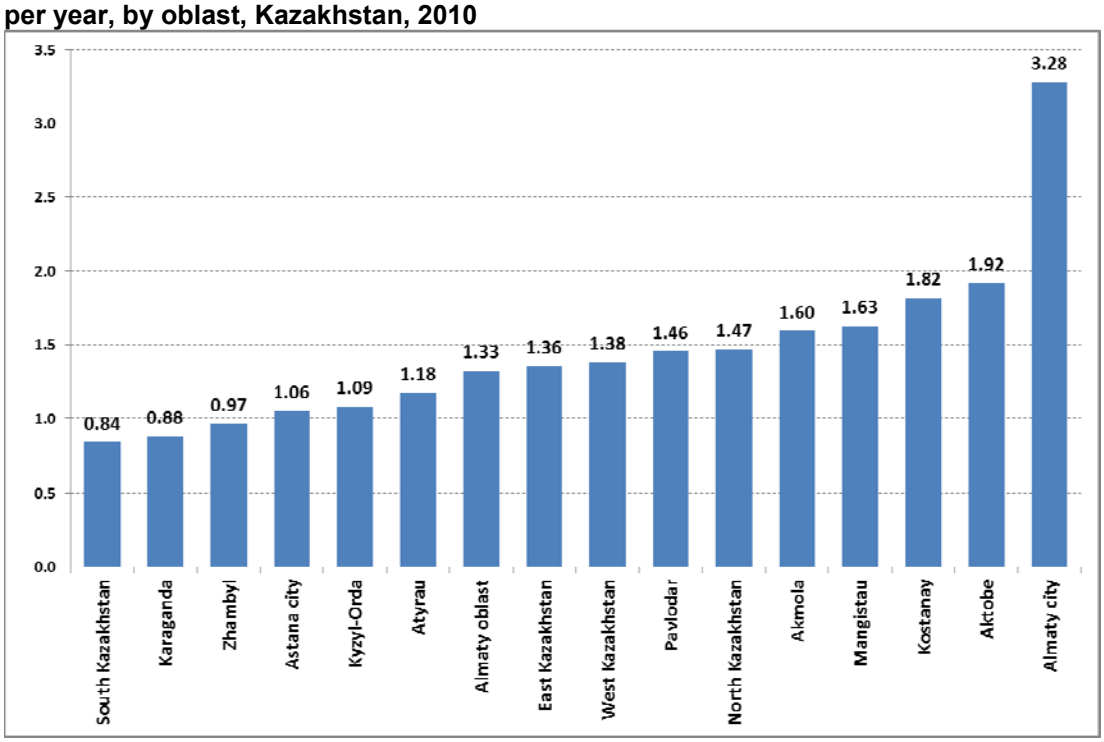
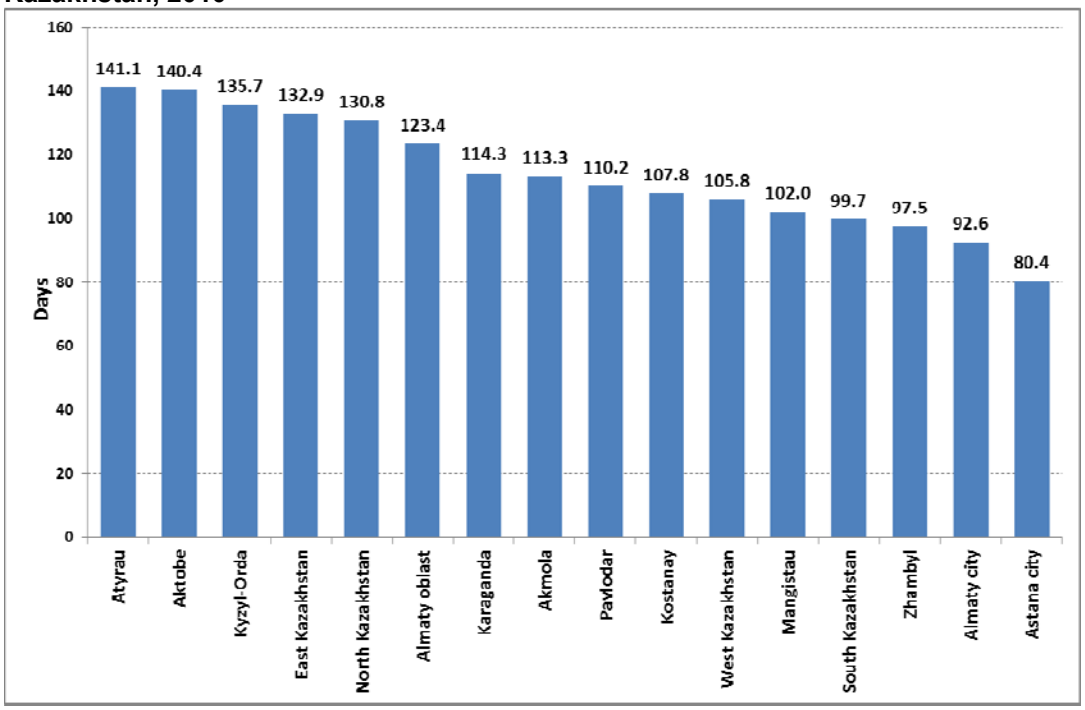
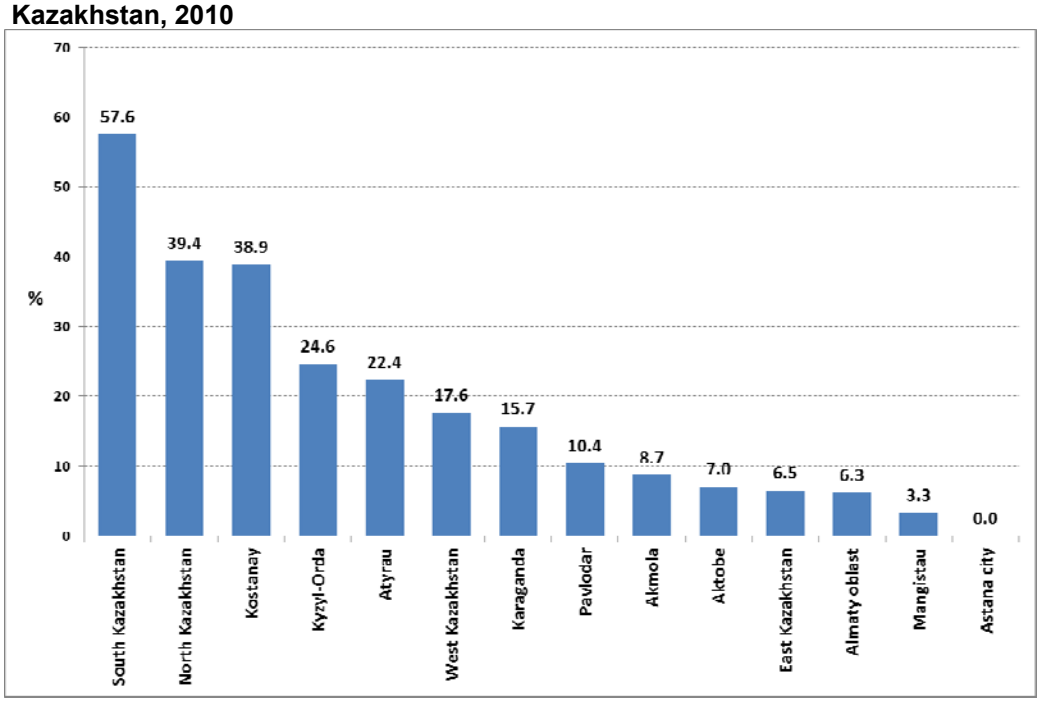


Fig. 21. Average length of stay (days), bacteriologically confirmed TB cases, by oblast, Kazakhstan, 2010



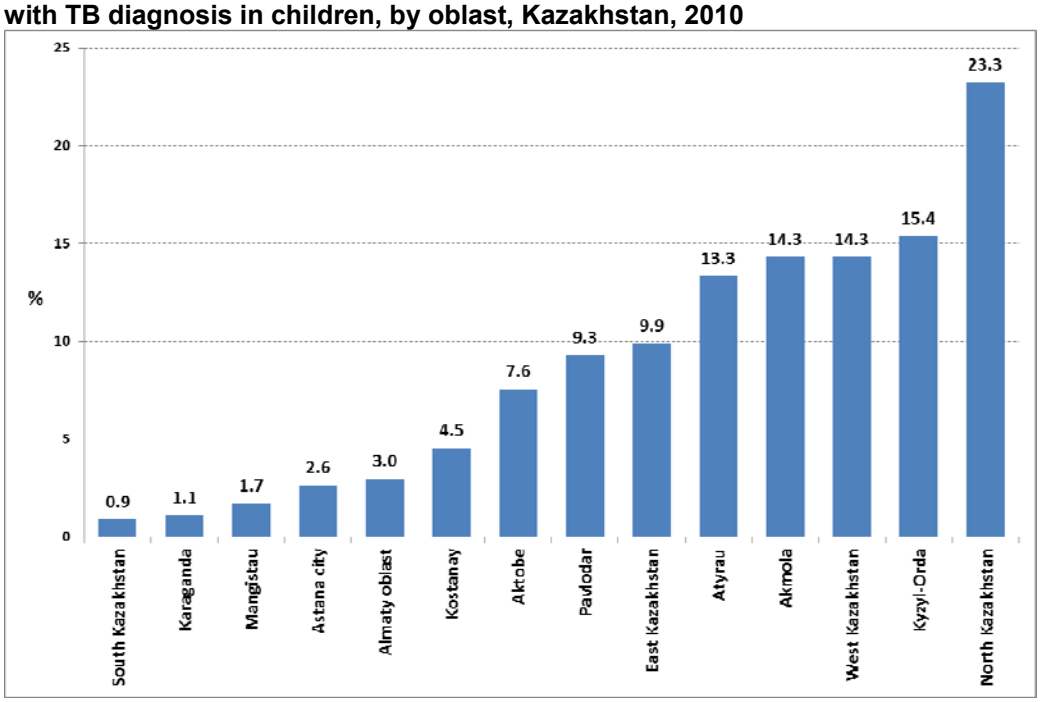
The number of TB discharges among children in oblasts was 917 in 2010 (Note: in the same year, there were only 726 new TB cases in children registered in Kazakhstan). Among them, just 65 (7.1%) were bacteriologically confirmed cases. In nine of 15 territories, the ratio of bacteriologically confirmed (i.e. potentially infectious) TB cases was below 10% (as low as 0.9–1.1% in South Kazakhstan and Karaganda) (Fig. 23).

Fig. 22. Non-TB cases as a percentage of all discharges of children, by oblast, Kazakhstan, 2010



Note: There is no paediatric inpatient department in Almaty City, and the one in Zhambyl Oblast was set up in late 2010.

Fig. 23. Bacteriologically confirmed TB cases as a percentage of all discharges with TB diagnosis in children, by oblast, Kazakhstan, 2010



Operations are is performed in 17 TB hospitals besides NCTP (in all oblast-level TB dispensaries except Mangistau Oblast and Almaty City; in three oblasts – East Kazakhstan, Karaganda and South Kazakhstan – in two facilities). In 2010 (excluding NCTP), there were a total of 1932 surgical interventions performed (all types), 37.2 procedures per week (assuming procedures take place 52 weeks per year) and on average 2.2 procedures per week per surgical

facility. Of the total number of procedures performed, less than half (890 or 46.1%) procedures represented cavitary interventions on the lungs (segmental resections, lobectomies or total pulmonectomies).

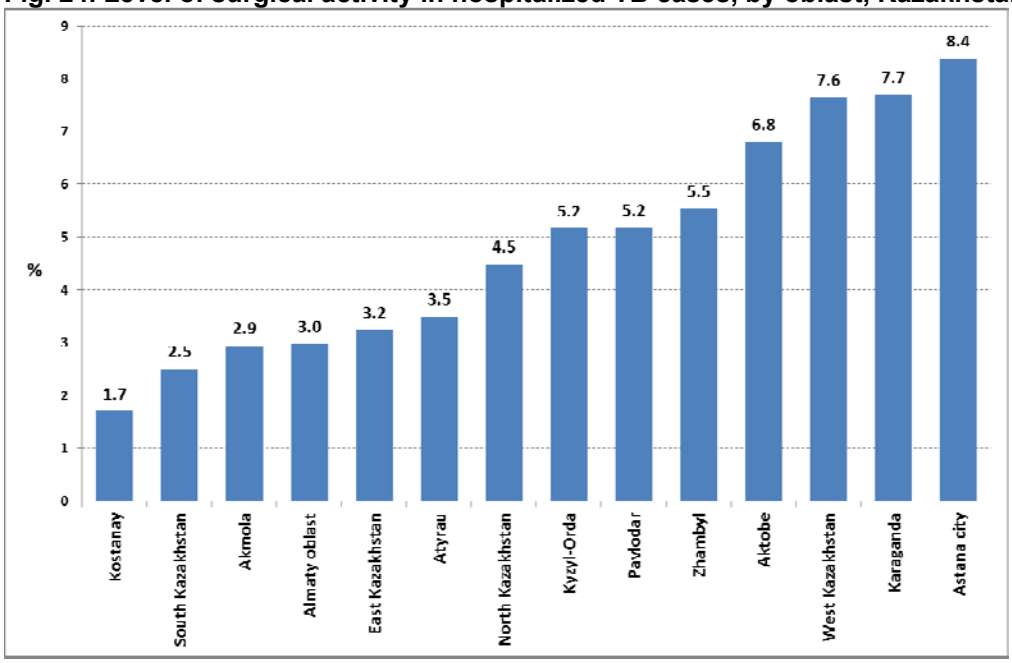
The number of operations for cases with non-TB diagnosis was 307 (10.9% of the number of non-TB discharges and 15.9% of all operations performed). The surgical activity level for all hospitalized TB cases was 4.2% in 2010 (1625 operations for 39 063 TB discharges). There are substantial variations in surgical activity levels for TB cases across regions, ranging from 1.7% in Kostanay Oblast to 8.4% in Astana City (Table 18, Fig. 24).

Table 18. Indicators of surgical activity in TB hospitals, by oblast, Kazakhstan, 2010

No.	Oblast	All cases		Non-TB cases		TB cases	
		No. of operations	Surgical activity, %	No. of operations	Surgical activity, %	No. of operations	Surgical activity, %
1	Akmola	86	3.4	15	15.8	71	2.9
2	Aktobe	172	7.6	28	17.7	144	6.8
3	Almaty Oblast	87	3.5	16	15.0	71	3.0
4	Atyrau	68	3.3	4	2.0	64	3.5
5	East Kazakhstan	127	3.4	18	4.7	109	3.2
6	Zhambyl	206	8.6	90	29.0	116	5.5
7	West Kazakhstan	193	8.0	16	15.2	177	7.6
8	Karaganda	270	8.8	51	21.7	219	7.7
9	Kyzyl-Orda	126	5.0	14	3.8	112	5.2
10	Kostanay	49	1.7	4	2.6	45	1.7
11	Mangistau[a]	–	–	–	–	–	–
12	Pavlodar	155	5.4	16	8.9	139	5.2
13	North Kazakhstan	114	5.0	23	8.8	91	4.5
14	South Kazakhstan	163	2.5	5	1.9	158	2.5
15	Almaty City [a]	–	–	–	–	–	–
16	Astana City	116	8.6	7	14.9	109	8.4
	TOTAL	1932	4.6	307	10.6	1625	4.2

[a] Note: surgery is not performed in facilities of Mangistau Oblast and Almaty City.

Fig. 24. Level of surgical activity in hospitalized TB cases, by oblast, Kazakhstan, 2010 (%)



4.1.2 Main conclusions

One overall conclusion deriving from this analysis is that the TB inpatient infrastructure in Kazakhstan is characterized by overcapacity, is not based on population needs and does not take into account the epidemiological situation; its performance is highly inefficient and does not provide for an appropriate quality of service.

The number of TB discharges substantially exceeds (by 57% countrywide) the annual number of active TB cases reported to the NTP. To a significant extent, this difference can be explained by the effort to fill the excessive hospital capacity (thus justifying the utilization of funds) by unnecessary hospitalization (supposedly, in many cases, involving persons without active TB disease).

The share of non-TB hospitalizations is about 7%; further, there is a high proportion of hospitalized cases who are not infectious initially (sputum-smear and culture-negative): these contributed to 53% of discharges and 49% of bed-days out of all TB cases, with a high average length of stay of 3.2 months. This is indicative of inappropriate use of capacity, as the great majority of these cases can be treated as outpatients, and those who require hospitalization for clinical reasons would need much shorter hospital stays. There were only 1.3 bacteriologically confirmed TB cases hospitalized per bed per year, with, again, an excessively long average length of stay of 3.9 months countrywide.

Management of TB in children requires special attention. The country has over 1000 TB hospital beds for children; at the same time, in 2011 there were only 619 new paediatric TB cases (in 2010 – 726, in 2009 – 806), but a total of 917 hospitalized TB cases were reported among children in 2010, out of whom only 65 (7.1%) were bacteriologically confirmed cases. The average duration of hospital stay in children is extremely high (6.4 months), although the majority of them do not require hospitalization at all.

There were only 1932 surgical interventions in total performed in 2010 (2.2 procedures per working week per surgical facility); the surgical activity level across all regions is 4.2% for TB patients. Such a low workload in the institution cannot assure an appropriate quality of interventions.

In addition to the overall issues and trends above, substantial variations in resource utilization exist across the regions.

Recommendations

To the Ministry of Health.

- Downsize the current highly extensive inpatient TB hospital infrastructure in Kazakhstan, not only to optimize the use of financial resources but to prevent the further spread of drug-resistant TB by reducing nosocomial infection in hospitals.

To the Ministry of Health and NTP.

- With the support of international partners (WHO, World Bank) conduct a comprehensive analysis of TB hospital performance, using proper methodology for activities, expenditure and outcomes. Based on this analysis, estimates of TB bed needs should be developed for the medium and long term, based on appropriate epidemiological projections including trends in drug resistance.

- Develop and enforce clear criteria for hospitalization and discharge of TB cases (based on clinical but not on "epidemiological" or social factors).
- Revise the model of TB care delivery alongside the optimization of TB hospital infrastructure. The model of TB care delivery should place emphasis on outpatient treatment, increasing outreach capacity, increased involvement of general health services and patient support. These will all have funding implications, as savings and reallocations from the hospital sector should be redirected towards patient care, including increasing the motivation of staff.
- Abolish the current practice of full hospitalization of children for the entire duration of treatment, since inpatient TB treatment in children is not justified in most circumstances. At the same time, efforts and resources should be redirected towards outpatient treatment, with appropriate patient and family support.
- Regarding surgery, even with potentially increased surgical activity for MDR-TB and XDR-TB patients, the workload will remain low and appropriate quality of service will not be ensured. Therefore, the surgical needs of TB patients should be considered across a number of neighbouring regions.

4.2 Prevention

4.2.1 Contact-tracing

The following achievements have been made in the field of contact-tracing:

- contact-tracing is an integral part of TB control efforts in the country;
- guidelines exist and contact-tracing is conducted routinely; contact investigation is broadly prioritized on the basis of the sputum-smear status of the index case;
- contacts are systematically followed up at six-month intervals;
- a significant number of paediatric cases are identified through contact-tracing efforts.

The following challenges remain:

- very low yield of contact investigations except in paediatric cases;
- continuation of practices with minimal infection control benefit, such as household disinfection;
- systematic implementation of evidence-based or best-practice-based contact investigation procedures; contact-tracing limited mainly to the household setting: other sites of possible transmission such as work, leisure, etc. usually not included in contact-tracing efforts;
- recording and reporting of clinical and epidemiological outcomes for identified contacts not routine; programme monitoring and evaluation of contact investigation efforts not systematic.

Findings

Contact-tracing or investigation is conducted for the majority of TB cases, with priority being given to sputum-smear-positive (SS+) cases. The usual procedure is for designated SES staff to visit the household of the newly registered TB case. Sometimes SES staff are accompanied by TB physicians when conducting the household investigations. SES is primarily responsible for epidemiological investigations, as well as for conducting source and contact investigations. SES

determines the need for isolation. SES also implements existing decrees related to the disinfection of new cases' homes. These are comprehensive, time- and resource-consuming disinfections of the living quarters, including toys, furniture, bedding, etc., conducted for infection control purposes. When interviewed, SES staff expressed uncertainty about the overall infection control effectiveness of the household disinfections, but also confirmed that the practice will continue until the mandate is changed at the national level.

Usually, the first step in the contact investigation process is an interview with the index case to establish infectious periods and identify contacts with possible exposure. However, infectious periods are not regularly established. The routine is to confirm the home address and develop a list of family members and others who live in the household. Source-case investigations (where the index case is a child) are also conducted on a routine basis but a larger yield of paediatric cases is derived through investigations of adult index cases. For example, in one oblast in 2011, approximately 70% of paediatric cases were detected through contact investigation efforts. All children in contact with the index case are invited to present at the TB dispensary to receive clinical examination, TST and X-ray (chest radiograph for children aged 0–14 years and fluorography for adolescents aged 15–17 years). Children and adolescents who are index-case contacts receive a repeat TST at the six-month follow-up examination. Two-step TST is not performed (that is, TST repeated 8–10 weeks after the last point of exposure) as infectious periods and points of exposure are not recorded or used for contact investigation purposes. If a child in contact with a sputum-smear-positive index case is found to be TST-positive, a three-month course of isoniazid at a dose of 5 mg/kg is prescribed. Young children (<1 year) identified as contacts and children with immunosuppressive conditions are placed on window prophylaxis and receive IPT whatever their TST results. Contacts are followed up every six months for one year; at each visit clinical examination, TST and X-ray are performed. Household contacts of sputum-smear-negative TB cases are invited for evaluation as well. Contacts of MDR-TB cases receive the same evaluation as those of non-MDR cases: the standard of care is observation and follow up. See Table 19 for details of contact investigations in one oblast over a three-year period.

Table 19. Contact investigations (Akmolinskaya Oblast), Kazakhstan, 2009–2011

Year	No. notified cases	No. contacts identified	Contacts per case (mean)	Contact investigation yield No. of cases detected (%)
2009	847	4322	5.1	27 (<1)
2010	654	3883	5.9	9 (<1)
2011	806	3309	4.1	14 (<1)

Recommendations

- Update current contact investigation procedures and develop screening algorithms based on infectiousness of index case and risk of transmission for contacts.
- Discontinue ineffective contact investigation practices such as comprehensive disinfection of index cases' homes.
- Identify staff responsible for contact investigation, update job descriptions and provide training in contact investigation (knowledge and skills training in effective case interview techniques, establishment of infectious periods, prioritization of contacts, etc.). Include contact investigation fields in surveillance and case management modules of TB register data systems (link to index case). Regularly review contact investigation yield and identify areas for improvement.

4.2.2 Vaccination

BCG is given twice in a person's lifetime (at birth and at age 6–7 years). Provided there are no contraindications, BCG vaccination is administered to all neonates within the first four days of life at the hospital maternity department, with the written consent of the mother. All maternity departments have a nurse trained and licensed in BCG administration. Mass TST screenings are conducted on all children aged 6–7 years to select children for BCG revaccination (usually TST screening campaigns are conducted in September among first-grade schoolchildren). TST is done by school nurses trained/licensed in TST administration and reading. Tuberculin (2 TU PPD-L) is administered intradermally in the forearm and read after 72 hours. If TST is negative, BCG revaccination is administered. Coverage with BCG vaccination in Kazakhstan in 2011 was 97.9% and coverage with BCG revaccination was 98.79% of eligible (TST-negative) children (or overall 43.9% [126 159/286 933] of all screened first-grade schoolchildren).

For children and adolescents aged 7–17 years (from second school grade) annual TST screening is performed only for risk groups. Indications for inclusion in risk groups include children with concomitant diseases or those who are often ill, children on corticosteroid therapy, diabetics, children from socially disadvantaged families; children may be added to or removed from the risk group list after annual reviews. In fact, about 50% of all children are included in risk groups. Positive TST is considered at ≥5 mm infiltration. Hyperergic reaction is defined as ≥15 mm infiltration in children and ≥17 mm in adolescents. Criteria for diagnosis of latent TB infection include: TST is ≥5 mm and first in lifetime not related to BCG vaccination, steady for 4–5 years positive TST sized ≥12 mm, or sharp increase of infiltration size of ≥6 mm over one year in previously TST-positive children. Children diagnosed with latent TB infection are started on a three-month course of isoniazid (5 mg/kg), supervised by parents or in TB sanatoria. Children with hyperergic reaction receive a two-month course of isoniazid (5 mg/kg) and ethambutol (15 mg/kg). The draft of the revised decree includes IPT consisting of six months of daily isoniazid at a dose of 10 mg/kg (6H), in accordance with current international guidelines. Also, the revised decree draft recommends one-time IPT (6H) for all HIV-infected children at the time of diagnosis of HIV infection. If a child is diagnosed with latent TB infection, his/her household contacts are included in contact investigation for TB.

4.2.3 Chemoprophylaxis

MDR-TB treatment regimens are standardized according to the National Ministry of Health Decree No. 218 of 2011. The regimen contains pyrazinamide (Z) for the intensive phase, an injectable agent (amikacin – Am or capreomycin – Cm), fluoroquinolones (ofloxacin – Ofx or levofloxacin – Lfx), protionamide (Pto) or ethionamide (Eto), cycloserine (Cs) and *p*-aminosalicylic acid (PAS). Moxifloxacin (Mfx), amoxicillin/clavulanate and clarythromycin (Clr) are available for a limited number of XDR-TB patients enrolled on treatment programmes under the Global Fund Round 8 grant (GLC cohort). Non-GLC cohort patients receive medicines from Government sources, which are procured from one national distributor and are the same in both the civilian and the penitentiary sector. For more information and recommendations, see Section 4.4, Treatment.

Current drug doses used for children and adolescents are as follows (according to Decree No. 218): daily regimens/dosage: INH – 5 mg/kg (4–6), RIF – 10 mg/kg (8–12), PZA – 25 mg/kg (20–30), EMB – 20 mg/kg (15–25). Intermittent three-day/weekly regimens: INH – 10 mg/kg (8–12), RIF – 10 mg/kg (8–12), PZA – 35 mg/kg (30–40), EMB – 30 mg/kg (20–35). Streptomycin is included in Decree No. 218 in category I, II and III regimens, but is not

currently used as a part of first-line treatment regimens. For more information, see Section 4.6.1, TB in children.

4.2.4 Infection control

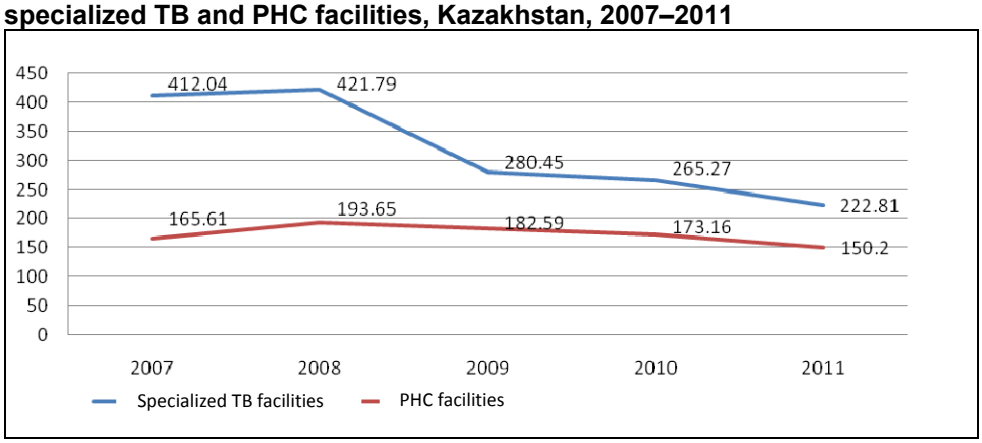
National level

Infection control is one of the main components of proper service delivery and is the key for ensuring a safe environment in health-care facilities for patients as well as for the staff. As an airborne disease, TB can present a big risk of nosocomial transmission of disease in facilities without proper TB infection control measures.

Over the last several years, Kazakhstan has undertaken very important steps towards improving infection control measures in specialized TB facilities, as well as in primary health care. Although improvements are visible and, during detailed facility risk assessments in specific regions, these improvements have been well noted, there is still no standardized approach to TB infection control at the national level, including a country strategy, proper legislation or an approved national infection control plan with budget and approved coordinating body for TB.

Kazakhstan has a well-organized surveillance system for TB disease among staff working in health-care facilities. According to the central registry provided by the NTP, there were 32 TB cases among health-care workers working in specialized TB facilities in 2011. Rates of TB disease among health-care workers (calculated from the information in the central registry) have decreased over the last five years (Fig. 25), both in specialized TB facilities and in primary health care, but are still higher than among the general population. This situation leads to the conclusion that TB infection control measures have been improving during the last five years in health-care facilities, but still need further upgrading at both national and facility levels.

Fig. 25. Rates of TB among health-care workers providing services in specialized TB and PHC facilities, Kazakhstan, 2007–2011



During the visit, team members acquainted themselves with regulatory orders (decrees) and sanitary norms and regulations related to TB infection control. Although these documents were last updated in 2012 (No. 33, Chapters 10–16; No. 178, Chapters 10, 11 and 12), the content of the documents is not much changed from previous regulations and again the main focus is placed on disinfection procedures within the facilities and in the community (Chapters 14 and 15 of No. 33 address this issue). This approach, besides being costly and ineffective for TB prevention, also adds to the stigma surrounding TB in the community.

At the request of the Ministry of Health, a temporary Infection Control Working Group was established in 2011 to assess the TB infection control situation in all oblasts and to rationalize the number of beds in TB specialist facilities on the basis of their infection control conditions. A special infection control plan was approved by this group on 18 July 2011 for conducting assessments. After assessment visits as a result of this initiative, some specialized TB facilities were closed. It is very important to accord permanent status to the infection control working group in order to keep the process going. Alongside facility risk assessments, this group can coordinate planning and monitoring of all infection control activities in the country. It will very important to have all interested and responsible parties involved in infection control as members of the group, including SES, donors and partners and nongovernmental organizations, to facilitate better coordination and planning. The checklist and indicators developed by NTP for monitoring infection control measures in the facilities should be shared and approved by the group to avoid different approaches to the assessment and monitoring process in future.

Besides the approval of the Infection Control Working Group, it is very important to have an approved national infection control plan, with budget. Although oblasts have local budgets available in the regions for infection control measures, it will be essential to have a budget for central-level activities such as planning and monitoring as well. One of the main activities for the Infection Control Working Group will be the finalization of national infection control guidelines and, in the light of these guidelines, the preparation of a list of suggested updates to the decrees currently used by SES. Request of TA is recommended for guideline review before approval.

Recommendations

To the Ministry of Health and NCTP.

- Accord permanent status to the national Infection Control Working Group. Develop/update a monitoring mechanism for infection control measures involving all responsible organizations within the working group to avoid duplication of regulations.

To the NCTP and SES.

- Update SES national-level regulations, with more emphasis on airborne transmission of the disease and special regulations for high-risk procedures.
- Alongside the updated regulations, modify the content of educational materials on means of disease transmission and precautions used for public and patient education.

To the NCTP.

- Share the checklist and indicators developed by NCTP for monitoring of infection control measures in health-care facilities. Approve them within the National Infection Control Working Group to avoid different approaches to assessment and monitoring.
- Finalize and approve a national infection control workplan, with a budget and national infection control guidelines.

Facility level

In the framework of the President's programme "100 new health-care facilities", model new primary health care facilities have already been built or are under construction. These buildings are designed to allow proper patient separation and triage. It will be important to develop special standard operating procedures for triage, separation and cough monitoring (for health-

care workers, a very simple one-page document) in order to improve this process in the new facilities.

In those primary health care facilities which have not yet been renovated, the separation process is complicated because of the small waiting areas and unventilated corridors: as a temporary recommendation, most emphasis should be placed on triage and cough monitoring. Eventually, all old buildings will need major refurbishment in order to meet the main requirement of a health-care facility, which is the creation of a safe environment for staff as well as for patients.

Although all possible interventions are in place for proper separation of patients in specialized TB hospitals following the current approach, separation is still an artificial process in oblasts where rapid diagnostic tests are not available everywhere (because of poor laboratory capacity or the absence of a sample transportation system). Judging by the percentage of primary resistance, around one fifth of patients with unrecognized DR-TB will stay in the departments for drug-sensitive patients until they receive their DST results using conventional methods. Besides, since patients are hospitalized for such long periods, their risk of reinfection with different strains is high.

WHO has recommended the use of ultraviolet germicidal irradiation (UVGI) lamps in health-care facilities in high-risk areas for TB transmission, where the installation of mechanical ventilation cannot be the first choice. As a general recommendation for all health-care facilities where risk is high, all unshielded UV lamps should be replaced by shielded upper-room UVGI fixtures which can be used during all working hours and substantially decrease the quantity of infectious particles in the air. Engineering control measures, including proper installation of UVGI fixtures and proper maintenance, will be very important. At least once per quarter, the effectiveness and safety of UV irradiation should be monitored with special equipment (ultraviolet C meter).

At the time of the visit, proper respirators had been procured in adequate numbers and a budget for future procurements was available in all visited facilities. In the future, it will be important to provide fit-testing equipment at oblast level. During monitoring visits to rayons, equipment can be brought to facilities for fit-testing for staff. After fit-testing, it will be important to refresh staff knowledge about the proper use of respirators. Based on the fit-testing findings, the provision of different models and sizes of respirators in required numbers should be planned.

Recommendations

All detailed facility-level recommendations are listed in Annex 6 (Field visits). The following are general facility-level recommendations.

- Improve triage and cough monitoring in primary health care facilities.
- Ensure availability of rapid diagnostic tests in oblasts for improvement of patient separation, especially in hospitals.
- Procure upper-room UVGI fixtures and ensure their proper installation and maintenance. In high-risk facilities, replace all unshielded UV lamps with shielded UVGI fixtures.
- Procure fit-testing kits at oblast level and conduct fit-testing for all staff who use respirators.

4.3 Diagnosis

The following achievements have been made in the field of diagnosis:

- The laboratory network is well-developed, including sample referral and laboratory infrastructure, quality control procedures, good materials and resources;
- laboratory staff are well-trained, knowledgeable and have a high level of performance;
- access to culture and DST is assured for nearly all TB patients (with some exceptions in a few places in the prison system).

The following challenges remain.

- Methods for rapid diagnosis of (MDR) TB, such as the Xpert MTB/RIF assay, are not yet available (although the country is planning to introduce them soon).
- The culture positivity rate[7] is low (49.1%), and consequently DST coverage among pulmonary TB cases was also low (46.0%).
- There are biosafety concerns in some facilities with regard to engineering, equipment and good laboratory practice.
- Quality control practices are not sufficiently developed to detect errors.
- The laboratory information management system is ineffective.
- There is a shortage of consumables and reagents (for BACTEC systems from the local budget), procurement and supply management are inadequate, and maintenance of equipment is suboptimal.
- There is a lack of official acknowledgement of the specialized training of laboratory staff involved in TB testing. Efforts are being made to obtain a licence for running TB refresher courses for laboratory staff from OTBD bacteriological laboratories, hosted by the national TB reference laboratory (NRL).
- Lack of harmonization of instructions/recommendations developed by different agencies.[8]

General recommendations regarding diagnosis

Main recommendations

- Implement rapid methods for the detection of TB and prediction of resistance to anti-TB drugs for testing (by Xpert MTB/RIF assay and/or line probe assay (LPA)) for all MDR-TB suspects and HIV-positive patients as soon as possible.
- Develop or update algorithms for laboratory technicians and clinicians in order to improve rates of early diagnosis of MDR-TB.
- Finalize the National Strategic Plan for TB Laboratory Service Development and begin implementation. The plan should be accompanied by detailed action plans to be implemented at the national, oblast and peripheral levels.

[7] The general data from the National TB Register are used here for new and retreatment TB cases; however, patients whose test results were not recorded in the Register are not included.
[8] Amendments to Decree No. 218 on laboratory services are being developed.

- Develop a laboratory quality manual, including a section on the selection and analysis of laboratory quality indicators as part of the development of a comprehensive laboratory quality management system, and implement it at all levels of the TB laboratory network.
- Finalize the development of a computerized laboratory information management system to ensure proper laboratory data collection, reporting and analysis, and begin implementation.
- Develop a laboratory biosafety manual and optimize all aspects of biosafety in the laboratories accordingly.
- Optimize TB laboratory diagnosis and continue provision of technical assistance and training in primary isolation and culture of *M. tuberculosis* strains.

Specific recommendations

- Organize training in the maintenance of laboratory equipment.
- Reduce the workload by taking two rather than three sputum samples, in accordance with recent WHO guidelines.
- Continue the daily transfer of sputum from sputum collection points to sputum-smear microscopy laboratories, where this procedure is already practised.
- Ensure appropriate laboratory human resources, in view of the increased workload at all levels of the TB laboratory network, and at the oblast level in particular.
- Ensure the institutionalization of TB laboratory specialized training in an official system of postgraduate education and continuing professional development.

4.3.1 Diagnostic algorithm

TB cases in Kazakhstan are identified through passive and active case-finding. Primary health care providers are responsible for the identification of TB suspects and their referral to the TB service. Suspected TB cases are defined as patients with symptoms who are contacts of a TB case, belong to a risk group, or show abnormalities on radiological screening. The diagnosis is based on physical examination, laboratory results, chest X-ray, previous treatment and/or history of previous TB. For laboratory analysis, three sputum samples per patient are currently collected. Often patients with TB-like symptoms are first put on empirical treatment for about two weeks (with a wide-spectrum antibiotic); if the treatment does not work, they are considered TB suspects.

Given the very high burden of drug-resistant TB, a policy for universal coverage by culture investigations and DST has been introduced in all oblasts. According to the latest information from NCTP, the coverage of culture investigations in the first quarter of 2012 was 90.2% for new cases and 91% for retreatment cases. The corresponding figures for DST coverage were 98.0% and 98.9%.

The percentage of TB suspects with positive sputum-smear results detected at the primary health care level and in specialized TB laboratories has been relatively stable in the last six years, varying between 4.0% and 4.7%. After an initial investigation in primary health care facilities, TB suspects are referred to the rayon TB dispensaries, where the diagnosis is confirmed and TB cases are registered for treatment. A central oblast physician consultative committee periodically reviews patient files and confirms the diagnosis of TB and any changes in the regimen in accordance with laboratory results.

4.3.2 Structure of the TB laboratory network

The TB laboratory network in Kazakhstan is well-developed and comprises a total of 22 culture laboratories and 446 microscopy laboratories at three levels: national, oblast and peripheral. The NRL, which is based at the NCTP in Almaty, coordinates the laboratory network. The NRL performs LPA testing to predict drug resistance to rifampicin and isoniazid (HAIN Lifescience, Germany) on all smear-positive samples and subjects the samples of all TB suspects to culture on both solid and liquid media. DST to first-line and second-line drugs is conducted on solid and/or liquid media. Identification is done by microscopy and a niacin and nitratase test.

As well as at the NRL, culture and DST are also performed at city TB dispensaries in Almaty and Astana, in 18 laboratories at oblast/regional TB dispensaries, and at a laboratory in the penitentiary system in Karaganda Oblast. Some of these culture laboratories perform culture on liquid medium in addition to culture on Löwenstein-Jensen (LJ) medium. Ten of these laboratories have performed LPA to predict drug resistance to rifampicin and isoniazid (HAIN Lifescience, Germany) since the beginning of 2012. Of the 446 microscopy laboratories, 275 are in the primary health care system, 131 at TB facilities and general clinical laboratories, and 36 in the penitentiary system. There are 552 sputum collection points. There is a good system for sputum collection and transportation. At all the sites visited, sputum collection was performed according to protocol. Transport of sputum samples from sputum collection points to microscopy laboratories is well-organized and takes place on a daily basis, using cars owned by the facilities. In most laboratories visited, standard operating procedures or other resources were available to guide the laboratory staff. Table 20 gives an overview of Ministry of Health executive orders and other guidelines in use for laboratory diagnosis of TB. National biosafety guidelines are being prepared for publishing. Laboratory staff are well-trained, knowledgeable and have a high level of performance.

Although, in general, the laboratories are well-organized and standard operating procedures are in place and followed carefully by the laboratory staff, major challenges remain. Timely delivery of reagents and maintenance and repair of laboratory equipment are problematic, and as a consequence certain laboratory tests cannot be performed and expensive equipment is not used. Because of inadequate ventilation, equipment and laboratory procedures, biosafety is a concern in some facilities. Furthermore, most laboratories lack an electronic recording and reporting system or are not (yet) integrated into the electronic system of recording and reporting in the country. Exchange of paper forms with diagnostic requests and laboratory results between health-care facilities and laboratories is a common practice, and feedback of laboratory results to the doctors treating TB is therefore delayed (see also Section 6.1.3, Recording and reporting, data management).

A national plan for the development of TB laboratory services started in 2011 and a draft of the plan is available. The plan aims to strengthen the system of laboratory quality management to ensure accessible, quality-assured laboratory diagnosis of TB in line with the international standards. The main objectives of the plan are: 1) to improve the quality of laboratory management in line with international standards; 2) to develop the laboratory infrastructure including human resources; 3) to perform quality assurance of laboratory examinations in line with international standards; 4) to introduce rapid TB diagnostics including molecular methods.

4.3.3 Quality control procedures in TB laboratories

The laboratory accreditation policy, which also includes TB laboratories, is included in the National Development Plan. At present, the NRL has the ISO 9001 certificate obtained in 2008 and it is in the process of being accredited by ISO 15189.

Table 20. Ministry of Health executive orders and guidelines in use for laboratory diagnosis of TB

Guidelines and orders for TB laboratory diagnostics/safety norms	Subject area
Ministry of Health Executive Decree No. 218 of 25 April 2011	On some issues regarding TB control
Ministry of Health Executive Decree No. 404 of 17 June 2011	On measures for TB control improvement
Ministry of Health and NCTP Guidelines of 14 March 2008	On monitoring and evaluation of TB control activities in the Republic of Kazakhstan
Ministry of Health and NCTP Guideline of 28 February 2008	On TB control in the Republic of Kazakhstan
Ministry of Health and NCTP Guidelines of 17 May 2004	Culture methods for detection of *M. tuberculosis* and drug susceptibility testing of first-line drugs
Ministry of Health and NCTP recommended practices of 11 February 2008	On the use of recording and reporting documentation in the TB control programme of Kazakhstan
WHO guidelines: *Laboratory services in tuberculosis control. Microscopy. Part II*. 1998[a]	Microscopy
WHO guidelines: *Laboratory services in tuberculosis control. Culture. Part III.* 1998[b]	Culture
Safety norms	
Ministry of Health of Kazakhstan Decree No. 13 of 10 January 2012	Sanitation and epidemiological requirements for designing, construction, reconstruction, maintenance and working conditions of microbiology and parasitology laboratories
Ministry of Health Kazakhstan Decree of 17 January 2012	Sanitation and epidemiological requirements for health-care facilities
WHO guidelines 2011	WHO policy on TB infection control in health-care facilities, congregate settings and households[c]

[a] WHO *(6)*.
[b] WHO *(7)*.
[c] WHO *(8)*.

Some quality control practices are in place (including for sputum-smear staining, media sterility, media growth characteristics and temperature control), but a systematic approach towards quality is lacking. Standard operating procedures (standard operating procedures) are available for some procedures and are presented in a standard format, but the majority of laboratory workers in the visited laboratories have little understanding of the standard operating procedures concept or use of standard operating procedures.

External quality assurance (EQA) is in place for various assays at various levels of the TB laboratory network. Since 2001, the NRL participates in the international EQA programme for anti-TB drug susceptibility testing, supported by the Supranational Reference Laboratory in Borstel, Germany (see the latest EQA results in Table 21). The NRL is certified for DST for first-line anti-TB drugs (certificate dated 21 June 2011). In 2011 the NRL obtained excellent quality results for amikacin, ofloxacin and capreomycin, but not for ethionamide. The NRL coordinates the national quality assurance programme for DST at the regional level, and proficiency rounds are performed annually. In 2011, out of the 18 laboratories participating in this proficiency study, only the laboratory in Akmola Oblast obtained 95% or more efficiency in DST for the four first-line anti-TB drugs. Seven laboratories obtained less than 80% efficiency for at least one of the first-line drugs. Ten laboratories had good results (≥95%) for DST for isoniazid and rifampicin. EQA for sputum-smear microscopy is in place and >99% concordance was achieved in all laboratories visited, but the EQA procedure followed is not consistent with WHO guidelines and not well designed to detect errors. In the framework of the Global Fund

Table 21. Proficiency test results for anti-TB drug susceptibility testing performed by the NRL in Almaty, Kazakhstan, 2011

Drug	Sensitivity (%)	Specificity (%)
Isoniazid	94.4	100
Rifampicin	94.7	100
Ethambutol	80.0	64.3
Streptomycin	94.7	100
Amikacin	100	100
Ethionamide	66.7	92.3
Ofloxacin	100	100
Capreomycin	100	100

project the blind method of EQA of sputum-smear microscopy was introduced in four pilot regions. The country plans to extend this EQA in the fourth quarter of 2012. Currently, EQA for culture is lacking, but plans exist to implement a system for this in the fourth quarter of 2013.

Internal quality control procedures for microscopy and culture are performed based on national guidelines. For microscopy, controls to test the quality of dyes and positive and negative controls are performed following the Ministry of Health and NCTP guidelines of 14 March 2008 "On monitoring and evaluation of TB activities in the Republic of Kazakhstan". Culture media sterility and growth characteristics are tested following the Ministry of Health and NCTP guidelines of 17 May 2004 "Culture methods for the isolation of TB mycobacteria and drug susceptibility testing to first-line drugs". All results are documented in a dedicated registration journal.

Specific recommendations to improve quality control procedures

- In order to develop further the quality assurance system of the TB laboratory network, a robust quality management system should be developed and implemented at all levels of the laboratory network, aiming at continuous quality improvement at pre-analytical, analytical and post-analytical stages of laboratory examinations. This system should include appointment of quality managers at the national and oblast level laboratories. Furthermore, a laboratory quality manual should be developed, including updated procedures for internal and external quality assurance practices for all types of laboratory testing and a section on the selection and analysis of laboratory quality indicators.
- External quality control of sputum-smear microscopy should be optimized by: (a) conducting quality control blindly, i.e. without knowledge of the results of the laboratory that first analysed the slides in order to review the slides objectively; (b) reducing the workload by revising the number of slides to be selected according to the new WHO guidelines; and (c) introducing testing by a quality control panel which is prepared centrally or procured (e.g. by INSTAND) and distributed to the laboratories.
- Strengthen quality control procedures for sputum-smear staining; ensure the possibility of rejecting commercial reagent kits of unacceptable quality and procurement of appropriate ones when needed.

4.3.4 Quality of laboratory diagnosis of TB

In Kazakhstan, culture and DST are mandatory for all cases and, indeed, in 2011 culture coverage and DST coverage of culture-positive cases were high (94.0% and 93.7%, respectively), but the overall coverage of DST among pulmonary TB cases, according to the data received by the review team from the register, was only 46.0% (9 514/20 703) because of the

low culture positivity rate of 49.1% (10 155/20 703) (unpublished data, Ministry of Health, 2012). The culture positivity rate has improved greatly over the last few years, from 28.2% in 2009 to 42.7% in 2011 among new cases (see Tables 22, 23), but should be improved further. Interestingly, the culture positivity rate varied significantly between oblasts, with Southern Kazakhstan Oblast, Zhambul Oblast and Almaty Oblast showing the lowest yield (Fig. 26). Similarly, detection of MDR-TB is low compared with the estimated figures and also varies considerably across the oblasts. This variation in MDR-TB detection appears to be mainly attributable to the variation of culture coverage and confirmation between oblasts (see Sections 2, Background information, and 6.1, Surveillance for more details).

