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Acknowledgments

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Abbreviations

ACSM	advocacy, communication and social mobilization
AFI	Act for Involvement
ART	antiretroviral therapy
BCG	Bacillus Calmette–Guérin (vaccine)
DOT	directly observed treatment
DST	drug susceptibility testing
GDF	Global TB Drug Facility
GDP	gross domestic product
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GLC	Green Light Committee
HCT	HIV counselling and testing
IPT	isoniazid preventive therapy
MDR	multidrug-resistant
MGIT	mycobacteria growth indicator tube
NGO	nongovernmental organization
NHIC	National Health Insurance Company
NIPP	National Tuberculosis Institute “Chiril Draganiuc”
NTP	National Tuberculosis Programme
PAS	Centre for Health Policies and Studies
PCIMU	Project Coordination, Implementation and Monitoring Unit
SIME	system of information for monitoring and evaluation
SMIT	Moldovan Society against Tuberculosis
TB	tuberculosis
TST	tuberculin skin test
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
XDR	extensively drug-resistant

Executive summary

The Republic of Moldova is among the WHO European Region's 18 high-priority countries for tuberculosis (TB) control and among the world's 27 high multidrug-resistant TB (MDR-TB) burden countries. The Global Fund to Fight AIDS, Tuberculosis and Malaria ranks the Republic of Moldova second among 110 countries by level of funds provided per capita. The second phase of implementation of its consolidated Round 8 and 9 TB grant was approved in December 2012 with a request to submit, at a later stage, a review of the National TB Programme and a strategic plan (based on the review) to improve treatment compliance and reduce loss to treatment follow up. A major concern highlighted was that supported interventions have shown only a limited impact in improving treatment success. In October 2012 the Ministry of Health asked the WHO Regional Office for Europe to coordinate the review of the National TB Programme.

The review took place from 4 to 15 February 2013. Twelve international and seven national experts participated, visiting 18 districts and three municipalities, the autonomous region of Gagauzia and the Transnistria region. The review team developed a strategic plan to improve treatment compliance and reduce loss to treatment follow up immediately after the review; this appears as part of the roadmap attached to this report (Annex 1). The team members conveyed their key findings and recommendations at the end of the mission to the Minister of Health.

Main findings

According to the latest surveillance data (2011), almost one third of newly diagnosed TB patients and two thirds of those returning for treatment have MDR-TB. The Republic of Moldova has one of the highest documented levels of MDR-TB in the world. Its prevention and control is of high relevance for the country and the WHO European Region.

The trends in TB and MDR-TB notification rates in the Republic of Moldova have not significantly decreased in the last five years. TB remains the most frequent diagnosis among people living with HIV. There is also significant ongoing transmission of TB and MDR-TB in the country. TB transmission has been documented among hospital patients and workers, caused by the large number of TB cases unnecessarily hospitalized for a needlessly long time and by the poor airborne infection control measures adopted. TB transmission outside hospitals is due to the late diagnosis of infectious cases. Poverty and poor social conditions for a significant part of the population are among the triggers for the development of TB infection to disease; they also impede timely diagnosis and treatment completion.

Some of the review findings, however, indicate that TB and MDR-TB trends may decrease in the future owing to the improved prevention and control interventions adopted in recent years. Comparing treatment success among new TB patients registered in October–December 2010 and 2011 (the latest information available) shows that the proportion of deaths among those evaluated has decreased (from 14% to 11%) and the proportion of patients lost to follow up reduced by more than half (from 11% to 5%). Districts with effective interventions introduced earlier report impressive increases in treatment success of TB and MDR-TB cases.

The review team members were impressed by the commitment and work within the National TB Programme, including the staff of the National Tuberculosis Institute "Chiril Draganiuc" and the

TB staff working in the districts and national partners under the Global Fund to Fight AIDS, Tuberculosis and Malaria framework. They have updated national policies and guidelines, introduced rapid diagnostics, procured and dispensed anti-TB drugs and piloted innovative approaches to support patients. Programme performances are measurable through a national database and operational research guides policy decisions. There is good collaboration between the Ministry of Health and the Ministry of Justice.

Nevertheless, the National TB Programme must still address some major challenges.

- Reports of severe forms of pulmonary TB are still too frequent; these indicate late access to diagnosis.
- During January–June 2012, the National TB Programme detected 555 (69% of the estimated) MDR-TB cases and placed only 344 on treatment. The remaining 211 MDR-TB cases (38% of those detected) were not included in the treatment cohort for Global TB Drug Facility-supplied drugs.
- A large number of TB patients unnecessarily receive hospital treatment, causing significant patient exposure to cross-infection and placing a financial burden on the health system.
- Incentives and enablers offered to TB patients and providers have been inconsistent over time and their impact on treatment outcomes is unknown.
- National and district budgets currently support interventions of unknown public health impact such as mass screening, Bacillus Calmette–Guérin revaccination and disinfection of patients' houses.

Main recommendations

Ministry of Health

- Prevention and control of MDR-TB should be considered a public health priority in the Republic of Moldova and receive adequate and coordinated support from the Ministry of Health and all other relevant ministries and national institutions.
- Funding should be made available to ensure free-of-charge treatment with high-quality anti-TB and ancillary drugs for all MDR-TB cases currently detected by the National TB Programme during either hospital or outpatient treatment. Access to treatment should also be guaranteed for all TB patients after the end of the Global Fund to Fight AIDS, Tuberculosis and Malaria grant.
- Consideration should be given to financial gains from adopting more cost-effective interventions such as improving targeted TB screening, appropriate use of existing diagnostic laboratory technology, use of international drug procurement, revising the use of capreomycin according to the country's anti-TB drug resistance profile and limiting hospitalization to severe TB cases.
- Additional financial and other support from local public authorities should be pursued and used for cost-effective interventions in line with National TB Programme policies and guidelines.
- The higher levels of TB, MDR-TB and TB/HIV coinfection in the Transnistria region should receive urgent attention. Further efforts should continue to strengthen the technical collaboration with the health authorities in both civilian and penitentiary sectors in the Transnistria region to ensure equal advances towards universal access to prevention,

diagnosis and treatment of MDR-TB. International financial and other support should be urgently identified and pursued jointly.

- The National TB Programme should have a central unit with the capacity and technical authority to update national policies and guidelines; ensure consistent training across different medical specialties; manage drug supplies, surveillance and supportive field supervision; and coordinate overall service delivery by the different providers at all levels of care. This central unit, irrespective of its location, should be directly accountable to the Ministry of Health, and its funding and legal mechanisms should be independent of the National Tuberculosis Institute "Chiril Draganiuc".
- Nongovernmental organizations should be acknowledged for their importance in providing effective TB outreach interventions among hard-to-reach populations and the community at large. A legal framework should be developed to contract out nongovernmental organizations for performance-based delivery of TB services. Nonmedical workers, when appropriately educated, should be allowed to undertake simple procedures (sputum collection, intake of anti-TB drugs under observation).
- A legal framework should be developed, along with national policies and guidelines and accountability to the National TB Programme, to allow and regulate the delivery of TB services in the network of private facilities.

National TB Programme

- Patients outside hospitals should be effectively supported in their adherence to treatment. Incentives and enablers from the National Health Insurance Company and under the Global Fund to Fight AIDS, Tuberculosis and Malaria grant should be consistent over time and cover all patients, with their effectiveness measured on improving treatment outcomes. Incentives linked to their performance should also be given to treatment providers working in family medicine and TB services. The new criteria for assistance from the Ministry of Labour, Social Protection and Family should be revised to address the social determinants of any form of TB disease.
- The National TB Programme should further improve its performance in TB case holding. A national working group should be established to develop a strategic plan for outpatient care to improve treatment adherence by the deadline given by the Global Fund to Fight AIDS, Tuberculosis and Malaria. The strategic plan must consider the funding mechanisms of both inpatient and outpatient facilities to ensure that cost-effective TB treatment is properly incentivized.
- The potential of the national TB database to improve the quality of data entered and the quarterly cohort analysis of programme performance should be maximized.
- The National Centre for Public Health and the National TB Programme should be empowered to jointly develop and implement internationally recommended policies for TB infection control in hospitals, outpatient facilities, TB patients' residences and communities.
- The collaboration between the Ministry of Health, Ministry of the Interior and Ministry of Justice should be further strengthened through a national committee to discuss and agree on direct and effective forms of collaboration with the National TB Programme, including the quarterly supply of anti-TB drugs.
- Collaboration between the National TB Programme and the National AIDS Programme should be further enhanced and expanded to ensure early TB detection among people living with HIV.

Introduction

The Republic of Moldova is among the WHO European Region's 18 high-priority countries for tuberculosis (TB) control and among the world's 27 high multidrug-resistant (MDR) TB burden countries (WHO, 2007; 2011a). According to WHO, estimated TB incidence and mortality in 2011 were 161 and 17 per 100 000 population respectively: these figures have decreased slowly in recent years. The drug resistance survey conducted in the Republic of Moldova in 2011 documented MDR-TB in 29% of newly diagnosed and 63% of previously treated TB patients (Stratan et al., 2011). In 2011 94% of all new TB cases detected were tested for HIV and 6% of these were infected. The latest achievements reported by the National TB Programme (NTP) include detection of 74% of the new TB cases estimated by WHO in 2011 and successful treatment of 57% of cases in 2010 (13% patients were lost to follow up, 11% died, 5% failed treatment, and 13% were not evaluated). The last NTP review took place in 2009.

The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) ranks the Republic of Moldova second among 110 countries by level of funds provided per capita. The country received TB grants from the Global Fund in Rounds 1, 6, 8 and 9 (Global Fund, 2013). Two principal recipients – the Centre for Health Policies and Studies (PAS) and the Project Coordination, Implementation and Monitoring Unit (PCIMU) – are implementing the consolidated grants of Rounds 8 and 9. Subrecipients of the grants are the National Tuberculosis Institute "Chiril Draganiuc" (NIPP), Act for Involvement (AFI) and the Soros Foundation – Moldova. The second phase of grant implementation (to mid-2015 for PCIMU and to the end of 2015 for PAS) was approved in December 2012 but included a request to the principal recipient to produce two documents by 15 August 2013: a review of the existing practices and procedures of the NTP related to case holding; and a strategic plan (based on the review) for outpatient care to improve treatment compliance and reduce loss to treatment follow up. A major concern highlighted was that Global Fund-supported interventions seem to have had a limited impact in recent years, especially on improving treatment success. The Ministry of Health, in an official letter dated 15 October 2012, asked the WHO Regional Office for Europe to coordinate and carry out a comprehensive review of the NTP.

The review took place from 4 to 15 February 2013. It identified specific recommendations for improving TB and MDR-TB prevention and control as described in the body of this report and proposed a roadmap for implementation (Annex 1). One of the review team members, Dr Kai Blondal, developed a strategic plan for outpatient care immediately after the review; this appears as part of the roadmap. Dr Pierpaolo de Colombani provided technical editing of the report.

Twelve international and seven national experts conducted the review, with the limited participation of three other experts (Annex 2). The review team members analysed relevant background documents (publications, studies, previous assessment reports, and similar); visited health facilities and institutions (selected to give a balanced representation of the different epidemiological, geographical and health service delivery realities in the country, including the penitentiary system, the autonomous region of Gagauzia and the Transnistria region); and interviewed policy-makers, health care providers, TB patients (through in-depth interviews and focus groups) and the main national and international partners at the national and district levels. The review team members developed a number of tools to collect data in advance in order to guide their field observations and interviews.

Annexes 3 and 4 give an overview of the review programme and activities. During the first week, review members divided into three field teams, each coordinated by an international expert, which visited a total of 18 districts and three municipalities (Annex 4). Each team then produced a field report organized as an analysis of strengths, weaknesses, opportunities and threats and discussed it with the other teams. All reviewers spent the second week in Chisinau attending visits and meetings at the central level and working on the various sections of this report. The review was also an opportunity to conduct a joint monitoring visit on behalf of the Green Light Committee (GLC) for the WHO European Region and the Global TB Drug Facility (GDF). The complete list of professionals interviewed is set out in Annex 5 and Annex 6 gives summary profiles of the patients interviewed.

The review team members conveyed their key findings and recommendations at the end of the mission to the Minister of Health, Dr Andrei Usatii, in the presence of all review members, the Special Representative of the WHO Regional Director to Prevent and Combat M/XDR-TB in the European Region and the WHO Representative in the Republic of Moldova.

General information

The Republic of Moldova is a landlocked country in south-eastern Europe, bordered by Ukraine and Romania on the east and west respectively. Its largest part lies between two rivers, the Dniester and the Prut. Most of the country is hilly, elevations never exceeding 430 m above sea level. About 80% of its very fertile land is dedicated to crops and pasture. It is one of the most densely populated countries of the former Soviet Union (106 inhabitants/km^2), and has a population of approximately 4.2 million (last census in 1994), 790 000 of whom live in the capital city of Chisinau. About 53% of the population lives in rural areas. An estimated 500 000 people live in the Transnistria region (the figure could be lower because of migration patterns). The Republic of Moldova has experienced negative population growth since the mid-1990s owing to the declining birth rate and outbound migration (Turcanu et al., 2012; IOM, 2012).

The Republic of Moldova became a parliamentary republic after its independence in 1991, following the dissolution of the Soviet Union. Since 2003 its administrative divisions are 32 districts, three municipalities (Chisinau, Balti and Bender) and the two regions of Gagauzia and Transnistria (the latter as result of a 5-month military conflict in 1992 – its borders are currently patrolled by the Russian Peace Corps). The Transnistria region is usually indicated as the area on the left (east) side of the Dniester River. The whole country includes 1682 communities.

Agriculture, food processing and viticulture are core aspects of the Moldovan economy, but large-scale labour emigration and the associated remittance inflows increasingly shape the economic and social landscape. The country is fully dependent on energy imports. It is estimated that 30% of the population is living in absolute poverty and 4.5% in extreme poverty, the majority living in rural areas (World Bank, 2013a). About 40% of the Moldovan workforce lives and works abroad, with remittances accounting for about 30% of gross domestic product (GDP) in 2008, boosting mostly private consumption and the construction sector. Inflation was brought under control and economic growth was only interrupted by the global financial crisis (World Bank, 2013b). In 2009 government spending as a proportion of GDP was 45.2%, but is projected to fall to 38% by 2014, which has clear implications for state funding of the health system. The Republic of Moldova is currently negotiating an Association Agreement with the European Union (EEAS, 2013). Finalization of this, expected by autumn 2013, would start a process of political, economic and institutional reform posed as conditions for joining the European Union.

Life expectancy at birth is 65 years and 73 years respectively for men and women (2010) – lower than in other countries in the WHO European Region (WHO, 2013b). Important causes of death are coronary heart disease (58% of men and 62% of women), cancer and digestive pathologies. Tobacco smoking is very common and alcohol use is estimated to contribute to the deaths of 19% of men and 14% of women.

TB epidemiology

According to the latest WHO estimates, in 2011 the country's TB incidence was 161 (133–192), TB prevalence was 234 (107–410), and TB mortality was 17 (16–18) per 100 000 population (WHO, 2012). The notification rate for new and relapse TB cases by the NTP in 2011 was 119 per 100 000 population. Differences existed between the Transnistria region and the rest of the country: notification rates in the civilian and penitentiary systems were 147 and 866 per 100 000 respectively in the Transnistria region, compared with 105 and 754 per 100 000 on the right side of the Dniester River.

Based on the drug resistance survey of 2011 (Stratan et al., 2011), the proportion of MDR-TB is 26% among newly diagnosed and 64.9% among previously treated TB patients (Table 1).

Table 1. Anti-TB drug resistance, 2011

Indicator	New		Previously treated		Total	
	cases	%	cases	%	cases	%
All patients	*1384*	*100.0*	*1042*	*100.0*	*2426*	*100.0*
Sensitive to all drugs	733	52.9	231	22.1	964	39.7
Resistant to any drug	651	47.0	811	77.8	1462	60.3
Resistant to H	504	36.4	750	72.0	1254	51.7
Resistant to R	375	27.1	685	65.7	1060	43.7
Resistant to E	268	19.4	530	50.9	798	32.9
Resistant to S	558	40.3	759	72.8	1317	54.3
With mono-resistance	187	13.5	63	6.0	250	10.3
Mono-resistant to H	51	3.7	15	1.4	66	2.7
Mono-resistant to R	9	0.6	4	0.4	13	0.5
Mono-resistant to E	18	1.3	6	0.6	24	1
Mono-resistant to S	109	7.9	38	3.6	147	6.1
With MDR-TB	360	26.0	676	64.9	1036	42.7
Resistant to H+R	9	0.7	16	1.5	25	1
Resistant to H+R+E	1	0.1	7	0.7	18	0.3
Resistant to H+R+S	135	9.7	166	15.9	301	12.4
Resistant to H+R+E+S	215	15.5	487	46.7	702	28.9
With other resistance	104	7.5	72	6.9	176	7.2
Resistant to H+S	65	4.7	40	3.8	105	4.3
Resistant to H+E	4	0.3	3	0.3	7	0.3
Resistant to H+E+S	24	1.7	16	1.5	40	1.6
Resistant to R+E	1	0.1	1	0	2	0.1
Resistant to R+S	5	0.4	2	0.2	7	0.3
Resistant to R+E+S	0	0	2	0.2	2	0.1
Resistant to E+S	5	0.4	8	0.8	13	0.5

Key: isoniazid (H); rifampicin (R); ethambutol (E); streptomycin (S).
Source: Stratan et al., 2011.

Translating these rates into case numbers, the figures for the Republic of Moldova are estimated to be 5700 (4700–6800) new TB cases, 600 (550–640) new deaths from TB and 1600 (1460–1740) new MDR-TB cases (calculated by adding 660 (570–760) newly diagnosed and 940 (890–980) previously treated TB cases) each year.

The drug resistance survey also shows wide variations in the proportion of MDR-TB among all TB cases across the country. The average for the Republic of Moldova is 42.7%, with different geographical areas ranging from 10% to 60% and six large cities exceeding 50%: Chisinau (50%), Balti (58%), Soroca (62%) and Basarabeasca (53%) on the right side of the Dniester River and Dubasari (50%) and Tiraspol (68%) in the Transnistria region.

According to Joint United Nations Programme on HIV/AIDS (UNAIDS), some 15 000 people were living with HIV in the Republic of Moldova in 2011 (UNAIDS, 2012). Many of them, however, are unaware of their HIV status: only 7889 HIV cases were registered in the country in January 2013, mostly among key populations and their partners. Estimated HIV prevalence among TB incident cases in 2011 was 5.7% (5.1–6.5%), or 660 (570–760) new HIV-related TB cases per year. TB/HIV coinfection reaches its highest levels in Tiraspol (18.3%), across the Transnistria region (12.8%) and in Balti (16.8%).

Based on the above figures, the Republic of Moldova is included among the 18 high-priority countries for TB control and among the 15 high MDR-TB burden countries in the WHO European Region (WHO, 2007; 2011b).

Recommendations

- Prevention and control of MDR-TB should be considered a public health priority in the Republic of Moldova and receive adequate and coordinated support from the Ministry of Health and all other relevant ministries and national institutions.
- The higher levels of TB, MDR-TB and TB/HIV coinfection in the Transnistria region should receive urgent attention.

NTP strategies, structure, budget and main achievements

Strategies

The Ministry of Health ensured countrywide coverage of the WHO-recommended DOTS Strategy (the basic package that underpins the Stop TB Strategy) during 2000–2004 and continued implementation of the Stop TB Strategy from 2006. At present, the national strategy for TB control in the Republic of Moldova is supported by a law on TB Prevention and Control (2008), embedded in the framework outlined by the law on approval of the National Development Strategy for 2008–2011 (2007).[1]

The latest Midterm Strategic Plan for NTP Implementation 2011–2015 (Ministry of Health, 2010),[2] endorsed by the Ministry of Health in December 2010,[3] further describes the national strategy for TB control. A number of Ministry of Health ordinances further develop and approve

[1] Law no. 153-XVI of 04.07.2008; Law no. 295-XVI of 21.12.2007.
[2] Government Decision no. 1171 of 21.12.2010.
[3] Ministry of Health Ordinance no. 1171 of 21.12.2010; Ministry of Health Ordinance no. 571 of 14.07.2011.

specific policy guidelines, such as those on TB control activities, staff performance-based indicators, TB recording and reporting, community centre involvement in outpatient support, treatment of TB in outpatient settings and TB clinical protocols for adults and children.[4]

The main aim of the Strategic Plan is to improve the health of the population by reducing the TB burden in the Republic of Moldova. The Plan has seven specific objectives.

1. Provide high-quality diagnosis to reach at least 70% detection rate of sputum smear-positive TB patients.
2. Extend universal access to TB treatment to reach at least 78% sputum smear-positive TB and at least 60% MDR-TB treatment success rate.
3. Provide social support for at least 90% of TB patients from socially vulnerable groups through partnerships at the community level.
4. Ensure effective control of TB/HIV coinfection and reduce the TB/HIV coinfection rate among TB cases to below 3%.
5. Raise people's knowledge of TB to at least 80% and maintain the Bacillus Calmette–Guérin (BCG) vaccination rate at birth at a minimum of 98%.
6. Conduct at least seven operational research studies with direct implications for TB control.
7. Improve the management, coordination, monitoring and evaluation of the NTP.

In the light of the country's MDR-TB burden, the review team felt that Objective 2 of the Strategic Plan should be expanded through a specific action plan in line with the Consolidated Action Plan to Prevent and Combat Multidrug- and Extensively Drug-resistant (M/XDR) TB in the WHO European Region 2011–2015 (WHO, 2011b).