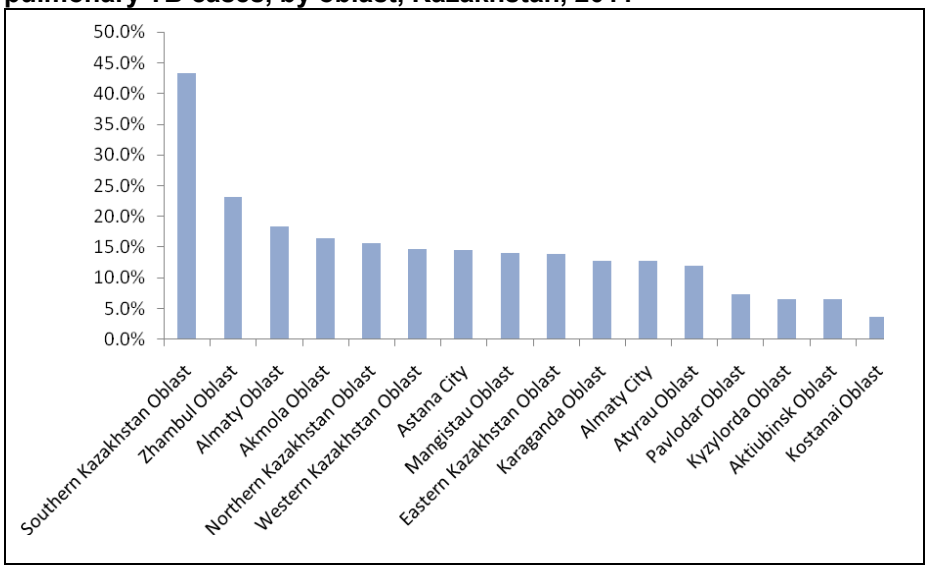
Table 22. Culture results for all new pulmonary TB cases in Kazakhstan, 2009

Sputum-smear microscopy result	Positive		Negative		Unknown/ Not conducted		Total
Positive	2821	(54.1%)	1063	(20.4%)	1329	(25.5%)	5213
Negative	1220	(13.3%)	5216	(56.8%)	2740	(29.9%)	9176
Unknown	61	(42.7%)	48	(33.6%)	34	(23.8%)	143
Total	4102	(28.2%)	6327	(43.5%)	4103	(28.2%)	14532

Table 23. Culture results for all new pulmonary TB cases in Kazakhstan, 2011

Sputum-smear microscopy result	Positive		Negative		Unknown/ Not conducted		Total
Positive	3289	(79.1%)	676	(16.3%)	192	(4.6%)	4157
Negative	1915	(23.7%)	5712	(70.6%)	465	(5.7%)	8092
Unknown	89	(59.3%)	36	(24.0%)	25	(16.7%)	150
Total	5293	(42.7%)	6424	(51.8%)	682	(5.5%)	12399

Fig. 26. Percentage of culture-negative cases among new sputum-smear+ pulmonary TB cases, by oblast, Kazakhstan, 2011



The low culture confirmation rates in some oblasts could be caused by differences in screening procedures between the oblasts and/or inappropriate storage, transport or processing of the sputum samples, or by data entry specialists not entering complete results of all performed cultures into the national register. During the country review, various observations showed that the low culture confirmation rates can be attributed, at least partly, to inappropriate laboratory procedures. In most of the laboratories visited, the centrifugation speed was too low: 3000 revolutions per minute instead of 3000 times gravity (3000 x g). In addition, the observed

contamination rates were too low, varying from 0.6% on LJ medium in a facility in South Kazakhstan Oblast to 1.5% on LJ and 3.6% on mycobacterial growth indicator tube (MGIT) medium, recorded in 2011 by the NRL. These low contamination rates indicate over-harsh decontamination of the sputum samples before culture.

DST for first-line drugs is performed reliably only by the NRL and the laboratory in Akmola Oblast (see Section 4.3.3, Quality control procedures in TB laboratories). The NRL performs good quality DST for the second-line drugs amikacin, ofloxacin and capreomycin (except ethionamide); the proficiency of second-line DST of the other laboratories has not yet been investigated. Data available at the NRL showed 15.0% XDR-TB, 51.1% pre-XDR-TB, and 28.4% mono-second-line-drug resistance among MDR-TB cases, but these data should be interpreted with care, since they are data from one clinic only, not from the whole country.

Specific recommendations to improve the laboratory diagnosis of TB

- Optimize laboratory diagnosis of TB by organizing technical assistance and training on the decontamination procedure for sputum samples for culture and centrifugation practices.
- Centrifugation speed for sputum preparation before culture should be checked and optimized in all facilities performing culture. The centrifugation speed depends on revolutions per minute, rotor length and tube length, and should be optimized for each centrifuge individually. Inappropriate centrifuges should be replaced.

4.3.5 TB laboratory workforce and training

Overall, there appear to be sufficient human resources at the peripheral level, but a lack of human resource capacity at the oblast level. The total number of TB laboratory workers in Kazakhstan includes 78 doctors and 308 technicians. There are no positions dedicated to quality management in TB laboratories. Staff turnover has been very low in the last 3–5 years.

The system of pre-graduation (prior to hands-on activities) and post-diploma education for TB laboratories complies with Ministry of Health Decree No. 661 of 06 November 2009 “On the approval of regulations for the qualification examination in the field of health care”. Upon graduation from medical colleges, graduates have a one-year internship in a selected field of specialization followed by primary specialization in bacteriology, and every five years they undergo training at the medical college followed by certification. Certification and assignment of the qualification categories (category 2, category 1 and the highest category) are conducted by the Control Committee of Medical and Pharmaceutical Activity of the Ministry of Health. There is no official acknowledgement of this TB laboratory specialized training, and no professional development credit hours are awarded to the trainees.

4.3.6 Introduction of methods for rapid diagnosis of TB

In July 2011, a memorandum of understanding was signed between the Ministry of Health of Kazakhstan, WHO and partners for participation in the project to expand access to new diagnostics for TB (EXPAND-TB). Within the framework of this project, equipment and reagents at the NRL and the bacteriology laboratory of the TB dispensaries in Almaty, Astana and Aktobe will be upgraded to enable them to use the new methods for rapid detection of MDR-TB, such as the MGIT system and LPA.

The Xpert MTB/RIF assay, which detects TB and resistance to rifampicin within two hours, will be implemented within the framework of the USAID TB CARE I project at four pilot sites: the

NRL and the City TB dispensary in Almaty, and in East Kazakhstan Oblast (Ust-Kamenogorsk) and Akmola Oblast. At the sites visited during the review mission, little information was supplied regarding the Xpert MTB/RIF implementation, presumably because knowledge about the implementation plans at these facilities was limited, even though two of the facilities visited aim to have access to the technology in the near future. Therefore, a few general recommendations for the implementation of the Xpert MTB/RIF technology are supplied below.

Specific recommendations for implementation of Xpert MTB/RIF assay

- An expert working group, including representatives of both laboratory experts and clinicians, should be established to guide the processes listed below.
- In a high MDR-TB country such as Kazakhstan, the Xpert MTB/RIF assay should be used as the primary diagnostic test. If testing capacity is limited, clear priorities should be set among the TB suspects to be tested including, as a minimum, all MDR-TB suspects and HIV-infected individuals of a particular population. Considering that time in prison is a strong risk factor for MDR-TB in eastern Europe, prisoners and ex-prisoners should be regarded as MDR-TB suspects.
- The diagnostic algorithm should be revised to include the Xpert MTB/RIF assay, and laboratory protocols, clinical guidelines, request and reporting forms, registers, etc., as well as the laboratory strategic plan, should be adjusted accordingly.
- Legal requirements should be considered to implement these changes, as official Ministry of Health approval and/or adjustment of the Executive Order may be needed, for example, to ensure clinicians can directly start category IV treatment if the Xpert MTB/RIF assay indicates TB and rifampicin-positive status, or for registration of the Gene-Xpert technology in the country.
- Sites should be selected in view of the expected load of TB suspects, human resource capacity and infrastructure and environmental conditions.
- Both laboratory and clinical staff should receive training, supervision and monitoring of sites should be conducted, and maintenance of equipment should be planned.

4.4 Treatment

4.4.1 Treatment regimen

With the support of Global Fund Round 6 and 8 grants, Kazakhstan has made significant improvements in its TB control programme. Current diagnosis and treatment of TB/MDR-TB have been developed in line with WHO recommendations. New intervention methods approved by WHO remain the key requirement for preventing drug resistance. It has become clear that, in conditions of very high DR-TB burden, timely diagnosis and proper treatment of DR-TB cases are necessary for overall success in combating the TB epidemic and achieving TB control targets and the disease-related Millennium Development Goals. Primary health care providers, who are being reorganized through the general practice model under the ongoing reform of the national health system, have been increasingly involved in TB control since the early 2000s.

TB treatment delivery sites in the civilian sector include 117 specialized TB dispensaries (at the national, oblast and rayon levels), and 130 TB cabinets in general outpatient health facilities (polyclinics). Inpatient TB departments have 13 498 beds, including beds for symptomatic treatment/palliative care and units for involuntary isolation. In 2011, out of 7390 MDR-TB patients, 1100 (15%) were sent for symptomatic treatment. In the penitentiary sector, TB

treatment is provided in 7 institutions with approximately 2000 beds, of which 300 beds are designated for DR-TB patients.

Case classification and definition of treatment category are conducted in the specialized TB service institutions. DOTS is an official strategy for TB control in Kazakhstan; it was introduced in 1997 and expanded to cover the entire country, including the penitentiary sector, in 1998. Standard first-line treatment DOTS regimens are prescribed in line with WHO recommendations, but the duration of treatment varies up to one year.

The majority of infectious TB patients are hospitalized during the intensive phase of treatment, for an average of two to three months for TB and four to six months for DR-TB. During outpatient treatment, follow-up of patients and drug dispensing are performed by the TB dispensary outpatient departments such as DOT cabinets, by daily treatment wards or by home-based care programmes. In big cities and rayon centres, ambulatory treatment is provided by primary health care facilities under the supervision of TB specialists (DOT workers). Direct supervision of treatment is in place for all inpatients and for the majority of outpatients. According to information from site visits, some patients living in rural areas are visited by *feldsher*s or other staff members on a weekly basis.

Treatment regimens for susceptible TB cases are standardized according to the DOTS guidelines. Treatment of patients on category I and II treatment is organized in all TB facilities in the same way: the majority of TB cases are hospitalized, at least for the intensive phase. The average period of hospitalization varies, but it is not less than three months. Reducing the length of inpatient treatment and prioritizing outpatient care will be a new challenge for TB services. Key persons in the OTBD and the NCTP team need more active supervisory programmes for all regions, and visits should be planned on a regular basis, with clear recommendations on how to reduce the inpatient period.

Case management after hospitalization requires further strengthening. Cooperation between TB specialists and primary health care staff needs improvement, and special training programmes to change the attitude of physicians are also needed. Currently, there is not a clear understanding in all oblasts of the division of responsibilities between TB services and the primary health care system. Primary health care facilities perform vaccination, preventive examinations, follow-up of risk groups and detection and control of treatment continuation. Primary health care doctors and medium-level primary health care workers undergo annual accreditation, which includes workshops followed by appraisal. Information on all new Ministry of Health decrees on TB control is provided, and training includes practical exercises in filling in medical forms TB 01 and TB 05 and other forms. Working with sanitary control and TB services, the primary health care workers participate in evaluations of TB foci, as well as contact investigation. TB contacts are evaluated for clinical symptoms: miniature mass radiography is performed for adults and Mantoux testing for children under 15. The mission understood that, in order to improve the management of TB cases during outpatient treatment, NCTP will need to update its guidelines.

Over the last five years (2006–2010), the proportion of pulmonary sputum-smear-positive cases have been relatively low, at an average of only 35% (36.0–35.3%) (Table 24). In the worst-case scenario, not all sputum-smear-positive cases had culture confirmation. In 2009, out of all sputum-smear-positive cases, 20% had a negative culture result and for 25% culture was not done or not recorded. There was clear improvement in 2011, when the figures were 16% and 5%, respectively. At the same time, despite increasing coverage of culture investigation, the proportion of cases confirmed by culture decreased from 41.9% in 2006 to 37.6% in 2010. Such

a low confirmation rate does not provide reliable data about the drug resistance profile of TB cases. On the other hand, this may be related to misdiagnosis of cases.

Table 24. Proportion of new sputum-smear-positive TB cases among all new pulmonary TB cases, Kazakhstan, 2006–2010

Year	No. pulmonary TB cases	Percentage
2006	6205	36
2007	6195	33.9
2008	6193	36.6
2009	5213	35.9
2010	4769	35.3

Source: European Centre for Disease Prevention and Control and WHO *(9,* Table 8*)*.

Treatment success decreased from 71.1% to 62.4% in the period 2006–2009 among new sputum-smear-positive TB cases (Table 25). The main reason for this negative trend is increasing drug resistance (failure rate of 29.5%). For retreatment cases, treatment success was only 48.4% in the 2009 cohort of patients, with a failure rate of 34.2% (Table 26).

Table 25. Treatment outcome results for new laboratory-confirmed pulmonary cases, Kazakhstan, 2009 (N=5355)

Outcome	Absolute No.	Percentage
Success	3341	62.4
Died	197	3.7
Failed	1581	29.5
Defaulted	153	2.9
Transferred out	82	1.5

Table 26. Treatment outcome of previously treated laboratory-confirmed pulmonary cases, Kazakhstan, 2009 (N= 9392)

Outcome	Absolute No.	Percentage
Success	4549	48.4
Died	850	9.1
Failed	3216	34.2
Defaulted	538	5.7
Transferred out	239	2.5

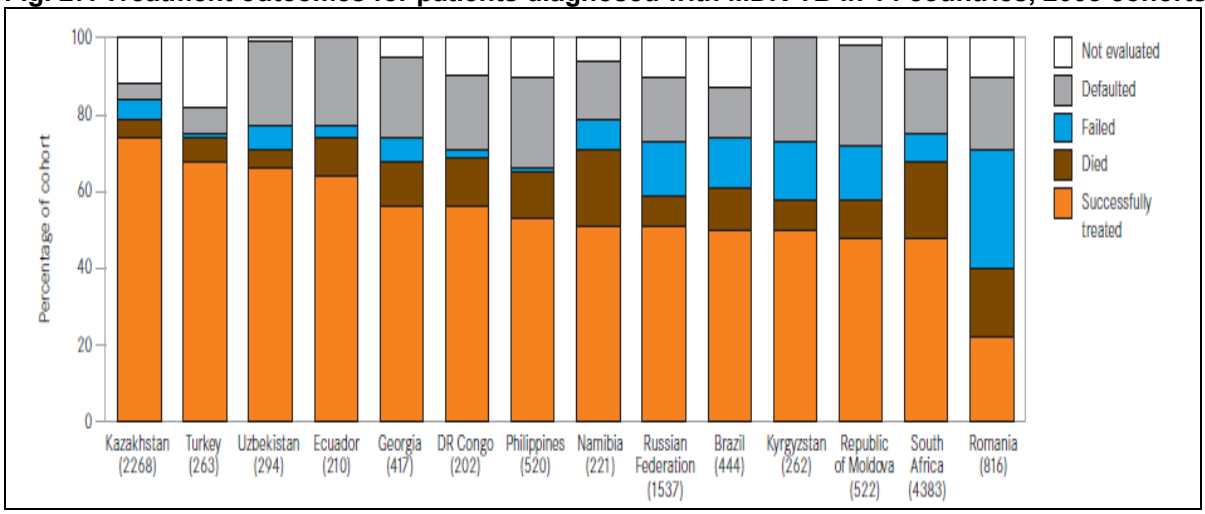
Fig. 27 shows treatment outcomes for patients diagnosed with MDR-TB in 14 countries (2008 cohorts).

4.4.2 Management of MDR-TB cases

Table 27 shows the proportion of MDR-TB among new and previously treated cases in the period 2006–2011. The first application by Kazakhstan to GLC was submitted in September 2006 and received GLC approval on 15 January 2007 for access to second-line drugs at concessionary prices for 380 patients in the pilot project in Almaty City. To strengthen the MDR-TB management strategy and widen MDR-TB treatment possibilities, GLC approved treatment for an additional 2260 patients in January 2009 and 1700 patients in November 2009, bringing the total number of approved patients to 4340.

Ambitious targets have been set for scaling up the diagnosis and treatment of MDR-TB between 2011 and 2015 at all levels of health care (Table 28).

Fig. 27. Treatment outcomes for patients diagnosed with MDR-TB in 14 countries, 2008 cohorts[a]



[a] Total number of patients starting treatment in each cohort is shown under each country.

Table 27. Proportion of MDR-TB among new and previously treated cases, Kazakhstan, 2006–2011

Cases	2006	2007	2008	2009	2010	2011
New cases	13.1	20	21.3	21.9	26.9	19.1
Retreatment	39.1	52.9	39.0	39.0	45.0	53.3

Over the last five years, the NTP has markedly improved its performance in the management of drug-resistant TB. Despite the increasing number of cases, access to rapid diagnosis and to proper treatment with second-line drugs has been considerably improved. As a result, 95% of TB patients now undergo DST. By the end of 2011, over 2600 MDR-TB patients had received treatment with high-quality second-line TB drugs provided by the Global Fund (GLC-approved cohort of patients). However, this number represents only 85% of its intended target (3110 patients). This underperformance is directly attributable to constant difficulties and delays in relation to second-line drug procurement via the IDA Foundation, a nongovernmental organization based in the Netherlands. Order times are steadily lengthening, which delays drug supplies and risks treatment delays. Because of this situation, in 2011 the Government increased the local budget in order to procure second-line drugs on the local market.

The current situation is more complicated, as some drug formulations (procured under Global Fund Round 8) are drawing near to their expiry date. According to the latest information, the NCTP administration has prepared a detailed plan for scaling-up the enrolment of MDR-TB/ XDR-TB patients and wishes to seek permission to allow the patients to transfer between the GLC cohort and the local cohort.

In the majority of cases, the treatment of MDR-TB patients in the civilian sector will start on an inpatient basis at the NCTP and the oblast-level TB dispensaries. For prisoners, the whole course of treatment will be administered in specialized DR-TB departments in one of the seven prison hospitals (see Section 4.6.2, penitentiary sector).

The potential risk groups for infectious cases and MDR-TB suspects in the polyclinics and outpatient departments of TB dispensaries (waiting areas) are not routinely identified. The isolation of coughers in waiting areas and education of the patients (cough hygiene) must be intensified. Protective materials (tissues, surgical masks) must be given to people coughing in crowded areas of the medical units. Educational materials should be posted on the walls in all units.

Table 28. Estimated number of patients and MDR-TB management needs for 2007–2015[a]

	Steps in programmatic needs assessment	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
1	Population (projections by UN Population Division)	15,421,864	15,531,645	15,643,930	15,758,521	15,873,025	15,984,703	16,092,936	16,197,626	16,298,563
2	Estimated incidence rate new ss+ cases, per 100 000 (WHO)	58.61	58.54	57.91	56.72	54.89	52.38	49.25	46.06	42.79
3	Estimated incidence rate new ss-/EP cases, per 100 000 (WHO)	71.79	71.71	70.94	69.48	67.23	64.17	60.33	56.42	52.42
4	Estimated number of new ss+ cases (WHO)	9,039	9,093	9,060	8,939	8,712	8,374	7,926	7,460	6,974
5	Estimated number of new ss-/EP cases (WHO)	11,072	11,138	11,097	10,949	10,672	10,257	9,708	9,138	8,543
6	**Case detection rate new ss+ cases, %**	71.3%	70.0%	**71.0%**	**72.0%**	**74.0%**	**77.0%**	**80.0%**	85.0%	90.0%
7	**Proportion of new ss-/EP cases detected, %**	121.4%	110.0%	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	100.0%	100.0%
8	Estimated number of new ss+ cases to be notified	6,443	6,365	6,432	6,436	6,447	6,448	6,341	6,341	6,277
9	Estimated number of new ss-/EP cases to be notified	13,437	12,251	11,097	10,949	10,672	10,257	9,708	9,138	8,543
10	**Proportion of re-treatment cases among all TB cases, %**	45.0%	42%	38%	36%	34%	32%	30%	28%	25%
11	Estimated number of all re-treatment cases to be notified	16,265	13,481	10,744	9,779	8,819	7,861	6,878	6,020	4,940
12	Estimated number of all TB cases to be notified	36,145	32,097	28,273	27,164	25,938	24,565	22,927	21,499	19,760
13	**Proportion of ss+ cases among all re-treatment cases, %**	51.6%	55%	60%	65%	70%	75%	80%	80%	80%
14	Estimated number of ss+ re-treatment cases to be notified	8,391	7,414	6,446	6,356	6,173	5,896	5,503	4,816	3,952
15	Estimated number of all ss+ cases (new and re-treatment) to be notified	14,834	13,779	12,879	12,792	12,620	12,343	11,843	11,157	10,229
16	**Proportion of patients to be covered by DST for MDR-TB diagnosis, by automated rapid technique, %**	2.8%	7.3%	75%	90%	90%	90%	90%	95%	95%
17	Number of patients with DST investigations for MDR-TB diagnosis (automated MGIT)	420	1,000	9,660	11,510	11,360	11,110	10,660	10,599	9,717
18	**Proportion of MDR among new cases, %**	20.0%	20.0%	**19.0%**	**18.0%**	**17.0%**	**15.5%**	**14.0%**	**12.0%**	**10.0%**
19	**Proportion of MDR among re-treatment cases, %**	52.9%	52.0%	**50.0%**	**48.0%**	**46.0%**	**43.0%**	**40.0%**	**36.0%**	**32.0%**
20	Number of MDR cases that can be diagnosed among new cases	1,289	1,273	1,222	1,158	1,096	999	888	761	628
21	Number of MDR cases that can be diagnosed among re-treatment cases	4,439	3,855	3,223	3,051	2,840	2,535	2,201	1,734	1,265
22	Total number of MDR cases that can be diagnosed (new and re-treatment)	5,727	5,128	4,445	4,210	3,936	3,535	3,089	2,495	1,892
23	Total number of MDR cases to be diagnosed (new and re-treatment) by DST, automated rapid technique			3,334	3,789	3,542	3,181	2,780	2,370	1,798
24	**Proportion of diagnosed MDR cases to be enrolled in treatment, %**			**70%**	**72%**	**74%**	**77%**	**80%**	**85%**	**90%**
25	Number of MDR patients to be enrolled in treatment in a given year - TOTAL			**2,330**	**2,730**	**2,620**	**2,450**	**2,220**	2,010	1,620
26	Needs' coverage with MDR-TB treatment, %			**52.4%**	**64.9%**	**66.6%**	**69.3%**	**71.9%**	80.6%	85.6%
	Needs in diagnostic interventions:									

[a] Based on the Global Fund projections for Kazakhstan and drug resistance surveillance data.

Isolation of TB suspects is not a particular concern, except for the contacts of MDR-TB cases or cases where TB suspects are hosted in areas also used by people with other lung diseases (polyclinics).

Sputum-smear-positive patients are routinely isolated, and all identified sputum-smear-positive TB cases are hospitalized. However, sputum-smear-positive TB patients with unknown DST results are hospitalized alongside drug-susceptible TB patients. Under the current practice, doctors wait for the results of laboratory tests (using solid media) for a couple of weeks or months when there is a serious risk of nosocomial transmission of infection. TB patients in the majority of TB departments for new and retreatment cases may be exposed to MDR strains, even if they are hosted in separate rooms. MDR suspects are sometimes isolated in special rooms if these are available, but unknown MDR-TB cases may sometimes be mixed with other patients. Patients with unknown bacteriological status must be isolated until the bacteriological results are available. The same situation applies to those DR-TB patients with pending DST to second-line drugs, which may lead to the MDR-TB cohort being exposed to XDR-TB.

Known multidrug-resistant cases are separated from others, with all MDR-TB patients identified being hospitalized in specialized departments until bacteriological conversion. During the site visits, it was noticed that patients are separated by sputum status and that the different floors of the facilities are marked red, yellow or green to indicate possible categories of infectiousness (SS+, SS-/SC+, etc.).

Proper treatment for MDR-TB cases is initiated rapidly in the vast majority of cases, each patient being discussed in the CVKK (Central Doctors' Council). According to the local management strategy (agreed with the GLC), the treatment of MDR-TB patients is standardized. The main treatment regimen consists of six drugs – Cm (or other injectable), Lfx, Eto, Cs, PAS and Z. For XDR-TB: Cm, Mfx, Cs, PAS, Clr and amoxicillin (Amx) are used. It was discussed that injectables should be administered daily for eight months after culture conversion. Injectables may be used intermittently (three to five times per week) after culture conversion to avoid toxicity: this practice may be confined to those patients with high risk of renal failure. Diagnostic algorithms should be revised in close collaboration with the bacteriological laboratory to ensure the routine use of rapid molecular tests. All MDR-TB patients should be tested for second-line drugs to diagnose XDR–TB prior to the start of category IV treatment.

For better follow-up of treatment efficacy, it is recommended that monthly sputum smear and culture testing should be conducted during the intensive phase and monthly sputum smear and quarterly culture during the continuation phase.

Management of side-effects needs to be improved: audiometry or some other routine and basic ear, nose and throat examination should be performed for all patients who receive injectables. Ancillary drugs should be provided free of charge during outpatient as well as inpatient treatment. All side-effects, not only serious ones, should be registered.

It was suggested that treatment with ART should be considered for all MDR-TB patients with HIV coinfection, regardless of their CD4 level. Updated clinical training in TB/DR-TB/HIV coinfection is essential for all TB personnel.

MDR-TB patients are usually hospitalized for long periods, an average of six months, as ambulatory care for these patients is not yet fully adapted to their needs. Some patients can probably be discharged from the hospital earlier, if the patient is bacteriologically converted (at

least sputum-smear conversion) and if it is possible to give injections or intravenous medicines in polyclinics (DOT cabinets). Shortening the length of hospitalization can decrease the cost of treatment and the risk of infection in the hospital.

Table 29 shows the coverage of category IV patients with second-line treatment between 2008 and 2011.

Table 29. Coverage of category IV patients with second-line treatment, Kazakhstan, 2008–2011

Coverage	2008	2009	2010	2011	2012 (planned)
Number of registered category IV patients, absolute number		7579	8634	7390	
Of those on second-line treatment, absolute number	2714	4366	5219	5565	6295
Coverage with second-line treatment	42%	57.6%	60.4%	75.3%	85%

Tables 30 and 31 show treatment outcomes for MDR-TB patients in 2008 and 2009.

Table 30. Treatment outcome results for MDR-TB patients, Kazakhstan, 2008

Treatment outcome	New pulmonary cases		Other cases	
	Absolute No.	Percentage	Absolute No.	Percentage
Success	393	77.8	1236	74.8
Defaulted	19	3.8	57	3.4
Failed	14	2.7	83	5.1
Died	21	4.2	93	5.6
Transferred out	21	4.2	87	5.2
Still in treatment	37	7.3	96	5.8
Total numbers	505		1653	

Table 31. Treatment outcome results for MDR-TB patients, all cases, Kazakhstan, 2009 (N=3897)

Treatment outcome	Absolute No.	Percentage
Success	2851	73.2
Defaulted	207	5.3
Failed	279	7.1
Died	254	6.5
Transferred out	178	4.6
Still in treatment	128	3.3

Recommendations

- Prepare and finalize a comprehensive national MDR-TB response plan based on the Regional Action Plan to Prevent and Combat MDR/XDR-TB in consultation with a wide range of stakeholders including nongovernmental organizations and patients associations.
- The country needs to revise its national TB strategic plan and ensure universal access to treatment for all diagnosed MDR-TB patients, in both the civilian and the prison sector.
- Ancillary drugs should be available free of charge at all outpatient treatment sites. Side-effects encountered during ambulatory treatment should be properly managed and registered.
- Expand ambulatory care of patients (all sputum-smear-negative patients including MDR-TB patients) using more flexible and patient-centred methods.

- The NCTP, with OTBD and local health administrations, should prioritize ambulatory treatment. Criteria must be developed for identifying MDR-TB patients and those with drug-susceptible TB who are likely to be discharged for outpatient treatment.
- Consider alternatives to hospitalization, such as community-based treatment with adequate DOT and social and psychological support. Early diagnosis of DR-TB, treatment with adequate regimens and early discharge from hospital to well-organized DOT in an ambulatory setting are the major factors contributing to eliminating transmission.
- Access to culture and DST examinations should be ensured for all TB patients in the civilian and prison sectors.
- To consider use of pyrazinamide during the whole duration of category IV treatment.
- To use at least three effective second-line drugs after finishing the intensive phase of treatment.
- Diagnosis of TB and MDR-TB needs to be improved by providing a full package of services for PLHIV.
- Conduct a more detailed analysis of the number of people with MDR-TB among different groups of patients (new, relapses, post-default, post-failure).
- Regularly re-evaluate the backlog of MDR-TB patients (chronic cases, patients on symptomatic treatment and those in involuntary isolation) for outcomes, resistance patterns and possibility of inclusion in category IV treatment.
- Conduct an expert consilium evaluation for all patients sent to palliative care (15% of all drug-resistant patients) in order to avoid unethical decisions made on the basis of the patient's social background.
- Record and report the number of MDR-TB patients who are detected and diagnosed each year, including all those in the register, not only those who begin treatment.
- Consider improving the conditions in the existing daily care units (more staff, available bed capacity, providing food).

4.4.3 Social support

Some local government authorities place special emphasis on providing social support for TB patients and allocate sufficient financial resources to meet existing patients' needs. Unfortunately, this is not generalized practice, and there are still patients who do not receive any social support. There is also a difference between support provided for a susceptible TB patient and that provided for an MDR-TB patient although, in order to increase adherence to treatment, social support should be provided for susceptible TB patients as well.

Since 2011, in accordance with a Ministry of Health decree, social workers and psychologists have been employed in outpatient health institutions (polyclinics) to assist with the various social needs of patients, including TB patients. But many posts remain to be filled. Nongovernmental organizations also employ social workers or counsellors from targeted communities. Those social workers do not always have a national diploma and therefore are not officially recognized or employed by the Ministry of Health. Approximately 70% of patients on ambulatory treatment will receive incentives (food and hygiene parcels) to encourage compliance with the prescribed regimen and adherence to treatment for the entire duration of the course. Reimbursement of transport costs depends on the patient's social status (family situation). These types of incentive

are available under both Government and Global Fund Round 8 funding. It is estimated that 15–20% of MDR-TB patients will have their drugs administered at home through the "Sputnik" programme under the Global Fund Round 8 grant. Generally, the level of social support available from Government sources differs from oblast to oblast, and there is no unified policy or regulatory act available to improve patients' adherence to treatment.

The provision of effective outreach and community-based services is a challenge for the country, in the health sector as elsewhere. Kazakhstan aims to strengthen capacity in the public health sector through forceful coordination of interventions by the NTP at central level, by increasing the responsibilities of the NTP dispensaries and optimizing links and referrals within the specialized TB service, as well as through collaboration and coordination with general health services. Effective regionalization and decentralization of NTP management is the key factor for success in a country as large as Kazakhstan.

Recommendations

To the NCTP.

- Continue collaboration with civil society organizations in all oblasts. In this regard, best practices from Akmolinskaya and Almaty Oblasts should be emulated in other regions.
- Consider developing a national policy to regulate and provide adequate social support for TB and DR-TB patients from Government sources to strengthen the sustainability of the system.

To the Ministry of Health.

- Recognize the work of social workers and counsellors who have been trained by nongovernmental organizations and are members of the targeted communities.
- Include these workers in the health-care system hierarchy in order to sustain their action.

4.4.4 Health-care staff compliance

Findings

- Most of the patients interviewed are satisfied with the way they are treated by health staff in TB hospitals.
- Some patients complained about the lack of a compassionate attitude on the part of generalist doctors in polyclinics.
- Health workers interviewed say that, even though psychology is part of their medical course, they should be better trained in interpersonal communication skills and ways of motivating/empowering patients.

Recommendation

To the NCTP.

- Develop and organize interpersonal communication skills training for health workers to enable them to communicate better with patients (at all stages of treatment) and increase treatment success.

4.4.5 Patient adherence strategies

Findings

- Patient adherence strategies are mainly based on education of the patient and his/her family and written informed consent at the start of treatment.
- Some *Hakimats* provide food packages and transport for patients during ambulatory treatment.
- Incapacity allowance may be awarded to MDR-TB patients.

Recommendations

To the NCTP.

- Enhance patients' knowledge about their disease through continuous education, acting in accordance with the values enshrined in the Patients' Charter for Tuberculosis Care *(10)*.
- Change the current patient agreement to respect the Patients' Charter for Tuberculosis Care and human rights.
- The patient's family should not be trained only in hygiene/infection control but also in identifying and reporting side-effects and psychological support.

4.4.6 Involuntary treatment

Finding

- Conditions of hospitalization during involuntary treatment are extremely poor (no psychosocial support, little space outside in the courtyard, nothing to do except lie on the bed, no visits permitted, etc.).

Recommendations

To the NCTP.

- Avoid mandatory hospitalization and concentrate efforts on treatment adherence strategies (education, support groups, incentives such as social packages, etc.), to encourage patients to continue treatment instead of threatening them.
- If compulsory treatment/isolation is used, then improve conditions of hospitalization (a bigger courtyard, social activities, visits from family members, proper infection control measures, etc.).

4.5 Care

4.5.1 Patient-centred initiatives

Some polyclinics have a client satisfaction questionnaire (general questionnaire where the client provides feedback on information given, any delays in treatment and quality of service received). At the TB hospitals visited, no satisfaction questionnaires were found and only suggestion boxes were available. Patients are not consulted or involved in the process of improving policies in TB care. However, such practices do exist, as some HIV/AIDS organizations have been consulted on the review of the HIV/TB decree.

Recommendations

To the NCTP.

- Empower patients to participate in TB control and care activities.
- Create opportunities for patients to provide input into TB policies and to participate in the management and planning of their own care.
- Promote the Patients' Charter for Tuberculosis Care (train health workers and patients about it, post it prominently in all health services).
- Modify the patient's consent form to match the Patients' Charter (modifications are especially recommended in the last two paragraphs of the consent form).

4.5.2 Peer support and patient and community participation

There is low involvement of TB patients or former TB patients in TB policy definition, awareness-raising, TB care or peer-to-peer groups. Communities (such as students and youth groups) are mainly involved in IEC activities. As far as the review mission could infer, there are no TB peer support groups in TB hospitals or sanatoria, or even for outpatients. Some HIV/AIDS organizations (for example, the Kazakhstan Union of People Living with HIV) organize peer-to-peer groups in which HIV/TB patients can participate, although these groups are only for outpatients. There are good examples of self-help groups organized by nongovernmental organizations which are members of the Jyldyz association in Shymkent. These self-help groups include former TB patients, but there are no self-help groups specifically for former TB patients. Organizing peer-to-peer and patient support groups at health-care facilities could be initiated by a facility psychologist or trained counsellor and taken over by patient organizations and/or nongovernmental organizations during the ambulatory phase.

Recommendations

To the NCTP and Jyldyz.

- Share the experience of Jyldyz and organize peer-to-peer and patient support groups in health-care institutions (TB dispensary/hospital) and in the community for outpatients.

To the NCTP.

- Find ways of providing enablers and incentives for patients to involve them in TB control and care.
- Empower patients to be equal partners in the TB response by supporting the creation of patient associations and ensure sustainability of patient engagement by including references to them in the formal regulations (decrees).
- Expand collaboration with youth, faith-based and other civil society organizations in TB prevention and care.

4.5.3 Psychosocial network and activities

Social support (food, allowances, transport costs) given to patients varies, as it depends on the local budget and the willingness of each *Hakimat* to provide such support. There are too few activities proposed for inpatients at TB hospitals or sanatoria. There is a general lack of recreation rooms at the facilities, and no special psychosocial support is given to patients in palliative care or in the forced treatment department.

Recommendations

To *Hakimats.*

- Increase social support (allowance, food, transport costs) given to patients, especially in oblasts which currently provide limited social support and assistance.

To the Ministry of Health.

- Appoint a counsellor in each health facility who can refer patients to a psychologist and to competent State services or nongovernmental organizations for social support (food, hygiene kits, legal support, etc.).
- Hire more social workers or outreach workers and create/review job descriptions; involve people from target communities who have experience with these communities.

To the NCTP.

- Organize social and vocational activities (sports/painting/sewing, etc.) in TB dispensaries and hospitals to reduce the risk of depression and treatment failure.
- Facilitate religious practices in the hospital (provide a multiconfessional space for prayer and invite a priest/imam to celebrate religious services).
- Allow (fund) nongovernmental organization/outreach workers to visit patients and give social support before patients are discharged, in order to facilitate the continuum of care and encourage treatment adherence.
- Have more psychologists and psychosocial workers on site at TB hospitals, children's TB sanatoria, AIDS centres and polyclinics.

4.5.4 Palliative care

Palliative care is an important part of any public health service. It is intended to relieve patients' suffering, maintain their human dignity, determine their needs and maintain the quality of their life as it draws to a close. It also includes help and support for the patient's family.

There are palliative care services functioning mainly in the northern and eastern regions of the country: hospices operate on the sites at Almaty, Pavlodar, Karaganda, Ust-Kamenogorsk, Semei and Kostanai. The Palliative Care Centre in Almaty is the first hospice in the country, established in 1999 by the order of the regional mayor and the Almaty Department of Health Care. Palliative care facilities provide care for oncology patients and for elderly patients who need supportive care. There are still hardly any palliative services for TB patients or people with HIV/AIDS in the terminal stage, or for children with incurable diseases *(11)*.

Especially for TB, some TB hospitals such as Turksibskij, in Almaty Rayon, have a symptomatic treatment department for patients who have experienced treatment failure, as well as an undefined range of other patients, including MDR/XDR-TB patients who have not adhered to treatment in the past. The admission of patients to the symptomatic treatment department is not always based purely on medical criteria, but may also be based on social criteria. Therefore, not all patients admitted there are in the final stages of their life. It is also not clear, according to the patients interviewed, how long they will stay at the department and whether they will be cured or not. In the department visited by the mission, patients do not receive any psychosocial support. There is no spiritual and/or religious support from volunteers or charities. Family visits are also rare.

A related problem is a lack of qualified health personnel such as psychologists and social workers, who could work in a team with doctors and nurses, providing medical, psychological and social help for incurable patients. No provision was made for social workers in the staff team in Turksibskij TB hospital.

Recommendations

To the NCTP and Ministry of Health.

- Develop criteria and standards for palliative care, initially by developing and piloting a model based on patient- and family-centred care.
- Provide psychological help for all patients and their families.
- Facilitate spiritual and religious support for hospitalized patients and/or organized end-of-life counselling sessions.
- Train and hire more psychologists and social workers to work in TB hospitals, especially within the TB symptomatic treatment department.
- Provide care at home when possible, as most patients prefer to end their lives at home, close to their relatives.
- Develop adequate educational standards and documents on palliative medicine.

To the NCTP.

- Develop criteria and standards on palliative care across the region to help with integrating new standards of palliative care into the management of MDR/XDR-TB from the time of diagnosis until the patient reaches cure or the end of life.

4.6 Special populations

4.6.1 TB in children

The following achievements have been made in the area of TB in children:

- there is a well-developed network of paediatric TB services;
- the majority of cases are diagnosed through active case-finding (mainly through TST screening of risk groups); contacts in the households of active TB cases are routinely investigated;
- routine access to bacteriological diagnosis of TB (culture and DST) is available for children;
- paediatric anti-TB drug formulations are available; children have access to first- and second-line treatment;
- recording and reporting for children and adolescents is excellent.

The following challenges remain.

- Despite a decrease in overall TB notification rates among children and adolescents, over the last six years MDR-TB rates have increased threefold among children and almost fivefold among adolescents.
- The proportion of child TB cases with bacteriological confirmation is low. Often the only diagnostic material used for bacteriological methods of diagnosis (smear and culture) in young children is a throat swab.

- Current childhood TB treatment regimens and preventive treatment regimens are not fully in accordance with the latest WHO guidelines *(12)*. New guidelines on treatment, revised in accordance with international standards, are prepared and pending endorsement.
- Children and adolescents are usually hospitalized for the full duration of TB treatment. There is a network of childhood TB sanatoria where some children receive IPT or no treatment at all.

Epidemiology, recording and reporting

A childhood/paediatric TB case is defined as a case in a child aged 0–14 years, and an adolescent TB case as a case in a young person aged 15–17 years. Routine national surveillance reports TB cases in children for three age groups: 0–4, 5–7 and 8–14 years and in adolescents for age 15–17 years. These age groups relate to planning of day care for young children (0–4 years), the organization of preschool (5–7 years) and school (8–14 and 15–17 years) education and staffing by caregivers and school teachers within TB services. Children are registered in the same register as other TB cases (TB-03 register for all cases, and TB-11 for category IV cases).

Total population of the Republic of Kazakhstan in 2011 was 16 558 400; of this number, the total number of children aged 0–14 was 4 093 100 (24.7%), and adolescents – 800 900 (4.8%). The total number of all TB cases registered in Kazakhstan in 2011 was 14 347; of these 619 (4.3%) were children and 780 (5.4%) – adolescents (Table 32).

Table 32. Registered new childhood TB cases, Kazakhstan, 2011

Age groups, years	New			TOTAL All new cases
	Pulmonary, smear-positive No. (%)	Pulmonary, smear-negative/not done No. (%)	Extrapulmonary No. (%)	
0–4	0 (0)	42 (26.6)	116 (73.4)	158
5–14	21 (4.6)	192 (41.6)	248 (53.8)	461
TOTAL 0–14	21 (3.4)	2342 (37.8)	364 (58.8)	619
15–17	149 (19.1)	532 (68.2)	99 (12.7)	780

Note: Percentage is the percentage of total cases in each age category.

TB notification rates among children in the Republic of Kazakhstan decreased by a factor of 3.8 over the last decade, from a peak of 57.6 per 100 000 population in 1999 to 15.1 per 100 000 population in 2011 (Fig. 28). A decrease in TB notification rate was also observed among adolescents: from 161.3/100 000 in 2002 to 97.6/100 000 in 2011, although the decrease was more modest (a factor of 0.6) compared with that among children.

The absolute annually registered number of childhood cases of TB meningitis has decreased over the last 10 years (Fig. 29). Two childhood cases of TB meningitis (both in adolescents) and seven cases of miliary TB were registered in Kazakhstan in 2011.

The age distribution of TB cases in children in Kazakhstan does not follow the usual pattern for many countries, showing a higher number of TB cases in age groups 0–1 and 5–7 years, and there is no increase in the number of notified cases at the start of mass TST screenings in the first grade of school (age 6–7 years); a sharp increase in the number of TB cases is observed at age 14 years for all groups for both actively and passively detected cases by detection method (Fig. 30).

Fig. 28. TB notification rates per 100 000 population among children and adolescents, Kazakhstan, 1996–2011

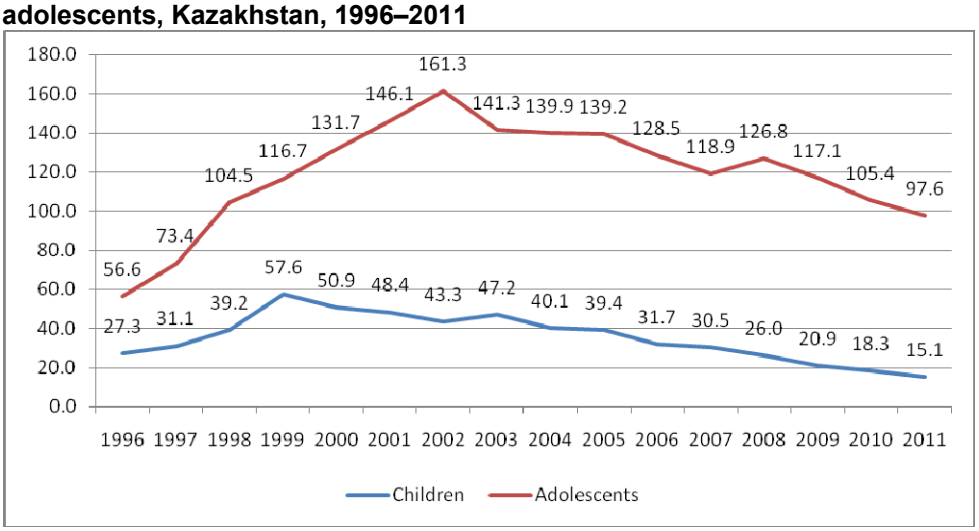


Fig. 29. Absolute number of cases of TB meningitis among all ages and among children/adolescents, Kazakhstan, 1999–2011

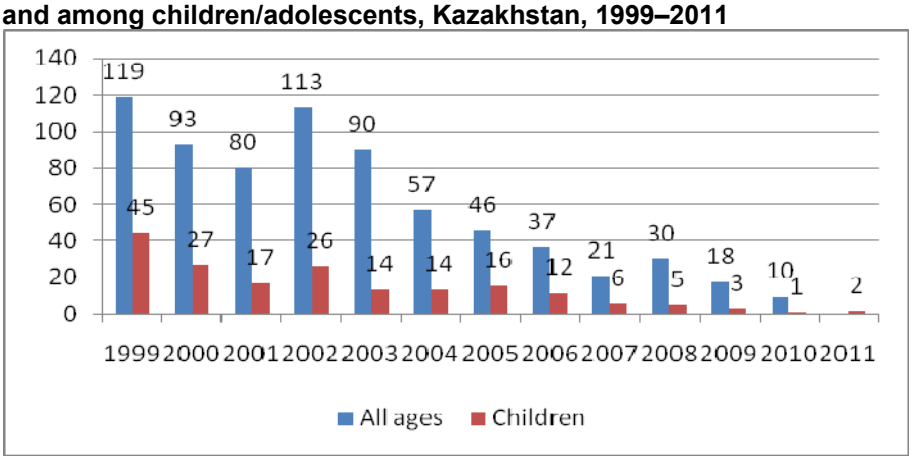
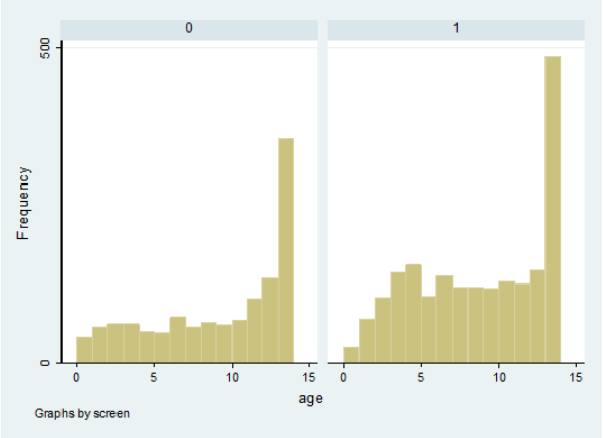


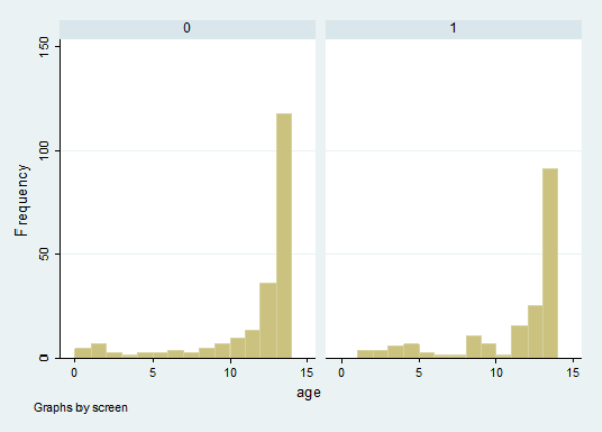
Fig. 30. Age distribution of TB cases in children, Kazakhstan, 2009

A. All TB cases



Left panel is for passively detected TB cases and right panel for actively detected cases.