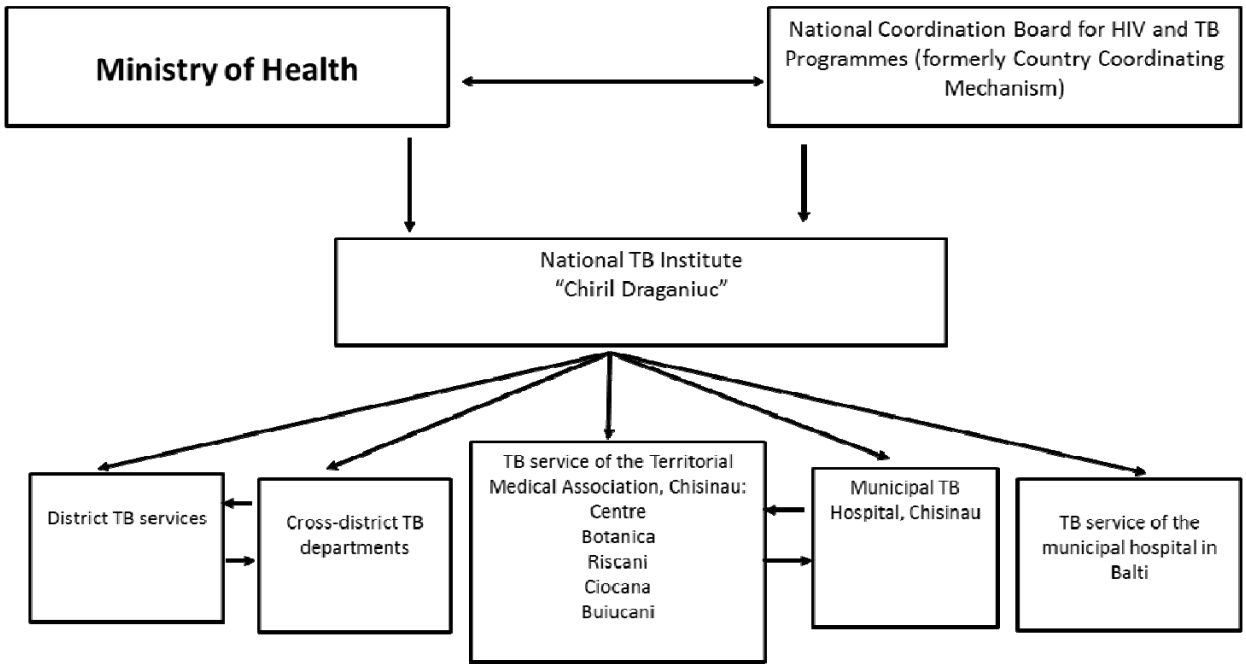
Structure

The NTP has a de facto central unit hosted by the NIPP. Its functions are developing policies and technical guidelines for Ministry of Health approval, planning, coordination with partners, laboratory surveillance and quality control, anti-TB drugs supply management, staff training, monitoring and technical supervision. To fulfil these functions the unit works in collaboration with national and international partners.

The NTP Manager works through the central unit, which comprises three subunits: the Monitoring Unit (overseeing recording and reporting), the Supervision and Training Unit (in charge of field supervision and in-service training) and the National Reference Laboratory. All NTP staff are NIPP employees and report to the NIPP director. The NIPP does not, however, have a specific budget line for its NTP-related functions under the contract with the National Health Insurance Company (NHIC). Consequently, it is only indirectly accountable to the Ministry of Health, has limited authority to supervise actual delivery of TB services in the field (Fig. 1) and depends on the external support of the Global Fund for its key public health functions.

[4] Ministry of Health Ordinance no. 180 of 08.05.2007; Joint Ministry of Health/NHIC Ordinance no.137/54A of 27.03.2008; Ministry of Health Ordinance no. 277 of 07.04.2011; Ministry of Health Ordinance no.465 of 07.06.2011; Joint Ministry of Health/NHIC Ordinance no.1285/265A of 20.12.2012; Ministry of Health Ordinance no.1343 of 28.12.2012.

Fig. 1. NTP organization chart



In the Transnistria region the Central Health Authority has overall responsibility for health services. Within it, the main Department of Health Care Organization is responsible for the TB programme.

TB inpatient services are delivered through a network of eight specialized TB hospitals with a total capacity of 1255 TB beds (280 for MDR-TB), including two hospitals with 250 beds in the Transnistria region (40 for MDR-TB). At the time of the review the MDR-TB hospital in Vorniceni planned to open a new ward of 250 beds for MDR-TB shortly (Table 2).

Table 2. Distribution of TB and MDR-TB hospital beds in the civilian system

Institution	Non-MDR-TB beds	MDR-TB beds	Total beds
NIPP in Chisinau	250	50	300
Municipal TB hospital in Chisinau	335	40	375
MDR-TB hospital in Vorniceni existing ward + new ward opening soon	0+0	110+250	110+250
Municipal hospital in Balti	130	40	170
District hospital in Floresti	20	0	20
District hospital in Soroca	30	0	30
Subtotal	*765*	*240+250*	*1005+250*
Municipal hospital in Bender (Transnistria)	160	40	200
District hospital in Dubasari (Transnistria)	50	0	50
Subtotal	*210*	*40*	*250*
Total	*975*	*280+250*	*1255+250*

In addition to these eight TB hospitals, two children's TB rehabilitation centres (in Tirnova with 200 beds and in Cornesti with 100 beds) admit children below 18 years with TB infection or disease in an environment designed to protect them from further TB exposure and poor living conditions, where their education can continue.

TB outpatient services are delivered through 55 dedicated service units (one per 75 000 population):

- 10 TB services at the municipality level in five territorial medical associations in Chisinau, one in Balti and four in Tiraspol in the Transnistria region;
- 43 TB services hosted in consultative and diagnostic departments (outpatient care departments within district hospitals), including four locations in the Transnistria region;
- 2 TB units in the Ministry of Railroad and State Chancellery.

A number of nongovernmental organizations (NGOs), mainly operating under the Global Fund grant, strengthen delivery of TB outpatient services and liaison with communities (Table 3).

Table 3. NGOs collaborating with the NTP

AFI (subrecipient of Global Fund grants)	AFI is the successor of Caritas Luxemburg, an NGO operating in TB control in the Republic of Moldova since 1999 that will continue to assist AFI in 2012–2014. AFI runs five projects that work with Anenii-Noi community groups against TB; offer TB/HIV interventions in prisons, TB patient support and a volunteering programme; and increase the roles of patients and communities in TB control.
Institute for Penal Reform	The Institute for Penal Reform (formerly the Centre for Assistance to Penitentiary Reform) is an NGO working in the fields of implementing alternatives to detention, reforming the system of enforcement of privative punishments and preparing prisoners for release. It has made efforts to establish rehabilitation centres to prevent recidivism and to introduce alternative punishment methods.
Medical-Social Programs	Established in 2008 with the support of Caritas Luxemburg, Medical-Social Programs works with AFI on TB and HIV prevention and control in the Transnistria region.
Moldovan Society Against Tuberculosis (SMIT)	Created in 2011 in Balti by former TB patients who felt that they were not fully involved in medical decisions, SMIT is funded by the Soros Foundation – Moldova. Staff visit people affected by TB and raise awareness of the disease. They also organize roundtable discussions with local authorities, visit hospitals and educate patients.
PAS (principal recipient of Global Fund grants for TB and HIV)	PAS (a former MedNet Centre) was established in 1999 to take over the activities of the Medical Internet Programme of the Soros Foundation – Moldova and ensure its sustainable development. PAS operates several projects that strengthen antiretroviral therapy (ART) adherence; provide support to orphans and children vulnerable to HIV; prevent mother-to-child HIV transmission; offer HIV counselling and testing (HCT) training; undertake second generation surveillance in HIV/AIDS; strengthen TB control; develop guidelines on treatment, care and support for injecting drug users; participate in the Salzburg Seminars programme; and conduct operational research on HIV prevalence among newly registered TB cases.
Soros Foundation – Moldova (subrecipient of Global Fund grants)	The Global Fund and the World Bank provide financial support to the programme activities of Soros Foundation – Moldova, which facilitate the implementation of projects to fight and reduce the incidence of HIV/AIDS and sexually transmitted infections.
Speranta Terrei (subrecipient of Global Fund grants)	Speranta Terrei is a small NGO working in Balti, founded in 2006. It has volunteers covering 57 villages; each volunteer is in charge of five patients.

In addition, all family doctors – including those working in district family medicine centres and in village family doctors' offices – are trained to identify presumptive TB patients and refer them

to a TB specialist, to screen TB contacts and risk groups, to ensure directly observed treatment (DOT) and to trace patients lost to follow-up. Under the Global Fund grant 10 TB community centres were set up during 2012–2013 within the premises of district TB units (at Cahul, Criuleni, Glodeni, Hincesti, Ialoveni, Orhei, Rezina, Straseni and Ungheni and at Ribnita in the Transnistria region) to improve patient support and try to decrease the number of patients lost to follow-up (see the section on case management below for a more detailed description).

Budget

In 2012 the NTP received a total budget of more than 182 million lei (approximately US$ 15 million). More than half came from the NHIC, one third from the Global Fund and the rest from the Ministry of Health (Table 4). Ministry of Health funding increased by almost one third from 2011 to 2012, excluding all indirect and other costs (such as treatment with ancillary drugs). The figures also exclude funds for TB care from local authorities and other ministries (including Justice, Defence and Interior).

Table 4. NTP budget by funding source, 2011–2012

Funding source	2011		2012	
	Lei	%	Lei	%
NHIC	94 503 000	46.8	95 307 000	52.3
Global Fund	89 272 000	44.2	62 281 000	34.2
Ministry of Health	17 986 000	8.9	24 684 000	13.5
Total	*201 761 000*	*100.0*	*182 272 000*	*100.0*

The NTP allocated more than half its total budget to inpatient care, including to two rehabilitation centres for children (Table 5). Rationalization of hospital beds and promotion of outpatient treatment could significantly reduce this major budget item; the additional funds created by hospital cost savings could be spent on treating and supporting more MDR-TB patients.

Table 5. NTP budget by item, 2011–2012

Budget item	2011		2012	
	Lei	%	Lei	%
Hospital TB care	83 592 000	41.4	83 632 000	45.9
Children's TB rehabilitation centre, Tirnova	9 233 000	4.6	10 114 000	5.5
Children's TB rehabilitation centre, Cornesti	3 472 000	1.7	5 101 000	2.8
Ambulatory TB care*	9 463 000	4.7	10 125 000	5.6
Performance payments*	1 448 000	0.7	1 550 000	0.9
Capital investments**	5 000 000	2.5	8 467 000	4.6
Centralized allocations**	281 000	0.1	1 002 000	0.5
Implementation of Global Fund grant	89 272 000	44.2	62 281 000	34.2
Total	*201 761 000*	*100.0*	*182 272 000*	*100.0*

The review team was not able to collect precise budget figures related to the Transnistria region.

Main achievements

In 2011, the NTP reported to WHO that it had registered 4208 pulmonary TB cases (including 3836 new and 372 relapse sputum smear-positive), 1108 retreatment cases (excluding relapse sputum smear-positive) and 25 cases with unknown TB history. TB case detection (new and relapse cases) can thus be calculated as 74% (62–89%) of the total number of cases estimated by WHO for the year. Among the new TB cases, 1272 (33%) were pulmonary sputum smear-positive, 2140 (56%) pulmonary sputum smear-negative and 424 (11%) extrapulmonary.

During the period 2008–2011, notification rates of new and relapse TB cases did not show a significant decreasing trend; nor did the MDR-TB notification rate (Table 6).

Table 6. Number and rate of reported TB cases, 2008–2011

Year	Population	New and relapse TB		MDR-TB	
		cases	per 100 000 population	cases	per 100 000 population
2008	4 100 645	4442	108	1048	26
2009	4 090 640	4347	106	1069	26
2010	4 082 299	4122	101	1082	27
2011	4 075 668	4208	103	1001	25

The notification rate of pulmonary culture-positive TB cases (new and previously treated TB cases) and the proportion of MDR-TB among them also remained rather stable (Table 7), which could be explained by an improving capacity of laboratory diagnosis. Meanwhile, the notification rate of all pulmonary TB cases (new and previously treated) showed a reduction over the same period.

Table 7. Number and rate of all pulmonary TB cases, 2008–2011

Year	Population	All pulmonary TB		Culture-positive TB		MDR-TB		
		cases	per 100 000 population	cases	per 100 000 population	cases	per 100 000 population	%
2008	4 100 645	5315	130	2367	58	1060	26	45
2009	4 090 640	5061	124	2267	55	989	24	44
2010	4 082 299	4993	122	2477	61	1047	26	42
2011	4 075 668	4886	120	2353	58	1024	25	44

These tables show the difficulties faced by the NTP in producing a reduction in TB incidence (case numbers fell by only 0.4% from 2010 to 2011) and in controlling MDR-TB.

In 2010, the NTP successfully treated 69.7% of new TB cases, 44.1% of relapse cases, 23.4% of cases retreated after loss to follow up and 26.9% of cases retreated after failing Category I treatment.[5] Death and loss to follow up, however, made up a significant proportion of the

[5] 2HRZE/4HR: two months of isoniazid, rifampicin, pyrazinamide and ethambutol followed by four months of rifampicin and isoniazid.

unsuccessful treatment outcomes and a significant number of cases were transferred to Category IV treatment[6] because they were found to have M/XDR-TB (Table 8).

Table 8. Outcomes among pulmonary sputum smear-positive TB patients by treatment history, 2010

Treatment outcome	New		Relapse		After loss to follow up		After failure	
	cases	%	cases	%	cases	%	cases	%
Cured	699	64.4	113	41.5	42	20.5	18	23.1
Treatment completed	57	5.3	7	2.6	6	2.9	3	3.8
Died	120	11.1	51	18.8	35	17.1	10	12.8
Treatment failed	45	4.1	26	9.6	11	5.4	19	24.4
Lost to follow up	106	9.8	39	14.3	75	36.6	18	23.1
Still in treatment	56	5.2	32	11.8	36	17.6	10	12.8
Transferred out	0	0.0	0	0.0	0	0.0	0	0.0
Not evaluated	2	0.2	4	1.5	0	0.0	0	0.0
Subtotal	*1085*	*100.0*	*272*	*100.0*	*205*	*100.0*	*78*	*100.0*
Transferred to Category IV treatment	191	15.0	102	27.3	80	28.1	64	45.1
Total cases registered	*1276*	*100.0*	*374*	*100.0*	*285*	*100.0*	*142*	*100.0*

Recommendations

- Consideration should be given to financial gains from adopting more cost-effective interventions.
- Additional financial and other support from local public authorities should be pursued and used for cost-effective interventions in line with NTP policies and guidelines.
- International financial and other support should be urgently identified and pursued jointly by all interested parties in the Republic of Moldova, including the Transnistria region.
- The NTP should have a central unit with the capacity and technical authority to update national policies and guidelines; ensure consistent training across different medical specialties; manage drug supplies, surveillance and supportive field supervision; and coordinate overall service delivery by the different providers at all levels of care.
- This NTP central unit, irrespective of its location, should be directly accountable to the Ministry of Health, and its funding and legal mechanisms should be independent of the NIPP.
- The NTP should further improve TB case holding.
- A national working group should be established to develop a strategic plan for outpatient care to improve treatment adherence by the deadline given by the Global Fund.
- In the light of the country's MDR-TB burden, objective 2 of the Strategic Plan should be expanded through a specific action plan in line with the Consolidated Action Plan to Prevent and Combat M/XDR-TB in the WHO European Region 2011–2015 (WHO, 2011b).

[6] Treatment with first-line and second-line anti-TB drugs based on DST results.

Case finding and diagnosis

Case finding

Passive case finding

Passive TB case finding in the Republic of Moldova relies on symptomatic patients self-reporting to primary health care services or even directly to TB services. Primary health care services are free of charge for all patients, including those uninsured. Patients pay, however, for all diagnostic procedures (including very expensive procedures such as bronchoscopy and computerized tomography), as well as for all drugs prescribed. This also applies to non-routine TB investigations (often conducted by private services) and courses of nonspecific antibiotics prescribed by primary health care providers for acid-fast bacilli sputum-negative patients with presumptive TB.

Active case finding

Free-of-charge annual fluorography is conducted extensively across the country, with a particular focus on target population groups at risk of developing TB:

- people who have been in contact with people and animals with TB
- people with post-TB sequelae
- ex-prisoners in the first 12 months after their release
- people infected with HIV/AIDS
- alcoholics, drug users and active smokers
- diabetics
- people receiving immunosuppressant treatment
- women during the postnatal period
- people with chronic lung diseases
- people with material disadvantages (such as those unemployed, migrants, and similar)
- people with psychological problems.

The Ministry of Health also lists four population groups subject to annual TB screening because of their employment and the resultant risk of transmitting TB to the public:

- all people involved in the food service
- people working in all levels of education
- all people working in public service and community institutions
- all employees of the public health system.

The district health authorities can, however, increase the target population for screening according to local priorities and financial capacity. As a consequence, the review team found wide variations across districts in the proportion of population (30–80%) annually screened for TB. Moreover, it was not possible to calculate from the available records the actual yield of such screening. The NTP would benefit from evaluating the yield of yearly TB screening of the population at large and consequently focusing more on cost-effective target risk groups.

The State Sanitary and Epidemiological Service, TB services and primary health care services work together to undertake contact tracing, interviewing newly diagnosed TB and MDR-TB patients to try to identify their close contacts among relatives, neighbours and co-workers. State Sanitary and Epidemiological Service personnel visit the patient's house, sometimes accompanied by a family doctor or TB doctor. All contacts, including sputum-negative TB cases, are asked to come to the TB dispensary for a clinical examination and chest X-ray (and tuberculin skin test (TST) if below 18 years of age), and all have a repeat chest X-ray every six months for a year.

Current national guidelines recommend prescription of isoniazid preventive therapy (IPT) to all contacts below 18 years of age with a positive TST test. WHO guidelines also recommend IPT in settings with high MDR-TB prevalence, and a research study on the feasibility of MDR-TB preventive treatment regimens in the Republic of Moldova might be considered. Latent TB infection is not usually diagnosed or treated among adults.

Diagnosis

Diagnosis of TB traditionally relies on direct microscopy of sputum smears (two sputum specimens), chest X-ray, bacteriological culture and first-line anti-TB drug susceptibility testing (DST). All MDR-TB cases should undergo DST for second-line anti-TB drugs. In 2011 almost half the patients the NTP registered had pulmonary TB with cavity lesions, including 100 cases detected only by autopsy (a possible indicator of late diagnosis). The Republic of Moldova's national TB guidelines were recently revised to include the algorithm for early diagnosis with the Xpert MTB/RIF assay (automated real-time nucleic acid amplification technology for rapid and simultaneous detection of TB and rifampicin resistance, endorsed by WHO).

Laboratories

The well-established laboratory network in the Republic of Moldova includes 59 level I microscopy centres, three level II regional laboratories for culture and DST (in Balti, Vorniceni and Bender) and the National TB Reference Laboratory in Chisinau. The level I microscopy centres have sufficient staff (although shortages may occur during seasonal holidays), but the regional laboratories and the National TB Reference Laboratory are understaffed.

The regional laboratories and National TB Reference Laboratory perform all conventional methods of diagnosis, including smear microscopy, culture and DST in solid and liquid media through the MGIT system and new molecular-based techniques (line probe assay for first- and second-line anti-TB drugs and the Xpert MTB/RIF assay). Since autumn 2012, Xpert MTB/RIF assays operate across the country, including ten installed at the district level (in Balti, Cahul, Causeni, Comrat, Edinet, Hincesti, Orhei, Soroca, Straseni and Ungheni), three in the Transnistria region (in Bender, Ribnita and Tiraspol) and three in prisons. Five HIV centres also received them through the TB REACH grant (Stop TB Partnership, 2013).

In 2011 the NTP reported a total of 4851 pulmonary TB cases, of which 95% had sputum smear microscopy and 91.2% had sputum culture. Among the 3412 new cases, 3243 (95%) had direct microscopy investigation of their sputum and 1272 (977+295: 37%) were sputum smear-positive (Table 9). An additional 706 (543+163: 21%) were confirmed by culture, which makes the total bacteriological confirmation by sputum smear and/or culture 1978 (58%). All these indicators point to a low performance of microscopy investigation and/or mistakes in recording results in the system of information for monitoring and evaluation (SIME) of TB database (National Centre for Health Management, 2012).

Table 9. Diagnosis of new and retreatment pulmonary TB cases, 2011

Result	New	Relapse	After failure	After loss to follow up	Total	
	cases	cases	cases	cases	cases	%
Total	*3412*	*815*	*207*	*417*	*4851*	*100.0*
With SS	3243	771	207	411	4632	95.0
With C	3111	391	140	266	3908	91.2
Without SS or C	6	41		4	51	1.1
Total SS+ and/or C+	*1978*	*495*	*181*	*333*	*2987*	*61.6*
SS+/C+	977	268	104	218	1567	32.3
SS+	295	104	41	67	507	10.5
SS−/C+	543	120	36	46	745	15.4
C+	163	3		2	168	3.5
Total SS− with/without C−	*1428*	*279*	*26*	*80*	*1428*	*37.4*
SS−/C−	1428				1428	29.4
SS−		279	26	80	385	7.9

Key: sputum smear microscopy (SS); sputum bacteriological culture (C); positive result (+); negative result (−)

The National TB Reference Laboratory prepares all staining material for microscopy. The review team found this to be of good quality and shipped on a regular basis without any shortages reported during the previous year. Löwenstein-Jensen media is available for culture in addition to Popescu media for culture and DST for first- and second-line anti-TB drugs. Although a mycobacteria growth indicator tube (MGIT) is in place in all regional laboratories, not all specimens are inoculated in liquid and solid media. This leads to long delays in receiving results and a lack of DST to orient therapy. A more systematic use of the MGIT would ensure culture results after 10 days on average instead of four to six weeks.