B. Bacteriologically confirmed TB cases



Left panel is for passively detected TB cases and right panel for actively detected cases.

Despite the decrease in overall TB notification rates among children and adolescents, rates of MDR-TB increased threefold among children (from 0.3/100 000 in 2006 to 0.9/100 000 in 2011), and almost fivefold among adolescents (from 2.9/100 000 in 2006 to 14.1/100 000 in 2011). Since 2008, MDR-TB notification rates among adolescents have been the highest among all TB cases (Fig. 31). The percentage of children among all notified MDR-TB cases ranged from 0.8% to 3.1% over the last six years (2.1% in 2011), showing no tendency to decrease/ increase, while the proportion of adolescents increased from 4.8% in 2006 to 6.7% in 2011. Similar trends were noted for prevalent MDR-TB rates and number of cases (Fig. 32).

Fig. 31. MDR-TB notification rates per 100 000 population and absolute number of notified MDR-TB cases among children, adolescents and all combined age groups, Kazakhstan, 2006–2011

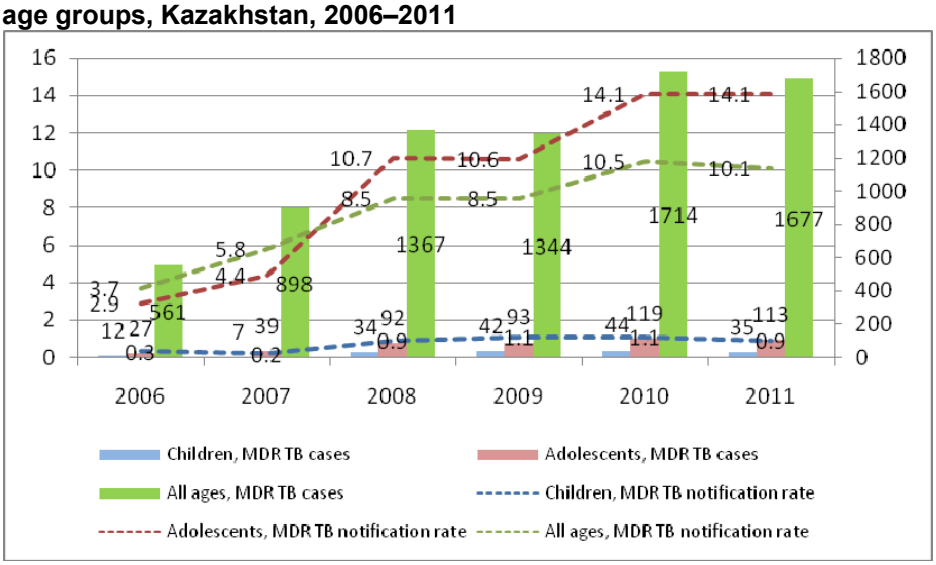
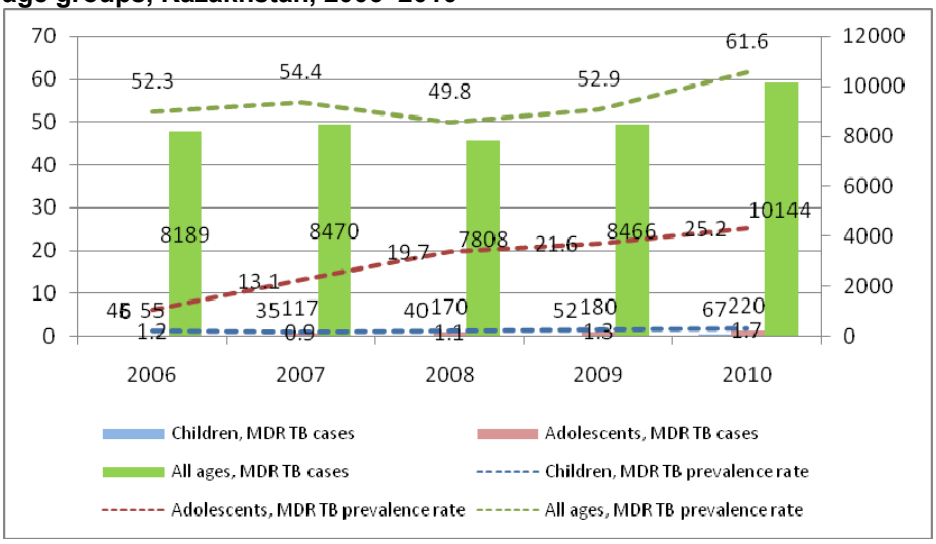


Fig. 32. MDR-TB prevalence rates per 100 000 population and absolute number of prevalent MDR-TB cases among children, adolescents and all combined age groups, Kazakhstan, 2006–2010



Treatment outcomes in children and adolescents treated with first- and second-line regimens for 2009 and 2010 cohorts are shown in Tables 33–36. In the 2010 cohort treated with first-line regimens, success rate among new TB cases was low (48%) among children aged 0–4 years,

largely because 34% were changed to category IV; also mortality was high (10%) and 5% failed treatment. The success rate in the 2010 cohort was 89% in children aged 5–14 years (8% were changed to category IV), and 80% in adolescents (16% were changed to category IV). The overall treatment success rate in children treated with category IV regimens (2009 cohort) was high: 100% in children aged 0–4 years, 96% in children aged 5–14 years and 88% in adolescents.

Table 33. Treatment outcomes in children treated with first-line drug regimens, Kazakhstan, 2010 cohort (n = 760) (ages in years)

Treatment outcome	New			Previously treated			TOTAL all cases		
	0–4 No. (%)	5–14 No. (%)	Total No. (%)	0–4 No. (%)	5–14 No. (%)	Total No. (%)	0–4 No. (%)	5–14 No. (%)	Total No. (%)
Cure	1 (2)	28 (4)	29 (4)	0 (0)	1 (3)	1 (3)	1 (2)	29 (4)	30 (4)
Completed	19 (46)	582 (85)	601 (83)	1 (50)	18 (56)	19 (56)	20 (47)	600 (84)	620 (82)
Died	4 (10)	4 (1)	9 (1)	0 (0)	0 (0)	0 (0)	5 (12)	4 (1)	9 (1)
Defaulted	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Failed	2 (5)	10 (1)	12 (2)	0 (0)	2 (6)	2 (6)	2 (5)	12 (2)	14 (2)
Transferred out	0 (0)	3 (0.4)	3 (0.4)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0.4)	3 (0.4)
Changed to category IV	14 (34)	58 (8)	72 (10)	1 (50)	11 (34)	12 (35)	15 (35)	69 (10)	84 (11)
Total	41	685	726	2	32	34	43	717	760

Table 34. Treatment outcomes in adolescents treated with first-line drug regimens, Kazakhstan, 2010 cohort (n = 1019)

Treatment outcome	New	Previously treated	TOTAL all cases
Cured	117 (13)	12 (9)	129 (13)
Completed	599 (67)	51 (39)	650 (64)
Death	4 (0.4)	1 (1)	5 (0.5)
Default	1 (0.1)	2 (2)	3 (0.3)
Failure	18 (2)	4 (3)	22 (2)
Transferred out	6 (1)	1 (1)	7 (1)
Changed to category IV	144 (16)	59 (45)	203 (20)
Total	889	130	1019

Table 35. Treatment outcomes in children treated with category IV regimens, Kazakhstan, 2009 cohort (n = 54) (ages in years)

Treatment outcome	New			Previously treated			TOTAL all cases		
	0–4	5–14	Total	0–4	5–14	Total	0–4	5–14	Total
Cured	1 (33)	12 (50)	13 (48)	0 (0)	7 (33)	7 (30)	1 (20)	19 (39)	20 (37)
Completed	2 (67)	12 (50)	14 (52)	2 (100)	12 (57)	14 (61)	4 (80)	28 (57)	32 (59)
Died	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)	1 (4)	0 (0)	1 (2)	1 (2)
Defaulted	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Failed	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Transferred out	0 (0)	0 (0)	0 (0)	0 (0)	1 (5)	1 (4)	0 (0)	1 (2)	1 (2)
Total	3	24	27	2	21	23	5	49	54

Table 36. Treatment outcomes in adolescents treated with category IV regimens, Kazakhstan, 2009 cohort (n = 175)

Treatment outcome	New	Previously treated	TOTAL all cases
Cured	48 (53)	49 (58)	97 (55)
Completed	34 (37)	23 (27)	57 (33)
Died	2 (2)	2 (2)	4 (2)
Defaulted	3 (3)	4 (5)	7 (4)
Failed	2 (2)	4 (5)	6 (3)
Transferred out	2 (2)	2 (2)	4 (2)
Total	91	84	175

Diagnosis

The majority of TB cases in children are detected through active case-finding (TST screening and contact investigations). Active TB case-finding though annual TST screenings of the risk groups found 58% of TB cases in children and 65% of cases in adolescents in 2011 (Table 37). Contact investigations in households of adult active TB cases are routinely done; 7% of children and 3% of adolescent TB cases were found through contact investigations in 2011.

Table 37. TB case-finding among children and adolescents in Kazakhstan, by method, 2011

Age group	Detected through screenings (active case-finding)		Detected by symptoms (passive case-finding) No. (%)	Total
	TST screenings No. (%)	Contact investigations No. (%)		
Children, 0–14 years	360 (58)	44 (7)	215 (35)	619
Adolescents, 15–17 years	507 (65)	27 (3)	246 (32)	780

Diagnosis of childhood TB is often based on clinical evaluation, positive TST and suggestive chest X-ray, as well as known contact with an infectious TB case. All children have access to bacteriological methods of diagnosis, including smear, culture and DST. In some facilities, there is access to rapid molecular methods (LPA – Hain test; the Xpert MTB/RIF test is at the implementation stage). The proportion of childhood TB cases with bacteriological confirmation of the disease is quite low: only 8.3% (21 out of 253) of pulmonary TB cases in children and 21.9% (149 out of 681) in adolescents with pulmonary TB were documented smear-positive in 2011. Methods recommended for obtaining clinical specimens in children in Kazakhstan include sputum expectoration, sputum induction, gastric aspiration, broncho-alveolar lavage and throat swAbsolute In practice, often the only diagnostic material used for smear and culture in young children is a throat swab taken early in the morning, fasting; this is not an internationally recommended method for specimen collection in children. Methods for diagnosis of extrapulmonary TB (such as fine-needle aspirates, spinal puncture, plural puncture, CT scan, magnetic resonance tomography, etc.) are routinely available. Children with TB are routinely tested for HIV after receiving consent from parents. In 2011, two (0.3%) of 619 children and one (0.1%) of 780 adolescents with TB tested HIV-positive.

Treatment and care

Sections on childhood TB are included in TB and MDR-TB guidelines (Ministry of Health decrees and methodological recommendations). Current drug doses used are as follows (according to Decree No. 218): daily regimens/dosage: isoniazid – 5 mg/kg body weight (4–6), rifampicin – 10 mg/kg (8–12), pyrazinamide – 25 mg/kg (20–30), ethambutol – 20 mg/kg (15–25). Intermittent three-day/weekly regimens: isoniazid– 10 mg/kg (8–12), rifampicin – 10 mg/kg (8–12), pyrazinamide – 35 mg/kg (30–40), ethambutol – 30 mg/kg (20–35). Streptomycin is included by Decree No. 218 in category I, II and III regimens, but is not currently used as a part of first-line treatment regimens. A draft of the revised Decree includes regimens and drug dosages in full accordance with the WHO guidelines on childhood TB *(12)*, pending endorsement by the Ministry of Health. Second-line drug treatment has been available for children and adolescents with drug-resistant TB since 2000. Childhood contacts of MDR-TB cases (often without bacteriological confirmation of diagnosis) commonly receive regimens with first-line drugs; treatment may be changed to category IV if there is a lack of clinical improvement on first-line regimens. Second-line drug treatment regimens for children include fluoroquinolones. Paediatric anti-TB drug formulations, including fixed-dose combinations, are available (see Section 7, Medical products, vaccines and technologies).

In most regions, children are hospitalized for the full course of TB treatment (Kazakhstan has 1130 children's TB beds). TB treatment is 100% DOT in the hospital. Children in hospital are separated by sputum status and drug resistance profile (where known). Children are also placed in specific hospitals according to their age or according to the availability of day-care workers and preschool and school teachers on the staff of children's departments in the hospitals. Social support for children with TB varies by region and is often provided by *Hakimats*. After treatment in the hospital, many children are then sent to sanatoria (Kazakhstan has 12 children's TB sanatoria in 10 oblasts, with a total of 2615 places). Some children do not receive treatment in the sanatorium as they have been placed there for social reasons. It is a common practice to provide IPT for children in sanatoria. Also, there are special boarding schools (*internats*) for children of TB contacts (total 3300 places). The practice of lengthy hospitalization and placement in sanatoria and *internats* may have a negative psychosocial impact, contribute to TB-related stigma and increase the risk of reinfection.

There do not seem to be barriers to access to care for children from the health-care system side. Many children with TB are from socially disadvantaged families; their parents may belong to marginalized social groups (alcohol abusers, ex-prisoners, people who use drugs) who may not seek care promptly for their children.

Recommendations

To the NCTP.

- Improve diagnostic specimen collection for increasing bacteriological confirmation of diagnosis of TB and drug susceptibility testing in children. Remove from the guidelines and abolish use of throat swabs for bacteriological diagnosis of TB in children. Ensure access by children to rapid molecular diagnostics for TB and drug resistance (LPA and Xpert MTB/RIF), that is, include these diagnostics in childhood TB diagnostic algorithms, obtain the best possible specimens and ensure timely modification of treatment based on results, where necessary.
- Finish revision of the childhood TB treatment and prophylactic treatment guidelines in accordance with the latest WHO guidelines *(12)* and endorse them. Train TB paediatricians in the use of the new guidelines.
- Revise criteria for hospitalization and lengthy stays by children in sanatoria. Expand ambulatory treatment of childhood TB (providing for compliance with legislation, school education, etc.). If placing in a sanatorium is considered for social reasons, an alternative may be to educate the family/parents and give direct support (food packages/training) to the family through outreach workers or a nurse.
- Develop materials for children and organize awareness campaigns in schools (for prevention and stigma reduction).

4.6.2 Penitentiary sector

The Government began to reform the penal system in the early 2000s, leading to a shift in accountability of the system and updating the old Soviet legal framework for prisons. However, the limited financing and outdated infrastructure remained. The penitentiary system was transferred from the jurisdiction of the Ministry of Internal Affairs to the Ministry of Justice in the early 2000s, and returned to the accountability of the Ministry of Internal Affairs in 2011. Ongoing penal reform and introduction of alternative penalties into the legislation decreased the

prison population. At the end of 2011, around 11 000 inmates were released by amnesty on the occasion of the 20th anniversary of the independence of Kazakhstan (Table 38).

The infrastructure of the penal system is similar to those in other central Asian countries and the Russian Federation and includes pre-detention centres, colonies (specialized and labour camps) and settlements. All penitentiaries differ by type and severity of crime, regime and health status of inmates. There is a large network of health facilities in the penitentiary system, with 13 general care hospitals, one psychiatric hospital and seven TB hospitals, which are considered as specialized facilities. Besides, the penitentiary system has 74 medical departments and 17 health points equipped with either a TB doctor or a general practitioner responsible for preventive and primary care for the relevant population. The total bed capacity of the prison sector is 4298 with 1840 beds dedicated exclusively to the treatment of TB and MDR-TB. According to official data, the prison sector is lacking medical personnel (58.7% of positions are staffed) mostly internists and X-ray specialists, but it differs from oblast to oblast. The system also lacks psychologist positions (Table 38).

Table 38. Prison population and personnel of penitentiary sector, Kazakhstan, 2004–2011

	2004	2005	2006	2007	2008	2009	2010	2011 (first half)
Total prison population	53 305	52 248	51 470	55 981	59 019	63 369	57 057	53 206
Medical personnel:								
TB doctors	176	176	179.5	180.5	180.5	167	167	167
Internists	102.5	102.5	104.5	101.5	100.5	101	106	106
X-ray specialists	68	68	72	72	72	73	76	76
Laboratory specialists	115	115	123	123	123	123	123	123
Nurses	617	617	631	631	631	631	631	631
Percentage of personnel employed:								
TB doctors						119	107.25	107.25
Internists						80	68.5	68.5
X-ray specialists						59	55.5	55.5
Laboratory specialists						65	101.5	101.5
Nurses						194	425.5	425.5

Treatment of TB and its drug-resistant forms in the penitentiary system is implemented within the NTP with the Health Department of the Committee of the Correctional System of the Ministry of Internal Affairs, which is responsible for the implementation of all health programmes, including TB. The organizational structure of health services in the prison sector is similar to that in other former Soviet countries and is hierarchical, with the Health Department of the Committee of the Correctional System in Astana managing all the territorial branches in all the oblasts. Integration between the civilian and penitentiary TB services has improved since 2009. Oblast-level branches of the Committee of the Correctional System, especially in those with TB prison facilities, coordinate their activities with the oblast health departments and OTBD. In all territories, the level of coordination of activities is adequate, with possibilities for the civilian doctors to collaborate with their prison colleagues on a regular basis. Thus, central medical expert committees established over the past few years are responsible for the MDR-TB diagnosis and category IV regimen design, also covering patients from the prison sector. In oblasts with no specialized prison TB facility and no access to bacteriological tests, OTBD provide consultancy services for prison patients and allow culture testing and DST at least for first-line drugs. In six oblasts with TB prison facilities, excluding the Karaganda prison sector which has its own level 3 bacteriological laboratory, culture and DST to first and second-line drugs are performed at OTBD.

Management of TB and DR-TB is possible in seven specialized TB hospitals in six territories of Kazakhstan, serving as referral centres for the whole country – Akmolinskaya, South Kazakhstan, North Kazakhstan, Pavlodar, East Kazakhstan and Karaganda oblasts. Each prison TB hospital covers several territories of the country, on average three to four oblasts. The total population of the prison TB facilities in the six oblasts is 2029 people, mostly TB and DR-TB patients, as well as healthy inmates, who are usually former TB patients.

Although the DOTS strategy was introduced countrywide in 1998, TB services in the prison sector have a high burden of TB and DR-TB, due to the lack of a proper management strategy and a shortage of second-line drugs in earlier years. Increased coverage of treatment for drug-susceptible TB and improved diagnosis allowed the prison sector to reduce the main indicators of TB over the past decade: incidence dropped from 2316 (2002) to 522.5 (2011) per 100 000 population, mortality from 140 (2000) to 61.4 (2011) per 100 000 population. Overall, around 1000 new cases are registered annually, with a very low proportion of sputum-smear-positive cases (27%). MDR-TB is one of the major public health threats to the success of the national TB programme in the penal system of Kazakhstan. In 2011, the level of primary MDR-TB was reported to be 30.8%, or 71.2% among retreatment cases, compared with 19.1% and 53.3%, respectively, in the civilian sector. Table 39 shows the epidemiology of TB in the prison sector between 2004 and the first half of 2011.

Table 39. Epidemiology of TB in Kazakhstan (prison sector), 2004–2011

	2004	2005	2006	2007	2008	2009	2010	2011 (6 months)
Incidence (per 100 000)	1388	1391	771.3	750.5	767.6	643.9	672.8	673.3
Mortality (per 100 000)	69.2	46.1	64.9	83.2	115.9	107.7	94.0	80.0
New cases[a]	1388	1391	1230	1100	1378	998	986	401
New cases SS+[a]	327	426	326	252	409	252	267	117
Retreatment cases[a]	4649	4099	3674	3465	1385	1167	755	305
Retreatment cases SS+[a]	685	724	547	513	n/a	427	349	142
Extrapulmonary TB	5	10	21	6	22	38	30	10
TB prevalence[a]	5591	5150	4920	4570	3715	2738	2438	2077
MDR-TB among new cases (%)				17.8	24.9	18.8	21.1	17.9
New cases MDR-TB[a]				60	109	103	54	46
MDR-TB among retreatment cases (%)				52.2	59.4	72.5	33.9	25.3
Retreatment cases MDR-TB[a]				423	520	447	427	53

[a] Absolute number.

According to internal regulations, all prison populations have to be screened for TB upon entry into prison and then by means of regular annual X-ray examinations over the period of their incarceration (Table 40). Even though sputum-smear microscopy was added to costly X-ray methods of TB diagnosis in 1998, doctors continue to rely on both methods. Some facilities, especially in peripheral colonies, lack reliable X-ray equipment. Existing equipment is outdated, and thus does not allow prison doctors to detect severe pulmonary disease in TB patients unless symptoms appear. Some prison settings attempt to collaborate and refer patients to regional civilian TB services for X-rays, but whether this happens depends on the budget and whether a collaborative relationship exists with civilian services. TB case detection is also complicated by the fact that prisoners may try to receive special treatment or benefits from being sick with TB, benefits that often include commutation of their sentence, a transfer to a colony with a milder regime, an amnesty and/or granting of parole. In settings with a high prevalence of TB infection, such as penitentiaries, identification of active cases is less than ideal, and therefore severe cases often develop.

Table 40. Detection of TB in Kazakhstan (prison sector), 2004–2011

	2004	2005	2006	2007	2008	2009	2010	2011 (6 months)
Tested TB suspects[a]	13 900	14 600	15 200	13 300	39 000	16 200	16 172	8407
Diagnosed with TB	899	646	559	456	1323	562	536	201
Diagnosed with sputum-smear microscopy (%)	6.5	4.4	3.7	3.4	3.4	3.5	3.3	2.3
Coverage by fluorography[a]	119 200	109 000	107 100	117 500	224 700	116 200	110 132	49 017
Diagnosed with TB by fluorography[a]	2 630	2 519	1 573	1 643	3 715	1 716	1 453	550
Diagnosed by fluorography (%)	2.2	2.3	1.5	1.4	1.7	1.5	1.3	1.1

[a] Absolute number.

Once diagnosed with TB or DR-TB, patients are transferred for specialized TB and DR-TB treatment for tertiary care to the designated specialized facility in one of the seven TB prison hospitals. Delays of 30–45 days in treatment of patients transferred from a peripheral colony to a specialized facility in one of six oblasts should be considered as one of the major threats for poor treatment outcomes.

Treatment outcomes for TB show that effectiveness among new SS+ cases remains the same at around 54%, which is relatively low and affected by a higher percentage of treatment failures (22.3% in 2010) mostly due to MDR-TB. A total of 11.4% of new cases in the first six months of 2011 were diagnosed with MDR-TB. Moreover, the prison TB programme registers as transferred those patients released from prison to the civilian sector. However, the outcome for those patients transferred to the civilian sector should be registered in the prison sector (Table 41). Treatment outcomes for SS+ relapse cases (Table 42) are lower than for new SS+ cases, with high rates of treatment failure (11.5% in 2010) and a large number transferred to the civilian sector (14.9% in 2010). The percentage of those diagnosed with MDR-TB is extremely high, standing at 33% in 2010. Thus, early diagnosis of MDR-TB, adequate isolation of patients and prompt initiation of treatment are crucial to the success of the prison TB programme.

Table 41. Treatment outcomes among new SS+ cases (prison sector), 2003–2011 (%)

Outcome	2003	2004	2005	2006	2007	2008	2009	2010	2011 (6 months)
Cured	54.6	50.0	54.8	45.7	58.6	53.3	53.0	54.0	55.0
Treatment completed	0.0	2.0	0.0	0.0	0.4	0.5	0.3	0.0	0.0
Died	0.8	1.0	0.6	0.9	1.4	4.9	5.6	2.1	1.2
Failure	18.5	25.0	26.3	26.5	22.3	22.5	21.9	22.3	24.5
Default	0.6	0.0	0.4	1.5	0.9	0.5	0.8	1.0	0.6
Transferred	25.5	22.0	17.0	24.5	15.3	7.7	8.6	13.0	7.3
Transferred to category IV (MDR-TB)	–	–	–	–	–	–	9.8	7.6	11.4

Treatment with second-line TB drugs has been possible only since January 2010, when the first cohort of 30 patients started treatment in the TB facilities at Karaganda prison (20 patients) and Pavlodar prison (10 patients). With the launch of the Global Fund Round 8 project in 2010, the prison sector scaled up coverage of MDR-TB diagnosis and treatment, with the total enrolment of the GLC cohort standing at 532 patients (355 in 2010, 177 in 2011). The enrolment of the GLC cohort was stopped in the autumn of 2011, owing to the organizational constraints

Table 42. Treatment outcomes among SS+ relapse cases (prison sector), 2003–2011 (6 months) (%)

Outcome	2003	2004	2005	2006	2007	2008	2009	2010	2011 (6 months)
Cured	55.3	39.7	45.7	45.2	45.6	41.7	41.2	32.7	41.0
Treatment completed	1.0	2.3	0.0	0.0	9.2	2.1	1.7	4.9	0.8
Died	1.0	1.0	0.8	5.4	1.5	3.8	4.7	2.5	3.1
Failed	17.0	23.6	26.4	24.6	21.2	16.5	16.7	11.5	12.0
Defaulted	2.7	1.1	1.5	4.8	0.3	0.7	0.8	0.0	0.8
Transferred	23.0	32.3	24.5	19.2	11.7	10.0	10.7	14.9	16.2
Transferred to category IV (MDR-TB)	–	–	–	–	–	–	24.2	33.5	26.1

associated with the launch of Phase 2 of the Global Fund Round 8 project, global changes in drug prices and delays in procurement through the GDF mechanism from the IDA Foundation. Coverage of the MDR-TB reservoir is not fully completed, as the estimated number of MDR-TB cases in the prison sector is around 1100 patients. A total of 926 MDR-TB patients were laboratory-confirmed with MDR-TB in 2011. The total number of patients with XDR-TB is unknown, as not every MDR-TB case is tested for susceptibility to second-line drugs. The total number of susceptibility tests for second-line drugs performed in 2011 was 631, with only 14 patients registered with confirmed resistance to an injectable agent and fluoroquinolone.

According to the agreement with the Global Fund, 85% of all MDR-TB patients will have access to quality-assured second-line treatment in 2012. There have been preliminary discussions at government level indicating that the Ministry of Internal Affairs will cover treatment of 25% of MDR-TB patients who are currently on the waiting list. Starting from 2012, the Committee of the Correctional System is allocating a budget for second-line drugs to cover 150 MDR-TB patients every year till 2015. Currently, and until the end of 2012, the prison system will enrol 30 patients in Akmolinskaya Oblast, 70 in East-Kazakhstan, 100 in Karaganda, 10 in Pavlodar, 30 in North Kazakhstan and 20 in South Kazakhstan. With the Global Fund Round 8 funding, the prison sector is planning to enrol 300 patients annually, making a total annual cohort of 450 patients (almost 40.9% of those registered with MDR-TB). In addition, MDR-TB patients who started treatment in the civilian sector but committed crimes while on treatment will complete their therapy with second-line drugs transferred from the OTBD. However, despite the improvements in scaling-up of MDR-TB treatment, the backlog of MDR-TB patients still remains at up to 60% of the total.

Regimens designed by the MDR-TB committees in the civilian sector are fully implemented by prison TB doctors and are standardized according to National Ministry of Health Decree No. 218 of 2011. Treatment outcomes for MDR-TB cohorts of GLC and non-GLC patients are not available owing to the short time since enrolment on MDR-TB treatment began (2010).

Only one bacteriological laboratory in the prison sector of Karaganda Oblast is classified as a level 3 laboratory able to perform DST for first-line and second-line TB drugs. The remaining prison TB facilities use the civilian sector. The Karaganda prison bacteriological laboratory is able to perform rapid molecular diagnosis of MDR-TB using LPA, and has the capacity to perform DST for first and second-line TB drugs, using a BACTEC MGIT-960 system procured with Global Fund funding, including equipment and consumables. At the same time, the Government allocates funding for bacteriological and clinical laboratory equipment within the State Health Care Development Programme for 2011–2015 “Salamatty Kazakhstan”. The TB prison facility in Stepnogorsk, Akmolinskaya Oblast has recently renovated its bacteriological laboratory to level 2 in order to perform culture testing. All bacteriological laboratories in the prison sector are assessed by the national quality assurance system at the NRL (NCTP) once a year.

Infection control has been one of the main challenges in the TB programme in the prison sector in Kazakhstan, thereby contributing to the development of a reservoir of MDR-TB. Starting from 2010–2011 with the launch of the Global Fund Round 8 project and implementation of the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan", issues of infection control started being addressed by prison sector authorities and administration of TB specialized treatment facilities. Thus, within the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan", the Government increased financing for the prison sector in 2011, which made it possible to renovate all seven TB prison facilities, improve living conditions in TB hospitals and separate patients according to sputum smear/culture and DST status. Installation of a mechanical ventilation system in one Karaganda prison TB facility is scheduled for 2012–2013. Currently, all TB patients are isolated from one another in separate buildings/barracks, with almost no access to other groups of patients with different sputum smear/culture/DST status. Similarly, patients with MDR-TB are separated from one another by smear/culture status in separate buildings, and divided into three zones (red, yellow and green). Upper-room UVGI is not yet available in the majority of prison treatment facilities, but it features in plans for future purchasing by the Committee of the Correctional System. Medical and administrative personnel are equipped with respirators, although they are not always used, but the attitude towards personal protection has significantly improved in recent years as a result of training in MDR-TB and infection control.

Registration of cases and the information system are consistent throughout Kazakhstan and mandatory in both civilian and prison TB services. Each of the six oblast Committees of the Correctional System is responsible for data collection from TB prison facilities and reporting to the Committee of the Correctional System at the Ministry of Internal Affairs level in Astana, which transfers data to the NTP. Recording and reporting forms are consistent across the NTP, including the prison sector.

Interdepartmental collaboration requires further improvement at national level, as 53% of patients registered at TB dispensaries are released with SS+ TB and thus require continued treatment (Table 43). The situation is mostly aggravated due to the lack of regulatory mechanisms on social support and motivating patients to continue treatment, especially for former prisoners living in other parts of the country.

Table 43. Information on interdepartmental collaboration between civilian and prison sectors, 2007–2011

	2007	2008	2009	2010	2011 (6 months)
Patients released from penitentiaries[a]		1759	525	853	399
Of these, number requiring continued treatment:					
SS+	614	605	498	672	316
SS-	272	336	252	310	113
Registered in civilian sector for treatment	353	311	255	441	168
HIV-positive cases registered in penitentiaries[a]		687	502	376	131
TB/HIV coinfected cases		178	177	140	133

[a] Absolute number.

Recommendations

To the NTP, Ministry of Health and Ministry of Internal Affairs.

- Start treatment for TB and DR-TB more promptly (start treatment when diagnosed).

- Increase access to rapid molecular diagnosis of DR-TB, at least testing for rifampicin resistance.
- Provide universal coverage with DST, at least for resistance to first-line drugs, for all sputum-smear-positive and culture positive patients.
- Provide access to category IV treatment for all patients registered with DR-TB, including XDR-TB patients.
- Strengthen infection control in TB penitentiaries:
  - administrative separation by sputum smear/culture and DST status;
  - environmental measures: installation of an adequate number of UVGI units;
  - individual protection: cough etiquette and masks for patients, and respirators for personnel.
- Address the problem of understaffing and motivation of personnel.
- Strengthen the system of pre-release preparation and post-release follow-up of TB and DR-TB patients to ensure treatment continuation (interdepartmental collaboration, information exchange, social accompaniment and support). Scale up good examples, for example, South Kazakhstan.
- Intensify social support for ex-prisoners, for example by providing a centre where they may stay once released from prison.

4.6.3 Migrants

Because of their (often irregular) status, migrants often face various kinds of human rights abuses, such as discrimination and denial of access to basic education, health services and decent working conditions. Furthermore, corruption among unscrupulous law enforcement officials, poverty and exploitation contribute to the marginalization and great vulnerability of the migrant population.

At a shelter camp supported by the Red Cross and the International Organization for Migration, temporary registration can be requested by migrants only if they have an official document or identification. This situation implies that there is no access to health care unless the person receives social or legal assistance first.

Most members of the most-at-risk population do not have an official personal identification document and are not registered with the city authorities. The Kazakhstan International Bureau for Human Rights and Rule of Law helps some of them to obtain their document, but it can take one year or longer. It is estimated that roughly 10–15% of PLHIV are not Kazakh citizens. Gulzhahan Akhmetova of the Almaty AIDS Centre says: “About 14% diagnosed with AIDS are inhabitants of other regions, which not only complicates treatment of accompanying diseases, but also interferes with control over appointments and carrying out ART”.[9] In Almaty City, Project Hope gives out vouchers to migrants who have HIV/AIDS, entitling them to free access to some collaborating polyclinics. But health workers are still reluctant to treat them, and PLHIV feel stigmatized.

Especially because TB and HIV are reasons for refusing migrants entry into Kazakhstan, identifying and providing services for unregistered migrants requires a special approach, as they

[9] Gulzhahan Akhmetova. Analysis of the reasons for the progress of HIV infection in the city of Almaty.

avoid contact with the authorities and are reluctant to provide any information about themselves, because of their fear of deportation. Labour migrants mainly work for construction companies. They can be found primarily on construction sites and markets. There is a general lack of interest in and support for migrants on the part of the Government authorities. Employers are also reluctant to cooperate because they do not want the authorities to know that they employ illegal workers. Labour migrants often do not have sufficient information about their rights or about health-care institutions where they can receive free medical assistance, such as HIV and TB testing. It is difficult to obtain data on migrants (either internal migrants or foreigners). PSI plans to start a new programme for migrants with the support of the International Organization for Migration. The programme will target 500 beneficiaries; PSI informed the mission that they did not have any official data available on migrants.

Migration is not a problem everywhere: for instance in Panfilov rayon, Almaty Oblast, migration mostly concerns *oralmans* who return from abroad and apply for Kazakh citizenship. They are examined upon their return in accordance with the relevant Ministry of Health order. In 2011, 116 migrants from 47 families were examined, and no cases of TB were detected. Monthly and quarterly reports on examinations of *oralmans* are submitted to the migration service. Since 2011, there have been no cases of TB among foreign citizens in Panfilov rayon. There are no centres for migrants in Almaty Oblast. In cooperation with migration police, *oralmans* are offered an examination for TB (miniature mass radiography for adults and adolescents, Mantoux skin test for children). In the Almaty Oblast dispensary in 2011, there were no TB cases among migrants. There was one TB case among persons who had returned from abroad. A report on TB among *oralmans* in 2009 was provided.

Recommendations

To the Ministry of Health and Ministry of Justice.

- Ensure that nonregistered people and illegal migrants have access to free services at polyclinics and TB dispensaries. Ensure that the voucher system is fully accepted by health-care staff.
- Do not deport migrants, especially if they are diagnosed as TB or HIV patients, since this creates additional resistance and discourages them from seeking health care.
- Ensure effective treatment for external migrants, either by allowing them to complete their treatment prior to any potential deportation, or by assuring continuation of care within TB health-care services in the country of destination. Ensure that at least the intensive phase of treatment of external migrants is completed before any potential deportation, according to the minimum package of cross-border TB control.

5 Health workforce

5.1 Main findings

1 Human resources for TB care at the national, regional and rayon levels are currently well managed as part of the overall human resources for health system and are supervised by heads of TB institutions and human resources focal points in the institutions.

2 There is no special human resources plan for TB or human resources plan for health in which future needs are matched to the current capacity of training institutions.

3 A central register, part of the national register of human resources for health, includes all details on TB staff, is available at all levels and serves as a basis for human resources development for TB staff.

4 The schedule for retraining and postgraduate training is well monitored; all staff are accredited every five years and postgraduate training courses that include TB and various subspecialties of TB are provided by postgraduate medical education institutions and NCTP free of charge.

5 The national system of medical education has been reformed to meet international standards; efforts are made to make the profession attractive to young specialists and ensure a fair distribution of medical doctors between urban and rural areas.

6 TB training starts in year 4 of the medical curriculum (year 6 until 2012). The TB module is obligatory for all physicians during their internship (since 2012, and excepting surgeons); specialization requires a two-year residency or (until 2014) a total of 540 hours' retraining for physicians from other specialties.

7 The medical education system has been reformed since 2012 in accordance with the Bologna Process; from 2014, specialization in TB will require a two-year residency and retraining of physicians from other specialties will not be allowed.

8 The curriculum includes modern principles of TB control and management, WHO recommendations, national practical guides and Ministry of Health decrees.

9 TB is not on the list of specialties for deficit or special support from the Ministry of Health.

10 Incentives include allowances bringing remuneration up to 190% of the salary to compensate for the infection risk run by medical workers working with TB (220% for those working with MDR-TB); in rural areas, the local administration provides accommodation, payments for communal services and initial installation grants for doctors.

11 Training for TB control in primary health care is provided by NTP in three-day modules with practical exercises; there are training centres at the NCTP and at all OTBD.

12 Training modules for primary health care have been developed by a training consortium including NCTP and the postgraduate medical education institute.

13 The TB and primary health care staff met by the mission members demonstrated a good knowledge of TB control and national orders and guides, as well as enthusiasm, knowledge and strict compliance with the Ministry of Health orders and sanitary control recommendations.

14 Job descriptions exist, and were available at all levels for different categories of staff; regular accreditation includes knowledge and performance in accordance with job descriptions.

15 There is a functioning system of internal and external audit within NTP, and effective supervision at all levels.

16 The main national information materials and guides on TB control are available at all levels and are used.

17 Accreditation for the professional qualification category takes place every five years; the criteria include the number of hours of continuous postgraduate training to be undertaken (includes all training – except Global Fund, conferences, etc. – similar to a credit system).

18 The main concern is understaffing (20%); current staff are mainly senior and/or of pre-retirement age.

19 There is a lack of young doctors wishing to specialize in TB because of the fear of infection, low salary, social vulnerability and low prestige of the profession.

20 There are five main State medical schools, one private medical school and one institute for postgraduate medical education that provide postgraduate training in TB medicine for doctors, but so far there is no coordination body.

21 There is no formal system for regular follow-up of the effectiveness of training, outcomes from educational institutions or feedback from NTP on training quality.

5.2 Human resources for health

The effective functioning of the health system depends on having competent and well-prepared human resources. Currently, there are seven medical schools that train medical doctors – six state medical schools and one private (non-state) medical school, as well as three medical faculties at general universities. In the academic year 2011–2012, there were 31 950 students at all medical schools, 77% of whom received an educational grant to finance their studies. On average, 3000 persons graduate from medical schools every year.

Some reforms of medical education have been implemented as part of the state programme for reform and development of the health system in the Republic of Kazakhstan for 2005–2010. In particular, since September 2007, all medical schools in Kazakhstan have introduced new curriculums, based on the international standards of the World Federation for Medical Education and adapted to the specific situation in Kazakhstan. This reform reviewed the regulatory basis for medical and pharmaceutical education, established and equipped clinical centres affiliated with the State medical schools and introduced new educational tools. In accordance with international requirements for quality control in medical education, a system of accreditation was introduced and standards for institutional accreditation for medical educational institutions were developed and adopted in cooperation with the National Accreditation Centre of the Ministry of Education and Science. Five medical schools were accredited in 2010–2011.

Reforms in medical education were guided by the Concept for Medical Education Development for 2006–2010 (adopted in 2005). The first medical doctors trained according to the new standards will graduate in 2013–2014. The Concept for Medical and Pharmaceutical Education in Kazakhstan for 2011–2015 was adopted in October 2011; the Ministry of Health has developed a draft concept for development of human resources for health for 2012–2020, with the main goal of drawing up an effective policy of human resources development for health to ensure high-quality health services. The draft concept has been approved by the relevant committee of the national Parliament and by the Government. The ultimate goal of the draft concept is to create an effective policy for human resources planning and development and to introduce new forms of human resources management and systemic measures to ensure continuing professional education. Under the draft concept, a national observatory for human resources for health will be established to coordinate the development of human resources for health in Kazakhstan.

Among the challenges facing medical education are the lack of university clinics, the slow introduction of interactive training tools and the shortage of teachers with appropriate qualifications. The independent evaluation of graduates from medical schools and colleges by

means of exams should be further developed. The criteria for entry to medical school should be improved through interviews and psychological testing.

The above problems have been reflected in the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan". Among the target indicators is the reduction of TB notifications to 94.7 per 100 000 population. Direction 5 of the Programme is devoted to the improvement of medical and pharmaceutical education through the gradual introduction of international standards for graduate and postgraduate training for staff at competitive-cadre level, as well as development and introduction of innovative technologies and tools in medicine. There is a goal of achieving international accreditation of medical schools.

In order to ensure qualified specialized medical staff, postgraduate medical training in Kazakhstan covers both postgraduate and additional professional education. With the goal of introducing independent evaluation in 2011–2015 of the knowledge and skills of graduates from medical schools in line with international experience, a Republican Centre for Evaluation of Knowledge and Skills will be established. In 2011, two medical institutions were equipped as Republican centres for knowledge evaluation using national resources and World Bank funding.

The national cumulative system for improving continuing professional development is aimed at increasing the motivation of medical staff to undertake professional development by accumulating hours spent on educational modules.

Since 2005, the state request/decree for training and retraining in state public health institutions has been made available to national institutions of medical education and research. The decree is drawn up in accordance with the needs of health-care institutions. Needs are estimated in accordance with requests submitted by the human resources services of health institutions, which submit them in cumulative form to the human resources services of the local institutions of State public health management. Staffing needs are estimated from the requests by health institutions agreed with the Ministry of Health.

Postgraduate training and retraining of health staff for health-care institutions under the Ministry of Health are funded from the Republican budget. Postgraduate training and retraining of health staff in the penal system are funded by the Ministry of Internal Affairs of Kazakhstan.

Training in the most advanced international technologies for priority areas of health care (maternal and child health, cardiology, heart surgery, anaesthetics, haematology, oncohaematology) is organized at the leading clinics of Belarus, Czech Republic, Germany, Israel, Japan, Lithuania and the Russian Federation, as well as master classes by leading international experts visiting Kazakhstan.

The overall policy on education is defined by the Ministry of Education and Science. Medical education is coordinated and supervised by the Ministry of Health. Additional postgraduate education is supervised by the Almaty State Institute for Postgraduate Medical Education.

To resolve the problem of staffing in the health-care system, especially in rural areas, the Ministry of Health, in cooperation with other State institutions, has taken the following measures.

- Since 2007, under the State educational grant system, 30% of grants are reserved for young people from rural areas who wish to enter medical school, with the stipulation that that

they should work for three years after graduation in rural medical institutions (the first graduation is expected in 2014).

- In 2011, the Law of the Republic of Kazakhstan "On Education" was changed to stipulate that graduates from medical schools in specialties funded by the State educational grant should perform compulsory work in health-care institutions for three years after graduation (the first graduation is due in 2019).
- In order to encourage medical specialists who have started work in health institutions in rural areas to remain in those posts, medical workers' salaries in rural areas will be increased by 25%, as well as providing initial payments equivalent to 70 minimum salaries and attractive loans for accommodation equivalent to up to 1500 minimum salaries.
- Higher education establishments and universities have established graduate employment centres in cooperation with local administrations and medical institutions.
- Memoranda have been signed between deans of higher education establishments, heads of regional administrations and Astana and Almaty Cities for the period 2011–2013 to ensure employment, equitable distribution and retention of graduates from medical schools.

The State compulsory standards for the highest level of professional education of the Republic of Kazakhstan were introduced by the Ministry of Health Decree No. 582 dated 1 December 2006.

The State standards for additional education in medical and pharmaceutical specialties were adopted in the Ministry of Health Decree No. 778 dated 26 November 2009. The Ministry of Health Decrees No. 51, dated 26 January 2012, and No. 93, dated 17 February 2012, introduced changes to Decree No. 778.

There is currently a process of cascade training in modern approaches to health system management under the Ministry of Health strategic plan for 2011–2015 and the project on technology transfer and institutional reforms in the health-care system of Kazakhstan. On completion of the project, training will be provided for heads of specialized medical institutions, including rayon, oblast and republican TB dispensaries.

At present, there is no national plan for human resources for health at the Ministry of Health. To create a comprehensive approach to the most important issues for human resources development, a roadmap for implementation of the Concept of development of health manpower resources of RK for 2012–2020 will be developed.

According to official data dated 1 January 2012, there were 58 486 posts for medical doctors (compared with 55 785 as at 1 January 2011), including 31 123 posts in the primary health care services. Of these posts, 5261 remained vacant, including 3062 in primary health care. In 2011, 2000 graduates from medical schools took up posts, 993 of them working in primary health care. Of the medical specialties, the biggest deficit in staffing named by the Ministry of Health was among therapists (546), laboratory workers (362), paediatricians (318), psychiatrists (315), gynaecologists/obstetricians (272), general practitioners (228), rehabilitation specialists (114), surgeons (106) and functional diagnostic specialists (272).

5.3 Human resources for TB prevention, control and care

Human resources were partially assessed during the previous country review mission (2007) and the GLC monitoring visit to the Republic of Kazakhstan (2011), although on a limited scale. The

recommendation from the country review mission was to address the training of bacteriologists for rapid diagnostic methods. Recommendations from the GLC visit concerned the need for training in infection control and TB/HIV coinfection. The outcomes of the current mission demonstrate that the above recommendations have been implemented – details below. The current review aims to present all the issues in human resources development for TB control and suggest ways of strengthening the human resources system.

Currently, the Republic of Kazakhstan is implementing the Concept of Medical and Pharmaceutical Education in the Republic of Kazakhstan for 2011–2015, which is intended to achieve an appropriate quality of medical and pharmaceutical education in accordance with best international practice. The Ministry of Health has developed a draft concept for development of health manpower resources for 2012–2020, with a vision of human resources for health in the Republic of Kazakhstan. The concept was developed in accordance with the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan". The concept analyses the current human resources situation and identifies key areas for personnel policy and key mechanisms for its implementation.

The NCTP is the leading national TB institution, providing supervision, education, research, treatment and diagnostic, consultative and highly specialized TB medical care. The NCTP has a human resources focal point for its staff. Research activities are supervised by the Deputy Director of NCTP. There is no focal point or department in the NTP responsible for planning or monitoring human resources for TB control. Within the NTP, the overall responsibility for human resources development for TB control lies with the Director of NCTP, Professor Tleukhan Abildayev. There is no formal focal point for human resources within the NTP, although there are technical human resources points at each TB institution and detailed human resources information is kept in the central electronic register for human resources for health, which includes detailed information on each medical worker's training and qualifications, the refresher or postgraduate training he/she is due to receive, etc.

Human resources development, including training and education for TB control, forms Priority 5 of the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan" and the MDR/XDR-TB response plan for the Republic of Kazakhstan. There is a specific and clearly described component on human resources in the MDR/XDR-TB response plan, including a budget for staff, international technical support and training.

So far there has been no separate medium-term or long-term planning for national human resources development for TB control, although the availability of and need for staff at TB facilities at different levels and the urban/rural distribution of staff can be assessed through the national register of human resources for health. There are some strategies to attract young doctors to TB work; however, there is no comprehensive strategy to reach this goal.
At the NTP institutions at different levels (from national to rayon) standard job descriptions for different categories and levels of staff involved in TB control are up to date and consistent with current national policies and recommendations for TB control (TB doctor, head of TB department, TB nurse, etc.). The job description samples were available, distributed to all staff concerned and known to them. Knowledge of job descriptions and compliance are performance indicators for regular appraisals and internal audit.

The major challenges described in attracting and retaining competent and highly qualified staff, especially young doctors, were as follows: the lack of incentives, low wages and a lack of social protection for health workers leading to a decrease in the influx of young cadres into health care,

and the ageing of medical personnel. Attracting and retaining staff are a particular problem in rural areas.

The strategy to combat TB in the Republic of Kazakhstan is based on the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan", the Message from the President of the Republic of Kazakhstan, Nursultan Nazarbayev, dated 28 February 2011, Decree No. 1263 of the Government of the Republic of Kazakhstan dated 21 December 2007 "On measures to protect people from tuberculosis in the Republic of Kazakhstan", and the Interagency Workplan for the Coordination of the Implementation of TB Control Activities for 2008–2012. The strategy is also based on Ministry of Health Decree No. 129 dated 10 March 2009 "On strengthening measures to prevent development of resistant forms of TB" and the Code of the Republic of Kazakhstan "National Health and Public Health System" dated 18 September 2009, aimed at reducing the burden of TB and multidrug-resistant TB.