External quality assurance has been in place for all laboratories for many years, with very good results. Of 200 investigations (of 20 strains and for 10 drugs) conducted at the National TB Reference Laboratory in 2012, the Supranational TB Reference Laboratory at Borstel in Germany found only one false-susceptible for capreomycin. Investigations also found only one regional laboratory with many false-susceptible results (10%) and the National TB Reference Laboratory immediately took corrective action. The regional laboratories and National TB Reference Laboratory should check the quality of microscopy at all peripheral laboratories on a quarterly basis. Unfortunately, not all checks are performed regularly owing to a shortage of supervisory staff, leaving the low positivity rate reported by some laboratories unaddressed.

The review team looked with interest at the improvements in TB diagnosis expected as a consequence of the recently introduced Xpert MTB/RIF assays. Overall, they found the percentage of invalid/error results from Xpert MTB/RIF assay tests to be 5–8%, a rate considered too high. Proper calibration of the machines, which the supply company should perform, could avoid some error results. Another issue with the supplier concerns the distribution of cartridges, which does not accord with the expected workload of the laboratory, leading to a risk of waste from passed expiry dates.

The most pressing concern was that laboratories are not using the new technology properly for timely case management, including early initiation of standardized MDR-TB treatment[7] and

[7] The Republic of Moldova's drug resistance profile (see Table 1) justifies the use of standardized treatment for MDR-TB: the recommendation is that this should begin before culture and DST results are ready, for more individualized treatment.

infection control measures. Moreover, they are not using the Xpert MTB/RIF assay effectively among risk population groups such as people living with HIV and prisoners. Meanwhile, patients themselves – rather than their sputum specimens alone – are sent to facilities where the Xpert MTB/RIF assay is available (often even to Chisinau); this is both an additional burden for the patient and a risk of delaying diagnosis. All these problems could be caused by insufficient information and training provided to staff involved in TB diagnosis.

Staff should be trained effectively in implementing the diagnostic algorithm included in the national TB guidelines. These recommend the use of the Xpert MTB/RIF assay for:

- symptomatic patients who have been in close contact with an M/XDR-TB case;
- children with clinical symptoms suggestive of TB, especially if they have been in close contact with a M/XDR-TB case;
- people living with HIV with symptoms suggestive of TB;
- prisoners with symptoms and/or chest X-rays suggestive of TB;
- other risk groups with symptoms and/or chest X-rays suggestive of TB, such as homeless people, injecting drug users, alcoholics, health workers or people taking care of M/XDR-TB patients, prison staff, people with immunosuppressive conditions (including neoplasm under immunosuppressive therapy, diabetes mellitus, hepatitis and renal insufficiency under haemodialysis);
- patients suspected of TB relapse but with negative sputum microscopy;
- patients with clinical symptoms of extrapulmonary TB, especially those with suspected meningitis.

Recommendations

- Consideration should be given to financial gains from adopting more cost-effective interventions such as improving targeted TB screening and appropriate use of existing diagnostic laboratory technology.
- The scale of TB screening should be limited to those risk population groups known for effective active case finding, based on international recommendations and local evidence.
- National guidelines should be developed on active case finding and contact investigation.
- The Xpert MTB/RIF assay should be used consistently with the national guidelines and treatment and infection control started immediately.
- Patients themselves should not be sent to Chisinau for DST but only their sputum specimens, for which transport should be made available.
- Bacteriological confirmation among all TB patients should be promoted through liquid media for all specimens and DST.
- Staff should be further trained on the Xpert MTB/RIF assay through tutoring during supervision and specific training courses.

Treatment and case management

Treatment

In December 2012 the Ministry of Health approved new national guidelines on the clinical management of TB and M/XDR-TB (Ministry of Health, 2012a; 2012b). These are in line with international standards and recommend Category I treatment for new patients with drug-susceptible TB, Category II treatment[8] for previously treated patients with drug-susceptible TB and Category IV treatment for patients with M/XDR-TB. In the case of meningitis, streptomycin replaces ethambutol.

The guidelines were only recently approved at the time of the review and were consequently not widely disseminated. The review team observed long-consolidated old-fashion practices among TB providers: 600 mg isoniazid prescribed daily instead of 300 mg; systematic hospitalization of all infectious and most non-infectious TB patients; and patients (new and retreatment) with treatment prolonged up to 12 months and recorded as treatment successes only after they were confirmed to be sputum smear-negative two years after treatment completion. Retreatment TB cases in particular were often classified as failures at the end of their successful treatment to justify a treatment extension for one more year, a practice that may explain the relative high proportion of failures among non-MDR-TB retreatment cases (Table 10). The clinicians justified the need to prolong the standard treatment by the high rate of anti-TB drug resistance in the country.

Table 10. Treatment outcomes among sputum smear-positive cases by previous treatment history, 2011

Treatment outcome	New		Relapses		After loss to follow up		After failure	
	cases	%	cases	%	cases	%	cases	%
Total reported	*1276*	*100*	*374*	*100*	*285*	*100*	*142*	*100*
Total evaluated	*1274*	*100*	*370*	*100*	*285*	*100*	*142*	*100*
Cured	699	54.9	113	30.5	42	14.7	18	12.7
Treatment completed	57	4.5	7	1.9	6	2.1	3	2.1
Died	120	9.4	51	13.8	35	12.3	10	7.0
Treatment failed	45	3.5	26	7.0	11	3.9	19	13.4
Lost to follow up	106	8.3	39	10.5	75	26.3	18	12.7
Transferred to Category IV treatment	191	15.0	102	27.6	80	28.1	64	45.1
Still in treatment	56	4.4	32	8.6	36	12.6	10	7.0
Transferred out	0	0	0	0	0	0	0	0
Treatment success rate (cured and treatment completed)	*756*	*59.3*	*120*	*32.4*	*48*	*16.8*	*21*	*14.8*

[8] 2HRZES/1HRZE/5HRE: two months of isoniazid, rifampicin, pyrazinamide, ethambutol and streptomycin followed by one month of isoniazid, rifampicin, pyrazinamide and ethambutol and five months of isoniazid, rifampicin and ethambutol.

Case management

The international community is increasingly concerned about the NTP's low treatment success, with a high proportion of patients lost to follow up among M/XDR-TB cases and a slow overall reduction in TB and MDR-TB notification rates (see Table 6). Several recent reports by international experts (available from WHO on request) have provided recommendations on how to reduce inpatient TB care and proportionally increase outpatient care (Berger, 2011; Cercone, 2012; Kavtaradze and Ciobanu, 2012; Salakaia and Mirtskhulava, 2011; Schreuder, 2011; Thybo, 2010; 2011). More outpatient care is required to reduce the transmission of TB in hospitals (Stratan et al., 2012) and to improve treatment adherence by implementing a patient-centred approach (Bivol et al., unpublished data commissioned by PAS, 2009; Ciobanu et al., unpublished data commissioned by PAS, 2010). Moreover, reducing hospital treatment and the number of beds could free additional resources that the NHIC might theoretically use to strengthen outpatient care.

Inpatient care provision relates closely to hospitalization criteria, health financing mechanisms and the current process of health care reform. The new national TB treatment guidelines recommend admission to hospital of patients with one of the following:

- severe clinical conditions;
- a positive sputum smear;[9]
- certain criteria in the home, such as being in close contact with children or pregnant women;
- inability to receive outpatient DOT;
- severe side-effects or co-morbidities;
- M/XDR-TB, until the bacteriological conversion of their sputum and proven tolerance of second-line anti-TB drugs.

All these criteria except the last may be subject to different interpretations that allow outpatient treatment of TB and MDR-TB from day one but could also be used to justify prolonged inpatient treatment at the decision of the treating doctor.

The Ministry of Health is contemplating downsizing national TB hospital capacity, planning to close TB wards in the hospitals at Soroca (30 beds) and Floresti (20 beds) and considering limiting TB inpatient treatment to four hospitals: the NIPP, the municipal TB hospital in Chisinau, the TB department of the municipal hospital in Balti and the MDR-TB hospital in Vorniceni. No roadmap exists, however, to reduce TB hospital bed numbers further: on the contrary, the number will increase from 1255 to 1505 in 2013 as consequence of the renovation of the additional ward in Vorniceni MDR-TB Hospital (see Table 2). In the Transnistria region there are no clear plans to reduce the number of TB beds.

The review team estimates that the actual need in the Republic of Moldova is for about 400 hospital beds for drug-susceptible TB and 380 for MDR-TB patients (Table 11). This calculation is based on conservative assumptions, such as an average length of stay in hospital of 60 days for new drug-susceptible TB patients (the average for the European Union is only 23 day (median 18 days)) and 120 days for MDR-TB patients, as well as a bed occupancy rate of 85%. The number of hospital beds required is thus less than half the currently available beds for drug-susceptible

[9] The guidelines also state, however, that when the necessary sanitary and epidemiological conditions are met and DOT can be ensured, sputum smear-positive patients can be treated in outpatient settings.

TB patients and close to the number currently available for MDR-TB patients (before the new ward in Vorniceni MDR-TB Hospital opens). Calculations including the beds in the penitentiary system show even greater current hospital overcapacity.

Table 11. TB hospital beds needed for 2012 (estimated by the review team)

New patients	Patients in need of hospital care	Average length of stay (days)	Total patient days	Hospital beds required with occupancy rate of:	
				100%	85%
Pulmonary sputum smear-positive TB (new and retreatment cases)	2074	60	124 440	341	401
MDR-TB	991	120	59 460	326	383

In a previous study, Cercone (2012) used far more sophisticated methodology based on an ad hoc model that allowed for various scenarios taking into account different categories of patient, terminally ill patients, current national trends in notification of TB and M/XDR-TB, overall demographic evolution and changes in health care practices. In this way, Cercone calculated the optimal number of hospital beds to be 304 (within a range between 93 and 704), which is not far from the review team estimates (Table 12).

Table 12. TB hospital beds needed for 2012 by treatment category (estimated by Cercone)

Treatment category	Beds (low estimate)	Beds (medium estimate)	Beds (high estimate)
Category I sputum smear-positive (drug-susceptible)	15	52	99
Category I sputum smear-negative and extrapulmonary	10	30	59
Category II sputum smear-positive (drug-susceptible)	19	31	46
Category II sputum smear-negative and extrapulmonary	18	35	59
With polydrug-resistant TB[a]	3	14	38
With MDR-TB	13	104	324
With XDR-TB	15	38	79
Other TB cases	0	0	0
Total	*93*	*304*	*704*
Rate per 100 000 population	*2.7*	*8.9*	*20.6*

[a] Polydrug resistant TB is a form of TB resistant to two or more drugs including to isoniazid or rifampicin but not to both at the same time.

The new ward expected to open shortly in Vorniceni MDR-TB Hospital may be justified as it is probably one of the few wards with appropriate infection control measures. Nevertheless, the review team believes that there is now a golden opportunity to prepare an action plan with the aim of reducing overall TB bed capacity in the country, closing those facilities with poor airborne infection control and relocating their staff.

In general, interventions to improve treatment adherence of TB and M/XDR-TB patients should focus on strengthening health system capacity to meet the needs of each individual patient. The NIPP, together with the partner recipients of the Global Fund grant, has come up with several initiatives to improve TB and M/XDR-TB case management; however, little evidence is available to prove the effectiveness of any of the following current interventions.

Involving family medicine providers

With the high coverage of family medicine providers, involving them further in case management would bring TB services closer to patients. In 2012 family medicine had a performance-based reimbursement system, with 95% of salary based on a fixed capitation fee and 5% paid according to performance, which for TB was measured by the number of people screened for TB, the number of cases diagnosed with TB and the number of TB cases treated.[10] From 2013 these proportions changed to 85% of salary based on a fixed capitation fee and 15% paid according to performance. Performance pay per TB case treated is only 800 lei (approximately US$ 68), however. Furthermore, it is common to divide this amount among all family medicine providers, a practice that makes the incentive seem irrelevant.

Involving NGOs

Several NGOs work under the Global Fund TB grant in the Republic of Moldova and the Transnistria region (see Table 3). The majority are holders of small grants and started work only about a year ago. Only PAS and AFI have funds not related to the Global Fund grant. AFI in particular has the longest experience of working directly with TB and M/XDR-TB patients both in the civilian and in the penitentiary system, where it started many years ago as Caritas Luxemburg.

One of the weaknesses of current collaborations with NGOs is the absence of a joint platform and a legal framework for their involvement in TB-related activities. The law currently prohibits NGO workers from dispensing drugs to patients, in contrast to the international evidence on ensuring effective DOT by involving lay workers. Moreover, NGOs are not listed among the potential providers that can be contracted by the NHIC – the only solution to ensure a sustainable phasing out of Global Fund support in future.

Establishing community centres

During 2012–2013, under the Global Fund grant, ten community centres were established within the premises of district TB units to improve patient support and try to decrease the number of patients lost to follow-up. Personnel at a community centre include one or two TB doctors, a psychologist, one or two nurses or social workers, a manager, an accountant and a driver, and some can also count on volunteers. The community centres' functions are to make an initial evaluation of the risk of TB patients becoming lost to treatment follow-up in future; to provide education and psychological support to patients and their families; to arrange any relevant social support available in the district; and to run advocacy, communication and social mobilization (ACSM) activities in the community.

The NTP review team visited several community centres and found performances varying in quality, depending on the time the centre was established and its links with local authorities. The community centres are completely dependent on the Global Fund grant and would represent a significant financial burden to the Ministry of Health if expanded countrywide. More sustainable arrangements should be considered, such as creating equivalent services within family medicine centres and for all patients with similar behavioural and socioeconomic needs (common to other medical conditions, such as HIV, alcohol and other substance dependency, and similar). These kinds of patient support should be included in the new forms of NHIC purchasing services recently introduced by the health care reform. This type of arrangement could be particularly cost-effective, since many of the community centres' TB-related activities take place in the community rather than on site.

[10] Doctors' performance is measured against 26 performance indicators, of which three are for TB.

Enhancing treatment support

TB patients have received a variety of support from NGOs and community centres over the years. Unfortunately, this support was fragmented and not provided consistently, making it difficult to document its impact on treatment outcomes. The majority of TB and M/XDR-TB patients in the Republic of Moldova are poor and often in great need of support during their treatment when they are unable to work: this includes both treatment support and social support.

Various NGOs provide treatment support under the Global Fund, based on incentives and enablers. The types of support on offer have varied and changed over time, leading to a very fragmented practice, making operational research into its cost–effectiveness very difficult. An exception is the Caritas Luxemburg/AFI project, which claims to have achieved a reduction in TB patients lost to follow-up after release from prison from 45% in 2004 to 26% in 2005. Speranta Terrei, an NGO working in the northern city of Balti, told the review team it had reduced the proportion of patients lost to follow-up to 5% by ensuring DOT with treatment support.[11]

More recently, the NTP review highlighted the reduction in the proportion of patients with drug-susceptible TB countrywide who were lost to follow-up or died between October–December 2010 and the same quarter of 2011 (the latest quarter for which complete SIME-TB data are available). These data suggest that treatment support may significantly reduce the number of patients lost to follow-up when provided consistently, as it was during the last months of 2011 (Table 13).

Table 13. Treatment outcomes for all patients with drug-susceptible TB enrolled for treatment October–December 2010 and 2011

Treatment outcome	October–December 2010 (%)	October-December 2011 (%)
Treatment success	70	70
Lost to follow-up	11.4	4.3
Died	13.6	11
Treatment failure	2.7	2.7
Not evaluated	2.3	12

Over recent years patients have been offered various different incentives and enablers to increase adherence to TB treatment under different donor-funded projects; however, owing to the different sources, types and policies of funding, these have been inconsistent and often caused inequalities between patients.

At present, TB patients receive three different types of incentives and enablers from different sources.

- The Global Fund, through grant subrecipient NGOs, provides a food package (equivalent to approximately 80 lei or US$ 7) four times per month during treatment continuation for both drug-susceptible TB and MDR-TB patients. The Global Fund grant will provide this support to 2250 drug-susceptible TB patients in 2013, to 2210 in 2014 and to 2140 (50% of the estimated number per year) in 2015, and to 570, 560 and 560 (85% of the estimated number per year) MDR-TB patients respectively during the same years.

[11] From 2006 to 2012 Speranta Terrei supported the treatment of 355 new TB patients, of whom 302 (85%) were successfully treated; only 5% of patients were lost to follow-up compared with the 12% national average.

- The NHIC provides a food voucher (equivalent to approximately 35 lei or US$ 3) daily to all new and retreatment pulmonary sputum smear-negative and extrapulmonary TB patients during their outpatient treatment (continuation or even intensive phase). The scheme excludes all pulmonary sputum smear-positive patients and those with MDR-TB. This support can be stopped in case of poor treatment compliance (discontinuation of treatment for more than three days per month or one day per week, depending on the site). In addition, the NHIC provides transport reimbursement (of approximately 75 lei/US$ 6 per month or more if transport receipts are produced) to enable DOT at the facility. The NHIC previously provided food vouchers only to outpatients living in urban areas, but decided to increase cover to include those in rural areas from January 2013,12 budgeting for approximately 1300 patients receiving such support in 2013.
- The Ministry of Justice and AFI provide treatment support for released prisoners (see the section on TB control in prison below for details).

Enhancing social support

TB patients and their families receive five different types of social support from different sources.

- The Ministry of Labour, Social Protection and Family provides sick leave during TB treatment to all patients who have been working and/or are insured. In 2011 this health insurance covered approximately 81% of the population. Unfortunately, TB patients are often not insured (such as farmers, migrant workers and unemployed people), and are consequently not entitled to this support.
- The Ministry of Labour, Social Protection and Family also provides a disability pension, for which the eligibility criteria were recently revised to include only the grade of physical disability and social status, excluding specific diseases – such as TB and M/XDR-TB – as standalone conditions for eligibility.
- Local administrations provide one-off support to poor families, including TB patients or families of TB patients. The amount available depends on the income of the person or family and can be anything up to 1000 lei (approximately US$ 84).
- Local administrations also provide assistance in obtaining the documents required to apply for a disability pension.
- NGOs provide education and administrative support. These interventions are scattered across the country and differ between districts, which makes it difficult to analyse their impact.

Recommendations

- Current practices should change to limit hospitalization to severe cases; consideration should be given to financial efficiency gains from downsizing the capacity of inpatient TB care.
- Patients outside hospitals should receive effective support in their adherence to treatment. Incentives and enablers from the NHIC and under the Global Fund grant should be consistent over time and covering all patients, and their effectiveness measured on improving treatment outcomes.
- The different initiatives undertaken to improve case holding and decrease the proportion of patients lost to follow-up should be systematically documented, monitored and evaluated.

[12] Joint Ministry of Health/NHIC Ordinance no.1285/265A of 20.12.2012.

- The new criteria for assistance from the Ministry of Labour, Social Protection and Family should be revised to address the social determinants of any form of TB disease.
- Treatment providers working in family medicine and TB services should be given incentives linked to their performance.
- NGOs should be acknowledged for their importance in ensuring effective TB outreach interventions among hard-to-reach populations and the community at large. Nonmedical workers, when appropriately educated, should be allowed by law to undertake simple procedures such as sputum collection and direct observation of anti-TB drug intake.
- Development of guidelines to diagnose and treat latent TB infection among adults should be considered.

TB in children

In 2010, 137 (3.3%) of the 4122 new and relapse TB cases registered by the NTP were in the age group 0–14 years, of which 76.3% were extrapulmonary, 17.3% pulmonary sputum smear-negative and only 5.0% pulmonary sputum smear-positive (Table 14). In 2011, 159 new and relapse TB cases registered by the NTP were in the age group 0–14 years, a 400% increase on the previous year.

Table 14. TB cases registered among children, 2010

Category	All ages		Age 0–4	Age 5–14	Age 0–14	
	cases	%	cases	cases	cases	%
Total new	*3743*	*68.8*	*39*	*98*	*137*	*98.6*
Pulmonary sputum smear-positive	1271	23.3	0	7	7	5.0
Pulmonary sputum smear-negative	2066	38.0	4	20	24	17.3
Extrapulmonary	406	7.5	35	71	106	76.3
Total previously treated sputum smear-positive	*844*	*15.5*	*0*	*1*	*1*	*0.7*
Relapse	379	7.0	0	0	0	0
Lost to follow up	299	5.5	0	0	0	0
Treatment after failure	166	3.0	0	1	1	0.7
Total other cases	*858*	*15.8*	*0*	*1*	*1*	*0.7*
Total	*5447*	*100.0*	*39*	*100*	*139*	*100.0*

The Ministry of Health approved a new national protocol on prevention, diagnosis and treatment of TB in children in December 2012 (Ministry of Health, 2012b). These correspond to international standards but were not distributed widely by the time of the review and previous practices were consequently still in evidence.

BCG vaccination

Children in the Republic of Moldova are vaccinated with BCG at birth (0.05 ml intradermally) and then at 6–7 years of age. All first-grade children receive TST screening in school and are

revaccinated if they have a negative reaction.[13] BCG coverage is reportedly very high (95–99%) for vaccination but much lower for revaccination (28.7% in the Transnistria region).

Given the high rate of TB transmission in the country and the corresponding likelihood of TB infection at the age of 7 years, BCG revaccination should not be considered cost-effective. WHO still recommends BCG vaccination only at birth.

Screening and IPT

Lists exist of all children at risk of TB and registered for annual TST screening – those with a medical risk (those on corticosteroid therapy, or with diabetes mellitus or other concomitant diseases) or a social risk (from socially disadvantaged families) – and are revised annually. It is estimated that about half the child population is listed and screened annually.