In addition to policy documents that form the basis of the strategy to combat TB in Kazakhstan, TB doctors are guided by Ministry of Health Decree No. 404 dated 17 June 2011, "On measures to improve measures to combat TB in the Republic of Kazakhstan" and Ministry of Health Decree No. 218 dated 25 April 2011 "On some issues of TB control". Interagency cooperation is regulated by the joint Ministry of Health Decree No. 393 dated 8 July 2008 and, Decree No. 306 dated 21 August 2008, Ministry of Justice of Kazakhstan Decree No. 343 dated 5 August 2008 "On approval of the interaction of State bodies in the fight against TB", and the joint Decrees of the Ministry of Health No. 810, dated 2 December 2009, and the Ministry of Justice of Kazakhstan No. 141, dated 28 October 2009 "On approval of the rules of the organization of TB care for those in the institutions of the penal system of the Ministry of Justice of the Republic of Kazakhstan" and the comprehensive action plan for prevention, diagnosis and treatment of TB and HIV in correctional facilities of the Ministry of Internal Affairs for 2012–2015.

The NCTP has issued Guidelines for Tuberculosis Control in the Republic of Kazakhstan, the Guide to Management of Cases of Multidrug Resistance in the Republic of Kazakhstan and the Guide for the Organization of TB Care in the Penal System of the Republic of Kazakhstan.

For TB specialists, NCTP scientists have produced and introduced in the regions guidelines on:

- monitoring and evaluation of TB control activities in the Republic of Kazakhstan;
- recording and reporting in the TB programme of the Republic of Kazakhstan;
- role of the primary health care network in the control of TB;
- surgical treatment of pulmonary and extrapulmonary TB;
- implementation of intensive therapy of TB of the meninges and central nervous system;
- TB prevention among children and adolescents in specialized preschool and school sanatoriums;
- organization of early detection of TB in children and adolescents in Kazakhstan;
- diagnosis and treatment of candidiasis in patients with TB;
- modern approaches to diagnosis and treatment of anaemia in patients with MDR-TB;
- tactics of TB and XDR-TB management;
- bronchoscopy in the diagnosis of pulmonary TB;

- management of patients with recurrences of pulmonary TB with various types of drug resistance and diagnosis of TB meningitis.

The TB service includes 1128 phthisiologists, of whom 177 doctors are in the highest category of qualification, 447 phthisiologists are in the first category of medical qualification and 126 are in the second category. Overall, the number of phthisiologists is only 88.7% of the required number, TB paediatricians 87.7%, radiologists 83.9%, and laboratory technicians 76.6%.

Staffing levels are laid down in Ministry of Health Decree No. 218 of 2011, which determines standard norms for hospitals (according to the number of beds) and outpatient TB facilities (per 10 000 population). The need for personnel in absolute numbers in 2011 was: 163 TB specialists, 59 TB paediatricians, 50 radiologists and 49 laboratory technicians. The average age of personnel is tending to rise.

The NCTP was founded as a scientific-methodological institution on 9 March 1932. Currently, it supervises all scientific and practical TB control activities in the Republic of Kazakhstan.

In all, 59 doctors and 22 researchers are employed at the NCTP (as at 1 May 2012). Of these, there are 30 doctors and two TB paediatricians in the highest category of qualification, nine TB doctors and one TB paediatrician in the first category and one TB doctor in the second category. There are seven radiologists. Overall, 53.1% of doctors are in one of the categories of professional qualification. Among the doctors and researchers, seven people hold the degree of Doctor of Medical Sciences, four persons hold the scientific title of professor, and there are 22 Candidates of Medical Sciences. There are 151 nurses working in NCTP. Of these, 82 are in the highest category of qualification, 22 are in the first category and four are in the second category (71.5% of all nurses are in one of the categories of qualification).

The norms for staffing within the TB service are laid down by the Ministry of Health. In 2012, 64.8% of the posts at the NCTP were occupied: 68.6% of doctors and scientists, 57.1% of TB paediatricians, 100% of X-ray technicians and 33.3% of laboratory doctors. The figure for nursing posts is 87.5%.

Among working physicians and researchers, 17.2% are aged 50 years or older; 18% of staff are of retirement age. Among midlevel health workers, those of retirement age account for up to 7.2% of all employees, while those aged over 50 years account for 29.8%.

In the majority of medical institutions, there was not a high turnover of staff during the last year and, in most of the institutions visited, human resources are not currently considered a problem. However, the low level of interest in TB among young doctors, due to the low wages on offer and the high risk of occupational diseases, has led to a shortage of doctors choosing to specialize in TB. The appeal of TB specialization among young doctors has also been reduced by the recent removal of the possibility of conducting research leading to a PhD at the NCTP. This is now only possible at the Medical University, which is not always convenient for students, particularly since the clinical site is located at NCTP.

For the purpose of effective professional training, WHO technical support is required to establish a system of independent evaluation of the knowledge, skills and abilities of students and graduates of medical schools in order to monitor the quality of training of physicians and ensure a high level of skills and knowledge.

5.4 Training

Undergraduate medical education for doctors is currently being reformed. From 2012, in accordance with the new Concept for Medical and Pharmaceutical Education in Kazakhstan for 2011–2015, training lasts for seven years (five years of undergraduate education (baccalaureate) followed by 2+1 years of internship), leading to the MD diploma of the general practitioner. Specialization is obtained through a two-year residence (four years for surgeons). According to the new state educational standards, TB is included in the curricula for students in year 4 (54 hours/1 week) followed by a test which they must pass, and in the curricula of interns (as of 2013 – 180 hours/two weeks with practical work at TB dispensaries), followed by a general examination that includes 15 questions on TB. However, surgeons do not have TB training during their four-year internship under the new standards. The curriculum includes, besides clinical aspects of TB control, basics of the management of TB control in Kazakhstan, epidemiology, the Stop TB strategy and international principles of TB control, documentation and the role of primary health care doctors in TB control. Textbooks on TB in Russian and Kazakh are used; however, there is no recent modern textbook on TB for higher-level medical schools by a Kazakh author.

To attract students to TB work, there is the Students' Scientific Society, which includes a TB section. Research students have studied the relevance of TB to students as a risk group and the role of nanotechnologies in TB treatment. Scientific student conferences on TB are organized for years 1–2 and 4–6, where medical students provide lectures on TB.

The **Almaty State Institute for Postgraduate Medical Education** is the main State institution that provides postgraduate primary specialization training and retraining for TB specialists, including a course on "TB of the respiratory system" lasting 216 hours (four weeks). A curriculum has been developed in accordance with the State Standard for Postgraduate Education for the Specialty "Phthisiology (adults, children)", as per Ministry of Health Decree No. 778 dated 26 November 2009, Ministry of Health Decree No. 51 dated 26 January 2012 and the typical training curriculum for additional medical education of Kazakhstan for the specialty "Phthisiology" (Ministry of Health Decree No. 916 dated 23 November 2010). The typical programme for primary specialization defines the number of training hours, possible topics and content, training methods, the clinical base, list of recommended literature, expected knowledge and skills and form of evaluation.

The working programme has been adopted by the Central Methodological Council of the Almaty State Institute for Postgraduate Medical Education. The compulsory part of the curriculum devotes 90 hours to studying the main principles of management of TB detection and treatment in Kazakhstan in accordance with Ministry of Health regulations. The elective part of the curriculum provides more detailed training in the diagnosis of various clinical forms of TB, surveillance and monitoring, TB chemotherapy, treatment of MDR-TB and TB/HIV. The students' knowledge is evaluated in a final examination.

There is a shortage of young doctors willing to specialize in TB. The reasons they give include low salaries, social vulnerability, poor working conditions with poor infection control, fear of infection and the lack of prestige of the specialty.

Primary specialization currently comprises 864 hours of training and covers various aspects of internal diseases in adults and children, TB in adults and children and X-ray diagnostics. The new primary specialization regime from 2012, for doctors who have completed a two-year internship, will comprise 504 hours. Postgraduate training consists of courses lasting 216 hours (one month), 108 hours (two weeks) or 54 hours (one week).

5.4.1 Postgraduate training and primary specialization in phthisiology

Planning, training and educational activities for postgraduate training in TB are conducted and implemented in close collaboration with the Ministry of Health through the departments of phthisiology of five leading State medical schools, one private medical school and one State institute for postgraduate medical education. Training courses under the Global Fund project are planned and implemented in coordination with international organizations and are not integrated into the official system of postgraduate medical education.

Some training efforts are coordinated with other programmes. NCTP staff are trained in specific areas in collaboration with the area concerned – e.g. training in laboratory strengthening covers various aspects of general laboratory management, training in TB/HIV is coordinated with the HIV programme, and regional-level staff are mainly trained in TB control.

The main problems of education and training are the rather outdated basic video material for phthisiologists and a lack of visual aids and dummies. Specialists from the TB department of the Almaty State Institute for Postgraduate Medical Education have designed distance learning courses for the regional TB services, but these have not been used owing to technical problems (online classes are not available everywhere, and not all experts at the regional level are able to use a computer).

Under the State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan", medical and pharmaceutical education and the system of postgraduate education and continuing professional development of health personnel, including TB, have been systematically improved. TB doctors should undergo postgraduate training every five years at the Almaty State Institute for Postgraduate Medical Education or the NCTP.

After graduating from a higher education establishment, medical doctors should undergo a one-year general practitioner internship at a medical university or a two-year residency in their chosen specialty at the NCTP, the Almaty State Institute for Postgraduate Medical Education or another medical school in the country. At present (until 2014) general practitioners can undertake their five-month primary specialization at the Almaty State Institute for Postgraduate Medical Education. Professors from leading medical schools conduct masterclasses and Kazakh doctors receive training in the best TB institutions abroad pursuant to agreements on training and mutual cooperation, funded by the Ministry of Health.

In 2011, 22 persons undertook primary specialization (1080 hours) in TB medicine at the Almaty State Institute for Postgraduate Medical Education, and 119 people undertook refresher training. In 2012, primary specialization training will be provided for 19 people (1036 hours) and refresher training for 27 people.

Between 2010 and 2012, 79 TB specialists from all regions of Kazakhstan were trained at the NCTP training centre. As part of the programme of improving the training and retraining of personnel, 20 TB specialists and 20 primary health care workers attended the training course in the Mangistau region. In 2012, three training courses are scheduled at the NCTP training centre for 26 TB specialists, and a series of on-site training courses is scheduled in Atyrau town for 25–30 TB specialists.

In 2012, three young professionals are scheduled to begin TB residencies at the NCTP. From 2011 to 2012, a total of three persons were enrolled in the phthisiology residency.

In 2011, together with members of the Consortium on Educational Innovation (Almaty State Institute for Postgraduate Medical Education/SD Asfendiyarov State Medical University/ National College for Training and Retraining of Secondary Medical and Pharmaceutical Workers/Kazakh Research Institute of Oncology and Radiology), an educational and methodological base for a network of primary health care physicians, nurses and midwives was developed. Representatives of the Almaty State Institute for Postgraduate Medical Education, the SD Asfendiyarov State Medical University, the National College for Training and Retraining of Secondary Medical and Pharmaceutical Workers, the Kazakh Research Institute of Oncology and Radiology, the Research Institute of Cardiology and Internal Medicine, the NCTP and the Scientific Centre for Obstetrics, Gynaecology and Perinatology of the Ministry of Health of the Republic of Kazakhstan were involved in the development of modular training materials. In 2011, 87 trainers from five higher education institutions were trained; they in their turn, using the cascade principle, trained 5306 primary health care workers in the country. In 2012, it is planned that over 8000 medical workers will be trained.

Topics in the training courses for TB specialists include the following:

- status of TB and measures for improving the situation in Kazakhstan (structure of the TB control programme in Kazakhstan; legislative and regulatory documents);
- general principles and modern methods in treatment programmes for TB patients, National Tuberculosis Programme;
- drug management, adverse reactions to anti-TB drugs and ways of overcoming them;
- modern methods of bacteriological diagnosis;
- healthy lifestyles;
- organization of monitoring of the programme, inspection visits to medical facilities;
- features of patients with drug-susceptible and drug-resistant TB;
- identification and registration of cases of TB, diagnostic algorithm;
- organization of TB control activities;
- electronic tracking of the TB contingent;
- clinical and laboratory methods, immunological diagnosis of TB;
- type of TB disease in adults, adolescents and children;
- epidemiology and pathomorphosis of TB;
- radiology methods in phthisiology;
- current views on the etiology and pathogenesis of TB;
- civil defence and the organization of medical care in emergency situations;
- X-ray anatomy, X-ray semiotics and chest medicine;
- the organization of TB services, the TB dispensary, groupings of dispensary contingents;
- clinical forms of TB, their different diagnoses, development and treatment of the disease;
- endoscopic methods of diagnosis, biopsy diagnostics;
- immunoprophylaxis of TB, TST.

The NCTP provides several postgraduate training courses for TB doctors, approved by the Ministry of Health.

- "Main aspects of TB management in adults and children" for TB doctors and TB paediatricians, therapists and pulmonologists. The course lasts one month (234 training hours), including lectures (16 hours), workshops (42 hours), practice (86 hours), independent training (72 hours). The course is evaluated by means of an examination.
- "Organization of early detection, diagnosis and treatment of TB and MDR-TB at the primary health care level" for primary health care specialists. The training course lasts 108 hours and is evaluated by means of tests.
- "Current issues of MDR-TB management" for TB doctors. The training course lasts 108 hours (8 hours of lectures, 21 hours of workshops, 50 hours of practical study, 29 hours of independent study) with a final evaluation by means of tests.

There are also two short thematic training courses each lasting 54 hours, on the structure of the TB service and organization of TB service work.

Under the Global Fund TB project (Rounds 6 and 8), where the NCTP is the Principal Recipient, the Training Centre was established and staff from NCTP were trained as trainers. Similar training centres were established at four regional TB dispensaries. Under the project various training activities took place (Table 44). The Global Fund project also supported training of Kazakh TB managers on international training courses in TB control, infection control and MDR-TB control.

Table 44. Training courses conducted under the Global Fund TB project in 2011 (Rounds 6, 8)

Title of training course	Level of trainers/length	Global Fund round	No. trained
Implementation of DOTS for primary health care	Regional-level trainers/3 days	6	426
TB and HIV		6	40
Monitoring and evaluation		6	20
Training of nurses as treatment compliance advisers	NCTP training centre/3 days	8	80
Infection control	NCTP and SES /3 days	8	79
Management of MDR-TB in hospitals	Partners in Health and NCTP /5 days	8	20
Management of MDR-TB for outpatients	Partners in Health and NCTP /4 days	8	101
Management of DR-TB in primary health care	NCTP/3 days	8	318
Total trained			1084

The above training courses do not have the official status of postgraduate training, and time spent on the course is not counted towards the hours of postgraduate training required for attestation and professional qualification categories for TB doctors.

5.5 Staff development

Among the social benefits granted to TB staff, besides their basic salary, there is a top-up amounting to 190% of salary reflecting the risk of infection run by TB doctors and a top-up amounting to 220% of salary for TB doctors working in MDR-TB facilities. TB doctors in rural areas get additional benefits – initial installation grants and accommodation and utility costs are refunded. All TB doctors get 42 days' paid annual leave per year, and health benefits during their annual leave (two salaries). There is a trade union for medical workers that refunds 50% of the cost of staying in a sanatorium, etc.

Staff receive induction training when they first take up their posts. The employment process is based on the vacancy and technical appraisal; induction training in the workplace is performed mainly by their supervisors. Standard job descriptions are available for different categories of staff. These are studied and signed on recruitment and are updated for current employees at the beginning of each year. Two copies are kept by the human resources department and within the Department. They are signed again during the evaluation process.

There is no shortage of information materials at the regional level. The following guidelines are available and used at national, oblast and rayon levels: Manual on management of MDR-TB cases, 2009; Ministry of Health Decree No. 218; Guide on TB control in the Republic of Kazakhstan, 2008; Methodological recommendations on monitoring and evaluation of TB interventions in the Republic of Kazakhstan, 2008; NCTP guide on monitoring and evaluation of collaborative activities on TB/HIV, 2010; Ministry of Health Decree No. 722 on integration of TB and HIV control programmes, 2009; Guide on TB control for primary health care providers, 2008.

The human resources inspector monitors the situation and prepares lists of the TB staff who will undertake the next postgraduate training course (every five years). This information is sent to the staff concerned and to the chief TB doctor. Requests for training courses can be sent to the NCTP or to the Almaty State Institute for Postgraduate Medical Education. During training, staff receive their salaries plus per diem and travel expenses. The training plan is available at the oblast level. The OTBD reports on staff to the NCTP training centre once a year, but the electronic database is available at all times.

The average salary of a TB doctor is KZT 60 000–100 000, depending on the doctor's qualifications; for medical nurses it is KZT 40 000–80 000, depending on qualifications.

TB doctors are also regularly trained by the OTBD training centre in early detection, DOTS and other aspects of TB control. They participate in regional and national conferences and workshops on TB control.

All doctors at the facility received postgraduate training in the last five years, and in addition they received certification training for higher categories of qualification (two doctors have the first category of qualification). Internships and training courses at the Almaty State Institute for Postgraduate Medical Education include practical information on TB management. TB laboratory doctors and TB laboratory technicians have received specialized and on-the-job training.

Among the key issues for human resources is the high proportion of TB doctors approaching pensionable age and the low proportion of young doctors to ensure continuity of TB control. Among the solutions could be training of persons from the local area at medical school and in TB internships, who could then stay and work in their home area (example – one young doctor in the facility).

5.6 Performance assessment

The NCTP has regional supervisors who also involve various specialists in their supervision visits, according to the specific issues on which consultation is needed. National-level supervision of the oblast level is conducted twice a year according to a schedule approved by the chief TB doctor. If required, an extra supervisory visit can be organized in addition to the

scheduled visits. Supervision of the rayons by OTBD is conducted by OTBD staff, who form the oblast monitoring and evaluation group. Supervision by oblast monitoring and evaluation teams takes place quarterly, following the schedule. Each rayon has one main supervisor and one backup supervisor.

There are supervision checklists for regional and rayon levels down to the facility level, which are published in the national monitoring and evaluation guide. Supervisors receive special training in supervision, forming part of the training module on monitoring and evaluation. The supervision reports are available at health-facility level, sub-rayon, rayon and provincial levels. The preliminary outcomes and recommendations are discussed with physicians and sent to heads of facilities and sometimes to the local authorities.

Recommendations are followed up by means of reports on the recommendations implemented, as well as during preparations for the next monitoring mission. Supervision is considered as practical support intended to find solutions for existing problems.

There is a system of individual accreditation of staff through internal or external audit by OTBD supervisors, which takes the form of training and tests including terms of reference on performance. In case of noncompliance with terms of reference or Ministry of Health decrees, monetary sanctions may be imposed, amounting to up to 30% of the salary of an individual worker. Health workers know their tasks and responsibilities; there is a process of internal audit of staff performance by the internal quality control service, which checks the performance of departments monthly and the performance of the regional TB dispensary quarterly. The audit is performed by OTBD staff coordinators for the management of detection and treatment and the deputy chief TB doctor for medical care. The audit is performed according to the checklist, which also includes the way the duties are performed compared with job descriptions.

There is an official State appraisal, accreditation and certification of every medical worker on completion of his/her primary specialization, and then every five years for the various categories of qualification. The criteria include the number of hours of postgraduate continuing education undertaken, depending on qualification (up to 216 hours for category 1).

For the qualification categories there are requirements specified in Ministry of Health Decree No. 661 – defining the number of training hours in the previous five years, publications and performance indicators.

Recommendations

To the NCTP.

- Appoint a human resources coordinator in the NTP.
- Integrate training courses on TB control supported by KNCV, USAID and Project Hope into the national system of postgraduate medical education.
- Develop checklists and organize regular feedback from NTP to the medical education system on training quality, to ensure that training corresponds to NTP needs.
- Develop a national TB textbook for students based on Russian textbooks and national specifics.

To the NCTP and Ministry of Health.

- Assess the potential gap in human resources for TB control after 2014 (due to the impact of specialized medical education reforms and ageing of current TB staff) and develop measures with a plan of action to guarantee the supply of human resources for TB control as required (e.g. advertise TB work among interns, develop a social protection package and incentives for TB doctors, merge the TB and pulmonology specialties).
- Assess the impact of current performance-based payment mechanisms and review them.
- Develop a coordination body for medical schools and NTP on training for TB medicine.

6 Information

6.1 Surveillance

The following achievements have been made in the area of information:

- there is a well-developed system of TB surveillance, recording and reporting;
- an electronic TB register has been introduced with countrywide coverage that allows for enhanced TB surveillance;
- recording and reporting forms and case definitions have been introduced based on WHO standards;
- a data completeness assessment and feedback system has been introduced;
- advances have been made in drug-resistance surveillance through increased DST coverage.

The following challenges remain.

- Parallel electronic and paper-based surveillance and duplicate recording and reporting create a high workload at subnational level.
- TB laboratories not (yet) integrated into electronic recording and reporting systems.
- Electronic TB register does not (yet) account for novel diagnostics for drug-resistant TB.
- TB surveillance in prisons not (yet) integrated into the NTP.
- No systematic appraisal of the quality of TB surveillance data (except for completeness).
- Low proportion of culture-positive pulmonary TB cases presents a challenge to drug resistance surveillance.

Recommendations

Key recommendations

- Develop and implement a national TB laboratory register (NTLR). The NTLR should take into account current as well as novel diagnostics, provide a platform for TB health-care facilities for easy and real-time access to laboratory results and be fully integrated into the National TB Register.
- Integrate TB surveillance in prisons into national TB surveillance under the NTP.
- Strengthen continuous drug-resistance surveillance with the aim of achieving Class A surveillance data. Conduct a review at oblast level in order to identify barriers to full

coverage, timeliness and high quality of culture and DST, including transportation and storage of specimens.

- Reduce (duplicated) paper-based recording and reporting and make the electronic TB register into a unified source of information for both NTP and SES.

Specific recommendations

- Develop a national standard and benchmarks for systematic and regular appraisal of the quality (i.e. completeness, timeliness, consistency and validity) of TB programme data at national and subnational level, including regular data quality reports.
- The safety and confidentiality of individual patient data should be ensured. Conduct an assessment of the safety of Web-based electronic patient data. Regular backups and data encryption should be ensured.
- Develop a reference manual for the electronic national TB database. The manual should include definitions, instructions for data entry and management, a data dictionary with definitions for each of the variables and instructions for amendment and correction of data, extraction of data and standard reports and problem-solving.
- Develop and distribute more illustrative guidelines and training materials for surveillance, recording and reporting.

6.1.1 Structure of surveillance

TB is a notifiable disease in Kazakhstan. Surveillance of TB is well-organized through a vertical system of standard recording and reporting of TB cases across three different administrative levels. At the *rayon* level, TB suspects are identified through passive and active case-finding and undergo clinical, radiological and sputum-smear examination in primary health care institutions (polyclinics, health-care posts). Rayon and inter-rayon TB dispensaries (TBD) act as basic reporting units, responsible for diagnosis, treatment and registration of TB cases, and reporting to the *oblast* level. At the oblast level, culture and DST are performed in specific laboratories. OTBD receive and forward TB case-reports to the *national* level. NCTP receives case-reports from all regions and sends standard reports on TB cases and treatment outcomes to the Ministry of Health. Traditionally, a parallel system of recording and reporting exists via SES, which collects single case-reports on newly detected TB cases and forwards aggregated data annually to the Ministry of Health. TB surveillance in the penitentiary system is organized outside the NTP via the Ministry of Internal Affairs. Aggregate data on TB cases detected in the penitentiary system are sent annually to the NTP.

6.1.2 Standard case definitions and indicators

Standard case definitions and indicators for recording and reporting of TB cases in Kazakhstan are in line with current WHO standards and recommendations.[10] These include recording of TB cases by site of disease (pulmonary and extrapulmonary), by sputum and culture result, by patient category (new case vs. relapse, retreatment after failure, defaults, and cases transferred in). Further, TB cases are recorded by the category of their treatment regimen (treatment category I – new cases; category II – retreatment cases; category III – sputum smear-negative

[10] See: Decree No. 218, Annex 1: "Instructions for detection, registration, treatment and dispensary supervision of tuberculosis in the primary medical and sanitary aid and anti-tubercular organizations" (version 25 April 2011).

and extrapulmonary TB cases; category IV – MDR/XDR-TB cases). The latter categorization, by treatment regimen, is no longer recommended by WHO.[11]

Besides recording and reporting of TB cases, Kazakhstan has maintained the traditional dispensary system which classifies TB cases into dispensary groups: dispensary group 0 – individuals with doubtful or insufficient evidence for active TB; group I – active TB cases; group II – TB cases in the regression phase after successful treatment; and group III – persons at increased risk of TB. This traditional system of registration forms the basis for either treatment initiation or screening and follow-up investigations.

6.1.3 Recording and reporting, data management

Kazakhstan has moved from a traditional, paper-based recording and reporting system inherited from the former Soviet health-care system to an electronic system based on WHO standards. An electronic national TB register was established in 2001 as a case-based management system for TB in a project led by CDC with funding provided by USAID. The initial system was implemented countrywide but suspended in 2003. In 2004, new data collection forms were integrated into an electronic TB register via a Visual FoxPro platform developed by local company MedInform. The electronic TB register includes detailed individual information on all TB cases treated in the country, including sociodemographic and diagnostic data and information about the treatment regimen provided and the treatment outcome. It was implemented as an add-on database complementing the paper-based system.

For each TB case, individual data are captured in the individual treatment card (form 01, see Box 1) from the start of treatment. The treatment card serves as a source of data for both a paper-based treatment register (form 03) and the electronic TB register. The latter is used as the principal tool for reporting of TB cases to the administrative level above. The electronic TB register is created at the rayon (and inter-rayon) TB dispensaries and updated monthly with individual patient information. Updated data on all TB and MDR-TB cases are downloaded monthly from the database and sent via email to the administrative level above. Currently, 37 rayons in the country transfer the TB register data using USB storage devices, as they do not have Internet access. Besides the paper-based TB register for TB cases (form 03; treatment categories I-III), a separate register exists for MDR-TB cases (form 11; treatment category IV). The paper-based TB registers are transported monthly to the OTBD and used for an assessment of the completeness of the data recorded electronically (see Section 6.1.4, Data quality assessment and documentation).

At the oblast level, case-based data from the datafiles provided by all rayons are combined in one database and sent on to the national level (NCTP). NCTP receives emails with the databases from all oblasts via an email address registered with a Russian email provider. Datafiles from the oblasts are downloaded from the email account and combined to form the national TB database. The electronic database allows for extraction of WHO standard reports on the number of TB cases notified and on cohort analysis of treatment outcomes at national or subnational level.

Laboratories are not yet directly linked with the electronic TB database. Sputum specimens are transferred to the laboratory along with laboratory request forms. Paper-based laboratory registers exist. Laboratory results are physically transported in paper form back to the health-care facilities, where they are stored in the patient folder and transcribed on to the individual patient cards.

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[11] See: *Treatment of tuberculosis: guidelines*, 4th ed. Geneva, World Health Organization, 2010, p.16 (http://whqlibdoc.who.int/publications/2010/9789241547833_eng.pdf, accessed 13 August 2014).

Box 1. Selection of standard forms used for recording and reporting of TB in Kazakhstan

TB-01: Individual treatment card for TB/MDR-TB cases, including demographic and diagnostic data and information about the course of treatment (regimen, dosage, uptake), changes in treatment regimens and treatment outcome. It is equivalent to the Treatment Card (Form 1) recommended by WHO.

TB-03: TB treatment registers for all TB cases (equivalent to Treatment Register Form 2 recommended by WHO).

TB-04: TB laboratory register.

TB-05: Laboratory form for microscopy results.

TB-06: Laboratory form for culture and DST results.

TB-07: Form for quarterly reporting of the number and characteristics of notified TB cases.

TB-08: Form for quarterly reporting of treatment outcomes.

TB-10: Form for quarterly reporting of sputum conversion.

TB-11: MDR-TB Treatment Register (treatment category IV).

In parallel with the NTP recording and reporting system, TB cases are reported via separate paper-based reporting forms to SES. SES operates institutions at oblast level, organizes contact investigation and reports new TB cases via the Republican SES Centre and the Committee of the SES to the Ministry of Health.

6.1.4 Data quality assessment and documentation

In Kazakhstan, as in many other countries, there is currently no standard for comprehensive, systematic and regular appraisal of the quality (i.e. completeness, timeliness, consistency and validity) of TB programme data. The following information is based on a visit to the Almaty City Dispensary and subordinated rayon dispensaries and facilities.

Completeness and timeliness of case-reports and case-based data

The completeness of TB case-reports in Kazakhstan is assessed on a regular basis as follows. The number of TB cases recorded in the electronic TB register (source: treatment cards) is verified regularly against the number of TB cases recorded in the paper-based TB registers (forms TB 03 and TB 11) in the rayon TB dispensaries. Although the findings of this verification process are not routinely documented, corrections are made immediately. A similar verification is conducted upon monthly presentation of the TB registers at the city TB dispensary.

The completeness and timeliness of the programme data are assessed on a regular basis as follows. The electronic TB database offers routine checks on data completeness and timeliness, which are regularly performed at the city level. These checks list the number of missing or incomplete entries for sociodemographic data, dispensary data, diagnostics and treatment data for TB cases and MDR-TB cases. Checks include timeliness (e.g. “no result for sputum-smear microscopy after 3 months of treatment: n = 7”) and logic (e.g. “Treatment outcome documented as ‘Transferred to category IV treatment’ but no DST result available: n = 2”). The “data quality reports” give the numbers of missing entries per rayon. However, they provide neither a direct reference to the respective individual treatment card for correction, nor any suggestions about how corrections can be applied. There is currently no reporting about how many of these

"mistakes" were subsequently corrected or how the correction was done. Further, there are no summary statistics available that would allow for an appraisal of systematic/general shortcomings or delays in documentation at rayon level. An assessment of the completeness and timeliness of DST results was performed for small samples of patients treated in Almaty City (Boxes 2 and 3). However, samples are non-random and sample sizes are small, hence it is impossible to draw general conclusions from these findings.

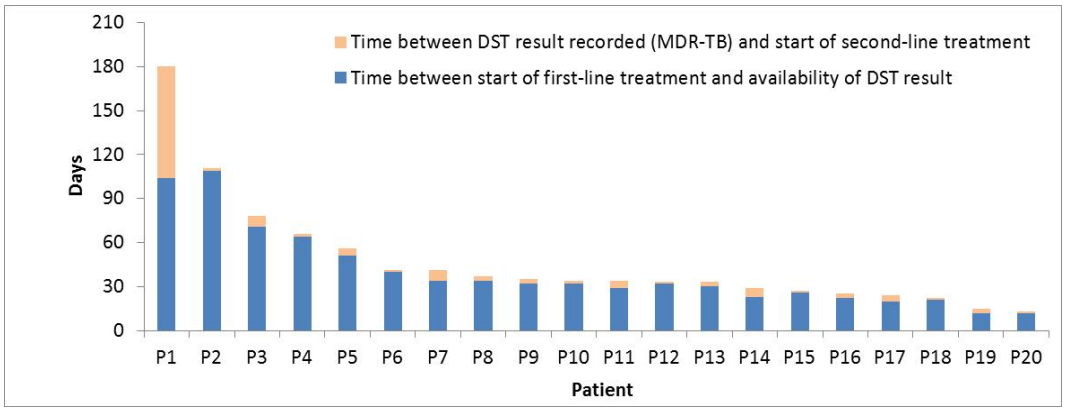
Box 2. Data assessment: complete, timely and accurate documentation of DST results

As part of the review visit, complete, timely and accurate documentation of first-line DST results were assessed for a small, non-random sample of 29 patients who were undergoing TB treatment in the Medeuskij rayon of Almaty City between January and March 2012. Laboratory (culture and DST) results documented in the laboratory were compared with culture and DST results documented for the same patients in the electronic database and in the treatment cards in the TB dispensary. The data verification exercise showed that for one patient, results were not documented at all in the treatment card, although they were available in the laboratory two months before. For two patients, results were not (yet) documented in the electronic database, but were present and accurate in the relevant treatment cards. For 26 patients, results were complete and accurately documented. The results suggest that incomplete or delayed documentation between the laboratory and the treatment facility/dispensary may occur for a small number of TB cases in Almaty City. The data suggest good accuracy of documented DST results. It is currently unknown whether incorrect, incomplete or delayed documentation occurs more frequently in other cities or in oblasts with longer distances between the laboratory and the treatment facility/TB dispensary.

Box 3. Data assessment: timeliness of recording patients with confirmed MDR-TB for second-line treatment

As part of the review, the timeliness of DST results and the recording of confirmed MDR-TB cases in the MDR-TB register were assessed in a small (non-random) sample of 20 patients with confirmed MDR-TB undergoing second-line treatment in Almaty City TB hospital in April 2012.

Of the 20 patients, 19 had the documented treatment outcome "transferred to category IV treatment" and one had "treatment failure". The median time between the start of first-line treatment and the availability of a DST result was 32 days in Almaty City, and the median time between the day on which the DST result (suggestive of MDR-TB) was available and the day when this patient was recorded in the second-line treatment register was three days. In four patients, DST results did not become available for more than two months; for one patient, there was a significant delay in recording the patient in the second-line treatment register (see graph below). The latter patient was the one with the documented treatment outcome "treatment failure". The results suggest that, overall, delay in DST availability and initiation of second-line treatment in cases with confirmed MDR-TB is not a general problem in Almaty City. However, delay does occur in some patients. It is currently unknown whether such delays occur more frequently in other cities or in oblasts with longer distances between the laboratory and the treatment facilities/TB dispensary.



Data consistency and validity

With the exception of external quality assessment for laboratories, there is currently no systematic assessment of the consistency and validity of programme data in Kazakhstan. The National TB Register and the TB surveillance infrastructure offer excellent opportunities for regular assessment of the consistency and validity of data, which would allow for early identification of (regional) shortcomings in data quality/recording and reporting, and to identify barriers to efficient TB control in general.

Questions that may be addressed through systematic data quality assessment include the following.

- Are there inconsistencies between culture and DST results documented in the laboratories and the corresponding results documented in health-care facilities at oblast or rayon level?
- Is there a delay between performing culture and DST, documenting results and initiating/adapting treatment for TB cases at oblast or rayon level?
- Are reported first-line and second-line treatment outcomes consistent with bacteriological diagnostic results during the course of treatment?

Regular (annual) quality reports can be very useful for providing feedback to regions (and rayons) in order to facilitate problem-solving.

6.1.5 Human resources and training in surveillance

The practice of extensive electronic and paper-based documentation, recording and reporting demands high numbers of staff members working in the statistical departments of the TB dispensaries at rayon and regional level, and at the NCTP. Physicians are responsible for documentation and report-writing. Operators (data managers) are responsible for recording and reporting and for operation of the electronic TB database. Assistants (nurses) work as data-entry clerks and assist with documentation. By April 2012, 570 people were employed by NTP for TB surveillance, 209 of whom were physicians, 177 operators and 184 assistants (Table 45).

Table 46. Employees working in TB surveillance in Kazakhstan, April 2012

Oblast	Administrative divisions		Surveillance staff		
	Cities	Rayons	Physicians	Operators	Assistants
Akmola Oblast	2	17	18	20	20
Aktubinsk Oblast	1	12	15	13	13
Almaty Oblast	4	16	21	24	16
Atyrau Oblast	1	7	8	8	8
Western Kazakhstan Oblast	1	12	14	15	13
Zhambul Oblast	1	10	12	11	11
Karaganda Oblast	8	9	18	8	14
Kostanai Oblast	4	16	20	1	15
Kyzyl-Orda Oblast	1	7	6	7	10
Mangistau Oblast	2	5	8	5	7
Southern Kazakhstan Oblast	4	11	16	17	15
Pavlodar Oblast	1	4	5	8	4
Northern Kazakhstan Oblast	1	13	16	12	14
Eastern Kazakhstan Oblast	4	15	21	20	15
Astana City	1	–	4	1	1
Almaty City	–	5	6	5	5
NCTP	–	–	1	2	3
TOTAL	36	159	209	177	184

Source: NCTP.

The educational background of staff members working in surveillance varies across the regions. Many of the physicians have previously worked in patient care. Some hold a degree in epidemiology or medical statistics. Assistants usually have a nursing background.

All staff members receive training in TB recording and reporting at the beginning of their employment. Further training is conducted at provincial level upon release of new (or updated) Ministry of Health regulations, usually every two to three years. There are few guidelines, manuals or training materials for recording and reporting. Documents released by the Ministry of Health are often used as a reference for definitions and procedures. It was felt that more illustrative manuals and training materials for recording and reporting, including diagrams, tables and flow charts, would strengthen the skills and knowledge of staff members in surveillance, recording and reporting at oblast and rayon level. There is currently no user manual for the electronic TB database available at oblast or rayon level.

6.1.6 Laboratory surveillance

There is an extensive laboratory network, with laboratories in the polyclinics and dispensaries at rayon level performing sputum-smear microscopy, laboratories at the oblast level performing culture and DST, and a supervising national reference laboratory at the NCTP. Quality assessment exists for smear microscopy and culture. Proficiency testing for drug susceptibility is performed annually with the help of a supranational reference laboratory located in Borstel, Germany. A current challenge to laboratory surveillance of TB is the lack of electronic recording and reporting for laboratories. Laboratories are not (yet) integrated into the electronic system of recording and reporting in the country. Paper forms with diagnostic requests and laboratory results are exchanged between the health-care facilities and the laboratories using a delivery service. The high rates of negative and unknown culture results, even among sputum-smear-positive TB cases (see Section 2, Background information, Tables 2 and 3, Fig. 4) suggest that there may be delays or problems with sample transportation, storage and/or conduct of culture in some oblasts. Finally, the electronic database used in TB health-care facilities is currently not set up for capturing diagnostic results from the new rapid diagnostic technologies.

6.1.7 Drug-resistance surveillance

Kazakhstan is one of the 27 high-burden MDR-TB countries globally. Continuous drug-resistance surveillance is in place, with the priority of conducting DST for both new and retreatment cases. New rapid genotypic methods such as LPA and Xpert MTB/RIF are currently rolled out or at a pilot stage, but are not yet available for the majority of TB cases in the country.

Kazakhstan currently reports class B continuous drug resistance surveillance data. Recent data suggest that class A criteria were almost met, except for the proportion of TB cases with a positive TB culture (Table 46; see also Section 2.2.3, Epidemiological situation of TB).

DST coverage among culture positive new and retreatment TB cases is high. However, the proportion of TB cases suitable for DST, that is, those with a positive culture result, is still low. There are two underlying factors responsible for this finding. Firstly, there is a high variation in the number of TB cases identified via active (radiological) case-finding in some of the oblasts (between 41% and 68% of new cases, see Section 2, Background information and Fig. 5), leading to high proportions of sputum-smear-negative and culture-negative TB cases. Such cases are most often not bacteriologically confirmed. Secondly, there is a high rate of negative/ unknown culture results even among sputum-smear-positive TB cases, suggesting that either transportation or storage of samples or performance of culture testing is of low quality in some oblasts.

Table 46. Assessment of the criteria for Class A drug-resistance surveillance data for Kazakhstan, 2011

	Criteria for drug resistance surveillance data	Target for class A	Recent figures for Kazakhstan (2011 data unless otherwise stated)	Target met
I	New case detection rate or new sputum-smear-positive case detection rate	≥ 50%	All cases (2010): 82%	Yes
II	Positive culture available among notified cases	≥ 50%	All pulmonary TB cases: 49.1% New pulmonary TB cases: 42.7% Retreatment pulmonary TB cases: 58.6% (Extrapulmonary TB cases 2010: 7.7%)	No
III	DST results available among cases with positive culture	≥ 75%	All pulmonary TB cases: 93.7% New pulmonary TB cases: 93.8% Retreatment pulmonary TB cases: 93.6%	Yes
IV	Accuracy for isoniazid and rifampicin in the most recent DST proficiency testing with a supranational reference laboratory	≥ 95%	Specificity (INH, RIF): 100% Sensitivity (INH, RIF): 94.7% Supranational reference laboratory: Borstel, Germany	Yes

It is, therefore, recommended that culture and DST procedures in the oblasts should be improved in order to strengthen drug resistance surveillance (see key recommendations above).

Detection of MDR-TB is still below the estimates, especially for retreatment cases (27.5% detected compared with 45.0% estimated MDR-TB), and there is substantial variation across the oblasts in the proportion of MDR-TB detected among new and retreatment cases (see Section 2, Background information, Table 4 and Fig. 8).

An analysis of the regional variation of MDR-TB detection was conducted (Box 4). The analysis suggests that the detection and surveillance of MDR-TB in the oblasts can be improved by the following action:

- among new TB cases: increasing the proportion of cases with a positive culture result;
- among retreatment TB cases: increasing the proportion of all cases with a positive culture result (strategy 1); increasing the proportion of sputum-smear-positive cases with a positive culture result (strategy 2), decreasing the proportion of cases without culture, regardless of a positive or negative result (strategy 3).

Box 4. Analysis of regional variation of MDR-TB detection in Kazakhstan by culture and DST

There is a high variation in MDR-TB case detection across the oblasts of Kazakhstan. An analysis of TB programme data was conducted to investigate whether there was an association between culture and DST coverage/performance and MDR-TB case detection (new and retreatment cases) at oblast level in 2011. The hypotheses used for this analysis were as follows.

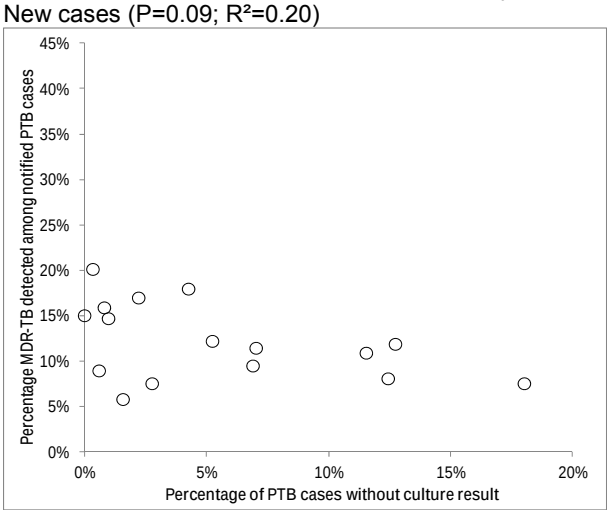
Variation in MDR-TB case detection across the oblasts is associated with:

a) the rate of TB cases without a culture result (inverse association);
b) the rate of sputum-smear-positive TB cases with a culture result;
c) the rate of all notified cases (regardless of sputum-smear result) with a positive culture result; and
d) the rate of culture-positive TB cases with DST.

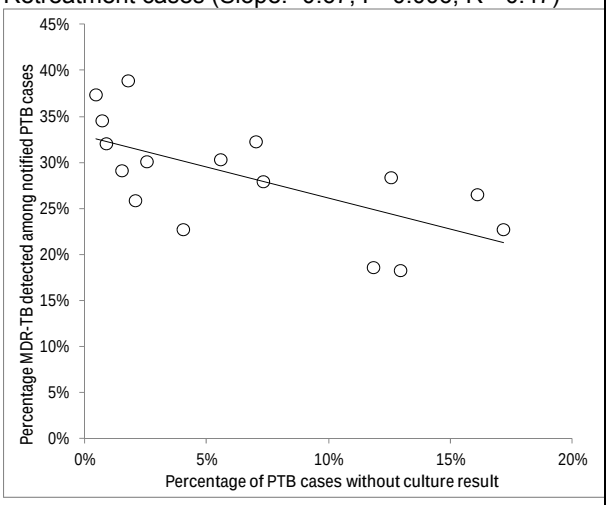
The slope of a fitted linear regression line (i.e. the percentage increase in MDR-TB case detection per 1% increase in the determinant), the p-value (test statistics for linear association) and the squared correlation coefficient (R^2, method of least squares) was estimated. New cases are shown on the left, retreatment cases on the right. The linear regression line is only shown in the case of statistical evidence for a linear association (evidence level $P<0.05$). Each circle in the scatter plots denotes one of the oblasts/Almaty and Astana City.

a) MDR-TB case detection vs. (non-) availability of culture results, 2011

New cases (P=0.09; R²=0.20)

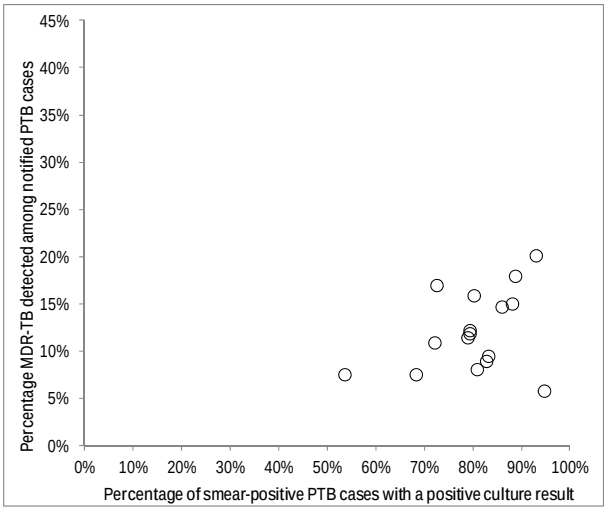


Retreatment cases (Slope: -0.67; P=0.006; R²=0.47)

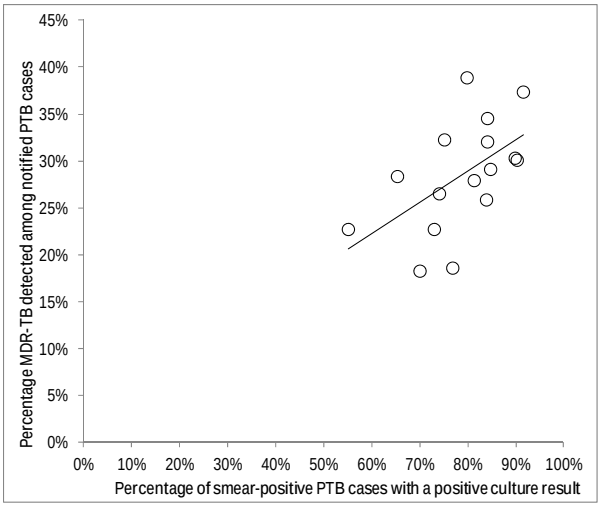


b) MDR-TB case detection vs. positive culture results among sputum-smear-positive TB cases, 2011

New cases (P=0.17; R²=0.08)

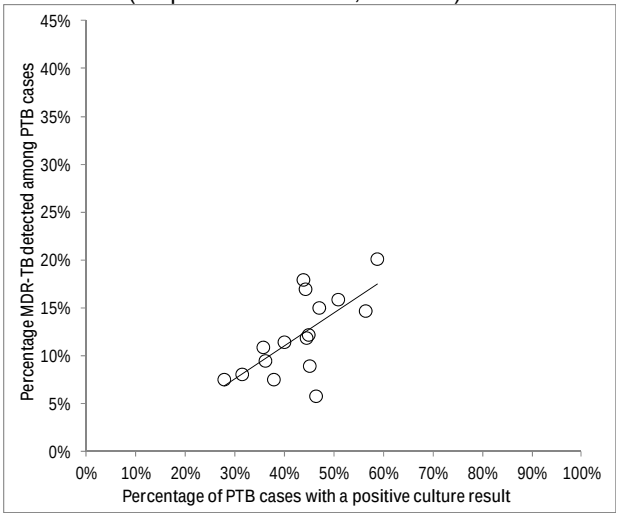


Retreatment cases (Slope: 0.34; P=0.03; R²=0.30)

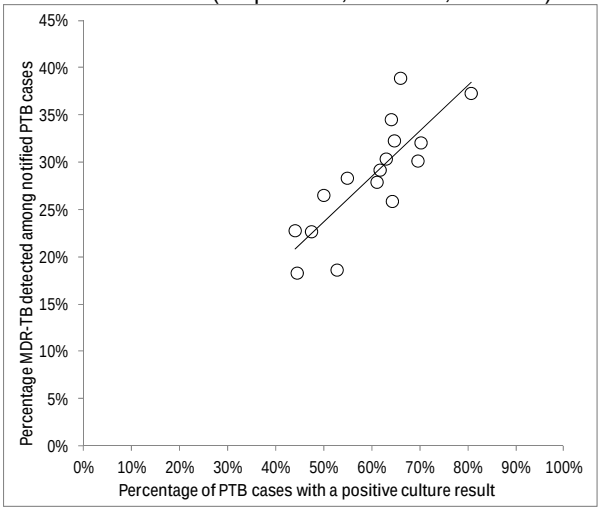


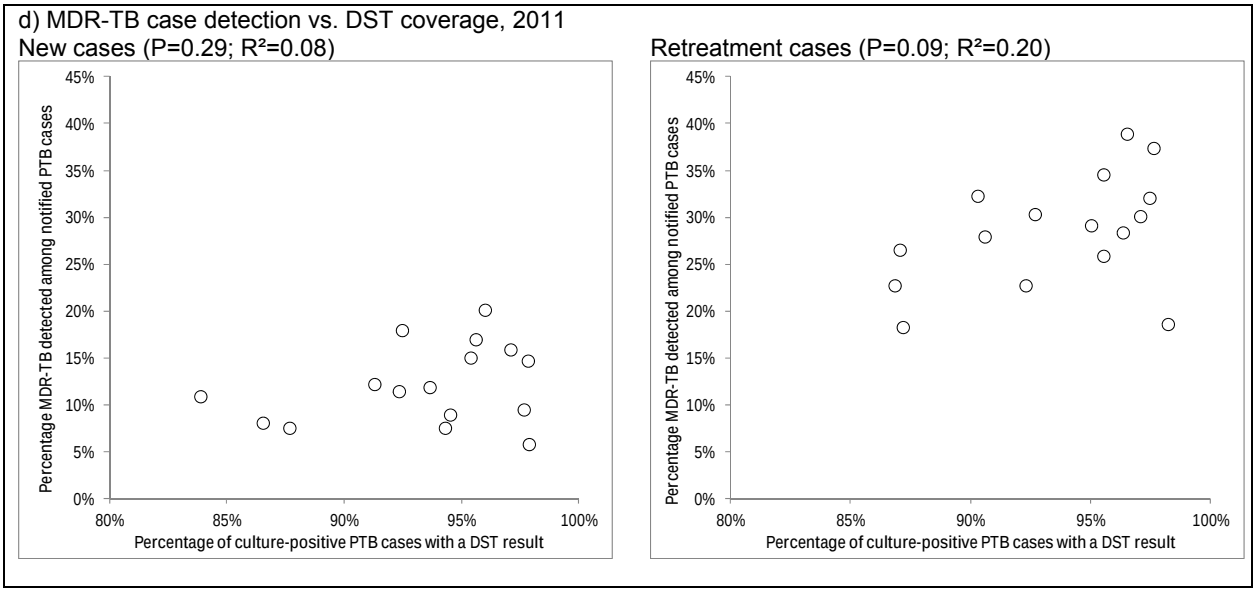
c) MDR-TB case detection vs. positive culture results among all TB cases, 2011

New cases (Slope: 0.35 P=0.004; R²=0.45)



Retreatment cases (Slope: 0.48; P<0.001; R²=0.67)





6.2 Monitoring and evaluation

The following achievements have been made in the area of monitoring and evaluation:

- TB care and control are routinely evaluated on the basis of standard indicators;
- monitoring of treatment outcomes is routinely conducted at national and subnational level;
- regular field supervision and monitoring visits are organized for all oblasts.

The following challenges remain.

- Some of the indicators for assessing the performance of TB control are outdated.
- Uncertainties about representativeness of second-line treatment outcomes.
- TB/HIV is currently not part of field supervision.
- Monitoring of drug side-effects within NTP needs strengthening.

Recommendations

Key recommendations

- Revise and rationalize the list of core indicators for TB. Develop a set of core indicators that accurately reflect performance and progress towards national and international targets for TB control.
- Discontinue the use of the treatment outcome “Transferred to category IV treatment”. Patients with confirmed MDR-TB during first-line treatment should be assigned the treatment outcome “treatment failure”.
- Strengthen monitoring of second-line treatment by initiation of monthly sputum smear and culture testing throughout the course of second-line treatment.

Specific recommendations

- Assess the representativeness and validity of treatment outcomes for the cohort of MDR-TB cases. Ensure that all MDR-TB cases are included in cohort analysis.
- Include one TB/HIV specialist in regional field supervision teams.
- Strengthen monitoring of drug side-effects. Standard guidelines for reporting and clinical management of adverse events during first-line and second-line treatment should be developed and distributed. Strengthen collaboration with the National Centre for Drug Expertise. Data should be made available by the latter on a regular basis, in order to facilitate monitoring of TB drug side-effects at national and regional level within NTP.

6.2.1 Monitoring and evaluation of the performance of TB control

The performance of TB control in Kazakhstan is monitored at national level via a set of 38 core indicators (Box 5). Treatment outcomes are monitored and evaluated on a regular basis (see Section 6.2.2, Monitoring of treatment outcomes). Annual reports to the Ministry of Health cover the epidemiological situation and trends, results from monitoring field visits, advances in laboratory/diagnostic services and financing of TB care.

Box 5. Core indicators for TB epidemiology and control in Kazakhstan

1 Number of TB dispensaries
2 Number of TB hospitals
3 Number of TB sanatoria
4 Number of TB hospital beds
5 Number of TB sanatorium beds
6 Number of TB bed-days
7 Number of TB doctors
8 BCG vaccination coverage among neonates
9 BCG revaccination coverage
10 Number of individuals screened for TB
11 Population coverage of TB screening
12 Coverage of fluorography among adults and young adolescents
13 Coverage of TB screening among children
14 Proportion of TB cases detected through screening among all registered TB cases
15 Proportion of TB cases with destructive forms of TB among all registered TB cases
16 Proportion of TB cases with fibrocavernous pulmonary TB among all registered TB cases (adults and adolescents)
17 Number of bacteriologically confirmed cases per 100 cases with destructive forms of TB
18 Number of respiratory TB cases with surgery
19 Closure of cavities among new TB cases
20 Sputum conversion at the end of the intensive phase of treatment
21 Proportion of children isolated
22 TB notification rate among adult TB contacts
23 TB notification rate among adolescent TB contacts
24 TB notification rate among child TB contacts
25 TB notification rate per 100 000 population
26 TB notification rate per 100 000 population (urban)
27 TB notification rate per 100 000 population (rural)
28 TB notification rate per 100 000 population (children)
29 Notification rate of bacteriologically confirmed TB cases per 100 000 population
30 MDR-TB rate per 100 000 population
31 TB prevalence per 100 000 population
32 MDR-TB prevalence per 100 000 population
33 Proportion of prevalent TB cases with fibro-cavernous pulmonary TB (adults/adolescents)
34 Intensive indicator of the recurrence of TB
35 TB mortality per 100 000 population
36 TB disability per 100 000 population
37 TB notification rate in the prison sector
38 TB mortality in the prison sector

Many of these core indicators for TB monitoring and evaluation are outdated, or at least not recommended internationally, or are of uncertain value. There are no indicators for management of drug-resistant TB, TB/HIV coinfection, TB control in specific populations or laboratory strengthening. There is currently no standard set of simple and composite indicators that allows for rapid assessment of the performance of TB control and the progress towards the international and country-specific targets.

6.2.2 Monitoring of treatment outcomes

For all TB cases treated under the NTP, treatment outcomes are ascertained at the oblast level by the TB central doctoral commission and recorded in the electronic TB register. Definitions of treatment outcomes are in line with international recommendations, with a few exceptions (see below). The electronic TB register enables simple processing of standard forms for cohort analysis of treatment outcomes at national, oblast and rayon level. The following challenges to monitoring of treatment outcomes in Kazakhstan were identified.

- Kazakhstan uses the standard treatment outcome "transferred to category IV treatment", which is assigned to "patients with MDR-TB, patients with the treatment outcome 'treatment failure' and a polyresistant form of TB, and patients with clinical resistance".[12] This category of treatment outcome is not in line with standard WHO recommendations, which advise that cases with drug-resistant TB should be assigned the outcome "treatment failure". It should be noted that not all people with TB who are assigned to the above treatment outcome are actually provided with second-line treatment. Category IV treatment includes cases on symptomatic treatment and prolonged first-line treatment. The treatment outcome "transferred to category IV treatment" is therefore misleading and should no longer be used, or should be used only as a subcategory of "treatment failure".
- There are uncertainties about the representativeness of cases included in the MDR-TB treatment cohorts. In the 2008 cohort, 74% of MDR-TB cases were successfully treated, with very low rates of unfavourable treatment outcomes (see Sections 2, Background information and 2.2.4, Treatment outcomes, and Table 5). One possible reason for this is that patients are usually preselected for symptomatic (palliative) care. Excluding such cases from cohort analysis would lead to a selection bias towards better treatment outcomes. It is therefore recommended that all MDR-TB cases should be included in cohort analysis, and that an analysis should be conducted of the representativeness and validity of treatment outcomes among MDR-TB cases.
- Sputum-smear and culture testing in the second year of second-line treatment is conducted and documented only every third month. It is recommended that monthly sputum-smear microscopy and culture testing should be reliably performed for all MDR-TB cases, including those with sputum-smear or culture conversion, in order to identify cases of reconversion and treatment failure, and that second-line treatment outcomes should be assigned in line with international standard definitions.

6.2.3 Field supervision of TB programme performance

Field supervision of the oblasts is conducted regularly. At national level, there are focal persons for each of the oblasts, and monitoring teams undertake supervisory visits to all oblasts at least twice a year. The monitoring teams include specialists for surveillance, diagnostics and drug supply, first-line and second-line treatment and childhood TB. There is currently no TB/HIV

[12] Decree No. 218, Annex 1: "Instructions for detection, registration, treatment and dispensary supervision of tuberculosis in the primary medical and sanitary aid and anti-tubercular organizations" (version: 25 April 2011).

specialist on the monitoring teams. Standard checklists are used and a feedback system exists for findings resulting from monitoring visits. Field supervision from the oblast to the rayon level is conducted in a similar way and on a regular basis.

6.2.4 Monitoring of drug side-effects

Drug adverse reactions and side-effects are recorded via standard forms filled in for each TB patient by the attending TB physician. Reporting is on a per event basis and includes the type of adverse event, related symptoms, duration of symptoms and management aspects. The forms are sent to the National Centre for Drug Expertise for monitoring purposes. Within NTP, drug adverse reactions are documented on the patient treatment card (TB 01); however, information stored in the treatment care only includes the number of events; it does not include information about clinical symptoms, management of the adverse event or reintroduction of the drug. Detailed information about the frequency and type of adverse events is not routinely available to the NTP; it is made available only upon request to the National Centre for Drug Expertise. Standards and guidelines for the management of drug side-effects and adverse events for second-line drugs are included in the treatment guidelines for MDR-TB treatment.

6.2.5 Use of data for decision-making

The following achievements have been made in the area of monitoring and evaluation.

- An annual report on TB in Kazakhstan is produced and disseminated.
- Routine TB programme data in Kazakhstan offer excellent opportunities for enhanced surveillance.

The following challenges remain.

- A lack of capacity for data analysis at NTP prevents optimum use of existing programme data for decision-making.
- TB programme data are not comprehensively used for decision-making.

Recommendations

- Strengthen capacity for data analysis at the NCTP. Ensure that staff are qualified and training is provided in statistical methods and data analysis.
- Seek technical assistance in order to produce and disseminate a more detailed annual report on TB in Kazakhstan, including information about the burden of TB and MDR-TB, TB and MDR-TB prevention and control, progress towards the targets for TB control, and financing of TB control.
- Make better use of existing TB programme data by prioritizing and developing a plan for programme data evaluation for subjects that are of relevance to decision-making in TB control.

6.2.6 Capacity for health information, programming and data analysis

Sufficient capacity is required to make best use of available data. Although data managers exist at all levels of NTP, few staff members are trained specifically in data analysis, statistical methods, programming or health informatics. The National TB Register in its current form has been developed and implemented with external technical assistance. A manual for using "EpiInfo" for routine data analysis was provided by the CDC, but it is rarely used. At the NCTP,

there is an urgent need for greater staff capacity in order to adapt and develop the National TB Register and conduct data analysis on subjects of relevance to decision-making in TB control. Capacity, training and resources are needed to strengthen data analysis and routine data evaluation at national level.

6.2.7 Surveillance system output documentation

The NCTP produces and disseminates an annual "Statistical report on tuberculosis in the Republic of Kazakhstan". The 2012 version of this report includes written "information about the epidemiological situation of TB in Kazakhstan, achievements and measures for improvement" as well as a set of 41 tables and 5 figures on health-care capacity (TB facilities, beds and TB physicians), BCG vaccination and active case-finding, TB case notification by patient category, bacteriology (sputum-smear microscopy and culture), DST results and patients started on category IV of treatment, notification rates in children, adolescents and adults, TB mortality and treatment outcomes, and an overview of data for the core indicators for TB epidemiology and control (see Section 6.2.1, Monitoring and evaluation of the performance of TB control).

The report contains various information and data relevant to TB epidemiology and control. However, it lacks a clear structure or illustrations that would allow the reader to follow the key conclusions and identify priorities for TB control directly from the information provided. Also, the report lacks compatibility with international standards and formats for reporting on TB which would make it possible to show the situation of TB in Kazakhstan in an international context. It is therefore recommended that data analysis and surveillance output documentation should be strengthened in order to develop a more comprehensive national TB report. A suggested outline for such a report is shown in Box 6.

Box 6. Suggested outline for a national TB report

Introduction
Executive summary
Indicators, definitions and methods
Chapter 1: The burden of TB (incidence, prevalence, mortality, MDR/XDR-TB, TB/HIV, TB in special populations)
Chapter 2: Prevention of TB (BCG vaccination, active case-finding, infection control)
Chapter 3: TB control (case notification, case detection, treatment outcomes, laboratory strengthening, detection and treatment of MDR-TB, TB/HIV collaborative activities, operational research)
Chapter 4: Progress towards the targets for TB control
Chapter 5: Financing of TB control
Chapter 6: Conclusions

6.2.8 Suggestions for analysis of programme data suitable for decision-making

Data from the National TB register and other data collected for TB control purposes in Kazakhstan offer excellent opportunities for enhanced surveillance and decision-making. Besides a more comprehensive report on TB in Kazakhstan (see previous section), the NTP should seek to prioritize more effective use of existing programme data for operational research in order to inform decision-makers about relevant aspects of TB control. More effective use of existing data should be accompanied by a rationalization of recording and reporting in order to avoid over-reporting of data that is less relevant or less useful.

The following list presents examples for operational research and evaluation of existing programme data that might be of direct relevance to decision-makers for improving and strengthening TB control. See also Section 3.7, Operational research.

- Evaluation of the current practice, effectiveness and cost-effectiveness of population screening for TB. The evaluation is intended to provide better information with a view to revising the current policy and developing a more targeted screening approach that takes into account the risk of sputum-smear-positive TB and MDR-TB in different groups of the population.
- Evaluation of regional variations of the MDR-TB burden and associated risk factors. This analysis may provide important insights for control of the MDR-TB epidemic and identify shortcomings in case detection and infection control at oblast level.
- Evaluation of the risk of TB/MDR-TB among (TB) health-care workers. This analysis may provide valuable information about barriers to efficient infection control at oblast level.
- Evaluation of current practices in palliative care for MDR/XDR-TB patients. This evaluation should address the criteria used for assigning patients to palliative care and investigate the potential for curative treatment (medical or surgical) for the TB cases currently in palliative care (numbering over 1000 at the end of 2011). The analysis is intended to develop criteria and guidelines for best practices in palliative care in line with international recommendations. It may be valuable to involve both national and international experts in this evaluation.

7 Medical products, vaccines and technologies

7.1 Supply/procurement/import

Kazakhstan has enough national resources to procure all TB medications needed for treatment of all forms of TB. Full sets of first-line and second-line drugs are manufactured locally, except for paediatric formulations. Currently, the national budget covers 100% of procurement of first-line TB medicines, plus that part of second-line medicines not covered through Global Fund support (Round 8). It should be noted that the decision to secure funding for second-line drug and subsequent procurement through GDF/GLC was made in 2007–2008 as a result of NCTP's concern about the quality of locally manufactured second-line drugs and the capacity of suppliers to respond to demand (reportedly, NCTP conducted drug-quality testing on some domestic second-line drugs, but the results were not made public).

First-line TB medicines and second-line drugs additional to the Global Fund supply are procured centrally by national tender. At the end of 2009, Kazakhstan adopted a "prime vendor" procurement mechanism, whereby a selected vendor takes all responsibility for competitive negotiation of prices for a set amount of public health essential medicines (including TB medicines). Quantification of medicine needs is done by the Ministry of Health based on the numbers of new and retreatment TB cases who were registered for treatment, according to the data received from oblasts, verified by NCTP specialists and adjusted for morbidity trends, buffer stock and the projected stock balances for TB drugs. National drug quantification guidelines (in the form of a 2008 Ministry of Health decree) are widely used.

The current prime vendor, SK Pharmacia, was not selected competitively but established as a parastatal organization by the government for this specific purpose. SK Pharmacia streamlined the procurement process, making national tenders into regular events with set timelines.

Distribution of medicines is performed by a separate logistics company that has designated central and regional warehouses. Oblast TB facilities order TB medicines from these warehouses, usually quarterly; medicines are then collected by the regional/rayon facilities. The system works well, according to doctors, and there are no reported shortages or expiries of TB medicines.

Second-line drugs and paediatric TB medicines funded by the Global Fund are distributed in a different manner: the GDF shipments arrive in Almaty by air, and after Customs clearance are stored for a short time at the NCTP pharmacy. Full annual supplies of medicines are then collected by the oblasts according to the number of cases undergoing treatment and expected cases. There are no major issues with the distribution and storage of TB medicines: the logistics infrastructure has significantly improved in recent years.

Kazakhstan will continue to procure second-line drugs using the Global Fund Round 8 Phase 2 money, for 1400 cases in 2012 and for another 950 cases in 2013 (the budget had not been approved at the time of the mission).

7.2 Registration

Drug registration is required for national procurement. Medicines arriving as humanitarian aid, including GDF medicines (second-line and paediatric drugs) are imported with annual waivers. For all medicines, both imported and domestic, each batch must be accompanied by an analytical batch certificate from the manufacturer, and must additionally be tested by national or regional drug quality laboratories.

The registration process takes on average seven months and costs about US$ 3500. The drug regulatory authority expects the fees to increase to US$ 7000 in 2012. Drugs can be registered by any authorized entity, such as a wholesaler, not necessarily a manufacturer. A standard drug product dossier is required (International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use).

There is one group of medicines that does not need official registration prior to importation; these are the medicines on the national orphan medicines list. Drug regulatory authority managers suggested that the NTP should apply to have GDF paediatric medicines added to the list, which will then enable the Government to procure these medicines from WHO-approved sources not currently registered in Kazakhstan.

There is no fast-track mechanism for the registration of any medicines, including WHO prequalified medicines. Some medicines, however, can be imported without registration, e.g. medicines on the national orphan medicines list and humanitarian aid medicines (GDF medicines).

7.3 Drug availability and use

All TB medicines required for treatment of drug-susceptible TB and MDR-TB are available from local manufacturers. There are currently three groups of manufacturers that produce TB medicines: ChimPharm, Nobile and Romat. The first two are good manufacturing practice (GMP) certified (by domestic inspectors trained by WHO); ROMAT is in the process of obtaining GMP certification. The list of all TB medicines registered in Kazakhstan is contained in Annex 7.

Paediatric TB medicines are not manufactured locally. One manufacturer, ROMAT, reported that it had developed paediatric formulations HR 60/60, HR 30/60, and HRZ 30/60/150. However, ROMAT cannot register these medicines for marketing in Kazakhstan because of a legal pitfall: these medicine formulations are considered innovative and as such require clinical trials, but clinical trials in children are forbidden in Kazakhstan. The manufacturer requested information about clinical trials for these medicines if conducted by the GDF suppliers; such information may enable the medicines to be registered in Kazakhstan in future.

7.4 Stock management

Drug storage conditions are suitable in every TB facility visited by the review mission. No stockouts were reported, and no expired anti-TB drugs. All stock records were up to date and the drugs on the shelves were well organized, with name cards and expiry dates.

Recommendations

To Ministry of Health/SK Pharmacia/NCTP.

- Promote the process of WHO prequalification for locally manufactured anti-TB drugs.
- Include the WHO prequalification as a requirement in tender documentation for State procurement of anti-TB drugs by January 2015.

To local manufacturers.

- Initiate the process of WHO prequalification for locally manufactured anti-TB drugs.

To Ministry of Health/NCTP.

- Facilitate the process of registration of anti-TB paediatric formulations.
- Implement drug management software.

To NCTP/Global Fund.

- Work in close collaboration with GLC/Europe by elaborating an expansion plan for new enrolments of patients with drug-resistant TB in Global-Fund-supported treatment for 2012–2014 and submit the plan to GLC/Europe.

8 Financing

8.1 Health sector financing and expenditure

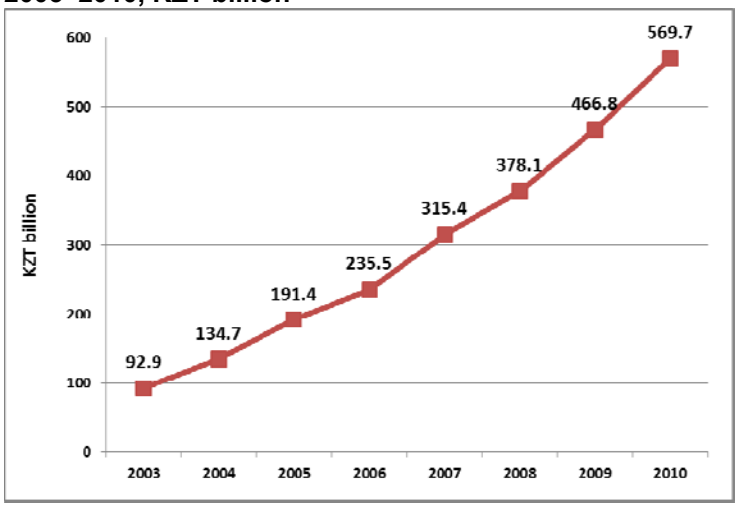
Health sector financing in Kazakhstan comes from two main sources: the public budget and private out-of-pocket payments by the population. Voluntary health insurance and external assistance are additional but less important sources of revenue.

Financing through the state budget was reintroduced in 1999 after a failed attempt to establish a national mandatory health insurance system in 1996–1998. Public health financing is channelled through the government budget at central (republican) and local (oblast) level, and is mainly derived from general taxation. Pooling of funds takes place at oblast level, replacing a decentralized funding scheme at rayon level in 2005.

Reflecting the positive trends in overall macroeconomic development in Kazakhstan and high gross domestic product growth rates, health expenditure has grown rapidly over the last decade although, according to WHO estimates, total health expenditure in 2009 was only 4.5% of gross domestic product, which is one of the lowest rates in the WHO European Region. At the same time, the public sector contributes about 60% of total spending on health; among former Soviet countries, only the Russian Federation contributes more. Similarly, the share of health spending in total government expenditure (11.3% in 2009 according to WHO estimates) is among the highest in the former Soviet countries *(13)*.

In 2010, total government expenditure on health (including expenditure incurred by "parallel" state services) amounted to KZT 566.90 billion (about US$ 3.85 billion), which in absolute terms was 6.1 times higher than the 2003 level (Fig. 33). Per capita public expenditure on health in 2010 reached KZT 35 350 (about US$ 240), 5.7 times higher than in 2003.

Fig. 33. Total public expenditure on health in Kazakhstan, 2003–2010, KZT billion



Until 2010, the oblast budgets bore the largest share of State health spending (60.2% in 2009, down from 77.2% in 2003). Since 2010, with the introduction of the Unified National Health System, the major part of financing for inpatient care was transferred to the central level and therefore became part of the republican budget spending on health. With this change, the share of the republican budget in 2010 rose to 66.2%, while the oblast budgets, with a share of 33.8%, are supposed to finance general and specialist outpatient services in their own territories and inpatient services for "socially significant" diseases and conditions (TB, mental disorders and drug abuse).

Most of the public health budget is spent on the basic benefits package ("State Guaranteed Benefits Package"), which represents a list of services considered to be the most cost-effective, to be supplied to the citizens of Kazakhstan and financed from the State budget. The package includes all emergency and primary health care and selected secondary and tertiary care services. However, as a share of total health budget, spending on interventions under the basic package has declined, from 70% in 2003 to 62% in 2010. The share of health spending by other State ministries and agencies, such as the Ministry of Defence and the Ministry of Internal Affairs (also known as the "parallel" health systems), is slightly above 1% of total public spending on health.

Provider-payment mechanisms have been continuously modified since the discontinuation of the health insurance system in 1999. They currently include capitation payments for primary health care, fee schedules for specialized outpatient care and case-based payments for hospitals ("clinical statistical groups" were introduced by a Government decree in October 2011). At the same time, it is widely accepted that provider payments are not properly costed, and public institutions are still being financed by a budget-line item approach on the basis of norms and input costs**.**

Health workers in the public sector are paid salaries according to the national scale approved by the Ministry of Labour and Social Protection. Additional differential payments are effected to take account of qualifications, experience and exposure to hazards (including infectious hazard payments to TB service staff). Over the last decade, the level of remuneration of health workers has increased substantially: between 2000 and 2008, their salaries increased by a factor of almost 5 (Source: World Bank, 2010). At the same time, salaries increased less quickly than nominal GNP and the overall budget of public health services.

While substantial positive developments regarding health system financing and allocation arrangements have taken place in the country in recent years, a number of serious challenges need to be addressed, as identified by the Government and international development partners such as the World Bank and WHO. There is a need to improve equity in resource allocation for health across oblasts, as equilibration mechanisms are insufficient to bring the oblasts' per capita allocation of public spending for health into line with the existing poverty levels, health outcomes and disease burden (such as infant or maternal mortality or TB burden).

The share of funding allocated to outpatient care in public health expenditure is low. According to National Health Accounts data, spending on primary health care in 2008 was just 15% of the overall Government health budget, and public expenditure on hospital care was 2.6 times higher than on outpatient services. It is difficult to determine the levels of public expenditure by key health priorities, since the current budget classification, coding and reporting structure does not allow for adequate monitoring of public expenditure on health priorities (such as maternal and child health and TB, for example). Spending on health promotion is very low, estimated at less than 0.2% of oblast health spending.

8.2 TB financing and expenditure

TB control interventions in Kazakhstan are financed from public (central and local) budgets. Allocations for TB through the central (republican) budget cover mainly procurement of anti-TB drugs (first-line and second-line) and costs of the central level TB institutions (NCTP). Local (oblast level) budget TB expenditure covers all other costs of specialized TB services according to the standard budget classification categories.

The analysis below includes expenditure by specialized TB facilities only, and does not include other "apportioned" health system costs (such as primary health care, SES costs or common management costs), since the current budget classification does not provide for disaggregation of expenditure by disease.

Following the general trend in the level of public spending for health in Kazakhstan, financing of specialized TB care has increased significantly in recent years. In absolute terms, overall TB expenditure increased by 39.1% between 2009 and 2012. This is mainly at the expense of oblast budgets, which increased by 50.9%, while republican budget spending shows a smaller but still substantial increase of 18.7% (Tables 47, 48).

Table 47. Specialized TB care budget expenditure in Kazakhstan 2009–2012, KZT thousands

Budget	2009 (expenditure)	2010 (expenditure)	2011 (expenditure)	2012 (planned)
Local (oblast) budget	15 579 528	17 885 364	21 767 773	23 509 195
National budget	8 959 034	8 959 034	9 935 228	10 630 694
Total TB budget	24 538 562	26 844 398	31 703 001	34 139 889

Table 48. Specialized TB care expenditure in Kazakhstan 2009–2012, US$ equivalent[a]

Budget	2009 (expenditure)	2010 (expenditure)	2011 (expenditure)	2012 (planned)
Local (oblast) budget	105 623 915	121 380 141	148 463 873	158 695 794
National budget	60 739 213	60 801 044	67 761 754	71 761 133
Total TB budget	166 363 128	182 181 185	216 225 627	230 456 927

[a] For this table and hereinafter for currency equivalents, official annual average exchange rates of the National Bank of the Republic of Kazakhstan were used (KZT for US$ 1): 2009 – 147.50, 2010 – 147.35, 2011 – 146.62, 2012 (1st quarter) – 148.14. For forecasts 2013–2016, an average exchange rate for the last four years was used (US$ 1 = KZT 147.40).

The oblast health budgets bear the greatest part of TB expenditure, and this share is growing with time: in 2009, the local and central budget shares of TB spending constituted 63.5% and 36.5% respectively, and in 2012 the proportion is expected to be 68.9% and 31.1%, respectively. In the coming years, the local budgets will contribute 69.3% of total annual expenditure on specialized TB services during 2013–2016 and the central budget 30.7% (Source: Ministry of Health and NCTP).

In 2011, TB expenditure in Kazakhstan amounted to KZT 1 914.60 (equivalent to US$ 13.1) per capita. If the planned level of financing and allocations is fulfilled in 2012, then the real-value expenditure on TB service institutions will have increased by 33.0–33.6% over three years (between 2009 and 2012) (Table 49).

Table 49. Specialized TB care expenditure in Kazakhstan per capita, 2009–2012,[a] KZT and US$ equivalent

Expenditure	2009 (expenditure)	2010 (expenditure)	2011 (expenditure)	2012 (planned)
KZT	1525	1644	1915	2037
US$ equivalent	10	11	13	14

[a] For the population denominator, annual average population figures of the Agency of Statistics of the Republic of Kazakhstan were used: 2009 – 16 093 481; 2010 – 16 323 287; 2011 – 16 558 676; 2012 (as of 1 May) – 16 757 039.

According to Ministry of Health medium-term budget forecasts, total TB expenditure is expected to grow by a further one third between 2012 and 2016, owing to a 7% annual increase in republican budget allocations and a 7–8% annual increase in local budget spending on TB services (Tables 50, 51). Thus, the overall level of TB expenditures (in absolute national currency values) would increase by 84.70% in the seven years 2009–2016 (republican budget increasing by 55.5% and oblast budgets doubled, increasing by 101.50%). The trends in TB expenditure 2009–2016 by budget source are presented below in Fig. 34.

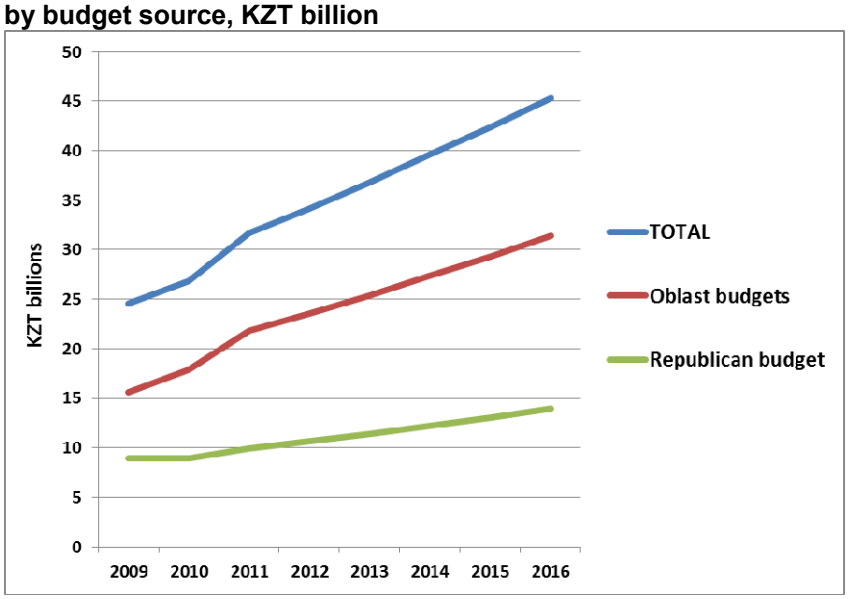
Table 50. Forecast of specialized TB care budget expenditure in Kazakhstan, 2012–2016, KZT thousands

	2012 (planned)	2013 (forecast)	2014 (forecast)	2015 (forecast)	2016 (forecast)
Local (oblast) budget	23 509 195	25 389 930	27 421 125	29 340 604	31 394 446
National budget	10 630 694	11 374 843	12 171 082	13 023 058	13 934 672
Total TB budget	34 139 889	36 764 773	39 592 206	42 363 662	45 329 118

Table 51. Forecast of specialized TB care expenditure in Kazakhstan, 2012–2016, US$ equivalent

Budget	2012 (planned)	2013 (forecast)	2014 (forecast)	2015 (forecast)	2016 (forecast)
Local (oblast) budget	158 695 794	172 251 903	186 032 055	199 054 299	212 988 100
National budget	71 761 133	77 169 897	82 571 790	88 351 816	94 536 443
Total TB budget	230 456 927	249 421 800	268 603 845	287 406 115	307 524 543

Fig. 34. Specialized TB care budget expenditure, Kazakhstan, 2009–2016[a] by budget source, KZT billion



[a] 2009–2011 actual expenditure; 2012 – planned; 2013–2016 – forecast.

Table 52 presents the actual (2011) expenditure for specialized TB service institutions financed from the local (oblast) budgets, by standard budget classification categories.

Table 52. Oblast budget expenditure for specialized TB care by standard budget classification categories, Kazakhstan, 2011, KZT thousands and share of the total

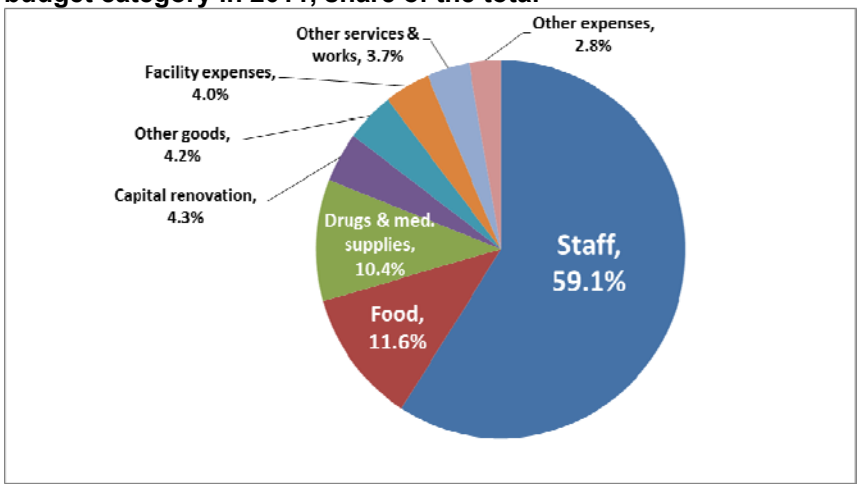
Code	Budget category	KZT thousands	% of total
111	Base salaries	11 182 966	51.37
113	Benefits (salary compensations)	548 971	2.52
121	Social taxes	735 569	3.38
122	State Social Fund contributions	380 379	1.75
125	Compulsory insurance contributions	6 569	0.03
131	Food	2 515 356	11.56
132	Drugs and other medical supplies	2 259 051	10.38
139	Other goods	923 263	4.24
141	Facility expenses	792 064	3.64
142	Communication expenses	55 065	0.25
143	Transportation expenses	19 380	0.09
147	Rental payments	1 295	0.01
149	Other services and works	811 539	3.73
151	Duty travel inside the country	115 325	0.53
155	Execution of court orders	2 528	0.01
159	Other expenses	33 872	0.16
332	Transfers to physical persons	8 906	0.04
411	Goods belonging to basic means	435 866	2.00
431	Capital renovation	936 161	4.30
452	Intangible assets	3 648	0.02
	Total local (oblast) budgets	**21 767 773**	**100.00**

Table 53 and Fig. 35 show that the largest share of funds (almost 60%) in TB institutions is spent on personnel (salaries, benefits and other employer/employee contributions), followed by food for patients, which is slightly higher than expenditure on drugs and medical supplies (11.6% and 10.4%, respectively). All remaining expenditure items amount to 19% of total local budget spending.

Table 53. Oblast budget expenditure on specialized TB care in Kazakhstan by main groups of budget category in 2011, share of the total

Codes	Group of budget categories	% of total
111, 113, 121, 122, 125	Staff salaries, benefits and contributions	59.10
131	Food	11.60
132	Drugs and other medical supplies	10.40
139	Other goods	4.20
141, 142, 143, 147	Facility expenses	4.00
149	Other services and works	3.70
151, 155, 159, 332, 411, 452	Other expenses	2.80
431	Capital renovation	4.30
	Total local (oblast) budgets	**100.0**

Fig. 35. Oblast budget expenditure on specialized TB care in Kazakhstan by main groups of budget category in 2011, share of the total



Between 2009 and 2012, payments for salaries, benefits and contributions increased by the highest amount (68.7–71.4%), while the percentage increase in spending in other categories was much lower (between 28.3% and 34.0%). According to the medium-term Ministry of Health forecast, the structure of oblast budget TB spending by category will remain similar to that for 2011 above (an equal annual percentage of increase for each budget category – 8.0% in 2013 and 2014 and 7.0% in 2015 and 2016).

Expenditure by specialized TB facilities in the regions (excluding sanatoria) in 2011 amounted to KZT 1 500 or US$ 10.2 per capita, 14.1% higher than the 2010 level. Substantial variations, though, are observed across oblasts (Fig. 36): per capita TB spending in institutions in Kostanay and Atyrau is two to three times higher than in Almaty Oblast and Pavlodar. The average level of expenditure per TB hospital bed was substantial, at KZT 1.84 million (US$ 12 579), representing an increase of 19.1% from 2010, with the highest levels in the cities of Almaty and Astana (Table 54). It is important to note that, despite the fact that, normally, oblast-level TB facilities manage more complex TB cases than the facilities at rayon and town level, the level of per-bed

financing is similar: in fact, in 2010, expenditure by oblast level institutions (about US$ 10 100 per bed) were even lower than those incurred at rayon level (US$ 11 000 per bed).

Fig. 36. Expenditure at specialized TB facilities (excluding sanatoria) per capita, by region, in 2011, US$ equivalent

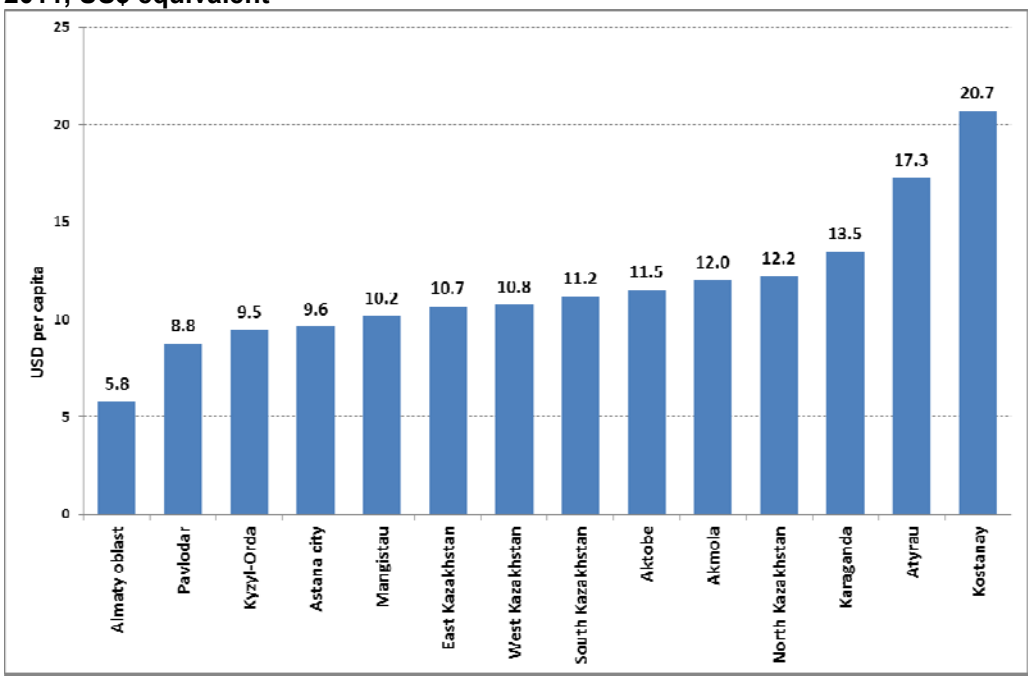


Table 54. Expenditure at specialized TB facilities (excluding sanatoria) by region, per capita and per TB bed, Kazakhstan, 2011, in KZT and US$ equivalent

Region	Expenditure per capita		Expenditure per TB hospital bed	
	KZT	US$ equivalent	KZT	US$ equivalent
Akmola	1764	12.00	1 745 657	11 906
Aktobe	1689	11.50	1 642 295	11 201
Almaty Oblast	849	5.80	1 550 624	10 576
Atyrau	2530	17.30	1 789 603	12 206
East Kazakhstan	1565	10.70	1 748 396	11 925
Zhambyl	1577	10.80	1 936 341	13 207
West Kazakhstan	1976	13.50	1 566 441	10 684
Karaganda	1387	9.5	1 644 721	11 218
Kyzyl-Orda	3038	20.70	2 321 344	15 832
Kostanay	1496	10.20	1 540 643	10 508
Mangistau	1285	8.80	1 616 847	11 027
Pavlodar	1793	12.20	1 462 775	9 977
North Kazakhstan	1638	11.20	1 186 199	8 090
South Kazakhstan	1412	9.60	2 395 273	16 337
Almaty City	916	6.2	3 974 062	27 105
Astana City	1259	8.60	2 833 094	19 323
Total (oblast level facilities)	1500	10.20	1 844 370	12 579

Although TB sanatoria are largely left out of this financial analysis, it should be noted that the overall expenditure on 30 sanatoria countrywide is also substantial (about KZT 3.9 billion, equivalent to about US$ 26.6 million or about US$ 1.6 per capita in 2011). Funding for sanatoria in 2011 increased by 24% compared with the previous year and amounts to almost 14% of total expenditure in specialized TB institutions in the regions.

The payment methods for TB facilities are unclear as, although they should be linked (in hospitals) to the number of cases treated, in reality it seems that budget planning and allocations are conducted on the basis of historical expenditure plus a percentage annual increase per budget item.

As mentioned above, financial classification and reporting do not include TB-related costs in outpatient facilities (i.e. TB cabinets located in general polyclinics) and primary care institutions; thus the overall expenditure for TB control is higher than that presented above for specialized TB services. At the same time, budget planning and expenditure are rigidly aligned to the existing structure that actually fits inpatient care and therefore does not allow the TB managers to use the available resources for such high-priority interventions as compliance support (for patients and service providers), programme supervision, monitoring and evaluation or capacity building.

Importantly, the current allocation and provider-payment mechanisms do not ensure proper linkages between levels and settings of care (i.e. between rayon hospitals and oblast hospitals, between inpatient and outpatient care, between specialized TB service and general primary health care services). Therefore the participating facilities and providers are not motivated to achieve results or increase the efficiency of service. Rather, the system creates perverse input-oriented incentives to justify the use of sizeable budgets at the institutional level. In other words, the system does not support implementation of patient-centred approaches or effective case-management practices across levels of care.

The main conclusions are that, keeping pace with robust macroeconomic developments in the country, public sector expenditure on health has increased substantially during the last decade. At the same time, imbalances persist in the allocation of financial resources across the regions and levels of care. The finances are skewed towards hospitals, while primary/outpatient services are still clearly underfunded. The recent changes in financing arrangements, introduced within the Unified National Health System, did not involve TB services, which are financed mainly from the local (oblast) budgets.

Public spending on specialized TB services is substantial and is steadily increasing with time, thus showing sustainable Government financial commitment to TB control. Although reliable TB financial data are not available for all countries of the WHO European Region, it is estimated that the level of TB expenditure in Kazakhstan (US$ 13.1 per capita per year, or about US$ 9370 per TB case in 2011, specialized TB services only) is the highest of all the former Soviet countries. On the other hand, the TB financing and allocation system is strongly oriented towards hospital care; it does not permit an efficient use of resources and does not cover a number of priority interventions, such as compliance support. The current provider-payment mechanisms are driven by inputs and not by patient needs; they do not stimulate cooperation between levels of care and thus represent an important obstacle to obtaining results through implementation of patient-centred approaches and effective case-management practices.

Recommendations

To the Ministry of Health.

- Improvements in financing of TB control interventions in Kazakhstan will be possible not merely by further increasing expenditure, but primarily by changing allocation and provider-payment mechanisms. These changes should mirror changes in the TB care delivery model towards outpatient care and intensified compliance support along the patient pathways.

- The Ministry of Health should consider the introduction of a case-based provider-payment system for TB care, with a relevant performance motivation scheme. Such a system would ensure the efficient use of resources, proper referrals and cooperation across the levels of care and, ultimately, the effective implementation of patient-centred approaches.