All children in contact with a TB case are referred to the TB dispensary to exclude active TB disease or latent TB infection, which may require IPT. The children are checked through clinical examination, TST and chest X-ray (if below 14 years of age) or fluorography. If active TB disease is ruled out but the TST is positive, recent TB infection is presumed and IPT prescribed for 6 months (10 mg/kg/day). If the TST is negative or doubtful IPT is prescribed for 3 months, after which the child is re-evaluated for further management. Children younger than 1 year and those with immunosuppressive conditions are given IPT without a prior TST. IPT is supervised by the family, school nurses and kindergarten teachers. It is difficult to evaluate the current level of IPT adherence.

The review team observed quite a range of different practices in screening and IPT. The TST is done routinely before revaccination only among the children listed as at risk; all other children are BCG revaccinated without a TST and consequently have vaccination complications if already TST-positive. Many of the children seen in the municipal TB hospital in Chisinau were admitted because of adverse BCG reactions and most were receiving local treatment of the affected site, while some were also treated with isoniazid.[14]

Diagnosis and treatment

TB disease in children is diagnosed by a TB specialist or a paediatrician in consultation with a TB specialist. All children below 18 years of age with TB are treated in the paediatric department of the municipal TB hospital in Chisinau or in one of the two children's TB rehabilitation centres. The rehabilitation centres are mainly populated by children from poor or socially marginalized families. The review team strongly doubts the need to have such children in a hospital and considers it preferable to organize TB treatment and social support for them through foster families or village communities. Nevertheless, the treatment success rate among children is satisfactory (Table 15).

[13] The TST consists of 0.1 ml purified protein derivative administered intradermally in the forearm and read within 72 hours by a trained nurse. It is considered positive when induration is >10 mm (or ≥5 mm if the patient is HIV positive or without a previous BCG vaccination); induration ≥17 mm is defined as a hyperergic reaction.

[14] The review team discussed the issue that BCG vaccination complications should not be treated with pyrazinamide (since BCG is based on the pyrazinamide-resistant *Mycobacterium bovis*) but with higher daily doses of other first-line anti-TB medication such as isoniazid (up to 15 mg/kg, to a maximum 300 mg) combined with rifampicin (up to 20 mg/kg, to a maximum 600 mg).

Table 15. Treatment outcomes among new TB cases (all forms) in children, 2011

Treatment outcome	Children (age 0–17 years) with TB	
	cases	%
Total registered for treatment	*162*	*100.0*
Cured	2	1.2
Treatment completed	154	95.1
Treatment failed	0	0
Died	3	1.9
Lost to follow-up	1	0.6
Still on treatment (because of MDR-TB)	2	1.2
Not evaluated	0	0
Treatment success rate (cured and treatment completed)	*156*	*96.3*

Recommendations

- The recently developed national guidelines on management of TB in children should be disseminated among clinicians at all levels.
- A specific algorithm should be developed for the diagnosis and treatment of latent TB infection.
- BCG revaccination at the age of 6–7 years should be abandoned.
- All children should have a TST before the BCG vaccination in order to avoid BCG adverse reactions.

Drug-resistant TB

In 2005 the GLC of the Stop TB Partnership approved the first cohort of patients for MDR-TB treatment in the Republic of Moldova. Since then, the number of MDR-TB cases included for treatment with second-line anti-TB drugs procured through GDF under the Global Fund grant has gradually increased (Table 16).

Table 16. MDR-TB patients approved for second-line anti-TB treatment under the Global Fund grant, 2006–2015

Year	MDR-TB patients approved (grant round)
2006	100 (R1)
2007	200 (R1)
2008	200 (R6)
2009	200 (R6) + 150 (R6) + 500 (R6)
2010	250 (R6) + 500 (R8)
2011	730 (R8)
2012	730 (R8)
2013	670 (R8)
2014	660 (R8)
2015	180 (R8)
Total	*4 890*

In recent years more MDR-TB patients outside the Global Fund grant were placed on treatment with second-line anti-TB drugs locally procured by the NTP; these drugs were also used for treatment of those estimated 200–300 patients with polydrug-resistant TB. Nevertheless, the MDR-TB patients treated with the support of the Global Fund are still the majority and the

treatment gap between the existing MDR-TB cases (estimated 1600 annually) and those placed on effective treatment remains large.

During January–June 2012, a total of 555 MDR-TB cases (69% of the estimated number) were diagnosed and only 344 (62% of those detected) started treatment with second-line anti-TB drugs (Table 17). The NTP reports several causes of this low enrolment to MDR-TB treatment:

- refusal by patients (most often based on a refusal to stay in hospital);
- lack of second-line anti-TB drugs (see the section on management of medicines and other commodities below);
- ineligibility decided by the national MDR-TB consilium established in Chisinau to evaluate and determine the treatment of all MDR-TB patients in the country.

Table 17. MDR-TB patients diagnosed and on treatment, 2009–2011

Year	New TB cases with DST		Retreatment TB cases with DST		Diagnosed MDR-TB	Started treatment	
	cases	%	cases	%	cases	cases	%
2009	1284	73	1129	68	1069	586	not available[a]
2010	1381	49	1140	67	1082	791	not available[a]
2011	1379	74	1006	68	1001	761	not available[a]

[a] MDR-TB patients detected one year may be enrolled for treatment with second-line anti-TB drugs in following years; it is not therefore possible to calculate their proportion from the annual total of confirmed MDR-TB cases.

There is no current official waiting list of patients for MDR-TB treatment but a delayed start of up to 6 months has been reported in some cases.

According to NTP guidelines, MDR-TB patients can be treated initially with a standardized regimen designed from the data of the drugs resistance surveillance, which includes:

- an intensive phase of pyrazinamide, capreomycin, fluoroquinolone, cycloserine and ethionamide;
- a continuation phase of pyrazinamide, fluoroquinolone, cycloserine and ethionamide.

Para-aminosalicylic acid is added to the regimen in cases of resistance or intolerance to a second-line anti-TB drug. The duration of the intensive phase is 6–8 months and until the patient has had at least two culture-negative results; total treatment duration is up to 24 months.

NTP guidelines recommend the use of this standard MDR-TB treatment regimen followed by an individualized regimen based on the patient's DST results and on the following principles.

- The regimen should consist of at least four drugs with known efficacy.
- Drugs with a possible cross-resistance profile should not be used.
- Drugs from groups 1–5 should be included in a treatment regimen based on their efficacy profile:
  - any first-line anti-TB drug (group 1) deemed to be efficacious can be included;
  - a treatment regimen must include an injectable drug (group 2) and a fluoroquinolone (group 3);
  - oral bacteriostatic second-line agents (group 4) are to be used to top up a treatment regimen to four efficient pharmaceuticals;

for treatment regimens with fewer than four effective drugs, two drugs from group 5 (agents with unclear efficacy, not recommended by WHO for routine use in MDR-TB patients) should be added.

The total number of anti-TB drugs in the regimen varies and may include between five and seven anti-TB drugs.

XDR-TB patients are treated using moxifloxacin instead of levofloxacin, and drugs from group 5 are also added to the standardized treatment regimen. The only group 5 drugs available to the NTP, however, are high-dose isoniazid, amoxicillin/clavulanic acid and clarithromycin. Linezolid is not available in the country at present, but may be purchased in future when it becomes available through the GDF if additional funding becomes available. The NTP is hosting a clinical trial with delamanid for a limited number of MDR-TB patients (excluding XDR-TB patients) (ClinicalTrials.gov, 2012). Bedaquiline has been offered to the Republic of Moldova for compassionate use, but may not be brought into the country as current legislation bans the importation of unregistered drugs except for clinical trials.

The treatment regimens for polydrug-resistant TB patients are in line with international recommendations.

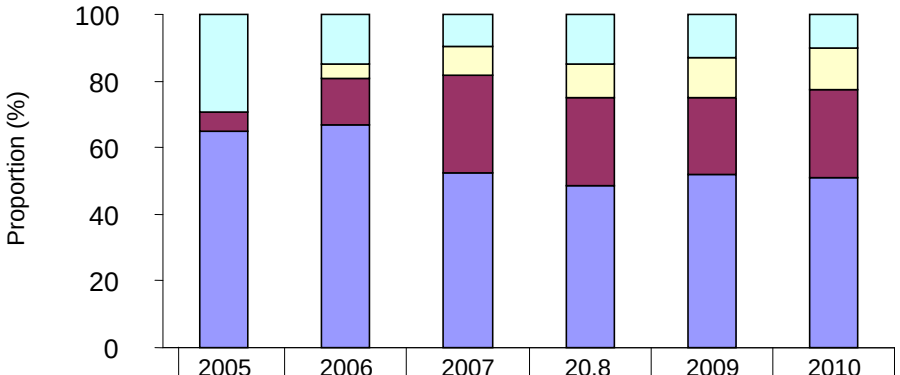
The review team observed that the NTP guidelines for the treatment of M/XDR-TB were often not followed, mainly because of a shortage of second-line anti-TB drugs. Capreomycin was not available until 2010 due to supply problems from the GDF – it was replaced by amikacin.[15] Levofloxacine is used, replaced by moxifloxacin in cases of resistance. In cases of resistance to a fluoroquinolone or XDR-TB an injectable drug is discontinued in the continuation phase (despite being a pillar of the treatment regimen and *Mycobacterium tuberculosis*'s susceptibility to it).

This shortage of second-line anti-TB drugs is a major barrier to universal access to MDR-TB treatment in the Republic of Moldova. During 2012 the NTP was able to increase the number of MDR-TB patients placed on treatment by relocating second-line anti-TB drugs from cases that lost to follow up or died. To increase the number of MDR-TB treatments further in future, the NTP could consider partially replacing capreomycin with the cheaper kanamycin or amikacin as the main injectable agent, while taking into account the increasing resistance to kanamycin (15.3% in 2011 and 15.6% in 2012) and some intolerance (amikacin is very painful when injected and both amikacin and kanamycin have more adverse reactions than capreomycin). It could be useful to assess the proportion of patients who stopped their amikacin or kanamycin treatment before the end of 2010 (when capreomycin became available and was prescribed instead) in order to guide the next procurement of second-line anti-TB drugs.

In 2010 the NTP reached a 47.2% treatment success rate among MDR-TB patients (Fig. 2). This low achievement was the consequence not of a lower quality of standardized treatment regimen instead of an individualized one but of the high proportion of patients lost to follow up (24.3%). The proportion of those who died was similar to the rate seen in other countries (Orenstein et al., 2009). It is important to note that the data for 2010 were preliminary at the time of the review and that 115 patients (14.5% of the 791 enrolled for treatment) were still on treatment but counted as treatment successes.

[15] Based on the review team's discussions and interviews with treating physicians, anecdotal evidence came to light about provider (and patient) preference for capreomycin over amikacin (or kanamycin).

Fig. 2. Treatment outcomes among MDR-TB patients, 2005–2010



	2005	2006	2007	20.8	2009	2010
Failed	29.4%	14.8%	9.4%	15.1%	12.8%	9.1%
Died	0%	4.5%	8.7%	10%	12.1%	11.6%
Lost to follow-up	5.9%	13.6%	29.5%	26.2%	23.2%	24.3%
Treated successfully	64.7%	67%	52.4%	48.5%	51.5%	47.2%

Note: The number of patients enrolled for MDR-TB treatment was 17 in 2005, 88 in 2006, 254 in 2007, 522 in 2008, 586 in 2009 and 791 in 2010.

Recommendations

- The treatment regimens for M/XDR-TB patients should be adjusted promptly, based on DST results, and include injectable drugs throughout the treatment course when needed.
- Adverse reactions to amikacin should be monitored, evaluated and considered in future procurement of second-line anti-TB drugs.
- National guidelines for the palliative care of terminally ill TB patients should be developed and implemented.
- A legal framework should be established to enable importation of anti-TB drugs for compassionate use in patients suffering from XDR-TB.

HIV-related TB

TB is the foremost AIDS-indicative disease recorded by the National HIV Programme (54% of all AIDS patients) (Godwin, 2011). Of the almost 8000 people living with HIV registered in the Republic of Moldova, 15–25% are lost to follow-up and not accessing ART, and are consequently at a higher risk of developing TB. In 2011 testing of TB cases (91% of all TB patients) detected an HIV prevalence of 5.8% countrywide, with the highest level of 25.5% in Balti.

Both the NTP and the National AIDS Programme, coordinated from the National Hospital for Dermatovenereology and Communicable Diseases, are implementing collaborative TB/HIV activities within their own areas of work. A Technical Working Group under the National Coordination Council for HIV and TB Programmes (formerly the Country Coordinating Mechanism) ensures joint monitoring and evaluation. The NTP's objective is to reduce TB/HIV coinfection to below 3% by 2015 through HIV prevention, diagnosis and treatment among TB patients and through TB prevention, diagnosis and treatment among people living with HIV. The most recent NTP guidelines (approved in December 2012) include a section on TB/HIV. The

National AIDS Programme does not have a specific TB/HIV objective and is in the process of updating its guidelines in line with the NTP guidelines (AIDS in Moldova, 2013; Ministry of Health, 2009; National Coordination Council, 2012). The national SIME-TB database provides data for TB/HIV surveillance, as will the new SIME-HIV database once it is operational.

Reducing the burden of TB in people living with HIV

According to the current national guidelines, people living with HIV should be screened for TB every year through clinical examination, chest X-ray and sputum microscopy. When a patient has a history of close contact with TB or there is a clinical presumption, the screening also includes the Xpert MTB/RIF assay, bacteriological culture and any other investigation required to detect an extrapulmonary form of TB (histopathology, and similar). Such investigations are conducted from the TB services of the territorial medical associations in municipalities and consultative and diagnostic departments in districts or by the infectious disease specialist in the HIV/AIDS facilities. Recently, almost all HIV/AIDS facilities were equipped with an Xpert MTB/RIF assay, except Cahul Hospital.

In the case of positive findings or TB suspicion, the infectious disease specialist refers the patient to a TB service for confirmation of diagnosis and treatment. No follow-up mechanisms are in place, however, to ensure that the patient referred actually reaches the TB services. In view of the risk of losing patients during referral and the poor infection control measures in the inpatient TB facilities where people living with HIV are often referred for diagnosis, the possibility of TB specialists visiting HIV treatment and care facilities for regular medical consultations or even being employed by them on a part-time basis should be considered. Alternatively, people living with HIV with presumptive TB should not be kept in a TB hospital but should be referred to a TB outpatient facility.

When active TB is excluded in the presence of an individual or epidemiological risk, IPT should be given for six months. However, IPT is often not given because of doctors' concern about the high levels of isoniazid resistance in the country. The current NTP procurement plan does not include IPT.

Reducing the burden of HIV in patients with presumptive and diagnosed TB

In 2011, HCT was provided to 91% of TB patients. According to the current national guidelines (Eramova and Ciobanu, 2011), HCT should be offered to all individuals of all ages with presumptive or diagnosed TB, but the review team assessed that HCT was proposed only to those diagnosed with TB. All territorial medical associations and consultative and diagnostic departments have specific rooms for HCT, as well procedure rooms where blood can be taken for HIV testing. Most TB facilities also have a HCT room. Once the blood sample is drawn, it is sent to one of the 17 enzyme-linked immunosorbent assay laboratories scattered around the country. The results are available from a few hours to two weeks after the request. The rapid HIV test is used only in maternity wards. In future increasing compliance with the newly approved national guidelines is expected.

HIV treatment and care are usually the responsibility of an infectious disease specialist. If a TB inpatient is found to be HIV-positive the specialist is called for a consultation at the admitting hospital; a positive test result during ambulatory TB treatment means the patient is referred to the HIV/AIDS facility. ART is indicated for all people living with HIV with active TB, and should

be initiated within the first eight weeks of TB treatment or even immediately when the patient's immune status (CD4 count) is less than 50 cells/mm^3. ART is further tailored based on the results of standard routine investigations.

ART is free of charge; it can be provided in hospital or outside in eight ART sites in Chisinau, Balti and Cahul, in Tiraspol, Bender and Ribnita in the Transnistria region, and in prisons (one in the Transnistria region). Of the newly diagnosed TB/HIV patients in 2001, 51% received ART. In Chisinau infectious disease specialists visit the municipal TB hospital and the NIPP once per week, an arrangement difficult to replicate in other locations because of the NHIC's resistance to reimbursing consultations across different facilities. Owing to the limited time of these consultations, people living with HIV who are designated "able to travel and non-infectious" may be requested to go to an outside HIV/AIDS facility for further evaluation and treatment. This practice is against hospital policy, represents great discomfort for patients (in terms of both cost and travel distance) and is a possible cause of delaying the start of ART. The MDR-TB hospital in Vorniceni has not arranged any consultations by an infectious disease specialist, which is of concern to the review team because of its current and future bed numbers.

According to the national guidelines, cotrimoxazole preventive treatment should be given to all TB/HIV patients throughout their TB treatment, without reference to any CD4 count level. This practice was observed by the review team.

In order to prevent delayed initiation of ART and continuation of TB- and HIV-related care, an algorithm should be developed to improve the linkage of these patients with the HIV/AIDS services. Territorial medical association and consultative and diagnostic department staff could undertake this during their annual contact with people living with HIV, supported by greater involvement of associations and NGOs working with people living with HIV.

Recommendations

- A technical working group should be created under the National Coordination Council for HIV and TB Programmes to design feasible solutions and a roadmap for effective implementation of TB/HIV collaborative activities.
- Regular meetings should be organized between the NTP and the National AIDS Programme to complete implementation of SIME-HIV and cross-check data.
- Mechanisms should be developed to ensure that diagnosis of TB among people living with HIV is pursued without any drop-out of patients during referral from one facility to another or any harm caused by the poor infection control measures in inpatient TB facilities.
- HCT should be offered to all presumptive and diagnosed TB patients, consistently with the national guidelines.
- Rapid HIV tests should be available in TB facilities, especially those with a high workload.
- A mechanism should be developed to ensure timely and proper diagnosis, treatment and care of HIV in Vorniceni MDR-TB Hospital.
- IPT should be initiated for all cases of latent TB in people living with HIV – proper planning and budgeting are required. IPT could be prescribed and monitored by an infectious diseases specialist, in close coordination with a TB specialist.

- The national guidelines on TB/HIV should be further revised to better reflect and strengthen symptomatic screening and use of the Xpert MTB/RIF assay in line with the most recent WHO regional protocol.
- The national HIV/AIDS treatment and care protocol should have a separate section on TB/HIV for increased involvement of infectious disease specialists in managing TB/HIV patients.
- Mechanisms should be developed to ensure that further HIV treatment and care is maintained among TB/HIV patients after their hospital discharge.

TB control in prison

The penitentiary system on the right side of the Dniester River consists of eleven colonies (including one for women and one for juveniles), two prison hospitals (at Prucul and Rezina) and five pre-trial institutions, designed to hold a total capacity of 7980 inmates. All institutions fall under the remit of the Department of Penitentiary Institutions of the Ministry of Justice.

A the district level 42 police offices are subordinate to the General Police Inspectorate under the Ministry of the Interior; 30 have a temporary detention facility to isolate arrested people for 24–72 hours (whether minor or adult). After this time, the arrestee is either released or transferred to a pre-trial institution for prosecution. If TB is found the arrestee is transferred to a prison hospital if sentenced or to a civilian institution if released.

The Department of Penitentiary Institutions reported that 6583 people were under detention on 1 January 2013 (82% of the total capacity), including 1571 (24%) on remand; 5% were women and 2% juveniles. Around 13 000 people pass through the penitentiary system every year (Ministry of Justice, 2013). The number of detainees has decreased significantly in recent years (10 591in 2004) thanks to the commitment of the Ministry of Justice and external support for reform of the penal system (Institute for Penal Reform, 2013). Efforts were made to introduce alternative methods of punishment to prison and to establish rehabilitation centres to prevent recidivism. In 2011 the Republic of Moldova was ranked only eleventh in the WHO European Region for prison population rate (International Centre for Prison Studies, 2013).

A contract-based collaboration with the Ministry of Health ensures the provision of services that prisons are not able to offer.[16] The recently approved Justice Sector Reform Strategy and Strategic Action Plan 2011–2016 contain a draft regulatory framework to transfer all health care services and workers in prisons from the Ministry of Justice to the Ministry of Health. This transfer, similar to that undertaken in other countries (including England, France, most of Italy, Norway and Scotland), was promoted by the European Union but delayed following the advice of the United Nations Office on Drugs and Crime (UNODC) and the WHO Regional Office for Europe, in order to ensure a smooth step-wise transition, including financing.

The Transnistria region has three prison colonies (Colony 1, Colony 2 and Colony for adolescents), one pre-trial institution and one prison for women. The prison population is on average 3000 inmates, with an annual turnover of about 10 000 inmates. The penitentiary system comes under the remit of the Central Justice Authority; it has neither experienced real reform nor received much support from external partners. The Central Justice Authority and Central Health Authority of the Transnistria region are supposed to collaborate and liaise with the Ministry of

[16] Joint Ministry of Health/Ministry of the Interior/Ministry of Justice Ordinance no.109/96/134 of 24.09.2003.

Justice and Ministry of Health in Chisinau, but dialogue between the two central authorities is still at a very early stage and liaison with the ministries in Chisinau is limited to implementation of Global Fund grants for TB and HIV.

In 2012 a total of 560 new and relapse TB cases (162 on the right side of the river and 398 in the Transnistria region) were registered in all prisons in the Republic of Moldova, at a rate of 925 per 100 000 inmates: about eight times higher than in the general population. The countrywide drug resistance survey of 2011 showed higher proportions of MDR-TB in prisons (30% and 87% among newly diagnosed and previously treated TB patients respectively) than in the general population (29% and 63%). 157 inmates are currently registered HIV-positive in the Transnistria region.

TB services in prisons are delivered through a network of 12 institutions (five in the Transnistria region) with a total capacity of 760 TB beds (260 in the Transnistria region), including 100 for MDR-TB (no dedicated MDR-TB beds in the Transnistria region) (Table 18).

Table 18. Distribution of TB and MDR-TB hospital beds in the penitentiary system

Institution	Non-MDR-TB beds	MDR-TB beds	Total beds
Prison hospital in Pruncul[a]	250	50	300
Prison hospital in Rezina		50	50
Prison hospital (pre-trial) in Chisinau	100		100
Prison hospitals (pre-trial) in Balti, Bender, Cahul and Rezina	50		50
Subtotal	*400*	*100*	*500*
Colony 1 in Tiraspol (Transnistria region)*	50		50
Colony 2 in Tiraspol (Transnistria region)*	50		50
Colony for adolescents (Transnistria region)	100		100
Prison for women (Transnistria region)	30		30
Pre-trial institution (Transnistria region)	30		30
Subtotal	*260*		*260*
Total	*660*	*100*	*760*

[a] Of Pruncul Prison Hospital's 250 beds, 40 are for infectious diseases and could be used for TB if needed.

Rezina Prison Hospital is dedicated to the care of patients lost to follow up, chronic cases and those refusing treatment (about 30% of the total) and receiving palliative care. The overall hospital TB bed occupancy rate is about 50%. In total, 180 medical personnel (doctors and nurses) currently work in the penitentiary system – far fewer than 5 years ago. A significant cause for concern reported by the Department for Prison Facilities to the review team is about the future of these staff once prison health services are handed over to the Ministry of Health.

On the right side of the river, a TB coordinator in the Department of Penitentiary Institutions ensures linkages with the NTP. Temporary detention facilities under the Ministry of the Interior are covered by the local civilian health facility. The penitentiary system is included in all relevant NTP activities, with the exception of supervision, which was very limited in recent years. Supervision by the Department of Penitentiary Institutions and temporary detention facility supervision by the NTP could be strengthened by revising an outdated order for inter-ministerial collaboration, which was issued in 2003. Collaboration of the penitentiary system in the Transnistria region with NTP, on the other hand, is limited to some key aspects of implementation of Global Fund grants, such as procurement of anti-TB drugs, some data sharing and the work of Medical-Social Programs (an NGO affiliate of AFI) to support TB control and harm reduction in prisons and TB patients after their release.

TB control in prisons is designed according to international guidelines. All new detainees are screened on entry (via medical examination and chest X-ray), a practice that made it possible to diagnose 27 of 132 (20.5%) cases in 2011 and 56 of 162 (34.6%) in 2012. All detainees, including those in pre-trial institutions, are also screened every six months by chest X-ray.[17] All presumptive TB cases are isolated when possible. Smear microscopy takes place in the prison hospitals in Pruncul, Chisinau and Bender but sputum specimens can also be sent to nearby civilian laboratories for bacteriological culture and DST; moreover, Xpert MTB/RIF assays were installed in Chisinau Pre-trial Hospital and Pruncul Prison Hospital in 2012. Anti-TB treatment is provided under DOT in prisons and supported after prison release through AFI and Medical-Social Programs. First-line anti-TB drugs are procured directly by the Ministry of Justice since January 2013 (previously through the Global Fund and GDF), while procurement of second-line anti-TB drugs through the Global Fund will continue until 2014. HIV services are also available in prisons, such as harm reduction (needle exchanges in 9 prisons and opioid substitution therapy in 18), HCT, rapid HIV testing and CD4 count (done in the civilian system) and ART (for 54 of the 157 HIV-positive inmates) (Subata, 2008).

TB treatment outcomes reported from the 2011 cohort of new pulmonary sputum smear-positive and MDR-TB cases treated in the Republic of Moldova's prisons are shown in Tables 19 and 20.

Table 19. Treatment outcomes among new sputum smear-positive TB patients in prisons, 2011

Treatment outcome	Right side of river		Transnistria region	
	cases	%	cases	%
Patients registered	*14*	*100*	*14*	*100*
Not evaluated	1	7	1	7
Treated successfully	7	50	3	21
Failures	0	0	4	29
Lost to follow up	1	7	2	14
Died	3	21	3	21
Continued treatment in Category IV	2	14	1	7

Table 20. Treatment outcomes among MDR-TB patients in prisons, 2009

Treatment outcome	Right side of river		Transnistria region	
	cases	%	cases	%
Patients registered	*40*	*100*	*17*	*100*
Not evaluated	0	0	0	0
Treated successfully	25	63	2	12
Failures	3	8	10	59
Lost to follow up	10	25	2	12
Died	0	0	1	6
Still on treatment	2	5	2	12

These data underline the challenging nature of M/XDR-TB in prison and the significantly higher problems in the Transnistria region; here, all treatment failures and MDR-TB patients are usually removed from treatment, with the exception of a few cases and those with relatives able to purchase anti-TB drugs on the open market.

[17] Two mobile X-ray units were procured through the Global Fund in 2009 for the right and left sides of the river, but the unit in the Transnistria region is broken and screening there is performed though three centres of miniature mass radiography.

It is important to mention the support given to the detainees (including staff training and patient support) by NGOs while in prison and by the Ministry of Justice and NGOs after their release and during treatment in the civilian system. On the right side of the river, the Ministry of Justice provides 2100 lei (approximately US$ 175) for all inmates released after their first imprisonment. In addition, AFI provided €100 to cope with their initial needs (such as identity card, clothing, food, transport and medical insurance) and €100 after completion of TB treatment as an incentive in 2012 (although it had to halve its support in 2013). AFI ensured the successful transfer of 75% of the 70–80 TB patients released from prisons each year. In the Transnistria region AFI is active though Medical-Social Programs, an affiliated NGO operating in patient support.

The review team visited prisons on both sides of the Dniester River. The team observed correct management of drug-susceptible TB and MDR-TB patients on the right side of the river but incorrect practices in the Transnistria region, such as poor drug prescriptions or even incomplete treatment as a result of unavailability of second-line anti-TB drugs. A major concern is the insufficient infection control in all prisons, mainly related to poor planning, weak environmental control and inadequate building infrastructure, for which the decreasing density of the prison population only partially compensates. Poor conditions and infection control were specifically noted in Pre-trial Institution 13 (although this institution was not included in the review programme), which is based in an old castle in Chisinau. Its closure is planned for 2015–2016, when a new building will be constructed with European Union funds.

Recommendations

- The collaboration between the Ministry of Health, Ministry of the Interior and Ministry of Justice should be further strengthened through a national committee to discuss and agree on direct and effective forms of collaboration with the NTP, including the quarterly supply of anti-TB drugs.
- Further efforts should continue to strengthen the technical collaboration with the health authorities in both the civilian and penitentiary sectors in the Transnistria region to ensure equal advances towards universal access to prevention, diagnosis and treatment of MDR-TB.
- International financial and other support should urgently be identified and pursued jointly by the authorities on both sides of the river.
- Supplies of first-line and second-line anti-TB drugs should be ensured in all prisons on both sides of the river.
- Infection control should be strengthened significantly, including in pre-trial institutions. Administrative and environmental interventions should be improved.
- Monitoring and supervision should be ensured for all penitentiary institutions on both sides of the river.
- Follow-up of TB patients' treatment after their release from prison should be further ensured and strengthened.
- The handover from the Ministry of Justice to the Ministry of Health of health care in prisons should be properly planned in consideration of the human resources involved and the need to ensure the continuation of effective TB services.

Other vulnerable populations and social determinants

As part of a nationwide programme to screen the population for various diseases (including diabetes mellitus, TB, cancer and reproductive health issues), the Republic of Moldova has a list of risk population groups recommended to undertake a series of medical tests every year (see the section on case management above). The benefit of these tests has not been properly measured, and it is questionable whether such mandatory screening reaches the population groups most at risk, such as homeless people, the rural poor, alcoholics and injecting drug users.

Innovative projects reaching risk population groups can be found across the country, such as TB screening and DOT among injecting drug users by outreach NGO workers in Balti. Unfortunately, this and similar initiatives could be considered illegal because the current legislation states that only medical staff can dispense anti-TB drugs.

Diabetes mellitus

Diabetes mellitus is a known risk condition for TB worldwide. In the Republic of Moldova it is estimated to affect 8.7% of the general population – more than 365 000 individuals – but it is reported through SIME-TB in only 4% of newly diagnosed TB cases. This could be explained by poor data recording of the condition, but also by significant underdiagnosis of diabetes mellitus in the country and especially among TB patients.

The Global Diabetes Foundation (based in Copenhagen, Denmark) provides specific support to the National Centre for Prevention, Diagnosis and Treatment of Diabetes in Chisinau to strengthen its capacity in early diagnosis of diabetes mellitus and prevention of long-term related complications, with a plan to expand these capacities outside Chisinau (a specific project is starting in the district of Orhei). The National Centre for Prevention, Diagnosis and Treatment of Diabetes also provides some training in the field, but it seems this will take many years to cover all primary health care providers countrywide. The NTP could represent a good entry point to accelerate efforts through its existing TB training and surveillance.

Workplace hazards

Many TB patients work in construction, agriculture and other physically demanding jobs, which all represent a physical hazard that may promote the development of TB. Furthermore, those with physically demanding jobs are often uninsured and may need to return to work even before their recovery is complete, which may lead to loss to treatment follow up and development of drug resistance. Even when successfully treated, post-TB sequelae can limit the patient's physical capacity to work in the same job in future. For these former TB patients, job redeployment and reorientation may be more appropriate than a disability pension. Because of the large numbers of people working in hazardous and physically demanding jobs in the country, this aspect has special relevance and is a challenge for the NTP.

In a focus group with a construction worker, a former soldier and an auto mechanic, the 24-year-old construction worker became out of breath after just a few minutes of conversation. The soldier grabbed the bony arm of the mechanic and said: "Look at him – he can't go back to work. None of us can do to the job we did before". The patient was right: all three men suffered permanent lung damage (see Annex 6 for profiles of patients interviewed).

Alcohol use disorders

The Republic of Moldova has the highest alcohol consumption rate in Europe, at an estimated 18.2 litres of pure alcohol per capita in 2005 (WHO, 2010). The strong links between alcohol consumption and the risk of TB and poor TB treatment outcomes are well documented in the literature and experienced in their daily practice by health providers in the country (Lonnroth et al., 2008; Rehm et al., 2009). TB patients with alcohol use disorders are reported to be the most challenging, with a much higher case fatality rate (20% and 24% among the new TB cases diagnosed countrywide and in the Transnistria region respectively in 2011). This high rate could also relate to their exclusion from MDR-TB treatment, as alcohol use disorder coexistence is one of the exclusion criteria adopted by the national MDR-TB consilium. This decision, motivated by the limited availability of second-line anti-TB drugs, is of ethical concern (see the section on ethics and human rights below) and contradicts the NTP's aim of providing universal access to TB and MDR-TB treatment. International experience and available evidence (Gelmanova et al., 2011) should be considered in order to organize joint services for TB and alcohol use disorder treatment.

Migration

The Republic of Moldova has high annual migration outflow, estimated to involve between a quarter and a third of the working-age population (IOM, 2012). Poverty, a lack of adequate employment opportunities and low salaries are the main reasons for emigrating. More than 60% of migrants are from rural areas and 77% are between 15 and 44 years of age. The most important destination countries are the Russian Federation (over 60% of emigrants) and Italy (20%), followed by Israel, Portugal, Turkey and Ukraine. Women are more prevalent among emigrants to Italy (mainly in care services) and men to the Russian Federation (mainly in construction). Women are more involved in long-term emigration, while men engage more in temporary labour emigration. Emigration is a recognized cause of the country's decreasing population (forecast to fall by 20% by 2050) and the feminization of its rural population. Remittances in foreign currency have contributed to the 5% annual increase in GDP in recent years, which was accompanied, however, by a decreasing employment rate (38.5% in 2010).

Of people newly living with HIV in 2010, 34% were reported to be migrants. Migrants are, however, usually younger and healthier than the non-migrant population and less likely to use medical services (aside from the issue of limited access caused by limited participation in a health insurance scheme). Most migrants report barriers in accessing health care abroad, such as lack of health insurance (34%), irregular status (28%), financial constraints (25%) and fear of losing employment (20%). These barriers are especially common for workers in construction, where temporary employment (usually three months at a time) without a legal contract is common. Their access to early diagnosis and adequate treatment of TB and MDR-TB in the recipient country is thus significantly limited, while their poor living conditions favour infection and disease. In the Transnistria region 150 000 of the total population of 500 000 are migrants. The Republic of Moldova should be considered a high-priority country for implementation of the European minimum package for cross-border TB control and care (Dara et al., 2012).

Migrants are included among the population groups at risk of TB. In 2011 SIME-TB recorded 3952 new and relapse TB cases, of which 623 (16%) had "migrant" status (58 cases had no

specified migration status).[18] While treatment success and loss to follow-up had similar proportions among both migrant and non-migrant TB cases, the case fatality rate was significantly lower among migrant cases (OR 0.71, P<0.05), as was the proportion of MDR-TB (131/390 [33.6%] vs. 719/1829 [39.3%], OR 0.82, P<0.05). These data appear to contradict the findings from the focus groups and the wide variance among districts in reporting migrant status may raise some doubts about the quality of SIME-TB data, although the younger age and better health of the migrant population is documented and may explain the contradiction. More operational research is needed to better describe the relation between TB and migration in the Republic of Moldova to guide target interventions.

Poverty and social support

TB may affect every social class but poor patients have a higher risk of TB infection and disease, combined with difficulty in completing treatment. Because nearly one third of the population in the Republic of Moldova lives in absolute poverty, this social determinant of TB cannot be ignored. Poverty is both an urban and a rural problem, but the lack of sanitation, improved water supplies and central heating make living conditions in rural areas especially difficult. In the focus groups organized by the review team patients described difficulties in providing even the most basic conditions for survival, such as heat in the winter and enough food. Patients described TB as yet another burden added to poverty, unemployment and family breakup due to labour migration. As the Ministry of Health is planning to shift to more ambulatory TB care, it is crucial that all patients in need can access socioeconomic support for the full duration of their treatment.

The poverty that so many patients suffer from is a barrier to both TB diagnosis and treatment. Patients reported self-medication and delays of up to six months before seeking medical care to the review team. Some feared they would have to pay for their TB treatment. Their fear is well-founded: even among the small number of patients interviewed, three reported out-of-pocket payments for diagnosis and treatment of pneumonia before a correct TB diagnosis. Public doctors often refer presumptive TB patients to private clinics for unnecessary and expensive examinations (such as bronchoscopy). While patients did not report any informal payments for TB care in interview, their widespread existence in other health services discourages most patients from timely seeking TB care.

TB patients in the Republic of Moldova benefit from a series of treatment incentives and enablers, but these have no clear impact measurement of treatment outcome. They have varied over time according to the patient's type of TB disease, district and even rural or urban residence (see the section on case management above). This variation has led to great confusion over the available benefits on the part of both patients and medical providers. Moreover, doctors and patients reported to the review team that incentives to MDR-TB patients provided by Global Fund grant subrecipients were delayed for nearly two months from the start of 2013. The timing of dispensing incentives has also led to additional discomfort: for example, asking rural patients to come to town every week, even if travelling would take up the majority of their day.

In some locations incentives are paid in the form of vouchers used to purchase food[19] in a store under contract; in others, incentives are in-kind, usually composed of basic items such as milk, sugar, coffee/tea, canned food, and so on. In the Transnistria region the incentives are in cash, paid directly to the patients, which may raise concerns about the possibility that patients will buy

[18] A "migrant" is defined as a person who has been out of the country for more than three months during the last year.

[19] These vouchers cannot be spent on items such as alcohol and cigarettes.

alcohol instead of food items. Operational research is required to compare administrative and medical records in each location and evaluate the impact of the existing schemes of incentives and enablers on TB treatment outcomes.

Recommendations

- Active TB screening with fluorography should be limited to evidence-based risk groups (such as homeless people, people living with HIV and injecting drug users) and resources redirected to ensure countrywide treatment of TB and MDR-TB patients under DOT.
- The current legislation should be revised to allow NGOs and other properly trained lay workers to provide TB services (such as education, sputum collection and DOT) among difficult-to-reach populations such as alcoholics, injecting drug users and those living in extreme poverty or lacking adequate social support.
- Forms of collaboration should be established between the NTP and the National Centre for Prevention, Diagnosis and Treatment of Diabetes to create synergic training programmes and improve the early detection of diabetes mellitus among TB patients.
- The current legislation adopted by the Ministry of Labour, Social Protection and Family should be revised to make all TB patients eligible for a disability pension for the full duration of their treatment, either in or outside hospital. The pension should be extended in cases of persistent disability and until the reorientation and redeployment of the worker.
- Screening and treatment of alcohol use disorders should be organized jointly with TB services.
- More operational research should be conducted to understand the risk of TB and MDR-TB among migrants and its impact on the epidemic in the country. Full access of migrants to TB services in their home country and the receiving country should be pursued through implementation of the European minimum package for cross-border TB control and care by all international and national partners, including NGOs.
- A socioeconomic evaluation of the patient should be used to design an individualized TB treatment completion plan, which should include socio-psychological counselling and coordination of services between the Ministry of Health, Ministry of Labour, Social Protection and Family, NGOs and local administrations.

TB infection control

Strengthening TB infection control in the Republic of Moldova is a high priority. The existing evidence is of a very high risk of cross-contamination in TB wards (Popa, unpublished data commissioned by PAS, 2009; unpublished data commissioned by CarLux NGO and the WHO Country Office in the Republic of Moldova, 2011; Stratan et al., 2012). TB transmission is high not only among patients but also among staff: according to SIME-TB data, number of health workers (physicians, nurses, laboratory technicians, cleaning workers and other staff working in any type of facility) diagnosed with TB disease annually was 8 in 2008, 17 in 2009, 16 in 2010, 26 in 2011 and 22 in 2012, including 36 nurses, 25 physicians, 23 cleaning workers and 4 others overall.

Responsibility for TB infection control is shared between the National Centre for Public Health[20] and the NIPP. The National Centre for Public Health has the authority to develop sanitary policies for the prevention of all communicable diseases, including TB, and to issue orders and enforce their implementation in all medical facilities through financial penalties or even temporary closures. The NIPP develops national guidelines related to TB, including for airborne infection control, but its authority to enforce them is limited. The interaction between the National Centre for Public Health and the NIPP is not clearly defined and their collaboration is limited. As consequence, the Republic of Moldova currently has neither a National Infection Control Plan nor a mechanism (such as a multidisciplinary commission appointed by the Ministry of Health) to develop one.

Both the National Centre for Public Health and the NIPP developed guidelines for TB infection control, but the review team assessed that their dissemination was very limited. The National Centre for Public Health issued guidelines on the control of nosocomial infection in 2009, but these include limited information on TB. The NIPP issued two sets of guidelines: on infection control in health services for the management of drug-resistant TB, which suggested policies and practices not fully accepted by the National Centre for Public Health (such as the manipulation of respirators); and the more recent national clinical protocols on TB in adults and children (Ministry of Health, 2012a; 2012b), which include some misleading directions, such as the need to use separate dishes and disinfect surfaces in order to limit TB transmission.

The National Centre for Public Health has primary responsibility for tracing TB contacts and final disinfection of TB foci. It has a mandate to institute sanitary isolation and evaluate the compliance with the existing Ministry of Health orders related to the disinfection of premises. The National Centre for Public Health has to be informed of each new TB patient, with priority given to those most infectious. Its personnel then have to interview the patient; verify the patient's home address and create a list of household members and other close contacts (although the period of patients' infectiousness is rarely investigated and the list of contacts becomes unreliable); visit the household and dispose of items for disinfection, including toys, furniture, bedding, and so on; and invite all contacts to report to the TB dispensary for further investigation. There is no evidence in the literature that disinfecting surfaces is effective in reducing TB transmission, while the data show the effectiveness of good room ventilation, as recommended by the NIPP.

Administrative measures

Most patients spend the two- to six-month intensive phase of treatment in hospital. The national policy is to keep them in separate rooms or wards, based on the result of their sputum microscopy (smear-positive separated from smear-negative patients) and DST (drug-susceptible TB separated from M/XDR-TB patients). All staff working in TB facilities should be screened every year via medical examination and chest X-ray.

In practice, however, different types of patients share hospital rooms before their DST results are available: Xpert MTB/RIF assay technology, even where it is available, is not used properly to identify and separate MDR-TB patients earlier. Patients referred to another medical facility are often moved by private or even public transport because ambulances are not allowed to carry infectious TB patients.

[20] The Sanitary and Epidemiological State Service was renamed the National Centre for Public Health in 2011.

Under the Global Fund grant, all health care providers (doctors, nurses, psychologists and community assistants) were trained on TB infection control, and education material was made available in inpatient and outpatient facilities and at community level. Nevertheless, more staff need to be trained, including the technical staff in TB facilities, and such training should continue on a regular basis. Moreover, the review team found that patients and their families did not always understand TB transmission.

Proper use of the Xpert MTB/RIF assay, reducing the number of beds per room, having rooms with individual toilets, training all staff and proper education of patients and visitors are the most important administrative measures to adopt. Close collaboration between the NIPP and the National Centre for Public Health could be instrumental in strengthening training and education for TB infection control in the country, as well as in updating and streamlining current policies and guidelines.

Environmental measures

The review team visited a number of TB facilities provided with mechanical ventilation systems, especially inpatient departments and laboratories. The hospital at Vorniceni has an MDR-TB ward of 110 beds served by a mechanical ventilation system with correct directional airflow, but it provides fewer air exchanges per hour than needed (4–7 in a ward) and its use should be improved. Moreover, it operates only 12 hours per day to reduce its high running costs. The new 250-bed ward opening in Vorniceni MDR-TB Hospital will also have mechanical ventilation; this raises concerns among the review team over its financial sustainability.