9. References

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Annex 1

KEY RECOMMENDATIONS

Area	Action	Timeline	Responsible
MDR-TB prevention and control	Prepare and finalize a comprehensive national MDR-TB response plan based on the Consolidated Action Plan to Prevent and Combat Multidrug- and Extensively Drug-Resistant Tuberculosis in the WHO European Region and in consultation with a range of stakeholders including civil-society organizations, communities and patients.	1st quarter 2013	NCTP, Ministry of Health
	Increase access to second-line treatment for all diagnosed MDR-TB patients in prison sector.	As soon as possible	Ministry of Health, Ministry of Internal Affairs
	Introduce and scale up rapid molecular diagnostic testing for TB and MDR-TB (all MDR-TB suspects to be tested for MDR-TB by molecular tests by end 2013 in accordance with the Consolidated Action Plan).	4th quarter 2012	NCTP, Ministry of Health
	Develop criteria for hospitalization and discharge of TB and MDR-TB patients.	2nd quarter 2013	NCTP
	Expand ambulatory care of patients (all sputum-smear-negative patients including MDR-TB patients).	As soon as possible	Ministry of Health, NCTP
Migration and TB	With a high-level technical consultation in central Asia, establish cross-border TB control and care.	1st quarter 2014	Ministry of Health, Ministry of Internal Affairs, Ministry of Finance
	Develop a minimum package of TB control services for external migrants.	As soon as possible	Ministry of Health
TB and HIV collaborative activities	Provide early diagnosis of TB for PLHIV in HIV/AIDS centres, monitor progress in detection of TB among PLHIV at oblast level and nationwide.	On a regular basis	NCTP, National AIDS Centre (NAC)
	Initiate ART for all PLHIV with TB as soon as TB treatment is tolerated (within the first 2–8 weeks), monitor ART efficiency, ensure access to opioid substitution therapy for injecting drug users with active TB and with TB/HIV.	As soon as possible	NAC in collaboration with NCTP and drug dependence treatment service
	Upon diagnosing latent TB in PLHIV start them on isoniazid preventive therapy (IPT), record data on coverage, length and outcomes of isoniazid therapy.	4th quarter 2012	NAC
TB infection control	Update the SES national-level regulations with more emphasis on airborne transmission of TB and special regulations for high-risk procedures.	By the end of 2013	Ministry of Health/ SES/NCTP
	Approve national TB infection control working group, national infection control working plan and national infection control guideline.	2nd quarter 2013	Ministry of Health/ NCTP
	Develop/update monitoring mechanism of infection control measures at the facility level involving all responsible organizations within working group.	2nd quarter 2013	NCTP/SES/Ministry of Health
Advocacy, communication and social mobilization (ACSM)	Establish a full-time position for ACSM. This person will be in charge of coordinating the new ACSM strategy linking up with the national TB/MDR-TB plan and engaging with various partners.	4th quarter 2012	NCTP
	Adopt, fund and implement the ACSM strategy and related multiannual action plan.	4th quarter 2012	Ministry of Health/ NCTP/National Centre for Healthy Lifestyles

Area	Action	Timeline	Responsible
	Establish "peer-to-peer"/patient support groups and organize social activities for TB inpatients and outpatients, with the support of trained counsellors and social workers.	As soon as possible	NCTP
	Facilitate establishment of Kazakhstan National Stop TB partnership to improve partnership, including private-sector involvement in TB control.	March 2013	Ministry of Health, national and international partners
Contact-tracing	Update current contact investigation procedures and develop screening algorithms based on index case infectiousness and risk of transmission for contacts.	4th quarter 2013	NCTP/SES
	Discontinue comprehensive disinfection of index cases' homes.	4th quarter 2013	Ministry of Health/SES
	Identify staff responsible for contact investigation, update job descriptions and provide training in contact investigation. Include contact investigation fields in surveillance and case-management modules of TB register data systems (link to index case). Regularly review contact investigation yield and identify areas for improvement.	4th quarter 2014	SES
TB laboratory	Finalize development and start implementation of the National Strategic Plan for TB Laboratory Service Development.	September 2012 – January 2013	NCTP
	Develop a laboratory quality manual, to include a section on laboratory quality indicator selection and analysis, as part of a comprehensive quality management system, and implementation at all levels of the TB laboratory network.	January 2013	NCTP and oblast laboratories
	Finalize development and start implementation of a computerized laboratory information management system, compatible with the National TB Register, to ensure proper laboratory data collection, reporting and analysis *(please refer to recommendation on "Surveillance" below in order to combine and implement tasks accordingly).*	March 2013	NCTP and oblast laboratories
Childhood TB	Finalize revision of the childhood TB treatment and preventive treatment guidelines in accordance with the latest WHO guidelines[a] and endorse them. Train TB paediatricians in the use of the new guidelines.	2nd quarter 2013	NCTP, Ministry of Health
	Improve diagnostic specimen collection for bacteriological confirmation of diagnosis in children. Abolish use of throat swabs for obtaining specimens for diagnosis of pulmonary TB in children.	As soon as possible	NCTP
	Revise criteria for hospitalization and lengthy placement of children in sanatoria.	2nd quarter 2013	NCTP
Human resources	Appoint a human resources coordinator in the NCTP.	1st quarter 2013	NCTP
	Assess potential gap in human resources for TB control after 2014 (due to the impact of medical specialized education reforms and ageing of current TB staff) and develop measures with a plan of action to ensure human resources for TB control as required (e.g. advertise TB among interns, develop a social protection package and incentives for TB doctors, merge TB and pulmonology specialties).	December 2013	NCTP, Ministry of Health
	Assess the impact of current performance-based payment mechanisms and review them.	4th quarter 2013	NCTP

Area	Action	Timeline	Responsible
	Integrate training courses on TB control supported by the Royal Netherlands Tuberculosis Association (KNCV), USAID and Project Hope in the national system of postgraduate medical training.	1st quarter 2013	NCTP
Surveillance	Develop and implement a National Tuberculosis Laboratory Register (NTLR). The NTLR should take into account current standards and novel diagnostics, provide TB health-care facilities with a platform for easy, real-time access to laboratory results and be fully integrated into the National TB Register.	June 2013	NCTP, Ministry of Health
	Develop a national standard and benchmarks for systematic and regular appraisal of the quality (i.e. completeness, timeliness, consistency and validity) of TB programme data at national and oblast level, including regular data quality reports.	June 2013	NCTP
	Strengthen capacity for data analysis to make better use of existing surveillance data. Produce and disseminate a more detailed annual report on TB in Kazakhstan, including information about: 1) the burden of TB/MDR-TB; 2) prevention and control of TB; and 3) progress towards the targets for TB control at national/oblast level.	2nd quarter 2013	NCTP
Monitoring and evaluation	Provide training on TB/HIV issues to experts from monitoring teams that visit oblasts.	As soon as possible	NCTP
	Conduct an evaluation of the current practice of palliative care for TB patients. This evaluation should address the criteria used for deciding to move to palliative care, and investigate the potential for curative treatment (medical or surgical) for TB patients currently under palliative care. Guidelines for palliative care for MDR/XDR-TB patients should be developed. Consider involving national and international experts in this evaluation.	4th quarter 2013	NCTP, Ministry of Health
	Conduct an evaluation of the current practice and efficiency of population screenings for TB in the country. Consider a revision of the current policy towards a more targeted screening approach that takes into account the risk of sputum-smear-positive TB and MDR-TB in different groups of the population.	4th quarter 2014	NCTP, Ministry of Health
Operational research	On the basis of the results of a programme review, set operational research priorities.	1st quarter 2013	Ministry of Health
	Prepare plan for building research capacity for the NCTP and oblast staff and organize training/coaching in operational research.	December 2013	Ministry of Health
	Increase the use of routinely collected data in operational research.	September-October 2012	Ministry of Health
Prison sector	Increase access to second-line treatment for all diagnosed MDR-TB patients, including patients with XDR-TB.	As soon as possible	Ministry of Internal Affairs, Ministry of Health, NCTP
	Provide universal coverage with drug susceptibility testing (DST) at least in respect of first-line drugs for all sputum-smear/culture-positive TB patients. DST in respect of second-line drugs should also be a high priority for at least all MDR-TB patients diagnosed, in order to define the level of XDR-TB and identify those with fluoroquinolone resistance.	As soon as possible	Ministry of Internal Affairs, Ministry of Health, NCTP
	Address the problem of understaffing and motivation of staff.	December 2013	Ministry of Internal Affairs

Area	Action	Timeline	Responsible
	Strengthen infection control measures in TB penitentiaries: administrative separation by sputum-smear/culture and DST, installation of a sufficient number of ultraviolet germicidal irradiation (UVGI) lamps, individual protection for personnel (respirators for personnel and surgical masks for sputum-smear/culture-positive patients)	As soon as possible	Ministry of Internal Affairs, NCTP
	Improve the system of pre- and post-release preparation of TB and DR-TB patients and transfer from prison to civilian TB services to ensure treatment continuation and follow-up. Scale up good examples from other countries and from Kazakhstan.	1st quarter 2013	Ministry of Internal Affairs, Ministry of Health, NCTP
	Improve the system of prompt initiation of treatment for TB and DR-TB patients (start treatment as soon as diagnosed).	As soon as possible	Ministry of Internal Affairs, Ministry of Health, NCTP
Drug management, vaccines and technologies	Promote process of WHO prequalification for locally manufactured anti-TB drugs.	As soon as possible	Ministry of Health/SK Pharmacia/NCTP
	Initiate the process of WHO prequalification for locally manufactured anti-TB drugs.	As soon as possible	Local manufacturers
	Include the WHO prequalification as a requirement in tender documentation for State procurement of anti-TB drugs.	April 2015	Ministry of Health/SK Pharmacia/NCTP
	Facilitate the process of registration of anti-TB paediatric formulations.	As soon as possible	Ministry of Health/NCTP
	Continue working in close collaboration with GLC/Europe by drawing up an expansion plan for new enrolments of patients with drug-resistant TB in Global-Fund-supported treatment for 2012–2014 and submit it to GLC/Europe.	As soon as possible	NCTP/Global Fund
Health system strengthening	Revise the existing TB care delivery model by promoting outpatient (ambulatory) management of TB cases (including MDR-TB), decreasing frequency and length of hospitalization and scaling up rapid diagnostic techniques, starting as soon as possible with demonstration projects in selected territories.	December 2013	Ministry of Health, oblast health administrations, NCTP
	Conduct a comprehensive analysis of TB hospitals' infrastructure and performance and develop medium- and long-term estimates of inpatient TB bed needs on the basis of epidemiological projections, resistance profile and the principles of the revised TB care delivery model, including clear criteria for hospitalization and discharge.	2nd quarter 2013	Ministry of Health, NCTP, oblast health administrations
	Revise provider-payment mechanisms for TB case management across all levels of care to reinforce outpatient case management, with appropriate patient support and follow up by general health service providers, e.g. through a performance motivation system.	1st quarter 2013	Ministry of Health, NCTP

[a] *Rapid advice: treatment of tuberculosis in children*. Geneva, World Health Organization, 2010 (http://www.who.int/iris/handle/10665/44444, accessed 13 August 2013).

Annex 2

PROGRAMME OF THE REVIEW MISSION IN THE REPUBLIC OF KAZAKHSTAN
10–16 MAY 2012

Composition of groups

Groups	External experts		Location	Accompanying person from the NCTP
Group 1a	K. Kremer (leader) I. Eramova V. Mirtskhulava	C. Goyon F. Marx	Almaty City	S. Sadykov
Group 1b	E. Yurasova (leader) E. Kurbatova	A. Mosneaga	Almaty Oblast	A. Kurbanova
Group 2	M. Dara (leader) S. Ahmedov	M. Danilovits	Akmolinskaya Oblast	K. Serikbaeva
Group 3	A. Yedilbayev (leader) G. Djumalieva M. Pak	N. Tukvadze N. Turusbekova	South Kazakhstan Oblast	E. Berikova

General programme

Time/date	Activity/meeting	Partners	WHO advisers
10 May	Meeting with the Minister of Health in Astana, a.m.	NCTP, Ministry of Health, WHO, Ministry of Internal Affairs	Review leader and Group 2 Representative of WHO in Kazakhstan
10–14 May	Groups work in oblasts	NCTP, Ministry of Health RK, OTBD, oblast and city health departments, rayon TB departments, AIDS centres, Department of Penitentiaries of the Ministry of Internal Affairs, local nongovernmental organizations, Almaty State Institute for Postgraduate Medical Education and phthisiatry department of SD Asfendiyarov State Medical University	Group 1a – Almaty; Group 1b.– Almaty Oblast (Taldykorgan and Talgar); Group 2 – Akmolinskaya Oblast (Kokshetau); Group 3 – South Kazakhstan Oblast (Shymkent).
15 May 9.30-13.00 14.00–16.00	Visit to NCTP Ministry of Health: microscopy laboratory, pharmacy and information and scientific department MDR-TB departments Nos. 1 and 2, children's department, surgical ward		All experts Meetings: 14:00: meeting of M. Dara and S. Ahmedov with KNCV; 15:00: CDC; 16:00: USAID Meeting of C. Goyon with PSI (14:00: Mira Sauranbaeva and Sagingali; 15:00: Nurali Amanzholov, Kazakhstan Union of PLHIV) Other experts at NCTP

Time/date	Activity/meeting	Partners	WHO advisers
16 May 10:00–13:00	Briefing at NCTP on the results on monitoring and evaluation	NCTP specialists, representatives of Ministry of Health, WHO, Republican Centre on Prevention and Control of AIDS, SES project implementation group of the Global Fund, USAID, KNCV, CDC, PSI, Project HOPE, Kazakhstan Union of PLHIV, Red Crescent, nongovernmental organization Peer-to-Peer, heads of departments of phthisio-pulmonology SD Asfendiyarov State Medical University and Almaty State Institute for Postgraduate Medical Education	All experts

Group programmes

No.	Activity	Participants	Objective
Group 1a Almaty			
10 May			
09:00–09:30	Meeting with the chief doctor of Almaty City TB Dispensary, N. Mukushev	Group 1a	Introduction of the goals, objectives and schedule of the mission
10:00–11:00	Meeting with the head of Almaty Health Department, R. Kuanyshbekova	Group 1a	
11:30–13:00	Meeting with specialists of Almaty City TB Dispensary	Group 1a	
14:30–16:30	Inter-rayon TB dispensary, Almaty City TB Dispensary Microscopy laboratory Pharmacy MDR-TB ward Information department	Group 1a	
16:30–17:00	Discussion of the group's findings	Group 1a	
11 May			
9:00 –13:00	Inter-rayon TB dispensary, branch in Zhetuoguz Rayon, Almaty Microscopy laboratory MDR-TB ward Outpatient department Inpatient department	Group 1a	
10:00–11:00	Meeting of F. Marx with SPC of SES and monitoring		
14:30–14:30	Meeting with the chief doctor of Polyclinic No. 22, Almaty City	Group 1a	
14:30–16:30	Visits to two DOTS points Sputum collection facility DOT room	Group 1a	
16:30–17:00	Discussion of the group's findings	Group 1a	
12 May			
9:00–11:00	Visit to Medeuskij City TB Dispensary, Almaty DOT room Sputum collection room	Group 1a	
11:30–13:00	Almalinskij Rayon polyclinic, Almaty DOT room	Group 1a	
14 May			
09:00–09:30	Meeting with the chief doctor and staff of Turksibskij Rayon TB Dispensary	Group 1a	Introduction of the goals and objectives and the schedule of the mission

No.	Activity	Participants	Objective
09:30–11:00	Turksibskij Rayon TB Dispensary Microscopy laboratory Pharmacy Outpatient department information department	Group 1a	
11:00–13:00	Turksibskij Rayon TB Dispensary Forced-treatment facility symptomatic treatment ward	Group 1a	
14:30–16:00	AIDS Centre	Group 1a	
14:30–15:30 16:00–17:00	Almaty State Institute for Postgraduate Medical Education	Yurasova	
16:30–17:30	SD Asfendiyarov State Medical University Nongovernmental organization Red Crescent	Yurasova Group 1a	
Group 1b Almaty Oblast			
10 May			
10:00–10:30	Meeting with the chief doctor of the Almaty OTBD, Sarsembaev, and OTBD specialists in Taldykorgan	Group 1b	Introduction of the goals and objectives and the schedule of the mission
10:30–11:00	Meeting with the head of Almaty Oblast health department, Meirbekov	Group 1b	
11:30–13:00	Meeting with specialists of Almaty OTBD	Group 1b	
14:30–16:30	Almaty OTBD Microscopy laboratory Pharmacy Children's ward	Group 1b	
16:30–17:00	Discussion of the group's findings		
11 May			
9:00–13:00	Almaty OTBD MDR-TB ward	Group 1b	Introduction of the goals and objectives and the schedule of the mission
10:00–11:00	Information department		
14:30–16:30	City polyclinic Work with physicians (2 facilities) Sputum collection room DOT room	Group 1b	
16:30–17:00	Discussion of the group's findings	Group 1b	
12 May			
10:00–10:30	Meeting with the chief doctor of Zharkent Rayon TB Dispensary, Almaty Oblast	Group 1b	Introduction of the goals and objectives and the schedule of the mission
10:30–13:00	Zharkent Rayon TB Dispensary Microscopy laboratory Inpatient department Outpatient department	Group 1b	
14 May			
10:00–10:30	Meeting the chief doctor of Almaty regional TB Dispensary Asemgaliev in Shymbulak	Group 1b	
10:00–13:00	Visit to pharmacy and storage in Shymbulak	Group 1b	
14:30–16:30	MDR department in Talgar Information department Microscopy laboratory	Group 1b	
16:30–17:00	Discussion of the group's findings	Group 1b	

No.	Activity	Participants	Objective
Group 2 Akmolinskaya Oblast			
10 May	Meeting with the director of NCTP, Ministry of Health (Abildayev) and the Minister of Health (Kairbekova)		
11 May			
09:00–10:00	Meeting with the chief doctor of Akmolinskij TB Dispensary Temirkhanova and specialists of OTBD in Kokshetau	Group 2	Introduction of the goals and objectives and the schedule of the mission
10:00–11:00	Meeting with the head of the Akmolinskaya Oblast health department, Tashmetov	Group 2	
11:30–13:00	Meeting with specialists of the OTBD	Group 2	
14:30–16:30	Visit to OTBD Microscopy laboratory Pharmacy Inpatient department (MDR-TB ward) Information department	Group 2	
16:30–17:00	Discussion of the group's findings	Group 2	
12 May			
9:00–13:00	Visit to city polyclinic in Kokshetau and outpatient department of Kokshetau OTBD Sputum collection room DOT room	Group 2	Introduction of the goals and objectives and the schedule of the mission
14 May			
9:00–10:00	Meeting with the Head of penitentiary department of Akmolinskaya Oblast	Group 2	Introduction of the goals and objectives and the schedule of the mission
10:30–11:30	Nongovernmental organizations: «Luch Nadezhdy» [Ray of Hope] «Prometei»		
11:30–12:30	AIDS centre		
Group 3 South Kazakhstan Oblast			
10 May			
09:00–09:30	Meeting with chief doctor of South Kazakhstan OTBD, Sakybaeva	Group 3	Introduction of the goals and objectives and the schedule of the mission
10:00–10:30	Meeting with the head of South Kazakhstan Oblast health department, Ismailov	Group 3	
11:00–11:30	Meeting with specialist of Shymkent OTBD	Group 3	
11:30–13:00	Microscopy laboratory	Group 3	
14:30–16:30	Shymkent OTBD MDR-TB ward Pharmacy Information department	Group 3	
16:30–17:00	Discussion of the group's findings	Group 3	
11 May			
09:30–10:00	Meeting with the chief doctor of Sairam Inter-rayon TB hospital	Group 3	Introduction of the goals and objectives and the schedule of the mission
10:00–13:00	Visit to Sairam Inter-rayon TB hospital Microscopy laboratory Inpatient ward Pharmacy Information department	Group 3	

No.	Activity	Participants	Objective
14:30–15:00	Meeting with the chief doctor of Sairam Oblast TB hospital	Group 3	Introduction of the goals and objectives and the schedule of the mission
15:00–16:30	Visit to forced treatment facility	Group 3	
16:30–17:00	Discussion of the group's findings	Group 3	
17:00–17:30	Arrival to Shymkent		
12 May			
9:00–13:00	Shymkent City Polyclinics No. 5 and No. 6 Sputum collection rooms DOT rooms	Group 3	
14 May			
9:00–13:00	TB prison colony ICh 167/2 of the department of governance of the correctional system in Shymkent Microscopy laboratory Pharmacy MDR-TB ward Information department	Group 3: Yedilbayev, Pak, Berikova	
9:00–10:30	AIDS Centre	Other members of Group 3	
11:00–13:00	Healthy Lifestyles Centre	Other members of Group 3	
14:30–15:30	Visit to nongovernmental organization Umit	Group 3	
16:00–16:30	Meeting with the head of oblast SES	Group 3	
16:30–17:00	Discussion of the group's findings	Group 3	
22:55	Shymkent to Almaty	Group 3	

Annex 3

LIST OF PEOPLE MET

Astana

Kairbekova SZ, Minister of Health, Ministry of Health, Kazakhstan
Adilbekov DZ, Deputy Hakim of Akmolinskaya Oblast
Bazarbayev KK, Deputy Director of the Department of the Committee for the State Sanitary-Epidemiological Service
Dusembaeva RT, Head nurse, Akmolinskij OTBD
Dzhanibekov TN, Head of Department of Penal System, Akmolinskaya Oblast
Efimenko LP, nurse, outpatient department of OTBD
Esei, ZhE, anaesthesiologist, Akmolinskij OTBD
Esmagulova BK, Head Nurse of Akmolinskij OTBD
Gabdullina KK, day-care nurse, outpatient department of OTBD
Gilyazutdinova SD, head nurse, outpatient department of OTBD
Irzhanova ZK, DOTS nurse, Kokshetau Central City Polyclinic
Junusova OP, nurse intensive therapy ward, Akmolinskij OTBD
Khamzina ZhE, nurse, Kokshetau Central City Polyclinic
Kuandykova ME, Deputy Head for sanitary services of Akmolinskij OTBD
Kukmanov SD, anaesthesiologist, Akmolinskij OTBD
Kulniyazova TS, nurse, sputum collection room, Kokshetau Central City Polyclinic
Kurbanova BN, head of laboratory, Kokshetau Central City Polyclinic
Kushpesova AP, nurse, Akmolinskij OTBD
Magafirina AK, nurse, Kokshetau Central City Polyclinic
Makenova AA, Head of pharmacy, Akmolinskij OTBD
Murzakhmetova ZS, Head of laboratory, Akmolinskij OTBD
Nysanbekova ZhN, Deputy Head for Organization of TB services of Akmolinskij OTBD
Osipova MA, Deputy Head of department for new smear-positive TB patients, Akmolinskij OTBD
Sabatayeva GZ, Head Physician, Kokshetau Central City Polyclinic
Sabitov MA, surgeon, Akmolinskij OTBD
Sadvokasov, BK, head of department of radiology, Kokshetau Central City Polyclinic
Saltykova RZh, Head Nurse of Akmolinskij OTBD
Seitenov NA, head of pulmonary surgical department Akmolinskij OTBD
Shayakhmetova KF, laboratory specialist, Akmolinskij OTBD
Shayakhmetova TN, head of outpatient department of OTBD
Shennikova SA, nurse, sputum collection room, Akmolinskij OTBD
Simonina LF, infection control nurse of Akmolinskij OTBD
Sultanbekova SA, Head of MDR-TB department Akmolinskij OTBD
Syzdykov OT, Director, Public Foundation “Prometei”
Tashmetov KK, Head of Department of Health Care of Akmolinskaya Oblast
Temirkhanova AT, Chief Physician of Akmolinskij OTBD
Turzhanova BG, therapist, Kokshetau Central City Polyclinic
Volkova IG, Head of therapy department No.2, Kokshetau Central City Polyclinic
Vysotskaya LF, organizational-methodical department, therapist/statistician, National Register
Yakupova SN, sputum collection room, nurse, outpatient department of OTBD
Zhelgozina MA, laboratory specialist, Akmolinskij OTBD
Zhuchkova MV, lawyer, “Ray of Hope” nongovernmental organization
Zhuzanova KV, TB urologist, Akmolinskij OTBD

National Centre for TB Problems

Abildayev TSh, Director NCTP, Ministry of Health
Adenov MM, Deputy Director for clinical work, NCTP, Ministry of Health
Baymukhanova KKh, Head of department for surveillance and methodology, NCTP, Ministry of Health
Bekembayeva GS, Deputy Director for research work, NCTP, Ministry of Health
Berikova EA, National Coordinator for MDR-TB
Bismilda VL, National Coordinator for bacteriological services
Kurbanova AT, National Coordinator for information system
Musabekova GA, National Coordinator for drug management
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Almaty City

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Chernova M, Programme Manager/PSI Central Asian Republics
Kozhabekov S, Kazakhstan Red Crescent
Kuanyshbekova RT, Head of the Department of Management of Health of Almaty City
Moldagaralieva Sh, Head of the laboratory TB dispensary of Medeuskij Rayon of Almaty
Mukushev NR, Chief Physician of Almaty City's TB Dispensary
Sabazova D, Chief Physician, Turksibskij Rayon of Almaty
Sadykov S, NCTP
Sandykbayeva M, nongovernmental organization Ar Namys
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Sauranbayeva M, Country Manager PSI Kazakhstan
Suleimenova G, Director of the Almaty Healthy Lifestyles Centre
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Ibadullaeva R, psychologist, City Polyclinic No. 6
Imniyaminova M, laboratory physician, City Polyclinic No. 6
Isimova B, human resources department, City Polyclinic No. 6
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Khoshanov MR, epidemiologist, Sairamskiy Rayon TB dispensary

Kliptsova N, infectious diseases specialist, City Polyclinic No. 5
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Kozhabayeva Zh, DOTS specialist, City Polyclinic No. 6
Kulbayeva GZh, Chief Physician, City Polyclinic No. 6
Kuzheleva A, Deputy Chief Physician, City Polyclinic No. 6
Mairkhanov TM, Chief Physician, AIDS centre
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Almaty Oblast

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Annex 4

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Annex 5

PROPOSED PRIORITY OPERATIONAL RESEARCH TOPICS

The table below gives a list of the proposed priority operational research topics. Please note that many of these topics are already in the NCTP research plan.

Topic	Rationale	Source of data
I. Improve access, screening and diagnosis of TB		
Determine the yield ("number needed to screen") and costs ("cost per case detected") of different strategies of active case-finding/TB screening in different population groups (i.e. adults, children/adolescents, prisoners, migrants). Assess current practices of contact investigation and identify ways of increasing the efficiency of this intervention.	To identify the most high-yield and cost-effective approaches to active TB case-finding in different population groups. Increase efficiency of screening.	National TB Register Routine programme data Additional data collection
Assess effectiveness of criteria for selection of children in risk groups for TB screening.		
Evaluate impact of diagnostic and treatment strategies based on rapid molecular tests for detection of TB and drug resistance (such as the Xpert MTB/RIF assay) on clinical decision-making, patient management and patient outcomes.	To monitor and evaluate clinical and programmatic impact of implementation of new diagnostic methods.	National TB Register Routine programme data
Evaluate programmatic impact (operational, costs, epidemiological) of implementation and scale-up of the Xpert MTB/RIF assay.		Additional data collection
Study epidemiology of TB, M/XDR TB and TB/HIV coinfection in migrants, their access to care and treatment outcomes.	To provide evidence for cross-border TB control, care and regulations	National TB Register
Study rates and risk factors for developing active TB disease among MDR-TB contacts.	To develop a strategy for management of MDR-TB contacts.	Routine programme data Additional data collection
Determine reasons for low bacteriological confirmation of TB diagnosis in adults and children.	To increase proportion of culture-confirmed TB cases and culture-positive cases with DST result.	Routine programme data Additional data collection
Study molecular epidemiology of TB in Kazakhstan, including drug-resistant TB.	To understand population dynamics of TB and assess transmission.	Additional data collection
II. Treatment of drug-susceptible and M/XDR TB: optimal access, delivery and community participation		
Identify risk factors for primary and acquired drug-resistant TB (polyresistant, MDR- and XDR-TB) at the individual and programmatic levels.	To determine current major drivers of the epidemic of drug-resistant TB in Kazakhstan in order to develop targeted interventions for its control.	National TB Register Additional data collection
Determine reasons for delays in time to TB diagnosis and detection of drug resistance and time to initiation of appropriate treatment. Evaluate impact of delayed detection of drug resistance and delayed initiation of appropriate treatment on amplification of drug resistance in initially polyresistant and MDR-TB cases and on treatment outcomes.	To ensure rapid detection of TB and drug resistance and appropriate treatment to prevent further transmission and amplification of resistance.	National TB Register

Topic	Rationale	Source of data
Identify predictors of poor patient compliance with TB treatment and default in patients with drug-susceptible and drug-resistant TB and evaluate strategies for improving compliance. Assess patients' preferences for social support and impact of social support for patients on compliance with treatment.	To develop effective strategies for ensuring treatment compliance.	National TB Register Additional data collection
Assess frequency and risk factors for adverse events in patients on first-line and second-line TB treatment.	To plan procurement of ancillary drugs and effective management of adverse events.	Routine programme data Additional data collection
Identify risk factors for poor end-of-treatment outcomes (death, failure) and relapse among patients with drug-susceptible and drug-resistant TB (including children and patients in penitentiary system). Study impact of surgery on treatment outcomes in patients with M/XDR TB.	To identify risk groups for poor outcomes and develop focused interventions.	National TB Register
Evaluate palliative care for M/XDR TB patients (characteristics of patients receiving palliative care, reasons for decision to place on palliative care, treatment outcomes) to evaluate the potential for curative treatment among cases currently in palliative care.	To develop specific criteria for palliative care and develop guidelines in accordance with international recommendations.	National TB Register Additional data collection
To compare current MDR-TB treatment monitoring strategy (monthly sputum-smear microscopy and culture before culture conversion and quarterly after) to WHO recommended (monthly microscopy and culture before and after conversion) and assess potential impacts on time to detection of any subsequent reversion to positivity. Cost-effectiveness analysis of different treatment monitoring schemes.	To determine optimal practice in MDR-TB treatment monitoring.	National TB Register Routine programme data Additional data collection
To evaluate the effectiveness of existing/new infection control measures on nosocomial, congregate and household transmission of TB. Evaluate rates and risk factors for latent and active TB among health-care workers. Assess impact of prolonged hospitalization on nosocomial TB transmission.	To identify facilities with increased rates of nosocomial transmission, to prevent nosocomial transmission of TB.	Routine programme data Additional data collection
III. Prevention and treatment of TB in persons living with HIV (PLHIV)		
Evaluate currently used TB screening algorithms among PLHIV and determine the optimal screening strategy.	To detect TB in PLHIV early to prevent mortality.	Routine programme data Additional data collection
Identify optimal models of IPT delivery to PLHIV and ensuring adherence to IPT.	To prevent development of TB in HIV-infected individuals through effective IPT.	Additional data collection
Identify risk factors for mortality and causes of death among TB/HIV-coinfected patients.	To develop interventions to decrease mortality in TB/HIV-coinfected patients.	Routine programme data
IV. Developing sustainable collaboration with all care-providers for TB care and control		
Assess contributions of different care-providers (primary health care, specialists, paediatricians, prison health services, etc) on case detection and outcomes.	To develop cost-effective strategies of TB service delivery.	Additional data collection
Assess cost-effectiveness and impact of ambulatory treatment on adherence and treatment outcomes of patients with drug-susceptible and drug-resistant TB.	To provide evidence for scaling up ambulatory treatment.	Additional data collection

Topic	Rationale	Source of data
V. Quality of surveillance and TB control (also refer to Section 6.2.5, Use of data for decision-making)		
Assess quality of recording and reporting at national and regional level.	To increase the quality of recording and reporting of TB.	National TB Register Routine programme data
Assess quality of continuous drug resistance surveillance data at national and regional level.	To identify shortcomings in drug resistance surveillance at regional level to move Kazakhstan from drug resistance surveillance class B to class A surveillance data.	National TB Register Routine programme data
Assess progress towards the WHO targets for TB control at national and regional level.	To identify shortcomings in TB control and increase progress in TB control.	National TB Register Routine programme data

Annex 6

FIELD VISIT REPORTS

Almaty City

Team members

Kristin Kremer, WHO (leader)
Charlotte Goyon, TB Europe Coalition/Global Health Advocates
Florian Marx, WHO consultant
Veriko Mirtskhulava, WHO consultant

Sites visited

- Inter-rayon TB Dispensary, Almaty
- Branch of TB Dispensary of Zhetysuskij Rayon, Almaty
- Sanitary-Epidemiological Centre of the Republic of Kazakhstan
- Polyclinic No. 22
- Healthy Lifestyles Centre
- TB dispensary of Medeuskij Rayon, Almaty
- Polyclinic of Almalynskij Rayon, Almaty
- Children's sanatorium
- Turksibskij Rayon hospital
- AIDS centre
- Kazakh Red Crescent Society, PSI and HIV/AIDS prevention nongovernmental organization
- Almaty AIDS Centre

Visit to the Inter-rayon TB Dispensary, Almaty

Discussion with patients, psychologist and health workers.

- Male, 23 years old: smear-positive and/or culture-positive, university student. Started treatment one month ago. He feels well informed about TB, does not know how he got TB, but thinks he was infected in the computer room at the university. His grandmother and mother are TB nurses, but they do not have TB. Doctors take time to explain what TB is and its treatment. He did not feel under pressure to sign the patient consent form. He is bored, so his parents and friends gave him a smartphone. He is ready to educate/inform his friends/relatives about TB when he is discharged. He does not feel stigmatized, but would love not to have to stop studying (fourth-year architecture). Did not see a psychologist or counsellor.
- Female, 60 years old: diabetic and TB patient, smear-negative and/or culture-negative. Her husband died of cancer of the pleura. She feels happy about care she has received in the

hospital. Feels part of a family, as the nurse and doctor are kind. She will have surgery next week. When asked if she knows why she should have surgery, she said that treatment has not been effective and that she has something on her lung which has to be removed. Did not see a psychologist or counsellor.

- Male, 65 years old, truck driver, smear-negative and/or culture-negative. Started treatment seven months ago, is losing weight, does not like the food here. Divorced, with two children. They do not visit often as the hospital is far from where they live. Would like to go home. Did not see a psychologist or counsellor.
- Male, 63 years old, smear-negative and/or culture-negative. A native of Korea, diabetic and TB patient. Discovered in hospital that he is diabetic. Does not know what to do or to eat, or what he can do to recover. Did not feel that he received enough information, he is old and needs to be reminded about what he should do. He would like more spiritual support. Patients have nothing to do, not even a TV. Did not see a psychologist or counsellor.

Psychologist

She works in both branches of the hospital. She sees patients on a voluntary basis and when referred by doctors. No patients interviewed had seen the psychologist or knew that there was one in the hospital. She encourages patients to comply with their treatment and explains that they can be cured if they follow doctors' advice. She does not organize group discussions or peer-to-peer discussions. She mentioned vocational training organized in the TB dispensary, but made no mention of social support needs of patients. She particularly looks after difficult patients (e.g. drug users, alcoholics) and encourages them to give up their bad habits. She does not work with nongovernmental organizations except in relation to HIV/AIDS.

Patient literacy

When a patient is diagnosed with TB, the doctor in the TB dispensary explains to him/her what TB is and offers various leaflets and videos.

Before starting treatment, the patient has to sign a consent form (contract) where his/her rights and duties are explained. This document is a good start, but it should be adapted to match the Patients' Charter for Tuberculosis Care *(1)*, and its terms should respect human rights (access to health care, not banning a patient because he/she defaults once).

Monitoring and evaluation

A meeting in the Statistical Unit of the Inter-rayon TB Dispensary of Almaty was held with the Head of the Unit and the Deputy Head.

Patient treatment cards for all TB patients are assessed for incomplete and invalid entries and entered into the electronic database. Further, the information recorded in the TB database is validated against the TB register (form 03). Data quality reports are prepared and sent to treatment facilities and polyclinics in the rayons every month. These reports mainly address missing data and provide a count of patient cards with missing information (for example, five TB cases without sputum-smear follow-up results in March). They do not include consistency checks (checks across variables), and they do not provide a direct reference to the patient treatment card with the incomplete information.

Training in monitoring and evaluation is conducted for every staff member who starts to work in the statistical department and internally for all staff members when a new decree on TB is published (usually every three to five years). Beyond this, there is no regular training in

monitoring and evaluation. The main reference for standard definitions of recording and reporting is the decree document. The electronic database was introduced in a workshop after it was launched. However, there is currently no user manual available. It was agreed that exercises addressing the quality of recording and reporting will be conducted at a later date.

Anti-TB drugs

The review team visited the drug storerooms of the Inter-rayon TB Dispensary. Storage conditions of the anti-TB drugs are good. The dispensary has two drug warehouses, both equipped with a thermometer; hygrometer and daily records of temperature and humidity are maintained. Each shelf has a card on it showing the name of the drug. The first-expiry-first-out principle is followed. Drugs are provided by the Almaty City Health Department. First-line anti-TB drugs are procured by the state and are generally obtained from local TB drug manufacturers. Second-line drugs are procured partially by the Global Fund and partially by the State: those procured by the state come from local TB manufacturers.

Treatment regimens

The mission team visited two treatment departments, one for smear-positive, drug-susceptible TB and the other for smear-positive drug-resistant TB. In both departments visited, the treatment regimens were in accordance with WHO recommendations

Recommendations

- Care: inform patients about the availability of psychologist services and be more proactive in offering psychological support.
- Monitoring and evaluation: additional reference materials such as more illustrative guidelines and training materials (manuals, flowcharts, films) would be helpful.

Visit to branch of TB Dispensary of Zhetysuskij Rayon, Almaty

Discussions with patients took place at this facility. When questions were raised about the lack of social activities offered to patients, the chief doctor pointed out that the recreation room has now been refurbished.

TB monitoring and evaluation

The team visited the laboratory of the TB Dispensary of Zhetysuskij Rayon in order to assess the documentation and flow of diagnostic results. Culture and DST are performed on the basis of sputum request form TB 06A. Culture results are documented and additionally indicated on Form TB 06 with a red stamp (positive), blue stamp (negative) or red-coloured pen (contaminated). The form is resent to the health-care facilities upon availability of DST results, usually within 28 days. All laboratory results are documented in laboratory register Form 18 which is captured, additionally, in an Excel-based datafile, used for internal analysis and reporting. Form TB 18 is sent to the archive at the end of the year, where it is kept for 10 years. A sample of 29 TB cases was extracted from the electronic datafile for cross-checking of laboratory results during the visit to Medeuskij Rayon (the next day).

No specific recommendations are offered to this facility.

Visit to the Sanitary-Epidemiological Centre of the Republic of Kazakhstan

The centre serves as a national centre for surveillance of dangerous infectious diseases. Its tasks include prevention, recording and reporting of infectious diseases. It provides practical,

information and methodological support for a variety of centres and institutions. It further organizes workshops and training. Specifically in respect of TB, the centre is responsible for supervision and monitoring of preventive measures, such as vaccination, TST screening, radiological screening, case-finding and contact examinations. It requests reports from all TB dispensaries in the country for all areas of TB prevention and control. TB data are reported to the State Committee for SES in Astana which assesses the data and sends them to the Ministry of Health for TB care performance assessment. The system of recording and reporting is based on the traditional surveillance system used in the former Soviet Union. However, recently, the indicators have been adapted in order to comply with international standards. The Director of the Centre promised to provide a list of the TB-related indicators and an example report by Monday 14 May. The Director emphasized the collaborative efforts of the NCTP and SES, for instance in radiological TB screening of risk groups.

No specific recommendations are offered.

Visit to Polyclinic No. 22

This polyclinic serves a population of 170 000, consisting mainly of young people and about 50% immigrants (60% from oblasts of Kazakhstan, 40% from abroad). The service is free and the distance travelled to the clinic ranges from 100 m to 15 km. The TB services include ambulatory treatment (DOT) and a sputum-smear collection point. There is no TB doctor in the clinic, but a regional doctor visits sometimes. DOT is given daily to patients, and in special cases patients can take the drugs home. A nurse follows up patients who interrupt their treatment. The polyclinic also performs contact-tracing and screening. Screening with fluorography is performed for students and risk groups once a year. Every year an assessment is made of the groups in the population who should be screened. In addition, high-density populations (with more (illegal) migrants) in three rayons are screened. A team consisting of a medical worker, a city administrator and a policeman go into these rayons to motivate people to go for the voluntary screening. X-rays are also taken after treatment completion, once every six months.

INH dosages for children are used for young adults of 15–17 years of age. INH prophylactic treatment is given for three months. Only NH+RIF are given in the continuation phase. The sputum collection point was very small, but everything was in place. The sputum collection "room" was connected to the outside by a door, and patients are instructed to collect the sputum outside. Firstly, patients are requested to wash out their mouth and subsequently to take three deep breaths. After the third breath, they should spit into a dedicated sputum tube. The name and number of the patient are written on the tube, and the tube is placed in a container (to which more tubes can be added) for transport. Containers are picked up every day at 8 o'clock. The mission was informed that the State wants to reduce sample collection to twice a week. In 2011, the sputum collection point received 208 sputum samples, of which 13 were positive. In the first four months of 2012, the figures were 82 and 6, respectively.

Recommendations

- Laboratory diagnosis (sputum collection): daily transfer of sputum from sputum collection points to smear microscopy laboratories is currently in place and it is recommended that this should not be changed.

- Laboratory equipment: there is a need for a small refrigerator to store the sputum samples until these are transported to the sputum-smear microscopy laboratory. There is a need for a dedicated marker to write on the sputum containers.
- Laboratory data management: an Excel-based datafile is created from Form TB 18. This file should be used for analysis and reporting purposes only if validated. Develop standard operating procedures for data quality management.

Visit to Healthy Lifestyles Centre

The National Centre for Healthy Lifestyles was established by the government in Decree No. 1678 dated 03 December 1997, in order to implement the strategy for health and healthy lifestyles. There is a network of 14 regional and nine urban healthy lifestyles centres. They have 16 thematic programmes (including HIV, sexual and reproductive health, and chronic diseases). One of their health themes is the prevention of TB. The programme aims to reduce the incidence and spread of TB, improve health and hygiene literacy, and create a more responsible attitude to health.

The centre provides lectures, tutorials, booklets, flyers, videos and public campaigns. The material is developed only by the Ministry of Health, with State and city funding. Materials are not piloted with the patients. There is cooperation with the Ministries of Education and Culture and nongovernmental organizations such as PSI, mainly for distribution of the materials. The use of these materials in polyclinics was not observed. However, polyclinics did use materials developed in cooperation with the nongovernmental organizations and funded by the Global Fund, which were found by the mission to be more user-friendly and targeting special groups.

Recommendation

- Printed communication materials need harmonizing with the whole TB programme and partners. If current communication materials are to be updated, it is recommended that they should be piloted with the target group.

Visit to the TB dispensary of Medeuskij Rayon, Almaty

The facility serves a population of 650 000 (half the city population, and including 140 000 children), representing three rayons and 11 polyclinics. It delivers ambulatory treatment only. The facility employs 22 doctors (14 TB doctors, 6 paediatricians, 8 radiologists) and 33 nurses. On average 200 people visit the facility per day of whom about 50% are sick and take drugs. In 2011 they had 380 active cases of whom about 40% were SS+ and about 10% were culture-positive. Thirty-five TB patients (9.2%) were HIV+ and none of them received ART.

Drug storage and organization were very good. Three MDR-TB patients were interviewed. They suffered from side-effects; one patient received three drugs and two patients received two drugs during the continuation phase. The facility had a patient information room with leaflets and a video about TB. Patient satisfaction questionnaires are given to patients and relatives and filled-in questionnaires were shown to the team. Monthly reports were made.

TB/HIV

HIV testing is not compulsory, but patients are advised that HIV testing is absolutely necessary. Overall, test coverage is almost 100%, suggesting that the voluntary nature of testing is uncertain. If a TB patient is identified, he/she receives (voluntary) counselling from a TB doctor and permission to conduct an HIV test is requested. If necessary, counselling is repeated to

convince the patient. No standard operating procedures exist for pre-counselling or post-counselling of TB patients in respect of HIV testing. Blood is taken from the patient at the TB facility and the blood is sent to the HIV centre for testing. If the patient is found to be HIV-negative, then the result goes to the TB centre. If a hospitalized TB patient is HIV-positive, then the infection specialist from the HIV centre comes to the hospital and informs the patient. If an ambulatory TB patient is HIV-positive, then the HIV centre contacts the patient and requests him/her to come to the HIV centre to hear the result. Normally it takes about 3–4 days before the HIV test results become available. If a TB patient has questions about HIV he/she should refer these to the HIV centre, and if an HIV patient has questions about TB he/she should consult the TB centre. TB diagnosis of HIV patients is done at the HIV centre. Diagnosis of TB in HIV/AIDS patients is usually done at the HIV/AIDS centre. The head of the TB dispensary is consulted if uncertainty remains. A member of the HIV/AIDS centre is on the central doctoral commission for TB.

Prison

There is a pretrial prison in one of the rayons, and this was mentioned as a possible factor influencing the HIV-positivity rate; 6 of the 35 TB/HIV patients were prisoners.

If a TB patient who needs ambulatory treatment is released from the pretrial prison, a letter (TB form 09) is sent from the pretrial prison to the TB dispensary, indicating the name and address of the patient. The rayon specialist TB doctor subsequently goes to the patient's house to advise him/her to go to the TB dispensary.

Monitoring and evaluation

Data availability and reporting time of culture and first-line DST results were verified for 29 patients who are currently under anti-TB treatment in the rayon served by the TB dispensary, using a list of laboratory results collected in the laboratory (the previous day), and documented culture and DST results from the electronic database and treatment cards in the TB dispensary. The results for one patient were not documented at all in the treatment card, although the results were available in the laboratory two months before. For two patients, the results were not (yet) documented in the database, but were present and accurate in the treatment card. The results for 26 patients were all documented correctly, suggesting good accuracy overall.

Laboratory

The clinical laboratory performs haematology, urine analysis and SSM. The staff consists of three laboratory assistants, two nurses and two doctors. Training for them is organized annually. The laboratory consists of four rooms: a collection room, an administrative/microscopy room, a room with two biosafety cabinets and a washing room. One biosafety cabinet has been in need of a new filter since end 2011. Ziehl-Neelsen staining is done with the Zintakon kit (Nabor Krasitelei, St. Petersburg). A new refrigerator, a computer and three microscopes are present; Olympus CX31, an Olympus from 1979 which needs repair, and a mono-ocular microscope (for chemical analysis).

In 2011, the laboratory received 3386 samples for microscopic diagnosis, of which 221 were positive. These samples represented 1144 patients of whom 101 were smear-sputum-microscopy positive. For follow-up, 3649 samples were received, of which 113 were smear-sputum-microscopy positive, representing 1808 and 75 patients, respectively. Forms were supplied showing the number of samples and sputum-smear positivity for each of the three rayons served by the laboratory and also for each of the polyclinics in these rayons; the sputum-smear positivity rate varied from 0 to 18.8% per polyclinic/facility. EQA forms were studied and the EQA procedure discussed in detail.

Treatment

The review team interviewed three MDR-TB patients in the continuation phase of their treatment, of whom two were taking only two drugs in the continuation phase (Cs and Lfx).

One patient with drug-susceptible TB did not really know the duration of her treatment, because according to the existing decree on TB treatment (No. 218) treatment duration varies from 6 to 13 months and the decision is made by the central medical committees.

Recommendations

- EQA sputum-smear microscopy: external quality control of sputum-smear microscopy should be conducted without any knowledge of the results obtained by the laboratory that first analysed the slides in order to review the slides objectively; alternative analysis forms should be introduced.
- Laboratory equipment: organize regular maintenance for biosafety cabinets; repair microscope; replace mono-ocular microscope.
- Treatment: treatment protocols should be revised to follow international guidelines. Technical assistance should be offered to optimize the treatment and management of side-effects.
- ACSM: optimize satisfaction questionnaires by including a question on the education level of the person who fills it out. For relatives, questions should also be asked about the social support required (not only on infection and hygiene control).
- HIV/AIDS: ensure the voluntary nature of counselling, develop standard operating procedures for voluntary counselling and testing; ensure data confidentiality.

Visit to polyclinic of Almalynskij Rayon, Almaty

The DOT room, the sputum collection room, the smear microscopy laboratory and the clinical laboratory were visited. The DOT room was small but adequate. Storage of drugs was acceptable, but locally procured, non-prequalified drugs were in use. At the time of the visit, nine patients were receiving ambulatory treatment; six every day (except Sunday) and three every other day. These patients had finished their time in the hospital and none of them were HIV-positive.

Sputum collection is performed in a room without ventilation in front of a big window which is opened during collection, except in winter. A new refrigerator was present in the collection room, and staff wore personal protective equipment. The UV lamp was very old, and the date of last replacement/maintenance was not recalled.

Laboratory

The SSM laboratory is a centralized laboratory for seven sputum collection points. There was a separate room (entrance through sputum collection room) with a biosafety cabinet (Airstream ESCO class II) and Ziehl-Neelsen staining (Zintakon kit). There was a space between the metal exhaust pipe in the ceiling and the biosafety cabinet. Microscopy (Loma) was performed in another room. No SSM+ slide was available for review. All SSM+ slides and 10% of SSM- slides are sent to the TB dispensary for EQA. A clinical laboratory where blood and urine tests were performed was located in another room; some of the equipment in this room was very old. Erisan was used for disinfection (didecyl dimethyl ammonium chloride, UN 1760). Two TB doctors and six assistants work in the laboratory. The training of personnel is conducted once a

year by SES and the TB dispensary. Staff receive fluorography and a physical health check annually and, for the last five years at least, nobody has been detected with TB.

Interpersonal skills in interactions with patients

When a patient comes to the polyclinic, he/she is first examined by the doctor. After the anamnesis, and if the patient is a TB suspect, the doctor asks the patient to submit three sputum samples. It is explained how the patient should produce the sputum, but little is said about the reason for the diagnostic procedure (to exclude or confirm TB), and no reassurance is offered to the patient; there were no leaflets on TB or HIV/AIDS in the consultation room.