In the other TB facilities visited by the review team (the MDR-TB department in the NIPP, the municipal TB hospital in Chisinau and the MDR-TB department and regional laboratory in Balti) the mechanical ventilation systems were not in use for different reasons. Large issues were identified in design (not providing the needed directional airflow or differential pressure, or not meeting international requirements) and in use and maintenance (old and noisy machinery with low efficiency and high power consumption). Since defective mechanical ventilation increases the risk of TB transmission, it should be allowed only after a competent technical check and proper staff training. Natural ventilation can be a very effective alternative to mechanical ventilation, if its adequacy is ensured by the provision of large, light windows with substantial functional apertures that are regularly opened by a specifically assigned person. Unfortunately, the review team observed that many hospital renovations replaced old windows with cheaper, leak-proof and less operable windows that did not allow proper ventilation of the rooms.

No TB facility in the country has shielded ultra-violet lights, even though they are recommended as an additional measure in high-risk areas. Unshielded ultra-violet lights are widely used, but their efficacy is limited as they can only be used in the absence of people. The ultra-violet lamps' working hours are registered in almost all facilities and they are replaced as specified by the manufacturer; however, ultra-violet meters are not available.

In all TB laboratories visited by the review team the biosafety cabinets were poorly serviced due to a lack of availability of specialized services in the country. The number of biosafety cabinets in the National TB Reference Laboratory and Vorniceni MDR-TB Hospital is insufficient.

Personal protection

The review team found respirators available in most of the TB facilities visited.[21] Personnel in inpatient facilities were generally using them during their work in contact with patients but this occurred much less in outpatient facilities. The "fit test" to test a person's ability to wear a respirator effectively on his/her face was not routinely practised. Use of surgical masks by patients and visitors in inpatient and outpatient facilities was largely encouraged and promoted (via posters and flyers) but availability of the masks varied.

A special issue raised with the review team was the transport of patients by ambulance, which is now limited to non-infectious TB cases. Simple procedures could be taken, however, to allow the transport of such patients without any risk of exposure to the driver. These include use of ambulances with separation between driver and patient; limiting transport to one patient at a time; ventilation through open windows and not air conditioning; and the patient wearing a surgical mask and the driver a respirator.

Infection control in the Transnistria region

Particular attention should be paid to airborne infection control measures in the Transnistria region because of its higher density of TB and MDR-TB cases. The infection control guidelines are the same as in the rest of the country, but are not enforced. Patients are not always separated in hospitals and respirators not always used.

Infection control in prisons

TB infection control in the penitentiary system is well established: the number of TB cases among prisoners is decreasing and so is their density. Nevertheless, the significant proportion of MDR-TB patients may be a concern. The prison population is intensively screened for TB through entry screening, full access to health care when needed, chest X-rays twice a year and smear microscopy for symptomatic people with a cough. More recently, the Xpert MTB/RIF assay was also made available, which is expected in future to ensure the rapid detection and isolation of MDR-TB cases. Administrative measures are in place, except at Rezina Prison Hospital, where the separation of MDR-TB patients is not ensured, bathrooms are shared and visitors not protected.

In general, the review team considered the infection control measures practised in the Republic of Moldova still insufficient in many TB facilities. The plan to concentrate an important number of MDR-TB inpatients in one place (Vorniceni MDR-TB Hospital) should be supported by implementation of good practices on infection control in that facility. As plans exist to extend TB and MDR-TB care outside hospitals, a new strategy should be developed for education of patients and their families.

Recommendations

- National Centre for Public Health and the NTP should be empowered jointly to develop and implement internationally recommended policies for TB infection control in hospitals, outpatient facilities and TB patients' residences and communities.

[21] An exception was one outpatient facility in Transnistria where staff had to purchase respirators themselves.

- Current policies on TB infection control should be revised and updated, based on the most recent evidence-based effective interventions. Administrative measures, with prompt diagnosis and initiation of TB treatment, should receive priority, while the final disinfection of the TB foci policy implemented by National Centre for Public Health should be abandoned as it is not supported by any international or national evidence of its effectiveness in preventing TB infection.
- Multidisciplinary commissions should be appointed at central and peripheral levels in order to develop the National Infection Control Plan and local infection control plans that include interventions at hospitals, outpatient facilities and TB patients' residences and communities.
- Infection control plans for inpatient TB facilities should include among their priorities: triage of respiratory patients; outpatient treatment of all TB patients who are not severely ill; decreasing the number of beds per room; isolation of M/XDR-TB patients in individual rooms with bathrooms; installation and use of mechanical ventilation systems only after a cost and feasibility evaluation, professional servicing and staff training; ensuring natural ventilation where mechanical ventilation is not available; ensuring wide use of shielded ultra-violet lamps; early diagnosis (using the Xpert MTB/RIF assay and BACTEC MGIT 960 system) and isolation of MDR-TB cases; personal protection for all TB staff (at inpatient and outpatient facilities); protected transport of patients by ambulance.
- The capacity of the National Centre for Public Health and the NTP should be built jointly through available international training courses and exposure to best practices.
- Training programmes should be developed jointly by the National Centre for Public Health and the NTP for the continuing education of all staff.
- The mechanical ventilation in Vorniceni MDR-TB Hospital (old and new wards) should be ensured 24 hours a day and sustained by a 10% increase in the hospital's annual budget. Effective administrative measures should be introduced urgently in Rezina Prison Hospital.

Management of medicines and other commodities

Quantification and funding

The NIPP staff are responsible for quantifying the need for first- and second-line anti-TB drugs, laboratory reagents and supplies for the country, including the penitentiary system. It calculates the need for first-line anti-TB drugs based on four fixed-dose combinations for 50% of patients; two fixed-dose combinations for 40% of patients; and single drugs (different forms of rifampicin, isoniazid, and ethambutol) for the 10% of patients it estimates will have adverse reactions and need the standard treatment re-tailored. This approach complicates the whole drug management process, creating opportunities for many physicians to deviate from the national treatment protocols and for patients to fail to complete treatment, thereby amplifying drug resistance. In principle, single loose drugs should not represent more than 1–3% of total procurement.

Until December 2012 all anti-TB drugs and laboratory consumables were procured under the Global Fund grant. From January 2013 funding of all first-line anti-TB drugs became the responsibility of the Ministry of Health; second-line anti-TB drugs will continue to be procured under the Global Fund grant until December 2014. The Ministry of Health is further committed to increasing its budget for first-line and second-line anti-TB drugs in 2014 and 2015, as

officially communicated to the Global Fund Secretariat in August 2012 (Table 21). Hospitals procure ancillary drugs locally through their own budgets.

The NTP currently requires a budget of US$ 3–4 million per year to buy second-line anti-TB drugs (based on GLC prices and current treatment regimens). This treats only a proportion of the patients in need, however (only 68% of the MDR-TB cases detected in 2012 received treatment). It is evident that more funding is urgently needed, immediately, to treat all the MDR-TB patients currently detected by the NTP and the additional estimated number of patients the NTP will detect by increasing future capacity.

Table 21. Funding of anti-TB drug and laboratory consumables by source, 2012–2015

Funding source	Annual budget (€)			
	2012	2013	2014	2015
Global Fund (total)	1 930 886	3 549 096	2 034 317	0
First-line anti-TB drugs	169 389	0	0	0
Second-line anti-TB drugs	1 286 957	3 035 297	1 565 678	0
Laboratory reagents and supplies	284 242	270 395	278 300	0
Related activities	190 298	243 404	190 339	0
Ministry of Health		484 848	1 998 642	1 470 164
Total	*1 930 886*	*4 033 944*	*4 032 959*	*1 470 164*

The funding situation in the Transnistria region is even more serious, with 158 MDR-TB patients enrolled in 2012 in the non-GLC cohort who received only part of the drugs prescribed: cycloserine, levofloxacin and aminosalicylic acid were not available; amikacin and kanamycin were only partially available; isoniazid, rifampicin and ciprofloxacin were available but were purchased out of local budgets. The situation in the Transnistria region may lead to the amplification of anti-TB drug resistance. The Central Health Authority confirmed to the review team its commitment to ensure funding for anti-TB drugs but also voiced serious concerns over its capacity to ensure that priority is given to TB and HIV prevention and control over many other public health conditions (such as cardiovascular diseases).

The NTP uses capreomycin for the treatment of all MDR-TB cases. Kanamycin or amikacin could be used instead, decreasing the cost per patient treated from US$ 4254 to US$ 3097. Kanamycin and amikacin have cross-resistance with streptomycin and frequently cause adverse reactions: they must, therefore, be replaced with capreomycin in some patients' regimens. Nevertheless, by using a proper mix of these three injectable drugs, based on the Republic of Moldova's drug resistance profile, [22] the NTP could save between US$ 800 000 and US$ 1 200 000 per year, which could be used to treat all currently detected MDR-TB patients.

Procurement and registration

Second-line anti-TB drugs are still procured under the Global Fund grant and directly from the GDF, benefitting from concessional prices and quality-assured products. In 2012 the Medicines and Medical Devices Agency organized a national tender for procurement of all first-line and a limited amount of second-line anti-TB drugs. A number of manufacturers were selected and the

[22] Based on the country's anti-TB drug resistance profile, it can be assumed that 50% of patients can be treated with kanamycin, 10–20% with amikacin and 30% with capreomycin.

list published in December 2012, but not all the suppliers had a contract at the time of the review; consequently, it was very unlikely that all items would be delivered by the end of February 2013, as initially planned.[23] Although there is no immediate risk of anti-TB drugs stocks running out at any level, the Medicines and Medical Devices Agency should expedite the contracting of all manufacturers and comply with the terms and conditions agreed with the Ministry of Health.

For the more than 30 anti-TB drug items procured by the Medicines and Medical Devices Agency, 16 suppliers were selected; only three of them (Macleod, Svizera and Lupin) have WHO prequalification or Stringent Regulatory Authority approval. All products, with the exception of the isoniazid 100 mg tablet, have a price higher than that offered by the GDF (between 6% and 42% higher, depending on the item). Local prices may even increase in future tenders owing to the relatively small market represented by the country. For these reasons, it is of paramount importance that the NTP continues central procurement of TB commodities and is open to international tenders or even direct procurement from the GDF. The Ministry of Finance does not currently allow direct procurement (except in emergencies) or international tenders; the law should be revised to allow the Ministry of Health to procure quality-assured products at concessional prices from the existing international TB mechanisms.

Under European standards, the Medicines and Medical Devices Agency requires registration of any drug in use in the country. GDF drugs are currently imported under a waiver mechanism, which is expected to end after the Global Fund grant is stopped. Drug registration by the Stringent Regulatory Authority requires a review of the drug dossier and takes three to five months; it currently costs the manufacturer 13 300 lei (equivalent to approximately US$ 1110) and should be repeated every five years. The language used in drug leaflets should be Romanian. These conditions are all discouraging to any new supplier seeking to enter the small Moldovan market. The Medicines and Medical Devices Agency is working towards simplifying the registration process through computerized submission of dossiers, use of English and the European Medicines Agency format, and a one-stop approach for the submission of dossiers and feedback.

The Medicines and Medical Devices Agency houses a quality control laboratory, which is not ISO certified.[24] No drug quality control system exists, but samples of drugs are regularly sent for testing to a laboratory in Canada (the annual cost for testing is approximately US$ 53 000) and no quality failures have ever been reported.
Hospitals procure ancillary drugs to support TB treatment locally through their own budgets. They are available, free of charge, only to hospitalized patients.

Storage, distribution and rational use of drugs

The NIPP has a good warehouse in Chisinau for central storage of all anti-TB drugs and supplies: it is clean and refurbished with well-organized stock, and has good inventory and store management practices in place. The warehouse has a quarantine zone where drugs are kept and inspected before being placed on the shelves; an alphabetical system is in place to identify their

[23] The review team understood that the national tender was a very long and difficult process because of the number of required approvals and unforeseen litigation actions. The tender included 1331 products (rather than using a variety of antibiotics, anaesthetics, and so on) and 5000 contracts had to be prepared, according to the specific products' manufacturers.

[24] A quality control laboratory that falls under the remit of the Medicines and Medical Devices Agency may create a conflict of interest, but no other entity in the country could currently take on this responsibility.

location. Additional space can be used in future if needs increase. A computerized system is available for drug management and the staff (two pharmacists and two doctors) are well trained. Standard operating procedures for the distribution chain are established.

Storage conditions were found suitable at the district level, facilitated by the fact that only a limited amount of drugs were stored. The review team was not able to access the records or reports in any of these district facilities, with the exception of the municipal hospital in Balti, which had a very good drug inventory tool.

All TB cabinets send their cars on the first month of each quarter to collect anti-TB drugs and laboratory reagents from Chisinau. Further distribution depends on availability of the hospital vehicle and the priorities of the district authority. The review team assessed that 10 of the 34 districts visited experienced a delay in supply collection and four had not yet collected. Most of the facilities visited did not have sufficient buffer stocks; this could be a result of the widespread practice of prescribing unnecessarily prolonged treatment to many patients. The review team did not observe any treatment interruptions, but considers this a risk if proper buffer stocks are not in place.

The review team also observed weak monitoring and supervision of the supply chain, with possible wastage of drugs with a limited shelf life.

All anti-TB drugs are provided free of charge, with the exception of ancillary drugs, which outpatients have to buy from the pharmacy. The review team observed many providers still prescribing a three-times-weekly Category I treatment regimen (adding isoniazid 100 mg to rifampicin 150 mg/isoniazid 75 mg) even though the new treatment guidelines issued in 2012 changed it to a daily regimen.

As mentioned in the section on quantification and funding above, the availability of single loose drugs in different forms creates opportunities for physicians to deviate from the national treatment protocols and for patients to fail to complete treatment and amplify drug resistance. Another problem in the rational use of drugs is the lack of availability of paediatric anti-TB drug formulations; this forces providers to crush tablets and open capsules to calculate doses roughly. The review team members visited a few private pharmacies where they were unable to buy first-line but able to buy some second-line anti-TB drugs (levofloxacin, ofloxacin, kanamycin), although a medical prescription was always requested.

The Medicines and Medical Devices Agency has established a web site-based system of pharmacovigilance that routinely collects information on adverse drug reactions. Few events have been reported so far, however – most from the NIPP in Chisinau (72 cases of adverse drug reactions were reported in 2011, of which 46 related to anti-TB drugs; in 2012, of 180 cases reported, 52 related to anti-TB drugs). The review team observed that adverse reactions are recorded on TB patients' cards but rarely reported to the Medicines and Medical Devices Agency. Meanwhile, the Medicines and Medical Devices Agency did not take any action on the cases reported, justifying this with the fact that all reported adverse reactions were indicated on the products' instruction leaflets.

Recommendations

- The necessary funding should be ensured to treat all MDR-TB cases currently detected by the NTP free of charge with quality-assured anti-TB and ancillary drugs, during either hospital or outpatient treatment.
- Consideration should be given to financial gains from adopting more cost-effective interventions such as using international pool procurement agency services and revising the use of capreomycin according to the country's resistance profile.
- An application should be sent urgently to the GDF for a grant for paediatric formulation anti-TB drugs for the whole country and a grant for first-line anti-TB drugs for the Transnistria region.
- Government funds should only be used to purchase quality-assured first- and second-line anti-TB drugs from either WHO prequalified manufacturers or those approved by the Stringent Regulatory Authority.
- National tender procedures should be improved and simplified by introducing pool procurement mechanisms.
- Additional funding should be ensured before the end of the current Global Fund grant to treat all diagnosed MDR-TB cases with quality-assured anti-TB and ancillary drugs through reprogramming of national resources and external support.
- First-line anti-TB drugs should be procured in the form of fixed-dose combinations, with the exception of a small proportion of single loose drugs, representing not more than 3% of total procurement.
- Timely distribution of anti-TB drugs should be ensured, with treatment regimens prescribed according to the latest national guidelines, and regular and supportive supervision.
- Pharmacovigilance should be strengthened to allow complete documentation of adverse drug reactions in the country and ensure relevant action.

Monitoring and evaluation

NTP surveillance in the Republic of Moldova is one of the leading and most sustainable among the countries of eastern Europe. It was initially designed by applying all existing international recommendations and standards, with the external financial and technical support of the Word Bank, Global Fund and WHO. NTP surveillance was created around three main pillars: tools, standard operation procedures and the human resources running the system.

The tools consist of a number of forms and the national TB register SIME-TB. The most important recording forms are the TB case reporting form (089), extensively revised from one used during the Soviet era, and the TB case management form (TB01). SIME-TB is a national electronic database with nominal information on each TB and MDR-TB patient that is routinely accessible for data entry and management by all TB peripheral units via the Internet (National Centre for Health Management, 2012). In cases of poor connectivity a standalone module is also available for data entry; this can be incorporated in the national database. Online data management and validation are ensured by logical check scripts that prevent duplication and mismatching of records. The central SIME-TB server is hosted in the National Centre for Health Management, where 2–3 dedicated staff ensure hardware and software maintenance.

SIME-TB was designed (starting in 2005) around the existing WHO recommendations on monitoring the most important NTP outcome and impact indicators. It has countrywide coverage, but does not properly represent the Transnistria region (no data are received from the penitentiary system and the population may differ from the United Nations Development Programme (UNDP) estimates). SIME-TB meets basic security standards, is well maintained and allows access according to different data needs, such as for data suppliers, data users, and the public domain. It has in/out communication gateways for interface with other information systems, such as the one maintained by the National Centre for Public Health to monitor 67 communicable diseases in the country.[25] Nevertheless, SIME-TB is not used to its full potential: to meet the current needs of the NTP it needs to be updated to incorporate revised TB case definitions and reporting, to enable drug management data entry directly rather than through a standalone module, to link with the vital registration system, to ensure effective pharmacovigilance, and to improve data analysis and interpretation.

The standard operation procedures for NTP monitoring and evaluation are incorporated in the national guidelines, as well as in data management and validation procedures.

Dedicated NIPP staff work in the Monitoring Unit in charge of recording, reporting and data management under the NTP. Few staff have the necessary skills and experience to perform their tasks; meantime, their assistance is increasingly requested by other NTP units (especially for training and supervision), other health departments (such as the National AIDS Programme, the National Centre for Public Health, the vital registration system, the penitentiary system and the health system of the Transnistria region). To strengthen NTP monitoring and evaluation, therefore, staff need to develop their skills further, based on task analysis and revised terms of reference. Current efforts to strengthen field supervision should be further supported through more funding and international training.

Over the years the NTP has overestimated the quality of SIME-TB and the reliability of its data. In addition, staff in the facilities were required by law to maintain paper patient recording and reporting, which caused duplication of work that may explain the frequent discrepancies between paper and electronic records observed by the review team, such as incomplete electronic recording of patient (TB determinants) and laboratory data. The parallel paper and electronic recording systems also make analysis and on-the-job training and mentoring difficult during field supervision visits, which are crucial and can greatly improve the quality and completeness of NTP data. Unfortunately, the review team was unable to assess this important feature of the NTP because the visits were not properly recorded. The Transnistria region was not included in NTP supervision visits.

Recommendations

- SIME-TB should maximize its potential for data entry and analysis. Its features should ensure updated use of new TB definitions and reporting; proper components on laboratories, drug supply management and field supervision; an interface with SIME-HIV; an epidemiological and programme performance profile at all levels (national, district and facility catchment area) for technical monitoring and public advocacy; and effective pharmacovigilance.

[25] SIME-TB can interface with other information systems, which opens the possibility of linking it to data from different sources and improving information available for action. For example, it is possible to link SIME-TB to SIME-HIV, as well as the system operated by local mobile operator Moldcell, which is now partnered with UNDP in a pilot project to strengthen DOT (see the section on operational research below).

- The latest WHO recommendations on NTP recording and reporting should immediately be adopted and implemented: TB definitions and reporting frameworks should be revised, SIME-TB adjusted in its data validation processes, and specific guidelines developed and widely circulated among all staff.
- Quality and completeness of TB data from the Transnistria region should be improved by assigning a staff member dedicated to TB monitoring and supervision, establishing a link with the vital registration system and setting up collaboration with the penitentiary system.
- The information from SIME-TB should be better used to direct future NTP research (see the section on operational research below). SIME-TB should be used for regular production of quarterly reports on notification and cohort analysis and on laboratory activities and analysis at the district level.
- The NTP Monitoring Unit should work according to a plan of action considering in detail all operations and their timing, such as distant data validation every month, and report generation and interpretation every quarter (within two weeks of quarter end) and year (by the end of April).
- The staff of the NTP Monitoring Unit and Supervision and Training Unit should receive revised terms of reference consistent with the NTP priorities and needs and based on task analysis. Staff capacity should be built consistently through national and international training.
- The NTP should have a specific budget line for field supervision and possible support for it should be negotiated with the NHIC. The NTP should receive a clear mandate for technical supervision from the Ministry of Health.
- All basic management units should be visited by the NTP every year. Supervision visits should be properly planned during the year and documented through field reports. Supervision should also be arranged when the number of TB cases not evaluated for treatment outcome exceeds 5% of the number of TB cases registered for treatment. When relevant, the supervision team should include an epidemiologist from the National Centre for Public Health to cover specific aspects of epidemiology, contact tracing and infection control.
- In-service training, provided by the NTP Supervision and Training Unit, and medical education, provided by the NIPP's Department of Postgraduate Education on Phthisiopulmonology, should be aligned and made sustainable in the long term.

Human resources development

The NTP has a total of 965 staff, including 371 TB doctors, 275 nurses, 12 laboratory doctors (bacteriologists) and 117 laboratory technicians (of these, about 140 are assigned to MDR-TB inpatient treatment delivery sites). A number of posts are vacant, especially in the penitentiary system (one third of the posts). The Transnistria region TB staff include 41 doctors, 99 nurses, 4 laboratory doctors, 9 laboratory technicians, 5 X-ray physicians, 10 TB physician assistants, others. About one third of the physician and nursing posts are vacant.

A major problem for the NTP in the Republic of Moldova, in common with many countries, is the high average age of staff, combined with the difficulty of finding young and motivated colleagues. TB doctors have an average age of 53.5 years, with 20% over 65 (the age of retirement) and only 22% below 40 and 10% below 35. TB and MDR-TB are well-known

airborne infectious diseases that significantly increase the occupational hazard of becoming infected and ill. TB and MDR-TB are also conditions often linked to poor socioeconomic conditions and lifestyles of patients with whom it is frequently difficult to follow a treatment plan. But the most important issues discouraging new generations of staff from working in TB, as reported to the review team, are the low salaries and exclusion from remunerative patient co-payments and private practice resulting from a health system where TB services are given free of charge. Despite this, the nurses and their role in prevention and control of MDR-TB is not properly recognized and supported.

Under the NTP and supported by the Global Fund, extensive and regular training has been provided over the years to all TB and primary health care staff, as verified by the review team. Adult in-service TB training is organized by the NTP's Supervision and Training Unit, as is on-the-job mentoring of staff during NTP supervision visits. Postgraduate phthisiology and pulmonology education is provided by the Department of Postgraduate Education on Phthisiopulmonology; however, there are disagreements between these two divisions, both under the remit of the NIPP, and the training curricula are different. Meanwhile, supervision visits are scarce and not used for proper staff mentoring.

In the near future, it is expected that fewer TB and MDR-TB patients will stay in hospital as a consequence of rapid diagnosis and the new policy limiting hospital admission to those patients with severe forms of TB. Hospitals, which already have overcapacity, will have to contract and be replaced by more and more effective outpatient services. To support this process, the NTP should rethink the number of dedicated staff and skill types required to ensure effective prevention and treatment of MDR-TB.

Recommendations

- The NTP should develop a human resource plan that considers the foreseen reduction of inpatient vs. outpatient care and organizes careful redeployment and capacity building of staff, matched by a scheme of adequate incentives for early retirement.
- The role of nurses in prevention and control of MDR-TB should be increased.
- The professional benefits linked to the occupational hazards of TB should be revised and incentives given to providers linked to TB outcomes.
- All TB training efforts should be towards a combined goal: streamlining in-service and postgraduate training in line with NTP policies and guidelines and supporting the effective and integrated delivery of high-quality TB and MDR-TB services.

Operational research

Operational research is a component of the Stop TB Strategy aimed at improving programme performance; assessing the feasibility, effectiveness and impact of new strategies or interventions on TB control; and collecting evidence to guide policy recommendations on specific interventions. Operational research generates information on "best practices" that can be documented and proposed for replication in other sites.

The potential for conducting such research, however, seems underappreciated by the NTP, despite its genuine commitment to improving performance. Part of this may result from inadequate staff training on formulating research questions properly and designing operational

research studies. An operational research agenda can be developed for the country, based on the findings of recent studies and the recommendations of this programme review.

The SIME-TB data already represent good background information and a guide to operational research studies. Collaboration between the Department of Postgraduate Education on Phthisiopulmonology and the NTP Monitoring Unit could be a way to direct domestic resources (such as postgraduate students) towards research that guides the NTP in improving its performance while maintaining low and sustainable costs.

The SIME-TB data show that notification rates of new and relapse TB cases, as well as of MDR-TB cases, have decreased only slightly during 2008–2012. Failure and death rates persist at too high a level among MDR-TB cases, although the number placed on treatment with second-line anti-TB drugs is increasing. Studies focusing on identifying the causes of MDR-TB treatment failure and death, as well as on MDR-TB transmission, should be considered priorities for research.

Recommendations

- The NTP's operational research capacity should be increased at the central and regional levels through training courses and external technical assistance.
- An NTP operational research agenda should be developed, outlining the high-priority topics to be studied, identifying key investigators and providing an adequate research budget.
- Strong collaboration should be established between the Department of Postgraduate Education on Phthisiopulmonology and the NTP Monitoring Unit to ensure sustainable operational research guided by current NTP surveillance.
- Best practices should be documented and put forward for replication.
- Operational research should consider risk factors and social determinants, including:
  - risk factors for vulnerability to TB such as tobacco and alcohol consumption;
  - patient preferences for social support and its impact on treatment adherence;
  - the efficiency and efficacy of incentives for different categories of patients;
  - risk factors and social determinants of poor treatment outcomes among drug-susceptible and drug-resistant TB patients;
  - causes of death among TB/HIV patients, including initiation of ART.
- Operational research should consider aspects of case finding and diagnosis, including:
  - factors delaying case detection among vulnerable and other groups at risk;
  - factors delaying diagnosis and treatment of drug-resistant TB;
  - the current yield of active TB case finding conducted among different population groups;
  - factors contributing to variable diagnostic performance between different providers;
  - reasons for low rates of bacteriological confirmation of TB diagnosis in adults and children;
  - the impact of the Xpert MTB/RIF assay implementation;
  - diagnosis and treatment of latent TB infection;
  - models of IPT delivery.
- Operational research should consider treatment and case management issues, including:
  - the effectiveness and cost–effectiveness of different methods of outpatient treatment and care;
  - TB disease among health care workers and infection control measures;

use of mobile telephones to support adherence to TB treatment;
the impact of surgery on treatment outcomes;
delivery models of coordinated or integrated TB/HIV services;
adverse drug reactions during treatment with first- and second-line anti-TB drugs;
palliative treatment implementation (characteristics of patients in need, selection and exclusion criteria, and so on) and evaluation of outcomes.

- Operational research should consider features of monitoring and evaluation, including:
  identifying underdiagnosis through a mortality capture recapture study and an MDR-TB notification inventory study;
  the quality of SIME-TB data;
  the quality of recording and reporting at the national and regional levels;
  the quality of continuous drug resistance surveillance at the national and regional levels.

Ethics and human rights

The first and most basic aspect of respecting human rights is ensuring that all TB patients – regardless of their social status, medical condition or history of poor compliance – have access to quality-assured treatment. Ample evidence exists to show that non-adherence to TB treatment is usually caused not by patients' unwillingness to be cured, but by their inability to complete treatment for a variety of reasons, especially economic and social ones. In general, patients want to be cured and would adhere to treatment if provided with appropriate access and adequate support (see, for example, Farmer, 2001; Greene, 2004). The existence of a large number of MDR-TB patients not receiving adequate treatment in the Republic of Moldova, especially in the Transnistria region, should therefore be seen as an infringement of the patients' right to access treatment of a potentially deadly but curable disease.

Selection of MDR-TB patients on treatment

The national MDR-TB consilium excludes those patients at risk of loss to treatment follow up, severe cases likely to die during treatment, and those in "other specific situations that may limit DOT throughout the full treatment course"; this last exclusion criterion is of major concern because it is often applied to patients identified as poorly compliant. Despite the exclusion of many "problematic" patients, however, NTP treatment outcomes are still quite poor.

The review team was told that many patients are excluded from MDR-TB treatment because they refuse to be treated in hospital. This decision makes little sense in a country where the full course of ambulatory treatment is included in the national guidelines and must be offered by law before applying any involuntary isolation. No efforts are made to treat alcohol and drug use problems along with MDR-TB treatment.

The most pressing ethical issue challenging the NTP is the limited availability of second-line anti-TB drugs and the need to select patients for treatment. The review team did not manage to retrieve information about the number of patients excluded from MDR-TB treatment by the consilium and the motivations for exclusion. It should be noted the same information was also unavailable during the NTP review WHO conducted in the Republic of Moldova in 2009 (Kavtaradze and Ciobanu, 2012).

Management of XDR-TB

Patients with XDR-TB receive the same treatment as those with MDR-TB or with additional isoniazid at a higher dose and amoxicillin/clavulanic acid – other group 5 anti-TB drugs are not available to the NTP. Patients failing treatment are sent home and taken off medication; the national guidelines are unclear on the discontinuation of ineffective treatments and palliative care. XDR-TB patients in the Republic of Moldova lack treatment options, although such patients are treated in other countries. Moldovan law does not permit importation of unregistered anti-TB drugs for compassionate use, while this is allowed in other European countries.

TB control in prisons

A great concern for the review team is the poor infection control and inability to treat all TB and MDR-TB patients in some prisons, especially in the Transnistria region. While incarcerated, the health and safety of the prisoners, as well as of visiting families and prison staff, is the responsibility of the Ministry of Justice. Additional collaboration between the Ministry of Justice and Ministry of Health, especially in the Transnistria region, is required.

Overdiagnosis of TB

The review team observed not only inadequate or undertreatment issues as described above but also cases of overtreatment, where patients were diagnosed with TB on the basis of a suspicious fluorography but with negative sputum microscopy and culture, and a negative Xpert MTB/RIF assay result (see the profile of Olga in Annex 6).

Involuntary isolation

In 2012, the Republic of Moldova issued a new law on involuntary isolation of TB patients; this replaced a previous law of 2009, which allowed coercive treatment and was strongly criticized by the international community for its human rights violations.[26] The new law considers involuntary isolation only after various different attempts are made to convince the patient to accept treatment (including offering a full course of ambulatory treatment) and a treatment plan is agreed between the TB specialist and the psychologist with the patient's family and local authorities. Involuntary isolation must be time-limited and reviewed frequently. Any sign of compliance (consenting to treatment) according to the law is sufficient reason to end coercive isolation and allow the patient to continue treatment on a voluntary inpatient or outpatient basis.

This law is written in a way that demands great efforts before a patient can be isolated and is therefore criticized by many providers. It should be noted that it was approved only recently and many doctors do not yet fully know of and understand it. Consequently, inconsistent practices were reported to the review team, such as doctors sending police officers or local authorities with the power to authorize involuntary isolation through a public health ordinance to the houses of uncooperative patients.

On paper, the new Moldovan law respects human rights and treats coercive isolation as an option only after all others have been exhausted. Because of weaknesses in the Moldovan health and social welfare systems, however, it is possible that this law will be poorly implemented or readjusted to meet local needs. Instead, the NTP should apply the law carefully and use

[26] Government Decision no. 295 of 14 May 2012; Law no. 153 of 4 July 2008.

involuntary isolation and TB treatment only after all other options have been exhausted, including provision of adequate social and psychological support. It should be noted that the review team only had the opportunity to examine a preliminary version of the new law.

Recommendations

- All MDR-TB patients detected should receive appropriate treatment, including those in prisons and in the Transnistria region.
- All patients should have access to the most appropriate treatment according to their clinical and social condition. The patients' exclusion criteria applied by the national MDR-TB consilium should be limited to extreme circumstances and should take advantage of decentralized treatment as close as possible to the patients' residence and needs.
- The work of the national MDR-TB consilium should be properly documented and the statistics (patients evaluated, patient excluded from MDR-TB treatment and reasons for exclusion) disclosed in the public domain.
- Conditions leading to vulnerability to TB per se – such as abuse of alcohol or other substances or absence of a fixed residence – should not be considered reasons to exclude patients from MDR-TB treatment but should rather be addressed – for example, by providing counselling and treatment of alcohol use disorders alongside MDR-TB treatment and appropriate social support.
- National guidelines on palliative care should be improved and widely circulated.
- Current drug regulations should be revised to consider the compassionate use of unregistered anti-TB drugs for selected patients.
- The new law on involuntary isolation of TB patients should be consistently reinforced in its implementation, and health providers and other institutions educated about it. A plan to apply this law at the district level should be prepared with the involvement of all local authorities. Application of the law should be monitored and reported yearly.

ACSM and community involvement

Most ACSM activities are planned and funded under the Global Fund grant and carried out by the principal NGO recipients (PAS and PCIMU) and subrecipients of the grant (see Table 3), which raises a concern about their future sustainability. There is no clear national ACSM strategy.

Large national campaigns led by PAS in districts have used posters and billboards displaying prominent Moldovans – such as actors, doctors and Orthodox priests – delivering simple, informative and de-stigmatizing messages about TB. Little ACSM is done at the national level, however, and virtually none at the international level.[27] This limitation may be related to the large NGOs' closeness to the Ministry of Health and NTP (even including former employees) and the dependence of smaller NGOs on funding from the larger, more conservative NGOs. This situation limits civil society's ability to properly challenge the Ministry of Health and NTP on key issues such as the limited availability of anti-TB drugs, mandatory hospitalization and the organization of TB services, which are not adequately centred on patients' needs.

[27] One exception is SMIT member Ms Oxana Rucsineanu, a former MDR-TB patient, who has become the ambassador for eastern Europe for the "Here I am" campaign.

The National Coordination Council for HIV and TB Programmes of the Republic of Moldova (formerly the Country Coordinating Mechanism) is largely made up of government employees of the Ministry of Health and other ministries (including Education, Justice and Labour). Other members are from NGOs mainly associated with HIV/AIDS and international organizations such as the International Federation of Red Cross and Red Crescent Societies and Save the Children. All major NGOs working on TB (PAS, PCIMU and more recently AFI) are represented in the National Coordination Council for HIV and TB Programmes, but some of those working most closely with patients (such as SMIT and Speranta Terrei) are not, although they are in a better position to represent the views of patients.

In 2013, shortly after the review took place, several of the smaller NGOs working with TB formed a national TB NGO platform, which includes AFI (presently serving as secretariat), SMIT, Speranta Terrei and others. The platform is intended to enhance collaboration between NGOs and their advocacy activities; it may also increase community involvement in TB control as these NGOs work locally with communities. The new platform is a positive development and is indicative of civil society groups' interest in playing a greater role in TB control in the future. The review team encourages any collaboration between NGOs in order to increase efficiency and effectiveness in activities such as advocacy, public education, de-stigmatization and patient support.

Of all the NGOs, only SMIT comprises former patients. Located in Balti, like other smaller NGOs it faces difficulties in funding its activities. In general, patients do not have much of a voice; nor is there much community involvement. Some of its current activities include training journalists and 1000 Orthodox priests about TB; these are promising, but do not have a clear strategy based on previous assessment or a well-defined set of follow-up activities.

Most NGOs do not have TB-related activities in the Transnistria region. A notable exception is Medical-Social Programs, supported by AFI, which provides social support to all patients, including former prisoners. There are more local NGOs in the Transnistria region and there is a serious need to involve them in TB control, especially among vulnerable population groups.

Understanding of TB among the general population and TB patients is still low. The knowledge, attitude and practice survey conducted in the Republic of Moldova in 2008 found that only 39% of respondents believed that TB was curable, 31% believed it could be spread by shaking hands and 81% believed it was spread through occasional contact with an infectious person (Scutelniciuc, 2008). Meanwhile, 78% of respondents knew that TB is transmitted by air through coughing dispersion. This suggests that a mixture of correct and incorrect information is in circulation. 33% of respondents felt that TB was something to be ashamed of.

The review team's discussions with patients revealed similarly low levels of knowledge, especially related to how TB is spread. They revealed that many patients thought they had TB because they had been exposed to cold weather, and believed their family members could be protected by using separate sets of dishes. It should be noted that the recommendation to use separate sets of dishes appears in the educational material produced under the Global Fund grant and even in the most recent NTP guidelines, as result of being copied from the guidelines produced by the National Centre for Public Health. This recommendation is not supported by evidence and may serve to confuse and increase TB stigma among the general population by reinforcing incorrect beliefs already circulating in the country.

The review team found brochures explaining the rights and responsibilities of TB patients, but these were only set out in broad terms, with a greater focus on the responsibilities, and did not quite correspond to the Patients' Charter for TB care (World Care Council, 2006).

Recommendations

- A national ACSM strategy should be developed as soon as possible and include new partnerships with NGOs not already involved in TB activities and public/private partnerships. This strategy should be supported by a national ACSM plan with activities and a timeline for their implementation.
- ACSM should also be conducted at the national level and with the involvement of different components of civil society, such as communities, faith organizations, former TB patients' associations, and similar. Correct messages regarding TB transmission, prevention, diagnosis and treatment should be conveyed and reinforced consistently.
- The composition of the National Coordination Council for HIV and TB Programmes should be revised to better represent organizations working directly with patients, enabling them to convey concerns.
- Platforms for NGOs working on TB intervention should be encouraged and supported.
- The Transnistria region must be part of the national ACSM and community involvement strategy. Efforts should be made to increase collaboration with local NGOs working in the Transnistria region and to encourage cooperation between NGOs on both sides of the river.
- All ACSM material should be revised and made consistent with the recommended international standards for TB prevention and control.
- The Patients' Charter for TB care (World Care Council, 2006) should be widely promoted among providers, translated into Russian and Romanian, and discussed with patients.

Health system and TB control

Whatever actions are necessary to improve TB diagnosis, treatment and care activities in the Republic of Moldova, they need to take place within a health system that is currently underfunded but, at the same time, experiencing interesting transformations.

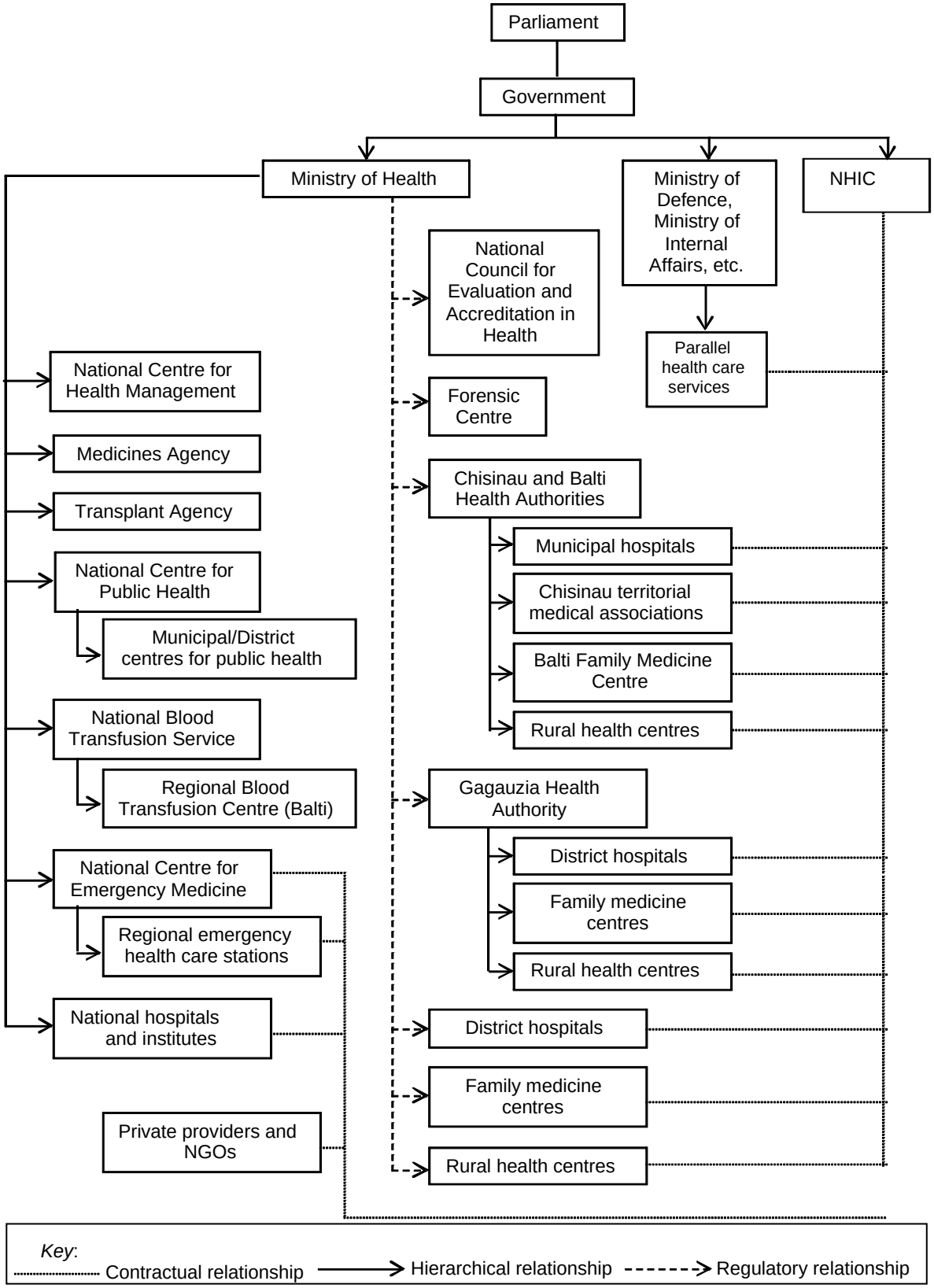
Health system governance

The health system in the Republic of Moldova, with the exception of the Transnistria region, moved away from the Semashko model inherited from the Soviet era to a system based on clear separation of funding and purchasing of services, and on delivery of services through gatekeeping primary, secondary and tertiary health care institutions (Fig. 3).

Major health system reforms include the laws on mandatory health insurance (signed in 1998 but only fully implemented in 2004) and on the minimum level of free medical assistance guaranteed by the state,[28] and the establishment of the NHIC in 2001.

[28] Law no. 1585 of 27 February 1998; Law no. 267-XIV of 3 February 1999.

Fig. 3. Organization chart of the health system on the right side of the river



Source: Turcanu et al., 2012.

Of specific relevance to the NTP are the National Centre for Health Management (responsible for development of standards, norms and regulations on health care and statistics), the Medicines

Agency (responsible for registration of medicines, quality control and pharmacovigilance) and the National Centre for Public Health (responsible for health protection, promotion and prevention). The Ministry of Health directly funds and controls all these institutions and ensures that hospitals and other health care facilities implement all approved norms and regulations on health through contractual NHIC services.