Recommendations

- Anti-TB drugs: only qualified drugs should be used; start the process of qualifying local drugs and in the meantime use GDF-approved drugs whenever possible.
- Sputum collection: in the absence of appropriate ventilation, sputum collection should be performed outside (for example, in a quiet area behind the polyclinic).
- Laboratory equipment: replace old centrifuge with a new one.
- Interpersonal communication skills: need to train health workers on interpersonal communication skills with the patient. Psychology forms part of medical education, but staff members feel that they should be better trained in patient literacy and motivation.

Visit to children's sanatorium

Interview with parents and teenagers

One woman interviewed had three children in the sanatorium. The younger two (both under five years) were not receiving any treatment. The teenager (15 years) was receiving isoniazid. She has no financial or private problems but wants to avoid infection in her home, where her father-in-law has TB. The children appear to be happy to stay at the sanatorium and had already been there for four months. There is no psychologist or counsellor. The mission was informed that teachers are trained in psychology.

Treatment

Only four groups of patients are treated in the sanatorium:

- children in the continuation phase of TB treatment with 4 months of HR
- children with TST result greater than 5 mm, treated with 3 months of INH 5 mg/kg/day
- children with TST greater than 15 mm, treated with 2 months of HE
- TB contacts with no positive TST result, who are not treated at all.

Prophylactic treatment regimens are not in accordance with the latest WHO recommendations.

Of 16 children in the group aged 0–4 years, only one was in the continuation phase of TB treatment, 10 were on 3 months of INH treatment and 4 were merely living at the sanatorium in order to remain isolated from the TB contact, who was being treated in a hospital.

Anti-TB drugs

Drug storage conditions are good. The stock records are up to date. GDF drugs are used for the continuation phase of treatment, but locally produced INH is used for prophylactic treatment.

Recommendations

- Psychosocial support: enable parents to come more often to see their child (by paying transport costs). Organize regular visits by a paediatric psychiatrist to assess mental health of children.
- Children's rights: avoid placing children in a TB sanatorium if possible, especially children who are healthy or only taking IPT. If it is considered necessary for social reasons, educate the family/parents and give direct support (food packages/training) to the family through outreach workers or nurse.

Visit to Turksibskij Rayon hospital

Turksibskij Rayon has four polyclinics. A total of 67% of health worker positions are occupied in the rayon (including practitioners who are of retirement age). At the time of the visit there were 288 patients: 140 with drug-susceptible TB and 116 on treatment with second-line drugs; 20 were lost to follow-up and four drug-resistant TB patients were receiving treatment with first-line drugs.

Patient education

The Director stated that health workers are aware of this approach, and that they provide materials for the team to tell them how to communicate with the patients and educate them. Materials for training of nurses were recently given to the dispensary by AIDS Foundation East-West. The questionnaire given to patients to assess their literacy on TB and to educate them is good and helps to brief the patient on TB in a systematic way. The questionnaire showed a good level of TB knowledge among the patients.

No specific recommendations are offered to this facility.

Visit to AIDS Centre

All PLHIV are screened for TB. Ninety percent of them received IPT. This is a pilot project, supported by Columbia University, United States, in three sites in Kazakhstan, where substitution therapy and methadone are used.

Recommendations

- Symptomatic treatment: psychosocial support should be provided for all patients. Provide medium-strength and strong painkillers when required.
- HIV/TB and IDU: allow single-point delivery for TB drugs/ART and methadone substitution therapy.

Visit to Kazakh Red Crescent Society, Population Services International and HIV/AIDS prevention nongovernmental organization, Almaty AIDS Centre

For information about findings and recommendations, please refer to the sections of this report dealing with ACSM and HIV.

No specific recommendations are offered to the individual nongovernmental organizations.

Almaty Oblast

Team members

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Accompanied by representatives from the NTP: Aliya Kurbanova (NCTP, Global Fund) and Dr Salavat Slavzhanovich Sarsembaev (Principal Doctor of Almaty OTBD, Taldykorgan).

Sites visited

- Almaty Oblast Health Department and Taldykorgan OTBD (MDR-TB department, childhood TB department, surveillance department, laboratory, drug store), City Polyclinic.
- Zharkent, Regional TB Dispensary (department for smear-positive drug-sensitive TB, department for smear-negative drug-sensitive TB, laboratory, drug store, surveillance department).
- Shymbulak, Talgar, Almaty Regional TB Dispensary in Shymbulak (drug store, children's department, department for involuntary treatment, MDR-TB department), Regional General Hospital and ambulatory *feldsher*-akusher point (FAP).

Visit to Almaty Oblast Health Department and OTBD, Taldykorgan

Health care structure in Almaty Oblast: in total 884 institutions, including:

- four oblast-level institutions
- four town-level facilities
- 19 specialized institutions (including TB facilities)
- four polyclinics
- two maternity hospitals
- 16 central rayon hospitals
- 36 rural hospitals
- 223 rural outpatient clinics (sel'skiye vrachebnye ambulatorii)
- 479 medical stations (meditsinskiye punkty)
- one other institution
- 39 sanitary-epidemiological stations
- 57 private medical facilities.

There are five penitentiary institutions in the oblast (including one pre-trial isolation unit).

Table A6.1 shows the number of medical staff employed in the oblast.

There is a strategic plan for health-care development in Almaty and Almaty Oblast for 2011–2015 (+ vision 2016–2020), in which TB control is one of the priority areas of action. TB-related indicators in this plan include decreasing morbidity by 10% and further developing the network of health services, starting at the rural level.

Table A6.1. Number of medical staff in Almaty Oblast, Kazakhstan, first quarter 2012 and first quarter 2011[a]

Medical staff	2011		2012	
	Absolute No.	Per 10 000	Absolute No.	Per 10 000
Doctors	3898	21.0	4031	22.0
Medium-level staff	10 672	58.0	11 378	60.7

[a] Including departments other than th Ministry of Health and private providers.
Note: Reference numbers for Kazakhstan (2011), per 10 000, for comparison; doctors – 38.0, medium-level staff – 86.2.

Kazakhstan is implementing a newly introduced Unified National Health System, which emphasizes hospital-replacement technologies and ambulatory care/primary health care. Overall oblast health-care budget:

- 2011 (executed) – KZT 38 billion (approximately US$ 257 million)
- 2012 (plan) – KZT 42 billion (approximately US$ 285 million)
- in 2012, the oblast health budget increased by 10% compared with 2011
- per capita health expenditure in 2012: KZT 22 100 or US$ 150.

The oblast level health budget covers primary health services and ambulatory outpatient health services, while all hospitals are paid from the central (republican level) health budget (since 2010), with the exception of three "socially-conditioned" services: TB, psychiatry and narcology. For health IEC (promoting healthy lifestyles), KZT 134 million (US$ 0.9 million) is budgeted for 2012, which is 0.3% of the total oblast health budget. Within the Unified National Health System approach, there are plans to introduce the principle of money following the patient.

The key problem (in health care in general and TB in particular) is ensuring adequate human resources. MDR-TB is another acknowledged problem in TB control. Quoted reasons for the increase in MDR-TB rates are improved diagnosis and problems with quality of anti-TB drugs. Another problematic area is ensuring compliance with TB treatment, especially in outpatient settings (75% of the population of Almaty Oblast live in rural areas).

Since 2011, under a Ministry of Health decree, social workers and psychologists have been appointed in outpatient health institutions (polyclinics) to serve the various social needs of patients, including TB patients. To date, in Almaty Oblast, 279 social-worker positions and 56 psychologist positions have been filled.

TB epidemiology

Tables A6.2–A6.11 show the epidemiology of TB in Almaty Oblast.

Table A6.2. Planned dynamics of TB indicators[a] in Almaty Oblast, 2011–2013, per 100 000 population

Incidence/prevalence/mortality	2011	2012	2013
Incidence	79.0	76.6	74.3
Prevalence	4.3	4.2	4.0
Mortality	94.3	84.9	76.4

[a] Relevant to State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan".

Table A6.3. TB notification rate (new TB cases) per 100 000 population, Kazakhstan and Almaty Oblast, 2001–2011

Area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Kazakhstan	155.7	165.1	160.4	154.3	147.5	132.1	126.4	125.5	105.5	95.5	86.8
Almaty Oblast	115.5	123.1	120.6	108.9	113.7	106.0	98.7	100.5	90.9	80.8	75.9

Table A6.4. TB notification rate in children (new TB cases) per 100 000 population, Kazakhstan and Almaty Oblast, 2006–2011

Area	2006	2007	2008	2009	2010	2011
Kazakhstan	31.7	30.5	26.4	20.9	18.3	15.1
Almaty Oblast	41.3	38.1	38.5	33.1	24.4	21.6

Table A6.5. TB notification rate in adolescents (new TB cases) per 100 000 population, Kazakhstan and Almaty Oblast, 2006–2011

Area	2006	2007	2008	2009	2010	2011
Kazakhstan	128.5	118.9	126.8	117.1	105.4	97.4
Almaty Oblast	92.8	90.3	84.5	78.9	70.2	72.4

Table A6.6. Notified MDR-TB cases per 100 000 population, Almaty Oblast, 2007–2011

No. of MDR-TB cases notified	2007	2008	2009	2010	2011
Absolute number	56	146	195	301	218
Per 100 000	3.5	9.0	11.0	15.8	11.6

Table A6.7. Cohort of TB patients (absolute number) in Almaty Oblast, 2008–2011

Types of patient	2008	2009	2010	2011
Total active TB	2250	1917	1930	1964
category IV	643	718	904	911
MDR-TB	566	665	830	862
XDR-TB	1	4	19	45

Table A6.8. Coverage of category IV patients on second-line treatment in Almaty Oblast, 2009–2011

Coverage of category IV patients	2009	2010	2011
Category IV patients, absolute number:	728	912	911
including patients on second-line treatment, absolute number	478	687	791
Coverage with second-line treatment, %	65.7	75.3	86.8

Table A6.9. TB mortality rate per 100 000, Republic of Kazakhstan and Almaty Oblast, 2001–2011

Area	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Kazakhstan	24.5	24.2	22.4	20.6	20.8	20.3	18.1	16.9	12.9	10.6	8.1
Almaty Oblast	17.2	11.3	9.8	8.9	10.1	7.8	8.6	7.1	4.9	4.1	3.5

Table A6.10. TB case notifications in Almaty Oblast, 2010–2011 (Form TB 07)

Notifications	2010	2011
New cases, total	1501	1433
new pulmonary *M. tuberculosis* positive (MTB+)	589	552
new pulmonary *M. tuberculosis* negative (MTB-)	647	666
new extrapulmonary TB	265	215
Retreatment cases, total	553	583
Retreatment pulmonary MBT+:	409	422
relapses pulmonary MBT+	367	393
after failure pulmonary MBT+	32	26
after default pulmonary MBT+	10	3
Other retreatment cases:	144	161
relapses pulmonary MBT-	117	138
after failure pulmonary MBT-	2	1
after default pulmonary MBT-	1	0
relapses extrapulmonary TB	23	19
after failure extrapulmonary TB	1	2
after default extrapulmonary TB	0	1
TOTAL TB cases	**2054**	**2016**

Table A6.11. TB treatment outcomes in Almaty Oblast, 2010 cohort (Form TB 08)

Treatment outcomes	Total No. of cases registered	Cured	Treatment completed	Failure	Death TB	Death other causes	Default	Transfer out	Transferred to Cat IV treatment	Diagnosis not confirmed	Total with treatment outcome
New pulmonary MBT+	589	335	–	23	8	9	1	3	210	–	379
New pulmonary MBT-	647	–	559	8	1	7	1	2	69	–	578
New extra-pulmonary TB	265	–	242	3	–	1	1	–	16	2	247
Relapses pulmonary MBT+	367	162	–	–	16	28	3	–	158	–	209
After failure pulmonary MBT+	32	15	–	–	1	–	–	–	16	–	16
After default pulmonary MBT+	10	1	–	–	–	1	–	–	8	–	2
Relapses pulmonary MBT-	117	–	80	1	1	4	1	1	29	–	88
After failure pulmonary MBT-	2	–	–	–	–	–	–	–	2	–	
After default pulmonary MBT-	1	–	1	–	–	–	–	–	–	–	1
Relapses extrapulmonary TB	23	–	17	–	–	2	–	–	4	–	19
After failure extrapulmonary TB	1	–	1	–	–	–	–	–	–	–	1
After default extrapulmonary TB	–	–	–	–	–	–	–	–	–	–	–

– = No data.

Number of new TB cases among children:

- 2009 – 132 (33.1 per 100 000)
- 2010 – 116 (24.4)
- 2011 – 104 (21.6).

In 2011, 911 patients required category IV treatment (including 218 new MDR-TB patients).

Laboratory

The TB laboratory service in Almaty Oblast consists of 30 laboratories, of which 9 are located in specialized TB service institutions and 21 in general health-service facilities. Culture is performed in eight laboratories: OTBD Taldykorgan, RTBD Talgar and six "culture points" in peripheral laboratories. There are 599 sputum collection points, of which 579 are based in the general health service. From 2005, all laboratories in the oblast are involved in the EQA system; smears for checking by Taldykorgan and Talgar laboratories are taken monthly, blinded.

Tables A6.12–A6.16 show activity indicators and DST data for Almaty Oblast.

Table A6.12. Main activity indicators of TB laboratories in Almaty Oblast, 2010–2011

Activity indicators	2010	2011
Microscopy investigations (persons)	25 832	26 115
Microscopy investigations (tests), total	64 511	66 676
of which, smear-positive	7315	6686
Microscopy tests for diagnostic purposes	39 191	39 896
Culture investigations (tests)	45 427	48 908
of which, culture-positive	11 954	14 444

Table A6.13. Number of microscopy investigations,[a] Almaty Oblast, 2007–2011

Year	General health services			TB service		
	Total	SS+	% SS+	Total	SS+	% SS+
2007	7586	450	5.9	4196	350	8.3
2008	8412	498	5.9	3966	355	8.9
2009	9175	459	5.0	4272	310	7.2
2010	9274	436	4.7	3898	297	7.6
2011	8807	380	4.3	4599	335	7.2

[a] Tests by laboratories in general health service and TB service laboratories.

Table A6.14. DST to first-line drugs, data for 2009 in Almaty Oblast[a]

DST to first-line drugs	New cases		Retreatment cases		Chronic cases		TOTAL	
	Absolute No.	%	Absolute No.	%	Absolute No.	%	Absolute No.	%
Total tested	708	100.0	567	100.0	167	100.0	1442	100.0
Pan-sensitive	363	51.2	217	38.3	19	11.3	599	41.5
Any resistance	345	48.7	350	61.7	148	88.6	843	58.5
Mono-resistance	50	7.0	43	7.6	7	4.1	100	6.9
PDR-TB	178	25.1	126	22.2	91	54.5	395	27.4
MDR-TB	117	16.5	180	31.7	50	29.9	347	24.1

[a] DST on solid media, LJ medium.

Table A6.15. DST to first-line line drugs, data for 2010 in Almaty Oblast[a]

DST to first-line drugs	New cases		Retreatment cases		TOTAL	
	Absolute No.	%	Absolute No.	%	Absolute No.	%
Total tested	866	100.0	343	100.0	1209	100.0
Pan-sensitive	284	32.8	70	20.4	354	29.3
Any resistance	582	67.2	273	79.6	855	70.7
Mono-resistance	55	6.4	16	4.7	71	5.9
PDR-TB	342	39.5	140	40.8	482	39.9
MDR-TB	185	21.4	117	34.1	302	25.0

[a] DST on solid media, LJ medium – for diagnostic purposes.

Table A6.16. DST to first-line drugs, data for 2011 in Almaty Oblast[a]

DST to first-line drugs	New cases		Retreatment cases		Transfer		TOTAL	
	Absolute No.	%	Absolute No.	%	Absolute No.	%	Absolute No.	%
Total tested	802	100.0	320	100.0	8	100.0	1130	100.0
Pan-sensitive	356	44.4	96	30.0	3	37.5	455	40.3
Any resistance	446	55.6	224	70.0	5	62.5	675	59.7
Mono-resistance	47	5.9	28	8.8			75	6.6
PDR-TB	284	35.4	95	29.7	1	12.5	380	33.6
MDR-TB	115	14.3	103	32.2	4	50.0	222	19.6

[a] DST on solid media, LJ medium – for diagnostic purposes. Full resistance patterns for the above are available.

Visit to OTBD, Taldykorgan

Laboratory

Laboratory includes bacteriological and clinical laboratory departments. The bacteriological laboratory has the capacity to conduct Ziehl-Neelsen microscopy, solid (LJ) and liquid (MGIT) cultures with *M. tuberculosis* complex identification (smear and blood agar for MGIT and smear and colony morphology for LJ), DST on solid and liquid media, and Hain test. It is a well-maintained facility. Specimens are delivered through a separate entry. Doors between clinical and bacteriological departments are not sealed, but it is planned to install sealed double doors. There are separate rooms for sterilization, autoclaving, preparing smears, reading smears, DNA extraction and amplification for Hain test, hybridization for Hain test, inoculation of culture, MGIT and solid media preparation. The laboratory is equipped with three Leica microscopes, three thermostats for solid media, one BACTEC-960 instrument and Hain test equipment. Centrifuges do not have safety covers and are not 3000 x g centrifuges. They do not have biosafety level II or III cabinets. Respirators are available. External quality control is done by the Talgar TB Dispensary laboratory. The clinical laboratory conducts complete blood counts, urine analysis and biochemical analysis (a basic metabolic panel: creatinine, blood urea nitrogen, glucose, cholesterol, triglycerides and liver function testing, but not including electrolytes, that is, sodium, potassium, magnesium, or thyroid-stimulating hormone).

Patient management

Taldykorgan OTBD, Therapeutic department No. 1 (new MTB+ cases) has 50 beds in total. Zoning is in place (green zone – for staff, yellow zone – for patients who stay longer and are smear-converted, red zone – for recently hospitalized patients and those not converted). "Cyclicity" is also observed (movement of patients within the department during stay). Average length of stay in the department in 2011 was 101.6 days; for the first quarter of 2012, it was 90.8 days. The criteria for discharge from hospital are smear/culture conversion, clinical improvement and positive X-ray dynamics. One issue cited by interviewees is that conversion takes place late (at three to four months), with the possible reason being the poor quality of drugs.

Adverse drug reactions: the yellow card (notification card for adverse reactions to a drug) is filled out when an adverse drug reaction is observed. In 2011, only one yellow card was completed (toxic hepatitis attributable to Z). All necessary drugs for management of adverse drug reactions: are available in the department.

MDR-TB Department

Taldykorgan OTBD, Therapeutic department No. 3 (MDR-TB among new cases) has 50 beds (in wards with two to five beds). At the time of the visit, there were 35 patients in the department. Zoning is in place (green/yellow/red). There are 2 doctors and 22 other staff. In 2011, 72 patients were discharged, with the average length of stay 162 days. Culture conversion takes place, in the majority of cases, at four to five months. A standard treatment scheme is applied: Cm (80%) or other injectable (20%) – Lfx – Eto – Cs – PAS – Z.

Adverse drug reactions: during first quarter of 2012, seven yellow cards were filled out (three for PAS injectable, three for PAS enteric, one for Pto) – dyspepsia and changes in hepatic probes in blood biochemistry tests.

The second-line anti-TB drugs in the department included the following (Table A6.17).

Table A6.17. Second-line anti-TB drugs in use in MDR-TB department, Taldykorgan OTBD

Drug	Name	Strength	Manufacturer	Expiry date
Cm	capreomycin	1 g	Chimpharm JSC, Shimkent, Kazakhstan	12/2012
Am	amikacin	500 mg	Krasfarma JSC, Krasnoyarsk, Russian Federation	01/2014
Lfx	levofloxacin	250 mg	Chimpharm JSC, Shimkent, Kazakhstan	01/2014
Lfx	levofloxacin	500 mg	Global Pharma Ltd.	01/2016
Ofx	ofloxacin	200 mg	Global Pharma Ltd., Almaty, Kazakhstan	11/2014
Eto	ethionamide	250 mg	Lupin, India	11/2014
Pto	protionamide	250 mg	Lupin, India	11/2013
Cs	cycloserine	250 mg	Global Pharma Ltd. Almaty, Kazakhstan	12/2014
PAS	p-aminosalicylic acid sodium	4 g	Chimpharm JSC, Shimkent, Kazakhstan	02/2014

The department has sealed double doors at the entrance. Mechanical ventilation is installed, but does not work yet. Discharge criteria include two consecutive negative cultures. Reviewed nine medical charts with TB 01 (seven new MDR-TB cases, one in failure category II and one in failure category I who had acquired resistance to RIF during first-line treatment). All new cases had started treatment with first-line regimens and the mean time between start of category I and change to category IV was 2.4 months (range: one to four months). One retreatment case changed to category IV five months after start of category I treatment, and the case with failure of category I treatment and acquired resistance to RIF after two months. The intensive phase is six months (the WHO 2011 guidelines on programmatic management of drug-resistant TB *(2)* recommend a minimum of eight months). Minimum total length of treatment is 18 months (the WHO 2011 guidelines on programmatic management of drug-resistant TB recommend a minimum of 20 months). All regimens were fine (including fluoroquinolone [Ofl or Lfx or Mfx], injectable second-line drugs, protionamide and pyrazinamide, as well as cycloserine and PAS). Approximately 8–12% of MDR-TB cases are XDR.

Recording and reporting system

Monthly reports on the majority of indicators (including receiving data from rayons) create a high workload for staff. Problem cited by interviewees: the database (register) does not provide for analysis of laboratory data (such as DST) or data on drugs (consumption – total and by category, stock/remainder, by facility).

Childhood TB Department

The inpatient paediatric department has 30 beds, for children with smear-negative active TB. The paediatric department is located in the same building as the adult department for smear-positive MDR-TB. At the time of the visit, 15 children were hospitalized. The staff includes two TB paediatricians in the inpatient department, 12 nurses and two teachers (day care and elementary school); there were no vacancies. Children are hospitalized for the full course of treatment. The drug doses used are the WHO 2006 recommendations (daily and intermittent 3 times/week regimens). Streptomycin is used only for category II regimens. Outpatient formulations were available in the drug store (fixed-dose combinations: RH 60/60 mg by Macleods; loose formulations: H 100ml, Lugansk, Ukraine; R 150mg, Pavlodar, Kazakhstan; Z 500mg, Pizina, Lupin; S Kievmedpreparat, Ukraine). All drugs had good expiry dates (2013–2014). An HIV test is performed on 100% of children; in 2011 one child was HIV-positive (in the oblast overall, 1.5% of all TB patients are coinfected with HIV).

Human resources

There are some shortages of staff compared with requirements at the OTBD: there are 41 doctors for 57 posts (0.8 compared with 0.9 in the Republic of Kazakhstan as a whole). The remaining positions are divided among the employed staff, allowing up to 0.5 of a post to be additionally

occupied. This increases the worker's basic salary. The workload increase is expressed as additional working hours and an increased number of patients. There is shortage of TB doctors in rural areas. Also there is a 0.5 post for a psychiatrist, a 0.5 post for a narcologist and a 0.5 post for a neurologist. These mainly support TB patients. TB staff are trained to work with burnout syndrome and support is provided for TB staff by specially trained colleagues (on prevention of burnout they are supported by the Global Fund and training on TB/HIV). There is no shortage of nurses, junior medical workers or administrative staff (in 2012, of 135 medical nurses 60% were in the professional qualification category). All TB doctors underwent postgraduate training within the last five years, and within the last three years on specific aspects of TB control. The major problems are: absolute numbers, advanced age and lack of TB doctors in rural areas, despite the additional social benefits on offer.

ACSM

At Almaty OTBD there is a TB doctor who acts as coordinator for advocacy and health education – Kendzhe Bektursunova. OTBD is responsible for work in general health care, schools and other public institutions; the sanitary control services work with agencies and organizations. Priority population groups are young people, school pupils and the non-organized population (pensioners, socially vulnerable people).

Three doctors were trained in ACSM at a workshop organized by the project "Quality of health care" in 2011; they then trained other TB doctors. There is a complex plan for TB education and information activities for OTBD and oblast sanitary control service in cooperation with Healthy Lifestyles Centres, covering activities, timeline and responsible services. Funding is provided from the regional budgets. There are funds for roundtables, conferences, lectures by TB doctors, videos.

Cooperation with nongovernmental organizations: the Kovcheg TB patient organization, Red Crescent, the Densallyk students' group. The deputy head of the oblast *Hakimat* supervises health issues and pays attention to TB.

Working with the media: 10 journalists were trained within the Global Fund Round 6 project; they provide support and disseminate information on TB control free of charge in newspapers and on the oblast TV channel.

TB patients are involved through questionnaires, contests in newspapers, poems, songs. International partners are KNCV, USAID, the Global Fund and the project "Quality of health care". Work with hard-to-reach vulnerable groups includes mobile miniature mass radiography and questionnaires before and after lectures. People related to clinical and social risk groups are identified for each primary health care territory in cooperation with a TB doctor, and individual work is done with risk groups. Patients' opinions are monitored quarterly, and there is a mailbox for patients' complaints and feedback. The mission was assured that all comments, complaints and suggestions are addressed. It is crucial to work continuously with the public; a specially designated staff position should be created or existing staff member(s) should be assigned full-time to this work.

Recommendation

- ACSM: designate a staff member/members to work full-time on information, education and communication activities.

Visit to City Polyclinic, Taldykorgan

The facility serves Panfilov district in Almaty Oblast. The population density is low – 11 persons per square kilometre. There are 42 settlements in the district; the distance from the two most remote settlements to the district centre is 122 and 92 km, respectively. The district health system includes one central district hospital, two rural hospitals, one TB hospital, 14 rural ambulatory points with doctors, nine FAPs, 19 *feldsher* points (including five *feldsher* points without fixed premises).

The district facilities and institutions are divided among TB doctors for supervision and coordination of preventive, diagnostic and treatment activities. Early detection procedures among the population include bacterioscopy, fluorography, Mantoux tests (for children). All women after delivery and prior to discharge undergo an X-ray. Risk groups are also evaluated by fluorography according to the Ministry of Health decree. The hospital facilities include 50 beds (since February 2012). There are two departments: for new smear-positive cases with unknown or drug-sensitive TB for four districts; and for smear-positive retreatment cases with unknown and drug-sensitive TB. If MDR-TB is detected by DST, patients are transferred out to the OTBD.

The City Polyclinic is a primary health care facility with a capacity of 1200 patient visits per year, although in reality it receives 1700 visits per year. There are general practitioners (territorial doctors), specialized consultants, a clinical-diagnostic laboratory which is also the point for microscopy for *M. tuberculosis* and X-ray diagnostic facilities. The registers of patient visits are electronic, and appointments are made online directly by patients. The City Polyclinic performs activities in TB prevention, detection and treatment control. Preventive activities are undertaken in coordination with the regional TBD coordinator and SES. Both active and passive detection are used. The main method of active detection is fluorography, with a coverage of 90% of the eligible population. The detection rate through fluorography is one case per 300 examinations (while previously it was one per 1700 examinations). There are planned fluorography screenings of organized population groups at State and private enterprises, schools, colleges, etc. The population groups that must have regular screening for TB under the Ministry of Health decree have a coverage of 90% of the eligible number.

The primary health care doctors receive financial incentives – an amount is paid on top of their salaries which depends on performance. In particular, if neglected or severe cases of TB are found, there will be penalties and the reduction of this amount by some percentage.

Sanitary inspections and work with territorial enterprises is considered of high importance. Mobile fluorography is used to cover socially vulnerable and mobile groups of population, such as homeless people, as well as non-mobile groups – people in psychiatric clinics, narcological dispensaries, etc. In the case of planned admissions to hospital, patients undergo fluorography.

All primary health care doctors have been trained in DOTS by the OTBD trainers. Patients who consult the primary health care doctor with respiratory or other complaints are investigated for TB-associated symptoms (cough lasting more than two weeks, night sweats, dyspnoea, fever, chest pain) and their social status is evaluated. TB suspects are referred for miniature mass radiography and triple smear microscopy at the polyclinic. In the event of a smear-negative result and clinical and X-Ray symptoms of bronchitis, treatment with nonspecific broad-spectrum antibiotics is started for 10 days. In the event of a smear-positive result, patients are referred to the OTBD. There is follow-up by phone on the outcomes of investigation at the OTBD and final

diagnosis. All TB suspects are registered in the register of TB suspects (TB 15), recording the name, age, gender, date of miniature mass radiography and result, date of referral to triple-sample smear microscopy and results, antibacterial therapy, final diagnosis. Annually reports on TB suspect investigations are sent to OTBD.

Primary health care doctors, along with TB territorial doctors and sanitary control services, participate in contact investigation. The interviewed doctors consider their participation in TB control as part of their work and expressed satisfaction with their cooperation with TB services. Primary health care doctors also monitor TB patients' treatment in the continuation phase. From the OTBD patients are returned for outpatient treatment to the primary health care doctors who first detected them. For drug-sensitive TB patients, there is a DOTS chemotherapy point operated by medical nurse or a *feldsher* at the polyclinic for those who live in a particular neighbourhood, depending on their treatment regimen. Once in 7–10 days, patients are evaluated by the territorial primary health care doctor. MDR-TB patients in the continuation phase are provided with DOT at home. TB drugs are supplied by the OTBD to the polyclinic. Some patients receive social support during their treatment, if required. There are educational materials for TB patients, and primary health care doctors have a guide on lectures for TB patients prepared with the support of the Global Fund, NCTP and Red Crescent. Primary health care doctors have been trained to provide TB education for patients and the public.

In case of treatment interruption for one day, the territorial primary health care doctor and territorial TB doctor are informed and all measures are taken to find the patient and continue treatment. The Ministry of Internal Affairs provides support for medical workers in finding homeless or socially vulnerable patients and returning them to treatment.

The DOTS chemotherapy point is located on the first floor of the polyclinic, with a separate room for smear collection and a separate entrance. There are two persons working there: a *feldsher* who administers DOT and a nurse who supervises smear collection. There is instruction on smear collection for patients, displayed clearly on the wall and on the door. The patient comes with a TB 05 referral for smear microscopy. There is a well-organized process of smear collection; the nurse showed excellent knowledge and skills in demonstrating the whole routine. There are prepared facilities for waste and sputum containers.

Workload of DOTS chemotherapy *feldsher*: 15 patients come for DOT daily, (category 1: 9 patients, category 2: 1 patient, category 3: 5 patient). The TB 01 form is provided by OPTD and filled in. The notes are accurate. The primary health care worker demonstrated a good knowledge of patients and required treatment regimens and demonstrated TB drugs available for their treatment. After taking the drugs, patients are asked about their side-effects and any complaints. The chemotherapy point is open from 8:00 to 10:00 daily, including Saturdays. MDR-TB patients within the Global Fund project are provided with DOT at home.

Table A6.18 shows the number of TB cases detected among TB suspects.

Table A6.18. TB cases detected among TB suspects

Year	No. TB suspects referred	No. TB cases detected
2010	11	3
2011	6	1
2012 (January–May)	2	1

Territorial doctors are trained in DOTS (2009) and internal diseases including TB (2010). All doctors have postgraduate training every five years at medical training institutions, and also thematic training on DOTS.

No specific recommendations are offered to this facility.

Visit to TB Hospital, Zharkent, Panfilov district, Almaty Oblast

TB service financing

Zharkent TB hospital budget for 2012: KZT 120 million, of which KZT 78 million is spent on salaries and benefits.

Laboratory

- The laboratory performs microscopy and culture on solid media LJ (it is one of the culture points in the oblast); after growth (approximately two months) the culture is sent to Talgar OTBD laboratory for DST. Sputum is not transported.
- The DST results are available 3.5–4 months after the start of treatment.

Patient management

- Contact investigation: during 2009–2011, no TB cases were detected among contacts.
- Zharkent TB hospital. Two departments located in different wings of the buildings and separated by inner and outer walls:
  - for new cases – 25 beds, 8 wards (22 patients at the time of the visit);
  - for retreatment cases – 25 beds, 10 wards (13 patients at the time of the visit).
- Criteria for hospitalization: infectious status (all SS+ positive cases are hospitalized). Other cases with extensive lung processes (no clear criteria).

Human resources

There are 143 medical doctors in the district health-care system, plus 519 nurses and *feldsher*s. TB control in the district is coordinated by the district TB hospital, which includes one principal doctor, six TB doctors, and one TB laboratory doctor. In total there are nine positions for TB doctors, of which eight are occupied, including two women on maternity leave.

The age of TB doctors: one TB outpatient doctor is of pensionable age, two doctors are aged 50–60 years, two doctors are aged 30–45 years, three persons are below 30 years: there is one young specialist just after internship, and two young doctors on maternity leave.

There are job descriptions available for different types of medical workers – TB doctor, TB nurse, head of department, etc. TB detection and treatment control in the continuation phase or other stages for outpatients are delegated to primary health care services and monitored by TB doctors. There was no turnover during the last year, and human resources are not considered a problem.

There is a system of individual attestation of staff through the external audit conducted by OTBD supervisors, which is performed through training and testing and includes terms of reference for performance. Supervision by the OPTD supervisor is performed quarterly. Checklists are available in advance, feedback is provided by means of an immediate summary during the visit. Follow-up of recommendations is performed during the next supervisory visit. Supervision is seen as practical support and there is an open and trusting atmosphere between the district and

OTBD staff. Medical workers undergo official accreditation and certification every five years for their qualification categories.

The average salary for TB doctors is KZT 60 000–100 000 (depending on qualifications), for medical nurses KZT 40 000–80 000 (depending on qualifications).

The human resources department for TB staff is based in the district primary health care facility (polyclinic), where all information is stored in the human resources system of the Unified National Health System. Annually it is determined who is due for regular postgraduate training and certification and this information is sent to the OPTD through the district's principal TB doctor. TB doctors also are regularly trained by the OPTD training centre in early detection, DOTS and other aspects of TB control, and they participate in regional and national conferences and workshops on TB control.

All doctors at the facility had undergone postgraduate training in the last five years, plus they had had certification training for categories of qualification (two doctors are in the first category of qualification). Internship and training courses at the Almaty State Institute for Postgraduate Medical Education include practical information on TB management. TB laboratory doctors and TB laboratory technicians have received specialized and on-the-job training.

Among the key issues for human resources is the high proportion of TB doctors approaching pensionable age and the low proportion of young doctors to ensure continuity of TB control. Among the solutions could be training of persons from the local area at medical school and in TB internships, who could then stay and work in their home area (example – one young doctor in the facility).

Medical products, TB drugs

TB drugs are supplied to TB patients free of charge. First-line TB drugs are funded from the regional budget, and second-line TB drugs are purchased from regional or Global Fund project funds. There is no use of fixed-dose combination TB drugs. Treatment regimens are consistent with the Ministry of Health Decree No. 218 and in line with WHO recommendations. There are no outpatient anti-TB drugs formulations available. The TB drugs are stored in a special facility of two rooms; the rooms where drugs are stored have locks and shelves with closed cells. The facility practises first-expiry-first-out. Stock records are kept with detailed information on each drug, producer and expiry date. In the visited facility, the stock records are up to date in respect of the amount of drugs on the shelves and already distributed. According to the information provided, there were no stockouts of anti-TB drugs in the health facilities during the last 12 months. In the visited facility, no expired anti-TB drugs were found during the visit.

There is a one-month buffer stock of anti-TB drugs in the facility visited. The medicines are stored in a systematic way (pharmacological). The storeroom is equipped with an air-conditioning unit, thermometer and hygrometer. The daily temperature/humidity check card is kept in the storeroom. There is adequate space in the storeroom to store drugs. There are no medicines stored directly on the floor. There is adequate space between the medicines and the walls.

The facility does not provide TST or BCG vaccination. X-ray equipment is modern, and waste disposal is carried out by a local supplier selected by tender.

Table A6.19 shows the first-line and second-line anti-TB drugs, tuberculin and BCG vaccine found in the facility.

Table A6.19. Stock of first-line and second-line anti-TB drugs, tuberculin and BCG vaccine, Zharkent TB Hospital, May 2013

Name/formulation/strength	Manufacturer (name/country)	Expiry date
Isoniazid, 100 mg	Lugansk Khimfarm, Ukraine	08/2013
Isoniazid, 300 mg	Chimpharm, Chimkent, Kazakhstan	12/2012
Rifampicin, 150 mg	Pavlodar Pharm Plant, Kazakhstan	04/2014
Pyrazinamide 0.5 g	Pavlodar Pharm Plant, Kazakhstan	03/2013
Ethambutol, A.4	Lupin, India	02/2016
Streptomycin, 1 g	Kievmedi, Ukraine	06/2014
Isoniazid, 300 10% in ampoules	Kievmedi, Ukraine	11/2012
Cyclocerin, 250 mg	Global Pharma, Kazakhstan	01/2014
Protionamide, 250 mg	Lupin, India	01/2014
Ofloxacin 200	Global Pharma, Kazakhstan	02/2013
Levofloxacin 500	Global Pharma, Kazakhstan	01/2014
For Global Fund project		
Cyclocerin 250	Macleods Pharmaceuticals, India	11/2012
Protionamide 250	FATOL RIEMSER	08/2013
Levofloxacin 500	Microlabs Ltd	08/2013
PAS 5.52	JSC Olainfram, Latvia	10/2013

TB education and ACSM

The TB hospital has two cars for visits. TB education for the public is conducted in cooperation with the Red Cross and a valeologist working for the central district hospital. TB education is also provided by the miniature mass radiography mobile groups during their visits to remote settlements. There are advocacy campaigns and coordination councils on TB organized at the district administration (*Hakimat*) around World TB Day. The district's principal TB doctor also works with the district administration to supply TB patients who need it with social support during the continuation phase (transport for TB patients, referral of children to general sanatoria). Local businesses also provide support for TB patients.

Children

BCG vaccination coverage in the district is 99.4% for first vaccination and 97.9% for BCG revaccination (2011). In 2011, 312 children and adolescents were sent to sanatoria because of latent TB infection.

Laboratory

The staff of the laboratory includes one laboratory doctor and three laboratory technicians. They occupy 1.25 doctor posts and 3.5 laboratory technician posts. The bacteriological laboratory has the capacity to undertake Ziehl-Neelsen microscopy and solid (LJ) cultures. Positive cultures are sent to Talgar TB Dispensary for *M. tuberculosis* complex identification and DST. The laboratory is well-maintained. External quality control for smears is undertaken by the Talgar TB Dispensary laboratory; Zharkent laboratory sends all smears to Talgar, smears are randomly selected for quality control, and the rest are returned to Zharkent laboratory. Zharkent laboratory does not store slides and destroys them.

The laboratory is equipped with three Leica microscopes and one thermostat for solid media. They have one biosafety level I cabinet and one new biosafety level II cabinet. In the first quarter of 2012, 585 diagnostic smears (for 195 cases, of which 51.7% were smear-positive) and 120 diagnostic cultures (of which 25% were culture-positive) were performed.

Surveillance Department

The electronic TB case-management system is in place and working very well. The operator is professional in data entry and generating required reports. The mission team cross-checked the general TB register (TB 03) with the MDR-TB register (TB 11) for the first quarter of 2012, and all patients with outcome "changed to category IV" in TB 03 were also in TB 11, and vice-versa.

Infection control

The hospital has two separate departments for smear-positive and smear-negative TB patients. All patients supposedly have drug-sensitive TB, although in fact many of them have DST results pending, and after approximately three months when DST results are ready, many patients are diagnosed with MDR-TB and are transferred to a specialized MDR-TB facility.

The facility has a nurse responsible for infection control. There were no TB cases in health-care workers in 2011. The nurse showed us the "Complex Plan of Infection Control Activities", a description of job responsibilities with regard to infection control, a register with a log of training in infection control of all newly hired staff, a register with a log of monthly instructions on new decrees, and finally a register with a log of prophylactic vaccinations of staff. There are monthly meetings of the Infection Control Committee.

Recommendation

- Address the potential staffing problem arising from the high proportion of staff of preretirement age, and the low proportion of young doctors. Advocate training in medical school and TB internships for individuals from the local area so that they can stay and work in their home area.

Visit to the Regional TB Dispensary, Talgar, Almaty Oblast

General information

Talgar RTBD is responsible for TB control activities in the southern region of Almaty Oblast: nine rayons and one town (Kapchagay), serving about 1.2 million people. About 80% of the population in the southern region of Almaty Oblast live in rural areas.

TB service structure and staff

In the southern region, there are five TB hospitals with a total of 250 beds (besides the RTBD in Talgar). RTBD Talgar has two separate campuses.

The current structure of the Regional TB Dispensary in Talgar (300 beds in total) is as follows.

- Building No. 1
  - Department No. 1 for children under 12 years – 40 beds;
  - Department No. 2 for children and adolescents over 12 years – 50 beds, including for MDR-TB – 20 beds;
  - Pulmonary therapeutic department No. 4 for forced treatment – 20 beds;
  - Pulmonary therapeutic department No. 5 for new MBT- and extrapulmonary cases – 50 beds.
- Building No. 2
  - Pulmonary therapeutic department No. 1 for MDR-TB among retreatment cases – 50 beds;

  - Pulmonary therapeutic department No. 2 for new MBT+ cases – 50 beds;
  - Pulmonary therapeutic department No. 3 for MDR-TB among new cases – 30 beds.
- MDR-TB departments (Block No. 2)
  - 80 beds for MDR patients;
  - 30 beds in the department for MDR among new cases (it is planned to increase capacity to 40 beds);
  - 50 beds in the department for MDR among retreatment cases.

There are four doctors in MDR-TB departments (two in each).

Staffing norms for TB doctors: the current norm (Ministry of Health Decree No. 328) is one TB doctor per 20 beds; it is expected that this norm will be changed to 8–12 beds/patients per doctor.

TB service performance

MDR-TB departments (Block No. 2): 260–275 MDR patients are hospitalized annually; average length of stay: about 90 days (MDR among new cases) and 120 days (MDR among retreatment cases); bed turnover: 3.1–3.2 days. In 2011, a total of 95 MDR-TB patients were enrolled in category IV treatment (of these, one died and one transferred out). At the moment, there is a total of 535 MDR-TB patients on treatment (different phases) in the southern region of Almaty Oblast.

Laboratory

RTBD laboratory: performs smear microscopy, LJ culture and quality control of peripheral laboratories in the southern region.

In the southern region, there are one regional laboratory (Talgar RTBD) and 18 microscopy laboratories, including five culture points.

Quality control of peripheral laboratories is performed blinded. In 2011, RTBD Talgar laboratory performed: 10 885 microscopy investigations; 20 440 culture investigations.

Patient management

Criteria for hospitalization used: according to Annex 1 of Ministry of Health Decree No. 218 of 25 April 2011, the strategy is to hospitalize all infectious TB cases. During 2010–2012, no TB cases were detected during contact investigation in the southern region.

There is a department for compulsory TB treatment with 20 beds. Hospitalization upon court decision only; all patients have MDR-TB (at the time of the visit, there were 14 patients in the department). Average length of stay four to five months. The wards are closed off from the surrounding area (barred and locked); there are security guards.

MDR-TB departments (Block No. 2): four yellow cards for adverse drug reactions were completed in 2011 (in one department).

Infection control measures include separate entrances, partition walls and ante-rooms; and zoning (red – yellow – green). Mechanical ventilation installed in MDR-TB departments in 2009 does not work.

South Kazakhstan Oblast

Team members

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Accompanied by a representative from the NCTP: Elmira Berikova.

Sites visited

- South Kazakhstan OTBD
- Sairam Rayon TB Dispensary
- Sairam Oblast TB Hospital, TB prison colony
- City Polyclinics No. 5 and No. 6
- Oblast AIDS Centre

Visit to South Kazakhstan OBTD

On the territory of the OTBD, there are three main buildings.

- Three-storey building for MDR-TB treatment. First floor: 90 beds for SS+ patients plus intensive care unit with two rooms; second floor: 70 beds for sputum-smear negative, culture-positive patients; third floor: 60 beds for sputum-smear negative, culture-negative patients.
- Two-storey building. First floor: physiotherapy and faculty; second floor: department for SS+ TB patients with comorbidities, with 55 beds.
- Two-storey facility. First floor: administrative department and bacteriological laboratory; second floor: pulmonary surgery, 60 beds, extrapulmonary surgery 40 beds.

All buildings are 87 years old, and renovations are planned in 2013. Programme management of DR-TB is implemented in direct accordance with Ministry of Health Decree No. 218, which was developed by the NTP in 2011 in conformity with WHO's 2008 *Guidelines for the programmatic management of drug-resistant tuberculosis (3).* The NTP recently submitted the amendments to the national protocol on MDR-TB to the Ministry of Health, which will include updates of the duration of treatment with injectable agents, increasing to a minimum of eight months, and the whole course of chemotherapy of a minimum of 20 months. Thus, the national protocol will match the most recent (2011) WHO recommendations on programmatic management of drug-resistant TB *(2)*, except for some recommendations on the frequency of bacteriological monitoring and ART treatment for HIV-coinfected patients.

Patients with MDR-TB and XDR-TB are treated in specialized TB facilities (MDR-TB wards) and at primary health care level in polyclinics and FAPs in both urban and rural settings. Patients are mostly hospitalized for the intensive phase in specialized MDR-TB wards at the South Kazakhstan OTBD, inter-rayon TB dispensary at Sairam and oblast TB hospital. The average duration of the intensive phase for the GLC cohort is six months (180 doses), with no possibility of extension with

injectable agents procured through the GDF mechanism because of incorrect forecasting while preparing the Global Fund Round 8 application in 2007–2008. From 2012, the newly enrolled GLC cohort will receive injectable agents for a minimum of eight months. Treatment for the GLC cohort in the intensive phase was prolonged using capreomycin funded by the government.

The duration of the intensive phase for the non-GLC cohort is 6–12 months (eight months in average), which is consistent with recent WHO recommendations. The requirement for the whole duration of treatment is 18–24 months for both cohorts. Regimens for both cohorts are designed by the MDR-TB Committee, which holds regular weekly meetings. Enrolment for the GLC cohort was stopped in November 2011; thus all patients currently registered with MDR-TB are starting their treatment with Government-funded second-line drugs. Since the start of the Global Fund Round 8 project, the South Kazakhstan Oblast has enrolled 176 GLC-cohort patients, including 17 with XDR-TB, and 428 receiving second-line drugs from Government sources (234 in 2012). Of the total of 851 patients with laboratory-confirmed MDR-TB, 774 patients are covered for second-line drug treatment in both cohorts (91.0%), with 39 patients with confirmed XDR-TB not covered with second-line drugs and the remaining 38 patients classified as treatment failures after MDR-TB treatment.

OTBD has three specialized MDR-TB units with 220 beds, with patients separated according to their smear and culture status (red, yellow and green zones). At the time of the visit, 173 patients with MDR-TB were on treatment, all with Government-funded drugs. The GLC-cohort patients were on treatment in ambulatory settings in both urban and rural areas. Surgical management is possible at the specialized surgical department (60 beds) and an extrapulmonary TB ward (40 beds). The total bed capacity of OTBD is 375 beds.

All patients were on treatment with a standardized regimen of second-line drugs including Z, injectable agents, fluoroquinolones (Ofx/Lfx), Pto, Cs and PAS. According to the protocol, pyrazinamide is used only in the intensive phase. However, in the case of severe disease, the MDR-TB Committee may extend the use of Z, potentially for the whole duration of treatment. Moxifloxacin is available only for XDR-TB patients from the GLC cohort, but it has a short lifetime (expiry end of May 2012). Starting from 1 June 2012, moxifloxacin will be replaced with high dosages of levofloxacin. The non-GLC XDR-TB patients are also covered with levofloxacin. DST to second-line drugs was not available for all patients with confirmed resistance to HR.

Mostly patients are hospitalized for the start of treatment and the whole intensive phase. Patients suffering severe adverse reactions may be hospitalized at any point during treatment, as well as those patients whose DOT cannot easily be organized in ambulatory settings. DOT is performed by nurses. Clinical monitoring at OTBD is possible, with consultations with psychiatrists, internists and other specialists. The full range of laboratory diagnosis is performed, including general blood and urine tests, liver function tests, bilirubin, glucose, creatinine, urea and uric acid. Side-effects are managed appropriately; an adequate list of ancillary medicines is available at OTBD pharmacy. However, there is a general tendency to withdraw the medicine from the regimen rather than restarting it after management of the adverse reaction. State-approved "yellow" cards are filled in by doctors if the drug is permanently withdrawn from the regimen. Side-effects are not recorded on a regular basis to monitor frequency, severity, outcomes or ancillary medicines used.

Laboratory

Laboratory workers strictly follow instructions given by NTP and other authoritative bodies. The oblast laboratory performs smear microscopy, TB solid and liquid cultures and DST for first-line

and second-line drugs, and supervises the oblast laboratory network, which consists of 18 specialized TB laboratories and 23 laboratories at primary health care level (for the last five years, the smear detection rate at primary health care laboratories has been less than 1%, for TB specialized laboratories the rate was around 15% in 2011) and one laboratory at the correctional facility. No rapid tests are yet in place, although there are plans to introduce the Hain test in the near future. Facilities at the oblast laboratory require upgrading to ensure an appropriate biosafety level for processing TB solid and liquid cultures. Some renovation has been undertaken in preparation for the installation of a ventilation system planned for 2013. It is therefore strongly recommended that ventilation should be installed in the laboratory facilities without delay to ensure proper airflow. Some quality control practices are in place (for smear-staining, media sterility, media growth characteristics, temperature control, etc.) but there is a lack of a systematic approach towards quality. Standard operating procedures are available for some procedures and are presented in a standard format, but the majority of laboratory workers in the visited laboratories have little understanding of the standard operating procedures concept or use of standard operating procedures. The oblast laboratory participates in EQA proficiency testing for DST organized by the NRL (100% and 91% results concordance in 2009 and 2010, respectively). EQA practices which are currently implemented based on NTP guidelines for the smear microscopy network are outdated, though with complex rechecking system elements (the currently used system is not designed to detect errors: no “blind” approach for rechecking; no random sampling; no proficiency testing exercises). A computerized laboratory information system at the oblast laboratory serves only for recording/archive purposes, with no report-generating functions. Some data is additionally maintained in separate Excel files; reports are mainly compiled manually, which is inadequate in view of the huge workload and amount of laboratory data to be processed; as a result, only limited analysis of laboratory work and quality indicators is performed. Additionally, because of contradictory instructions issued by different authorities, a double registration system of patient examinations is maintained at the laboratory which is not permissible and should be discouraged.

Infection control

The facility has an infection control committee which meets regularly every month. The committee members are representatives of the OTBD, oblast SES and penitentiary sector. Minutes of committee meetings were supplied to the team. There is a facility infection control plan, updated in 2012. The infection control plan covers all main activities and subactivities, listing the responsible staff and timelines. Surveillance of TB morbidity among staff is conducted; a registry for TB disease among staff in the oblast is available in the facility. A total of two new cases of TB among staff were registered in the South Kazakhstan Oblast in 2011. Training on infection control has been conducted by NTP. An oblast-level budget is available for the procurement of infection control equipment, including respirators, surgical masks and disinfecting reagents. Proper respirators in sufficient amounts have been procured for 2012 (5000 respirators). Standard operating procedures are developed for high-risk procedures like sputum collection. Separation is in place, based on microscopy, culture and DST status.

The challenges in the area of TB infection control are the following. Regulations from central level include unnecessary interventions mainly focused on facility disinfection, involving high-dose, strong disinfectants used on surfaces, linen, personal belongings, dishes, food leftovers, etc. Although separation is very well organized and the facility has designated high-risk, medium-risk and low-risk areas, still separation cannot be fully accomplished until laboratory rapid diagnostic methods are implemented. The requirements for infection control measures for sputum collection are not fully adequate. Engineering control measures are poor: mostly saturation UV lamps are used in the facility and some of them were not functional. In most parts

of the buildings, old windows have been replaced by plastic windows with a 50% fixed area, which reduces the potential for natural ventilation. Respirators were not used by all staff in high-risk areas, for example in the SS+ MDR-TB treatment facility.

ACSM

Advocacy activities intended to obtain and maintain the level of funding from local authorities are carried out by the TB programme. There is close collaboration between the programme and the heads of local administration in implementing the objectives. IEC activities are carried out in TB institutions. The most prominent activity is "patient schools": five subjects related to TB taught over 5–10 days. The nurses who conduct patient schools have been trained in patient education (funded by the Global Fund). The IEC indicators are monitored by the oblast monitoring and evaluation team. The retention of information by the patients varies, with the highest retention observed at the forced treatment facility.

Achievements include good organization of work by the healthy lifestyles nurse, monitoring of indicators from patient schools and the use of various media channels for communicating TB messages.

Challenges include lack of active participation of TB patients in education of their peers (non-risk groups) about TB; and retention of knowledge about TB by patients in some TB facilities. One concern is the sustainability of the work of the healthy lifestyles nurse, currently supported by the Global Fund. Information materials, especially in respect of TB transmission, should be harmonized.

Human resources

Government efforts to attract medical staff to rural areas have had a positive impact at the facilities visited. Job descriptions and other information in personnel files are kept in good order. Part of the tasks are delegated to the primary health care network, and many TB facilities have been reorganized recently, with little impact on staff. Programme performance is monitored by the monitoring team using a number of indicators. The results of monitoring are reported by the team to management and discussed with staff. All levels of the TB control programme are covered by supervision, from the national to the oblast/rayon level and from the rayon to the primary health care level. Separation of monitoring and supervision is a good idea, since it divides the more control-oriented function from the on-the-job training and mentoring function.

The staff at this and other visited oblast facilities are young. Staff remuneration and workload in the visited facilities are adequate, staff information is kept accurately, staff turnover is low. Regular training, at least once every five years, is available and funded by the Government. Special training and updates regarding any changed policies or protocols are organized at the national and regional level. The challenge is shortage of particular specialists (laboratory staff, psychologist/sociologist at TB facilities, national-level specialists).

Recommendations

- Diagnosis: DST to second-line anti-TB drugs (at minimum to an injectable agent and fluoroquinolones) should be performed before starting MDR-TB treatment on all patients with confirmed resistance to H and R, or R resistance only, using the BACTEC MGIT-960 system.
- Treatment: Z should be considered for use during the whole duration of treatment for MDR-TB patients with severe pulmonary damage and cavities. The duration of the

intensive phase of treatment should be a minimum of eight months. The whole course of chemotherapy of MDR-TB should last no less than 20 months.

- Long hospitalization of MDR-TB patients (i.e. for the whole intensive phase of treatment) is not required. Patients can be discharged from hospital during the intensive phase at least when there is strong evidence for bacteriological conversion and a good treatment response has been achieved, and when strict DOT can be guaranteed in the ambulatory setting and injections can be administered at the primary health care level.
- Side-effects should be recorded on a regular basis to define the frequency of adverse reactions and the ancillary medicines used.
- Laboratory: urgently install a ventilation system at the oblast laboratory facilities and follow biosafety precautions in arranging a workflow path for daily operations; develop a biosafety manual.
- Appoint a laboratory quality manager; develop a comprehensive quality manual; continue developing standard operating procedures for all procedures and promote their effective use by all workers.
- Develop and implement an internationally recommended EQA system for smear microscopy networks (information and education materials can be found at: http://www.tbcare1.org/publications/toolbox/eqa/).
- In collaboration with NTP/NRL, develop and implement a robust laboratory information management system capable of generating reports, including those for monitoring laboratory quality indicators.
- Ensure proper staffing at the oblast laboratory in view of the steadily increasing workload.
- Infection control: update standard operating procedures developed for high-risk procedures, such as sputum collection and bronchoscopy. In addition, these standard operating procedures should contain information indicating where (indoors/outdoors) in what conditions (natural ventilation/mechanical ventilation/UVGI) and at what intervals (if conducted indoors in a sputum collection room or booth) such procedures can be conducted.
- Consider replacement of all saturation UV lamps by upper-room UV lamps and ensure their proper installation, use and maintenance. This may improve infection control conditions, especially in winter when the use of natural ventilation is relatively limited.
- Procure special equipment for monitoring ventilation systems and UVGI in the OTBD while conducting monitoring visits (vaneometer to check air velocity and ultraviolet C meter to monitor effectiveness and safety of UVGIs).
- When major renovations of the buildings are conducted in 2013 (as currently planned) all plans need to be consistent with infection control requirements. The role of mechanical ventilation should not be overestimated. It is very important to make sure that installation is performed properly and that the facility has enough budget for its use and maintenance.
- Develop a respirator programme in the facility, within the framework of the infection control committee, and ensure annual fit-testing of all respirators and education on their proper use.

Visit to Sairam Rayon TB Dispensary

The dispensary serves a population of 500 000. It is located in a brand new two-storey standard building, built in 2010 using Government funding (cost KZT 937 million, including equipment.) The total number of new cases registered in 2011 was 128. Among new patients with pending DST results, around 18% are subsequently diagnosed with MDR-TB and transferred to the OTBD for further treatment.

The facility serves both inpatients and outpatients and has 100 beds for SS+ drug-sensitive patients. First floor: outpatient department on one side and inpatient department for SS+ new cases on the other side. Second floor: inpatient department for SS+ retreatment cases on one side and cabinets for electrocardiography, ultrasound, bronchoscopy, dentistry and physiotherapy plus a dining room on the other side.

The Sairam Rayon TB Dispensary provides treatment for regular TB and MDR-TB patients from three rayons and Shymkent City, and also serves as a monitoring centre for rayon primary health care facilities. The building was renovated in 2010 using Government funding. The majority of patients with MDR-TB living in close proximity to the dispensary come for treatment to the DOT room, which is open six days a week during regular working hours. MDR-TB regimens and dosages are adequate, with the majority of patients on continuation-phase treatment. The use of injectable agents in ambulatory settings is challenging, so the majority of patients are hospitalized at the OTBD for the whole intensive phase of treatment. At the time of the visit, 73 patients were on ambulatory treatment at the DOT point at the dispensary, 30 of whom had MDR-TB (10 GLC and 20 non-GLC). The majority of patients take their drugs in a single dose once a day. Side-effects were not recorded or reported in recent months. PAS is supplied from Government sources. Three patients from the non-GLC cohort were on an injectable agent (Cm) but reported injections being done on Sundays. No doses were recorded as missed. Dispensary doctors perform regular monitoring of treatment of patients in polyclinics (DOT cabinets or *chimizatorskiye*) in the catchment area at least once every 10 days, in line with Ministry of Health requirements. Social support is provided only through the Global Fund Round 8 grant for nine patients.

Drug storage and management are adequate, with separate recording and storage of GLC and non-GLC drugs. Conditions are adequate, with a thermometer and hygrometer available, and air conditioning. The dispensary receives its stock of second-line drugs monthly from the pharmacy at OTBD. Information on drug management may be sent to the rest of the territories of Kazakhstan, containing dosages of each medicine used in the regimen for each patient, with the cumulative figure calculated at the end of each month.

Laboratory

A former smear-microscopy centre has recently been renovated and upgraded into a culture point. At the beginning of 2012, a laboratory doctor was hired and trained (at the oblast-level laboratory) to perform culture isolation using LJ solid medium (ready-made medium slants are obtained from the oblast laboratory). Laboratory staff have demonstrated good theoretical knowledge of laboratory procedures, but the alarmingly low contamination rates (0.6%) and culture growth rates (about 10% – 43 positive cultures out of 444 culture tests in total, including 33 positive cultures out of 310 culture tests for diagnostic purposes over four months in 2012) require further development of practical skills and thorough monitoring of laboratory examination procedures. Grown cultures are sent to the oblast laboratory for DST. Additionally, for some patients, sputum samples are referred to the oblast laboratory for MGIT examination.

The referral system between the rayon and OTBD is well organized. Random checking of patient data traceability and compatibility with TB clinical forms and laboratory logs has proved that patient records are organized and well-kept. To sum up: the laboratory is taking its first steps in TB culture examination and needs continuous support from the oblast-level supervisor.

Infection control

The plan of the new traditional-style building is very good and enables proper separation of patients. The facility has a staff member responsible for infection control and a very well-developed infection control plan for 2012. The plan covers all main activities and subactivities, showing responsible staff and timelines. Surveillance of TB morbidity among staff is conducted; over the last five years there were no TB cases among staff. A registry for TB disease surveillance among staff is available in the facility. On-site training in infection control measures forms part of the infection control plan and is the responsibility of the facility epidemiologist and chief doctor. Funding from the oblast infection control budget is available for infection control equipment, including respirators and surgical masks. Separation is in place. Patients are separated in the hospital into two departments, primary cases and retreatment cases. Within the departments, patients are separated by culture status, SS+ C+ and SS+ C-, and patients with pending sputum-smear microscopy results are also separated within the rooms in the department.

However, as indicated in the registry, around 18% of all inpatients are found to have MDR-TB when they receive their DST results. Although all these patients are transferred to Chimkent OTBD, they have nevertheless been in contact with drug-sensitive TB patients in a single department. Sputum collection is a major challenge in the building. There are two points for sputum collection. One is an outdoor booth for ambulatory outpatients, and the other is indoors for inpatients located on the first and second floors of the building. The outdoor sputum collection booth is a totally enclosed space with no ventilation. The indoor sputum booth is located at the end of the outpatient care department, within a closed room, with no natural ventilation. All hospitalized patients come in the morning between 07:00 and 08:00 for sputum collection, crossing the whole building from the first and second floors. (Mechanical ventilation installed in the sputum booth was measured using a vaneometer and proved good, at 18 air changes/hour.) In the registry most of the windows have “fixed openings”, which limits natural ventilation. Although both SES and OTBD staff perform quarterly monitoring visits, there is no capacity to monitor engineering control measures. No fit-testing of respirators is conducted.

Recommendations

- Treatment: side-effects should be recorded on a regular basis to define the frequency of adverse reactions and ancillary medicines used.
- Second-line drugs should be withdrawn from the regimen only when ancillary medicines used to combat adverse reactions like nausea and vomiting are ineffective.
- The quality of DOT should be monitored regularly by TB doctors to avoid self-administered treatment. Thus, the treatment of patients in the intensive phase should be performed under strict DOT six days a week.
- Financing: set up a policy dialogue to ensure financing for ancillary medicines in order to manage adverse reactions of patients treated at the primary health care level.
- Laboratory: in terms of biosafety, some improvements should be made in procedures for staff actions when entering or leaving “clean” and “dirty” areas; the workflow path should

be revised to meet safety requirements; the centrifuge should be replaced by a safe type with caps.

- Laboratory staff should continue developing practical skills in TB culture techniques; on-site observation of laboratory performance by the oblast-level laboratory supervisor is strongly recommended.
- Infection control: before rapid diagnostic tests are introduced, separate patients with pending DST results; known contacts of MDR-TB cases; and relapsed cases. Separation can be done by using different rooms within both departments.
- Organize outdoor sputum collection outside the booth in good weather. Move the booth closer to the outpatient care services (at present it is very far away) and ensure that there are large openings in the booth for good ventilation. Use the booth only if weather conditions (rain, snow) do not allow sputum collection outside.
- Set up a separate sputum collection booth for the second floor, to avoid all patients crossing the building in the morning and gathering in the outpatient department for sputum collection. The booth should preferably be located on the second floor close to the inpatient department. Ensure it has a high air-change-per-hour rate, as the current one does. Besides ensuring good ventilation, stipulate a minimum 15-minute interval between patients for both sputum collection booths.
- Maximize the use of natural ventilation in the whole building in good weather.
- Develop a respirator programme in the facility within the framework of the infection control committee and ensure annual fit-testing of all respirators and education of staff on proper use of respirators.

Visit to Sairam Oblast TB Hospital

The hospital formerly served as the main treatment facility at oblast level for the management of MDR-TB. Since 2011, the hospital has been reorganized for the management of XDR-TB and forced treatment (60 beds). At the time of the visit, there were 32 patients with MDR-TB on treatment and 16 patients on category I and II treatment. Three MDR-TB patients and one with regular TB were coinfected with HIV. Under State regulations, forced treatment is prescribed for patients with TB and DR-TB who remain smear-positive and refuse treatment in the ambulatory sector. No analysis of the main reasons for hospitalization for forced treatment has been performed. A narcologist and psychiatrist are available to patients; no psychologist is available. Treatment regimens were designed by the MDR-TB committee at the OTBD, and are adequate. PAS has been omitted from the majority of regimens due to intolerance. DST to second-line drugs was not available for all patients in the ward, only DST to first-line drugs. A list of ancillary medicines is available and is updated every 10 days by the hospital pharmacy.

The Sairam Oblast TB Hospital laboratory is a well-organized laboratory which performs smear microscopy and culture isolation examinations. It is well equipped with 2 biosafety cabinets, although the centrifuge is old and does not meet safety or technical requirements for TB work. The laboratory staff of four (one doctor, two technicians, one cleaner) are qualified and experienced; task rotation is conducted on a monthly basis. The daily workload is 13/15 smears/cultures. Grown LJ cultures are referred to the oblast laboratory for DST. In 2011, the laboratory made 4092 smears and 4052 cultures from 2051 patients. Of 4052 culture tests, 1104 (27.2%) were culture-positive. The laboratory staff are familiar with the standard operating procedures concept; laboratory documentation is well-kept.

Infection control

The separate building for forced treatment is located in an old one-storey building. Currently, this department serves all inpatients with SS+ TB, in both sensitive and drug-resistant forms, who are under forced treatment by court decision. Separation is in place, one department is designated for SS+ sensitive and SS+ resistant cases. Within two departments for regular and drug-resistant TB, patients are further separated by culture status and by different resistance patterns. The maximum number of beds in one room is five. The facility has very well-developed infection control plan and separation strategy. Respirators are sufficient in quantity and of good quality. Staff used respirators when entering the departments.

The main challenge in the facility is the old infrastructure which requires major renovation. No engineering control measures are in place. In DOT rooms where nurses distribute drugs in both departments, ventilation is very poor.

Recommendations

- OR/ACSM: conduct analysis of the causes and reasons for forced treatment of TB and MDR-TB patients.
- ACSM: strengthen social and psychological rehabilitation of patients. Nongovernmental organizations should be considered as an option for social and psychological rehabilitation.
- Improve patient education to strengthen knowledge about the approximate remaining time to be spent at the facility for patients in the forced treatment facility and ensure their adherence to treatment upon discharge from the facility.
- Care: consider hiring a psychologist to provide psychological support for patients.
- Diagnosis: DST to second-line anti-TB drugs (at minimum to an injectable agent and fluoroquinolones) should be performed before the start of MDR-TB treatment on all patients with confirmed resistance to H and R, or R resistance only, using the BACTEC MGIT-960 system.
- Treatment: Z should be considered for use during the whole duration of treatment in MDR-TB patients with severe pulmonary damage and cavities.
- The duration of the intensive phase should be a minimum of eight months. The whole course of chemotherapy of MDR-TB should last no less than 20 months.
- TB/HIV: ART treatment is recommended for all HIV-positive patients, regardless of their CD4 cell count.
- Laboratory: continue developing standard operating procedures and analysing laboratory performance indicators in collaboration with the oblast-level supervisor.
- If NTP decides to adopt new EQA schemes for smear microscopy, the Sairam Oblast TB Hospital laboratory could be considered as one of the sites to lead this process, in collaboration with the OTBD laboratory.
- Replace the centrifuge with a type appropriate to TB work.
- Infection control: as a short-term recommendation before the infrastructure is improved, ensure positive pressure in nurses' rooms, with directional airflow from the nurses' room to the corridor.
- Install upper-room UVs within the departments, especially in high-risk "red" zones.

Ambulatory treatment at Shymkent City TB Dispensary

According to data from the 2010 official census, around 640 000 people live in Shymkent City. Unofficially, the oblast health department estimates the population at around 1.2 million people, half of whom are thought to be labour migrants from other rayons of South Kazakhstan Oblast, *oralmans* and people from neighbouring countries. In 2011, the City TB Dispensary reported 719 cases of TB, 515 of whom (71.6%) reported as new cases. A total of 307 patients were registered in category IV with laboratory-confirmed MDR-TB, of whom around 85% are receiving treatment.

Besides specialized TB facilities (OTBD and City TB Dispensary), ambulatory treatment for TB and MDR-TB patients in Shymkent city is provided through an extensive network of 10 city primary health care polyclinics and six family outpatient units (semejnaya vrachebnaya ambulatoriya). Each primary health care facility has a DOT point and DOT providers (nurses), assigned to administer DOT to TB and MDR-TB patients, mostly during the continuation phase, and perform sputum collection and defaulter tracing. Overtreatment is monitored by City TB Dispensary doctors on a regular basis (twice a week). DOT points are open six days a week, with Saturday working hours from 8:00 to 13:00. Transportation is available at every primary health care facility, but is not used for defaulter tracing. If a patient defaults, DOT nurses contact the patient themselves. The system of "home patronage" (i.e. home care) is available for a limited number of patients, mostly those with MDR-TB, who are not able to come for treatment to a DOT point at either the City TB Dispensary or a polyclinic. The list of patients for home patronage is updated monthly by the OTBD. The home patronage system with a vehicle, driver and nurse was established in the third quarter of 2010 within the Global Fund Round 8 grant: it originally covered 30 patients up to 2012, and now covers 20. Social support (food baskets) is provided for 23 patients on a monthly basis but does not address the actual needs, as the majority of patients are from a socially disadvantaged sector of society. Reimbursement of travel costs is also possible only through Global Fund funding (75 patients covered per month). In 2011, the City government allocated around KZT 300 000 for social support (food baskets), which was considered as substantial aid, but not allocated on a regular basis. Each city polyclinic has a psychologist providing psychological consultations for TB patients; clear job descriptions are available. A separate room for psychologists is available at each polyclinic, in line with Ministry of Health regulations on primary health care (Ministry of Health Decree No. 606).

Visit to Polyclinic No. 5

Polyclinics cover one fifth of the population of Shymkent, including socially disadvantaged population groups. All specialist positions are available, including ear, nose and throat specialist, neurologist, surgeon, cardiologist, endocrinologist, paediatrician and internist. The full range of laboratory diagnostic tests is available, including general blood and urine tests and biochemical examinations.

At Polyclinic No. 5 there were 17 TB patients on treatment, all with confirmed smear- and culture-negative status. Of these, seven have confirmed MDR-TB, and all are on continuation phase treatment (five GLC and two non-GLC patients). Treatment of TB and MDR-TB is organized at the DOT point, and performed by a trained DOT provider (chimizator). The DOT point is open six days a week, with Saturday hours from 8:00–13:00. All patients approached the DOT point themselves because they lived close to the polyclinic. None of the patients was reported as suffering from alcohol abuse. There are various possibilities for treating patients during the intensive phase, including a day-care hospital with 12 beds, open five days a week,

available in the polyclinic building. No food is provided for patients treated in the day-care hospital.

Shymkent Polyclinic No. 5 has a smear-microscopy laboratory which has recently been established after renovation works at the polyclinic building. Nowadays the laboratory serves a population of about 70 000 people, performing smear-microscopy examinations only for diagnostic purposes, while treatment follow-up examinations are performed at the Shymkent City TB Dispensary laboratory. Before this smear-microscopy centre was opened, all sputum samples were referred for testing to the Shymkent City TB Dispensary laboratory, and the latter still closely supervises the polyclinic laboratory. The polyclinic laboratory is fully equipped, has a self-made biosafety cabinet and enough supplies to perform smear microscopy. Commercial reagent kits are used for smear-staining (as everywhere throughout the oblast TB laboratory network). The laboratory's workload is low (e.g. only 14 people were tested in April 2012); in 2011 the smear detection rate was 5% (10 smear(+) patients identified out of 200 suspects screened).

The facility plan complies with infection control standards. The facility has very high ceilings, wide corridors and big windows facilitating good ventilation within the building. Triage of patients at the entrance is very well organized. The facility has an infection control committee and infection control plan. The functional responsibilities of infection control committee members are well assigned in the plan. The infection control plan has been updated in the last year. The DOT room has a separate entrance and waiting area. Sputum collection takes place outside near the microscopy laboratory, which is situated in the same department as the DOT point. Medical staff working in the DOT point and microscopy laboratory have an adequate number of proper respirators. However, cough monitoring and triage need some improvement. Another disadvantage is that outside sputum collection is conducted in a closed booth with poor mechanical ventilation. The office of a member of the technical staff (engineer) is located in front of the DOT room.

Visit to Polyclinic No. 6

Polyclinic No. 6 provides services for a population of 57 000 people from the local catchment area and supervises primary health care in two family outpatient units. The polyclinic has the full range of medical personnel, including three social workers and two psychologists. As of the time of the visit, the DOT provider at the polyclinic was providing treatment for 27 TB patients, including 12 with MDR-TB (GLC – seven patients, non-GLC – five patients). All patients on treatment had confirmed smear- and culture-negative status; none were on the injectable agent. The DOT point is open six days a week, with Saturday hours from 8:00 to 13:00. All patients approached the DOT point themselves because they lived close to the polyclinic. None of the patients was reported as suffering from alcohol abuse. There are various possibilities for treating patients during the intensive phase, with a day-care hospital available in the polyclinic building. No food is provided for patients treated in the day-care hospital.

The smear microscopy centre of Shymkent Polyclinic No. 6 is a new one and was opened in March 2012 (TB 04 log has its first records dated 28 March 2012) to serve the population of about 85 000 people; by the day of the visit, 12 suspects had been screened and one patient had been found to be smear-positive. Before the laboratory opened, all sputum specimens were referred to the Shymkent City TB Dispensary laboratory for testing: thus, in 2012 overall case-finding resulted in the detection of four smear-positive patients out of 67 tested (6%). The laboratory has a self-made biosafety cabinet and enough supplies to perform smear microscopy,

including commercial reagent kits for smear-staining. However, the microscope had a poor light that needed adjusting; a technical check of the microscope is recommended.

At the time of the review mission, there were 27 SS- patients in the continuation phase of treatment. The DOT room is equipped with an open-type ultraviolet lamp. Medical examinations of personnel (with fluorography) are performed once per year. No TB cases have been registered among medical staff during the past five years. Medical staff working in the DOT room have sufficient respirators. The facility requires major renovation. The corridor forms the main waiting area and is very poorly ventilated. There is no triage or cough monitoring. During the visit of the mission, one patient waiting in the corridor had a severe cough. The outdoor sputum collection booth had no openings for ventilation. The UV lamp in the DOT room was open-type and not functional.

Recommendations

- Treatment: follow all clinical recommendations of the WHO NTP review mission. Consider the possibility of conducting intensive-phase treatment at primary level.
- Quality of care: conduct regular assessments of the quality of DOT in rural and urban settings. Strengthen ambulatory treatment through a patient-centred approach. Additional financial resources are required to develop the system of home patronage.
- Laboratory: Polyclinic No. 5 – consider revising the scope of tasks for smear microscopy laboratories by including follow-up examinations as well as diagnostic examinations and strengthening of quality assurance and control activities at peripheral laboratories. Strengthen smear-staining quality control procedures; ensure availability of mechanisms to reject commercial reagent kits of unacceptable quality and procure appropriate ones, when needed. Ensure proper functioning of self-made biosafety cabinets through regular technical maintenance and quality checks. Improve smear preparation techniques; consider revising/harmonizing instructions for making smears with disposable plastic loops to find a solution that meets both biosafety and quality requirements – current use of disposable loops results in poor quality smear preparation.

Note: the above recommendations are relevant to all centres which perform smear microscopy examinations and have similar working conditions.

- Polyclinic No. 6: see recommendations above for the Polyclinic No. 5 laboratory. Adjust the light in the microscope; replace the old microscope with a new one, if possible. Update laboratory workers' job descriptions to include the scope of work in smear microscopy.
- Infection control: Polyclinic No. 5 – Although during the day there is only one, or maximum two, patients coming for sputum collection and therefore the risk is low, it would be better to organize sputum collection in the open air when the weather is good and ensure some ventilation openings in the sputum collection booth, which will be used only if the weather is bad. Relocate staff rooms away from the DOT cabinet corridor.
- Improve triage and cough monitoring procedures. To facilitate this recommendation, develop a special standard operating procedures for cough monitoring, cough etiquette and triage of potential TB suspects and assign staff to be responsible for these aspects. If feasible, replace the open-type UV lamp in the DOT room with closed upper-room UV and also install upper-room UV in the polyclinic main waiting area and DOT waiting area.
- Polyclinic No. 6: facilitate the use of the main waiting area and improve its natural ventilation. Do not use the corridor as a waiting area. Improve triage and cough monitoring

procedures. Organize sputum collection in the open air when the weather is good and ensure some ventilation openings in the sputum collection booth, which will be used only if weather is bad.

- Substitute unshielded UV lamps in DOT room with closed upper-room UVs if feasible and install upper-room UV also in the polyclinic main waiting area.

Visit to TB prison colony ICh 167/7

The TB prison colony of South Kazakhstan Oblast is responsible for the treatment of diagnosed TB and MDR-TB patients transferred from six oblasts: Mangystau, Atyrau, West Kazakhstan, Kyzyl-Orda, Aktobe and South Kazakhstan. In 2011, the prison sector of South Kazakhstan Oblast received additional funding from the Government amounting to over KZT 430 million for renovation of the specialized TB colony and medical equipment. Funding was allocated within the "State Health Care Development Programme for 2011–2015 "Salamatty Kazakhstan". In 2013, the TB colony is expecting additional funding of KZT 218 million from the Government, which it plans to spend on strengthening administrative measures for infection control. Funding has been used to renovate the barracks, improve patients' living conditions and staff workspaces and ensure the administrative separation of patients according to smear/culture and DST status.

The total population of the TB colony at the time of the visit is 477 inmates, including 374 patients with active TB (114 with MDR-TB). Coverage of MDR-TB treatment is 38% and comprises only GLC medicines procured from the Global Fund Round 8 grant (44 patients). Sixty-five patients with MDR-TB are on the waiting list to be included in MDR-TB treatment with either GLC medicines or Government-funded drugs. At the time of the visit, the TB colony received second-line drugs from Government sources for 20 patients (only Cm and fluoroquinolones, the rest are expected in late May 2012). Nutrition of TB patients has improved significantly over recent years and now amounts to around 4000 kilocalories per patient per day (KZT 550).

Transfer of patients from other oblasts for treatment is one of the major challenges for treatment success, and may take up to one month or longer. Around 450 patients came into the TB colony and 440 patients were released in 2011, which means that health personnel are overloaded with work. The facility is understaffed, with eight doctor posts and 15 nurse posts unfilled. Currently, besides 18 TB doctors, the TB colony has one psychiatrist, two internists, one dentist, one ear, nose and throat specialist, one dermatologist and one physical therapist and psychologist.

Treatment of TB and MDR-TB is organized in 300 beds, which seems unduly overcrowded for drug-susceptible TB patients. Management of MDR-TB is performed in specialized MDR-TB wards separated from each other by smear/culture and DST status (three zones: red, yellow and green). Within wards, patients are not separated from one another since DST to second-line drugs has not been conducted on 100% of MDR-TB patients. Those patients with confirmed XDR-TB are isolated in a separate ward and currently do not receive any treatment. The unified MDR-TB committee at the OTBD is responsible for regimen design and clinical monitoring of MDR-TB, also for the prison sector. MDR-TB cases are regularly presented by prison TB doctors at the weekly meetings of the MDR-TB committee. Regimens and dosages are adequate. PAS has been withdrawn from the regimens of all 44 patients because of intolerance. Side-effects are managed with ancillary medicines, but medicines are often permanently withdrawn from the regimens. Side-effects are not recorded or analysed. Culture conversion in the GLC cohort is also not regularly recorded, but time to conversion is, on average, 3–4 months. DST results for second-line drugs are not available in the majority of cases reviewed. Six patients

were coinfected with HIV; all of them were on ART treatment. Data on CD4 cell count and viral load were available for all patients, but with poor clinical response and possible immune failure with ART treatment. Three patients have confirmed MDR-TB and are on the waiting list to begin treatment for MDR-TB with second-line drugs.

DST to first-line and second-line drugs is conducted regularly at the bacteriological laboratory of the Oblast Health Department on two days a week, regulated by the joint agreement between the Oblast Health Department and oblast prison sector. The same agreement regulates surgical treatment for prison TB patients at the Oblast Health Department surgical ward. Clinical laboratory diagnosis has improved, with potassium, liver function, bilirubin, creatinine, urea and uric acid tests available.

The laboratory at the correctional setting is well organized and run. It has been recently renovated and has enough space and, potentially, the capacity to perform TB culture examinations, if the decision is taken to do so, the laboratory is furnished and equipped with the items needed to perform culture examinations and all biosafety requirements are met. Laboratory staff (four people) are well-trained. At the time of the visit, the laboratory conducted on-site microscopy testing and used the Shymkent City TB Dispensary laboratory facilities to perform culture examinations twice a week. The workload is quite high and is steadily increasing (7281 smears and 540 cultures in 2011, compared with 2220 smears and 229 cultures in four months in 2012). Laboratory recording and reporting documentation is well-kept; some developed procedures for handling documentation (e.g. a formal note for discarding positive smears after their storage period has expired, a quality control log for staining, records for technical maintenance of equipment) can be cited as a good example for other laboratories to follow. It was the only laboratory of all those visited in the oblast which demonstrated compliance with the proposed standard operating procedures format – standard operating procedures were signed by a laboratory worker to confirm familiarization with the standard operating procedures content and commitment to follow its requirements.

Recommendations

- TB in prisons/treatment: follow all clinical recommendations of the WHO NTP Review mission. Side-effect monitoring and management should be adequately performed, with the possibility of reinitiating withdrawn second-line drugs from low dosages up to a full increase, depending on weight and tolerance. Side-effects should be recorded and frequency of side-effects analysed. Conduct continuous review of 1G dispensary group (treatment failures and chronic patients with confirmed MDR-TB) and consider enrolment into MDR-TB treatment.
- ACSM: provide policy dialogue at Ministry of Internal Affairs level to scale up the enrolment of MDR-TB patients on the waiting list.
- Diagnosis: Perform DST for second-line drugs in every case diagnosed with HR resistance, using either solid media or liquid media on BACTEC MGIT-960 in the civilian sector.
- Infection control: Strengthen administrative measures by localizing patients by smear/DST status.
- TB/HIV: reconsider ART regimen for those patients with TB/HIV coinfection and MDR-HIV with no clinical response to ART. ART should be provided for all TB and MDR-TB patients with coinfection, regardless of their CD4 cell count.

- Laboratory: in collaboration with the NRL and the OTBD laboratory, develop and implement a computerized laboratory information management system for the proper collection and analysis of laboratory data (accordingly, supply the laboratory with a computer). Strengthen analysis of laboratory performance indicators (including checking of smear results for consistency).

HIV service

Republican TB Dispensary

All patients with active TB are screened for HIV. Blood samples are sent to a territorial AIDS centre, the results are received in one week. If HIV infection is present, an HIV expert is invited to the TB hospital to follow up on HIV treatment and care.

In 2011, 23 076 people were diagnosed with active TB, 22 480 (97.4%) were tested for HIV, and only 352 (1.5%) were identified as HIV-infected, including 52 IDU. Fifty PLHIV were diagnosed with MDR-TB. In 2011, 20 PLHIV with active TB died. These important data, indicating a close link between TB, HIV, drug use and drug resistance to TB treatment, were collected in response to a request, but the information is not collected as routine health indicators and is thus not used for decision-making to address the needs of the most vulnerable groups.

The TB inpatient department of the Republican TB Dispensary has not had TB/HIV patients since 2010. Medical personnel lack knowledge on HIV and its treatment and monitoring and have not been trained in HIV.

Visit to City TB Dispensary

Fourteen PLHIV with active TB were hospitalized in the TB inpatient department, of whom four have MDR-TB. All of them have been attended by the HIV expert from the City AIDS Centre and receive CPT, but ART has not been initiated. TB and HIV experts do not discuss joint TB/HIV patient management, and TB doctors are not involved in the provision of any HIV care.

Visit to City AIDS Centre

There are 1689 PLHIV registered for HIV care at the City AIDS Centre. However, no data are available about the number of PLHIV seen for care annually. In 2011, 92 PLHIV were diagnosed with active TB, of whom 73 are IDU and 72 are male. However, opioid substitution therapy is not available at the AIDS Centre. A total of 358 PLHIV (cumulative figure) are on ART. The level of retention in ART after 12 months is only 61%. Efforts to increase ART adherence are essential.

In her analysis of the reasons for the progress of HIV infection in 58 patients who have developed AIDS in the city of Almaty, Gulzhahan Akhmetova, who works at the Almaty AIDS Centre, showed the following.

- In Almaty, 44.8% of patients first come to light when already at the HIV-infection end-stage. Wider introduction of indirect fluorescent antibody testing is necessary, as indicated in recommended clinical research.
- A total of 41.4% of patients had been on the dispensary list for more than two years. More careful and regular dispensary observation and various incentives for regular dispensary observation and support for ART are required.

- A total of 13.8% of patients stopped dispensary observation when they changed their place of residence. In Almaty, it is necessary to pay all-round attention to the problems of migrants in order to improve their access to medical assistance.

Ms Akhmetova estimated that roughly 10–15% of PLHIV are not Kazakh citizens. "About 14% diagnosed with AIDS are inhabitants of other regions, which not only complicates treatment of accompanying diseases, but also interferes with control over appointments and carrying out ART."

The mission had an informative discussion with the USAID Dialogue on HIV and TB Project, which is implemented by a consortium of partners led by Population Services International (PSI) and includes Project HOPE, AIDS Foundation East-West, and the Kazakhstan Union of PLHIV.

This is a five-year project aimed at reducing the spread of the HIV and TB epidemics in central Asia (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) by improving health behaviour among the most-at-risk populations (IDU, female sex workers, men who have sex with men, migrants, prisoners and PLHIV).

Project goals include:

- reduction in risk behaviours associated with HIV transmission;
- increased use of evidence-based HIV prevention and TB treatment services by most-at-risk populations;
- improved TB case detection among selected most-at-risk populations; and
- improved compliance with and decreased default rate from TB treatment among most-at-risk populations (outreach activities range from peer education to client management to social escorts who accompany clients when they visit HIV and TB services).

Visit to Narcological City Dispensary

The estimated number of IDU in Kazakhstan is 123 640, although the number officially registered in narcological services across the country is 30 256. In the Narcological City Dispensary, as of 1 April 2012, 4209 drug-dependent people were registered, of whom 96% (4055) are IDU. Heroin is the main illegal drug used in the country. However, only 118 patients receive opioid substitution therapy. All outpatients of the narcological dispensary are referred to general practitioners for TB examination, but there is no follow-up or statistics on number of people reached, screened or diagnosed with TB. For inpatients of the narcological dispensary, TB screening is performed by means of universal X-ray. If TB is suspected, an invited TB expert from a TB dispensary makes the TB diagnosis and transfers a patient by car to the TB hospital.

Health-care workers at the dispensary believe that all IDU are offered HIV testing. However, the data indicate that, in 2011, of 909 newly registered IDU only 45% (412) were tested for HIV (in either inpatient or outpatient facilities). HIV test results are not known to health-care workers because of the – probably incorrect – perception of confidentiality.

Nongovernmental organizations working with IDU are not in contact with the narcological service. Better collaboration between TB and HIV services, the narcological service and civil society is required.

Visit to Almaty Regional TB Dispensary

The proportion of TB patients with known HIV status is 100%. The proportion of TB/HIV patients, of all TB patients in 2011, was 40 out of 2671 (1.5%) in the oblast. The number of TB/HIV patients on ART is zero, as patients start ART after their discharge from the TB service. Five patients who were already on ART prior to their TB diagnosis continued their treatment under the control of TB doctors, and ART was supplied by the AIDS Centre to the TB dispensary. TB patients with detected HIV infection are attended by an AIDS Centre specialist and receive CPT at the TB dispensary. The TB/HIV responsible officer follows up these cases.

All TB patients are tested for HIV if their status is not already known. TB doctors perform pre-test consultations. If the HIV test is negative, the same TB doctors conduct post-test consultations. If the HIV test is positive, the post-test consultation is conducted by an infection specialist from the AIDS Centre.

HIV patients are treated by TB doctors as instructed by AIDS Centre specialists. An HIV patient who is suspected to have TB is referred for diagnostic examination to the general primary health care facility. The patient is referred by phone, and no papers are supplied stating the HIV status of the patient. The patient him/herself informs the primary health care doctor about his/her HIV status. The AIDS Centre specialist follows up the patient. ART is usually started on completion of TB treatment. If the patient started ART before TB was detected, ART is continued under the TB doctor's control. Information about ART and CPT is included in the TB 01 form, as well as on the list of prescriptions. TB/HIV coordinators were trained in 2010 on "Monitoring and evaluation of TB/HIV collaborative activities in the RK" in training courses organized by the national TB centre for TB doctors, HIV module (three to four hours). TB doctors are trained in pre- and post-test counselling.

All TB patients with unknown HIV status are persuaded to undergo HIV testing. They sign an informed consent form and are tested on their awareness of TB, including TB/HIV. The AIDS Centre informs TB doctors about HIV and invites them to attend training about new regulations, decrees and guidelines. Quarterly, there is an exchange of information on TB/HIV patients between the TB and HIV services.

HIV prevention activities among TB patients include education on HIV and risk behaviour, information leaflets, lectures, patient schools and a questionnaire upon arrival. There is no access for TB patients to opioid substitution therapy; however, it is available outside TB facilities.

IPT is administered by AIDS Centres, which have TB doctors on their staff. IPT is provided for all TB patients with HIV infection (isoniazid 0.3–0.6 mg per day for six months).

Cooperation between TB services and AIDS Centres is laid down by Government Decree No. 1280. It covers continuity, collaboration of TB and HIV services in surveillance, prevention, examination of patients and joint medical councils by two services. There is a need for additional training of TB doctors in HIV infection control. The Central Asian Scientific and Practical Conference on TB/HIV (Dushanbe, Tajikistan, 6–7 October 2010) served as a basis for exchanges of experience.

In the visited facility, the treatment card, form TB 01, included information on CPT and ART, dates of starting CPT and ART and the dates and outcomes of any HIV test. The treatment regimen is described on the medical card and prescription sheet.

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Annex 7

FIRST-LINE (NON-GDF) AND SECOND-LINE ANTI-TB DRUGS CURRENTLY USED IN THE TB NETWORK OF THE REPUBLIC OF KAZAKHSTAN

No.	Drug name, strength, dosage form	Supplier/manufacturer	WHO pre-qualification	Reason for purchase
1	Ekoks (ethambutol hydrochloride), 400 mg, tablet	Macleods Pharmaceutical Ltd., India	Yes	
2	Ethambutol, 400 mg, tablet	Pavladar Pharm Plant Ltd., Kazakhstan	No	
3	Kombutol (ethambutol hydrochloride), 400 mg, tablet	Lupin Limited, Mumbai, India	Yes	
4	Isoniazid, 10% 5 ml, solution for injection	Darnitsa, CJSC, Ukraine	No	
5	Isoniazid, 300mg, tablet	Pavladar Pharm Plant Ltd., Kazakhstan	No	
6	Pyrazinamide, 500 mg, tablet	Pavladar Pharm Plant Ltd., Kazakhstan	No	
7	Macrozide (pyrazinamide), 500 mg, tablet	Macleods Pharmaceutical Ltd., India	No	
8	Rifampicin, 150 mg, capsule	Pavladar Pharm Plant Ltd., Kazakhstan	No	
9	Rifampicin ferein, (rifampicin), 150 mg, lyophilizate for injection, vial	BRYNTSALOV-A PJSC, Russian Federation	No	
10	Forecox (rifampicin/isoniazid/pyrazinamide/ethambutol), 150/75/400/275 mg, tablet	Macleods Pharmaceutical Ltd., India	Yes	
11	Piref-4 (rifampicin/isoniazid/pyrazinamide/ethambutol), 150/75/400/275 mg, tablet	Pavlodar Pharm Plant Ltd., Kazakhstan	No	
12	Rimstar 4fixed-dose combinations (rifampicin/isoniazid/pyrazinamide/ethambutol), 150/75/400/275 mg, tablet	Sandoz Private Limited, India	No	
13	Streptomycin, powder for injection, 1 g, flacon	"Kyivmedpreparat" JSC, Ukraine	No	
14	Streptomycin, powder for injection, 1 g, flacon	Synthesis JSC, Russian Federation	No	
15	Amikacin, powder for injection, 0.5 g, flacon	Krasfarma JSC, Russian Federation	No	
16	Merkatsin (amikacin), solution for injection, 500 mg/2 ml, flacon	E.I.L.I. Co World Medicine, Egypt	No	
17	Capreomycin, 1 g lyophilizate for injection, flacon	Khimfarm JSC, Kazakhstan	No	
18	Kanamycin, powder for injection, 1 g, flacon	Khimfarm JSC, Kazakhstan	No	
19	Cycloserine, 250 mg, capsule	Global Pharma Ltd. PO, Kazakhstan	No	
20	Oflomac (ofloxacin), 200 mg, tablet	Macleods Pharmaceutical Ltd., India	No	
21	Neuroks (levofloxacin), 500 mg, tablet	Global Pharma Ltd. PO, Kazakhstan	No	
22	Protionamide, 250 mg, tablet	Macleods Pharmaceutical Ltd., India	No	
23	Etamid (ethionamide), 250 mg, tablet	Macleods Pharmaceutical Ltd., India	Yes	
24	Paskonat (PAS), solution for injection, 3% 400 mg, flacon	Yuri-Pharm, LLC, Ukraine	No	

No.	Drug name, strength, dosage form	Supplier/manufacturer	WHO pre-qualification	Reason for purchase
25	Pasco, sodium. Each sachet contains: *p*-aminosalicylate sodium delayed-release granules (60% w/w) 9.2 g (equivalent to 4 grams *p*-aminosalicylic acid).	Khimfarm JSC, Kazakhstan	No	
26	Clabel (clarithromycin), 500 mg, tablet	Nobel Ltd., Kazakhstan	No	
27	Floxsafe (moxifloxacin), 400 mg, tablet	MSN Laboratories Ltd., India	No	
28	Moximac (moxifloxacin),400 mg, tablet	Macleods Pharmaceutical Ltd., India	No	
29	Amiklav (amoxicillin + clavulanate), 625 mg, tablet	Chimpharm JSC, Kazakhstan	No	
30	Clavam (amoxicillin + clavulanate), 625 mg, tablet	Alkem Laboratories Ltd., India	No	
31	Medoklav (amoxicillin + clavulanate), 625 mg, tablet	Medochemie Ltd., Cyprus	No	
32	Peteha (protionamide), 250 mg, tablet	Rimzer/Fatol, Germany	No	Global Fund
33	Cycloserine, 250 mg, capsule	Macleods Pharmaceutical Ltd., India	No	Global Fund
34	Pasco sodium. Each sachet contains: *p*-aminosalicylate sodium delayed-release granules (60% w/w) 9.2 g (equivalent to 4 grams *p*-aminosalicylic acid), 100 g, jar	Macleods Pharmaceutical Ltd., India	Yes	Global Fund
35	Moxifloxacin, 400 mg, tablet	Cipla Ltd., India	Yes	Global Fund
36	Levofloxacin, 250 mg, tablet	Micro Labs Ltd., India	No	Global Fund
37	Amikacin (selemycin), solution for injection, 500 mg/2 ml, flacon	Medochemie Ltd., Cyprus	No	Global Fund
38	Amoxicillin + clavulanate, 400 mg, tablet	Micro Labs Ltd., India	No	Global Fund
39	Clarithromycin, 500 mg, tablet	Micro Labs Ltd., India	No	Global Fund
40	Kapostat (capreomycin), lyophilizate for injection, 1 g flacon	Eli Lilly, USA	No	Global Fund