Local authorities own primary and secondary health care institutions, while the Ministry of Health itself owns tertiary health care institutions. Within the administrative authorities of the municipalities of Chisinau and Balti and the autonomous region of Gagauzia, special subdivisions are responsible for the administration of subordinated health services. Since 2008, as part of the health care reform, family doctors in charge of primary health care are no longer accountable to hospital directors at the municipality and district levels. All district TB doctors remain administratively accountable to district hospital directors, but are de facto more closely linked operationally to family medicine directors as more TB patients are managed outside hospitals.

In the Transnistria region, the Semashko model remains unchanged, with central budgeting focusing heavily on hospital care. The Central Health Authority directly manages primary, secondary and tertiary care services, emergency services and their staff independently from the Ministry of Health in Chisinau.

The Health Care System Development Strategy for 2008–2017 and the Medium-Term Budgetary Framework for 2013–2015 guide the health system in the Republic of Moldova (Government of the Republic of Moldova 2007a; 2007b). The Framework contains five key areas:

- policy development and health system management
- high-priority interventions in public health
- individual medical services
- resource generation for the health system
- special health programmes.

The primary health care structure is based on the population per family doctor. The same applies to the distribution of hospitals by type, category and number of hospital beds by population, as reflected in the Programme for the Development of Hospital Care for 2010–2012. District hospitals have five basic departments: therapy, surgery, paediatrics, maternity and communicable diseases. A National Hospital Master Plan was developed with World Bank support in 2009 but has not yet been implemented, despite being revised more recently.

Health system financing

Since 2004 and the introduction of mandatory health insurance there has been a continuous increase in both total health expenditure and public expenditure on health in the Republic of Moldova. In 2009 total health expenditure as a proportion of GDP was 12.5% (among the highest in the WHO European Region); this was also the result of additional resources given to specific health programmes (such as immunization, diabetes, mental health and paediatric care). Total health expenditure per capita in absolute terms, however, was 357 lei per US$ purchasing power parity – much lower than in other countries of the WHO European Region – significantly limiting the volume of the package of services provided and their quality.

The proportion of public expenditure on health was only 53.7% of total health expenditure; this indicates the particularly high burden of poor health on the poorest in the population, who are often at risk of catastrophic health care costs. Spending on curative services as a proportion of public expenditure on health was quite high in 2010 (68.1%), while spending on public health and prevention was just 5.3%. Public expenditure on medicines and medical devices for patients in outpatient settings was also very low (3.3%), although these services account for 19.7% of total health expenditure. The overall balance between the proportion of spending on inpatient (22.6%) and ambulatory care (19.7%) within public expenditure on health confirms the government's commitment to strengthening primary health care services.

Since 2004 mandatory health insurance has formed the basis of health financing in the Republic of Moldova (with the exclusion of the Transnistria region). Based on revenue source, 40.3% of total health expenditure in 2010 was from mandatory health insurance contributions and 44.9% from out-of-pocket payments. Contributions from the working population to mandatory health insurance come predominantly through payroll contributions of a fixed percentage of salary (7%, of which 3.5% is paid by the employee and 3.5% by the employer); self-employed people are expected to purchase their own annual cover at a fixed price. The non-working population (comprising 14 categories including pensioners, students, children, people registered as unemployed, and so on) is covered through transfers from the central budget to the NHIC. Voluntary health insurance accounts for less than 0.1% of total health expenditure (2010 figures).

The NHIC is the sole purchaser of health services, which has enabled a purchaser–provider split, and payments for services are made on the basis of contracts, most of which are prospective. Access to emergency and primary care services is universal, regardless of insurance status, and so is access to all services connected to key public health issues such as HIV/AIDS, TB and immunization. The package of benefits available under mandatory health insurance covers specialized outpatient and hospital care and a very limited range of pharmaceuticals. For those without insurance cover these services are paid in full as out-of-pocket payments, which are made up of informal payments and direct fee-for-service payments. There are no official user fees or co-payments for services covered under mandatory health insurance, although there is a sliding scale of co-payments for any pharmaceuticals covered. Informal payments occur at almost all levels of the system, but they are much more widespread for inpatient care; the amount patients pay informally for care reflects the severity of the illness. The Ministry of Health is committed to reducing informal payments in the system and it is hoped that increasing the salaries of health care workers and adding performance-related payment mechanisms, together with improvements in transparency through external auditing, will help to achieve this aim.

Part of the population is explicitly uninsured (20.3% of the resident population in 2011). Those without insurance are most often self-employed agricultural workers or those in informal employment in urban areas; the uninsured often also have low incomes. From 2010 households registered as being below the poverty line automatically receive mandatory health insurance cover, but this may not drastically improve equity in the system as 73.1% of all out-of-pocket payments in 2010 were for pharmaceuticals, and the list of medicines that can be reimbursed through mandatory health insurance is extremely limited in order to maintain the system's financial sustainability. Pharmaceuticals that patients need to purchase include those for counteracting adverse reactions to treatment with second-line anti-TB drugs and for palliative TB care.

The way the NHIC pays providers has direct implications on NTP performance. The NHIC has contracts with primary health care facilities based on a fixed capitation fee for the population covered and a performance-related adjustment. Until the end of 2012 the amount paid to primary health care facilities was broken down into 95% from fixed capitation fees and only 5% from performance-related adjustments; in January 2013, the proportions changed to 85% and 15% respectively. The performance-related payment is linked to appropriate gatekeeping functions, screening of noncommunicable diseases, delivery of maternal and child health services and TB prevention and care (Table 22). While TB services have the highest weights, when applied to only 15% (5% in 2012) of the budget these produce an additional income that primary health care providers do not regard as a real incentive.

Table 22. Indicators and their performance-linked weight for calculating NHIC budget, February 2013

Indicator	Weight (points)
Appropriate hospital admissions (general)	20
Screening for noncommunicable diseases:	
Hypertension	1+3.5+4
Diabetes	4+3.5+4
Cervical screening	5
Cancer screening	10
Maternal and child health:	
Early prenatal visits	30
Folic acid administration in pregnancy	5
Iron administration in pregnancy	5
Ultrasound screening	5
Other maternal and child services	5+5+5
Early postnatal child visits	20+20
TB:	
Each person in a risk group screened for TB	4
Each person diagnosed with TB	10
Each completed TB treatment	80

Note: The aggregated number of points determines the value (in money) of each individual point. Each unit receives an amount equal to the number of performance-related points multiplied by the monetary value of a point.

NHIC contracts with general hospitals are subdivided into those for outpatient care, which are based on capitation (but not adjusted for performance), and those for inpatient care, which are based on a fixed price per case adjusted by the overall complexity of the care. Complexity is defined by diagnosis-related groups that weight each admission according to diagnosis, procedure, age and co-morbidities. In practice, this means that in order to maximize their income hospitals have to treat more patients, especially those of higher clinical complexity, more quickly.

NHIC contracts with specialized hospitals, such as the TB hospitals, are taken out of the diagnosis-related group system – which would make them unsustainable – and based on a fixed price per hospital day. This arrangement, however, is a clear incentive for long hospital stays, and has therefore been abandoned by many countries in the region.

In the Transnistria region, health services are financed by taxation, although there have been repeated talks of moving to mandatory health insurance. Some limited basic services are free of

charge, while the Central Health Authority sets the charges for other services. TB diagnosis and treatment are given free of charge but other services that may be related to TB should be paid. The Central Health Authority has very limited funds: the review team was told that these would cover only 57% of the estimated needs for 2013. Considering that 80% of funding is spent on staff salaries, there is a drastic limit on funding for consumables (including medicines), capital (infrastructure and equipment) and running costs. The situation may deteriorate further as the Russian Federation reduces food supplies to health care institutions in the Transnistria region and future international support is uncertain.

Health system workforce

Since independence, more than 40% of health workers have left the Moldovan health system, many migrating abroad. The result is that the average numbers of doctors (35.9 per 100 000 population) and mid-level health personnel (77.3 per 100 000 population) in the Republic of Moldova are currently lower than European Union averages. The biggest discrepancy is with family doctors, at 52 per 100 000 population compared with 85 per 100 000 in the European Union. At the beginning of 2011 the Ministry of Health reported a shortfall of 1031 doctors (including 286 family doctors) and 916 nurses (including 283 family nurses).

The main destination countries for Moldovan health workers are Italy, Romania and France (Italy being particularly popular among mid-level personnel), and the main reasons for leaving the country are low salaries, poor working conditions and obsolete technology, lack of opportunity for professional growth, increased health hazards, lack of proper living conditions and poor infrastructure at the community level. Clearly, all these factors have even more influence on discouraging doctors from undertaking a TB residence. The Ministry of Health has developed a Strategy for Development of Human Resources for Health, with World Bank support, which aims to improve the situation through initiatives such as adjusting medical education to current needs, better planning of human resources and improving motivation of health personnel.

Training of doctors in the Republic of Moldova takes place in the State University of Medicine and Pharmacy "Nicolae Testemitanu", which opened in Chisinau in 1945. Training of mid-level health personnel takes place in five medical colleges located in Balti, Cahul, Chisinau, Orhei and Ungheni. Postgraduate training is provided through residency programmes and fellowship training in one of 32 specialties. The residency programme is run by the medical university, which has a special Faculty of Residency and Internship Training. The clinical chairs of the university are spread throughout all the big hospitals in the capital city, and undergraduate and postgraduate clinical training takes place in 72 medical and public health institutions across the country. The medical colleges produce nurses, midwives, *feldshers* (doctors' assistants), dental technicians, mid-level hygienists and epidemiologists, and laboratory personnel.

In the Transnistria region 50–70 medical doctors graduate each year from the Transnistria State University and two medical colleges in Tiraspol and Bender.
Continuous medical education is regulated by the Law on the Exercise of the Medical Profession.[29] According to this law, every doctor is obliged to accumulate a certain number of continuous training hours and to pass an examination every five years confirming the previous qualification or awarding a new category of qualification. The medical university has a special Faculty of Continuous Education that organizes training courses and periodic examinations. In

[29] Law no. 264-XVI of 27 October 2005.

practice, however, continuous medical education does not meet the changing needs of the medical profession that include – for example, in the case of TB control – learning new policies and guidelines, management of TB co-pathologies, liaising with social services, communicating effectively with patients, and so on. Despite the strong collaboration and integration of TB and primary health care services and the successful experience of many countries in the region – including neighbouring Romania – the Practical Approach to Lung Health (WHO, 2013a) was not adopted as key strategy to strengthen early detection and management of TB cases at primary health care level.

The health workforce is also declining in the Transnistria region owing to migration (mainly to eastern Europe) and a gap in replacing retiring personnel. Salaries are low (US$ 150–200 per month for a doctor) and the relatively higher salaries in rural areas are nevertheless insufficient to attract new staff, leaving many positions vacant.

Medical products, vaccines and technology

Two government decisions on setting conditions for the marketing and use of medical devices and on approving regulation for the procurement of medicines and other products with a medical destination regulate the procurement of medical products.[30] The Medicines Agency organizes centralized procurement from budgetary resources that is destined for national and special programmes, such as the NTP. Medical facilities can also buy certain types of medical product from their own reserves and extra-budgetary resources after coordinating this with the Ministry of Health and getting official approval.

A significant amount of equipment has been provided through humanitarian aid and development projects: in 2009 the European Union provided basic modern equipment to rural health centres, autonomous health centres and family medicine centres (€3.9 million); in 2010 the Swiss Agency for Development and Cooperation equipped the country's paediatric emergency and intensive care services and supported the piloting of a health technology management system; and in 2009–2010 the Government of Japan provided modern equipment for the district hospitals in Criuleni and Anenii-Noi and the National Scientific and Practical Centre of Emergency Medicine.

The Ministry of Health has a Department of Medical Device Management, which deals with import authorizations and monitors the use of equipment. An electronic inventory of medical devices is under development. Management of medical devices at the institutional level is limited to maintenance, which is problematic because of the coexistence of old and modern technology and the lack of qualified specialists in this area. In most cases maintenance is delegated to the private sector. This limits proper maintenance of equipment such as the safety cabinets and mechanical ventilation systems purchased under the Global Fund grant.

Health information

Two automated information systems for primary health care, called "Medex 2.0" and "Cabinet Manager", were developed separately. Both are integrated into clinical processes and are used on a daily basis but supply information to the National Centre for Health Management only via printed reports. The Ministry of Health is currently trying to identify the most suitable system for nationwide implementation. Separate information systems were developed for the National

[30] Government Decision no. 96-XVI of 13 April 2007; Government Decision no. 568 of 10 September 2009.

HIV/AIDS and TB Programmes; these interface with the National Centre for Health Management information system. At the hospital level the situation is even more fragmented, as every big hospital in the capital city has tried to develop its own information system.

Telemedicine was piloted in a few institutions. The introduction of e-Health is part of the portfolio of e-services and e-registries to be developed under a larger Governance e-Transformation Project. Priorities for 2013 include the development of an integrated medical information system for hospitals and an automated information system for primary health care.

Service delivery

At the end of 2010 the Republic of Moldova had 84 hospitals (including two dispensaries with beds). These include 34 district, 10 municipal and 18 national hospitals under the Ministry of Health and 11 hospitals belonging to other sectors, plus 11 private hospitals. Over 50% of the hospitals (18 national, 9 municipal, 8 parallel providers and 9 private) are located in the capital city, Chisinau. Primary care facilities at the end of 2010 consisted of 37 family medicine centres covering 216 health centres, 556 family doctor offices and 359 health offices; there were also 46 autonomous health centres covering 71 family doctor offices and 44 health offices. The municipality of Chisinau also has five territorial medical associations covering 12 family medicine centres, 5 consultative and diagnostic departments and 53 consultative departments. Family medicine centres and consultative and diagnostic departments provide both family medicine and specialized outpatient services.

Most public hospitals have had no significant capital investment since the country's independence and obsolescent equipment ranges from 60% to 80% of stock. A study conducted in 2009 and 2010 (Edwards, 2011) revealed structural safety problems in 10 (16.4%) of the institutions covered, most of which were built at the end of the nineteenth or first half of the twentieth century; electricity and water supplies as well as sewerage networks in most hospitals were also found to have a high level of wear. Through the support of the World Bank, 36 health centres and family doctor offices were renovated during 2010–2011 and another 38 are due to be renovated in 2011–2013. The World Bank project also contributes, together with the European Union and the Council of Europe's Development Bank, to the renovation of the Republican Clinical Hospital – one of the biggest teaching hospitals in the country.

The Ministry of Health developed a National Hospital Master Plan in 2009 with support from the World Bank, which reflects the government's plans for developing the hospital sector up to 2018. It focuses on the regionalization of hospital services at the local level and the consolidation of the hospital network in Chisinau. New studies are now being initiated to develop plans for centralization/regionalization of specific services to Cahul and Balti hospitals, starting with chemotherapy and radiotherapy services for cancer treatment; developing long-term care services in the Republic of Moldova; and "operationalizing" the conclusions of the National Hospital Master Plan by further rationalizing the hospital network across the country, but specifically in Chisinau.

In the Republic of Moldova, the family doctor is responsible for a defined catchment population and acts as the gatekeeper for secondary and tertiary care. These doctors work in territorial medical associations in municipalities and in consultative and diagnostic departments in districts. Presumptive TB patients are investigated with sputum microscopy and chest X-ray and/or referred to the district TB doctor to confirm the diagnosis. The TB doctor refers back to primary health care confirmed TB patients considered eligible for outpatient treatment. In practice, most

TB patients, including all those sputum smear-positive and with MDR-TB, are hospitalized for extensive time, even if their conditions do not require it, and referred back to primary health care only after completion of the intensive phase of treatment.

Until 2008 primary health care centres were attached to (and dependent on) the nearest district hospital; since then they have progressively been given autonomous status, so they have become distinct entities running their own contracts with NHIC, holding their own current accounts and making decisions on the distribution of the (scarce) resources that can be freed from any efficiency gain. Nevertheless, their capacity and experience to operate independently and organize more effective health care delivery differs widely. Some of the units visited by the review team had only recently (January 2013) been granted this new status.

Secondary care is delivered by district and municipal hospitals offering both inpatient and outpatient services. In the municipalities territorial medical associations, located within the premises of the old polyclinics and independent of the municipal hospitals, provide outpatient services. Because the NHIC contracts inpatient and outpatient care services separately, the financial resources received cannot be moved between services; for example, it is not possible to transfer cost savings generated from decreased TB inpatient care to strengthen outpatient care. Tertiary care is provided through specialized hospitals in Chisinau and some districts. The two TB hospitals in Vorniceni and Chisinau (where most MDR-TB patients are treated) have separate contracts with the NHIC.

The Ministry of Justice, Ministry of Defence, Ministry of Internal Affairs (covering police, border services and pre-trial institutions) and the State Chancellery own parallel health care structures. Their budget originates from the respective ministries, although the Ministry of Justice and the border service also have contracts with the NHIC. These structures can provide TB outpatient and inpatient services.

A limited network of private commercial and non-profit-making health care facilities and services also exists. Some of the private commercial organizations hold contracts with the NHIC, although not for TB services. Most private non-profit-making organizations are NGOs working as subrecipients of Global Fund grants for HIV and TB prevention and care. Despite their long-term involvement, these NGOs still operate in a legal limbo and have neither a clear regulatory framework stating the type of care they are entitled to deliver nor the status of official listed health care provider that the NHIC can consider for contractual services.

In the Transnistria region, according to recent data released by WHO (Rockenschaub et al., 2012), primary health care is delivered through polyclinics in municipalities (which also provide specialized outpatient care), 37 village outpatient health centres – each staffed by a general practitioner, a paediatrician, an obstetrician/gynaecologist, a dentist, nurses and midwives – and 60 feldsher and midwife points – each staffed by a feldsher, a nurse and a midwife and serving between 300 and 1500 inhabitants.

The region has 4335 hospital beds, a lower number than in recent years but still too high for the population of 600 000. Secondary care is provided through five district hospitals (1525 beds), two municipal hospitals (605 beds) and one rural hospital (30 beds). Tertiary care is provided through a number of hospitals: the Republican Hospital in Tiraspol (665 beds), the Republican Mother and Child Hospital (375 beds), the Republican Psychiatric Hospital (230 beds), the Republican Hospital for Invalids of the Second Word War (305 beds), the Dermatovenereology Dispensary (50 beds), the Republican Hospital for Infectious Diseases (300 beds), the HIV

Department in the District Hospital of Slobozia (30 beds), the Republican TB Hospital (200 beds) in Bender and the TB Department in Dubossary District Hospital (50 beds). The Central Interior Authority has a polyclinic for its civil servants and the Central Justice Authority has two hospitals. In addition, a Russian Military Hospital serves the Russian Army stationed in Transnistria. The large number of hospitals, inherited from the Soviet era, is currently a challenge for the Central Health Authority to properly maintain and fund.

Recommendations

- A different administrative position should be considered for district TB doctors to ensure closer collaboration with and provision of technical support to primary health care providers, as well as outpatient prevention and care of TB and MDR-TB.
- Medicines needed to support TB and MDR-TB treatment and palliative care should be provided free of charge.
- Current financing mechanisms for outpatient and inpatient TB services should be carefully evaluated and redesigned in order to increase incentives linked to primary health care performance and remove those linked to admission and long stays in hospitals.
- Continuous medical education should be redesigned to include more updated approaches for MDR-TB prevention and control.
- The Practical Approach to Lung Health (WHO, 2013a) should be introduced as a means of ensuring sustainable involvement of primary health care in early detection and ambulatory treatment of TB and MDR-TB cases.
- Capacity for regular servicing and maintaining equipment, including that procured under the NTP, should be urgently built within the health system and included in any contracts with private sector organizations.
- Health information systems should be further reformed to ensure proper interfacing with systems currently in use, such as SIME-TB, and a continuum of patient care across the different levels of health care.
- Implementation of the National Hospital Master Plan should be used as an opportunity to reduce the number of TB beds and promote outpatients services for the majority of TB and MDR-TB patients.
- A legal framework should be developed for NGOs to be contracted by the NHIC for performance-based delivery of TB services.
- A legal framework should be developed to allow delivery of TB services in the network of private facilities. This should take place alongside the development of national policies and guidelines and have accountability within a public–private partnership with the NTP.

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Annex 1

ROADMAP FOR IMPLEMENTATION OF REVIEW RECOMMENDATIONS

Recommended action	Timeline (quarter after action recommended)				Authority responsible
	Q1	Q2	Q3	Q4	
NTP STRATEGIES, STRUCTURE, BUDGET AND MAIN ACHIEVEMENTS					
Pursue additional financial and other support from local public authorities for cost-effective interventions.	**X**	**X**	**X**	**X**	**MoH, local authorities, NTP, national partners**
Identify and pursue international financial and other support in the Republic of Moldova, including the Transnistria region.	**X**				**MoH, NTP, international partners**
Establish a central NTP unit with capacity, technical authority and accountability to the MoH.		**X**			**MoH**
Establish a national working group to develop a strategic plan for outpatient care to improve treatment adherence.	**X**				**MoH, NTP**
CASE FINDING AND DIAGNOSIS					
Revise risk population groups for TB screening.	**X**				**MoH, NTP**
Develop national guidelines for active case finding and contact investigation.		X			NTP
Use the Xpert MTB/RIF assay consistently.	**X**	**X**	**X**	**X**	**NTP**
Arrange efficient transport of sputum specimens for DST.	X				NTP, MoH
Ensure bacteriological confirmation and DST for all TB patients.	X	X	X	X	NTP
Train staff on the Xpert MTB/RIF assay.		X	X		NTP
TREATMENT AND CASE MANAGEMENT					
Revise hospitalization policies and the plan to downsize inpatient TB care.				**X**	**NTP**
Make consistent the incentives and enablers from the NHIC and under the Global Fund grant.			**X**		**NTP, national partners, NHIC**
Document, monitor and evaluate the different initiatives undertaken to improve case holding.	X	X	X	X	NTP, national partners
Revise the criteria for assistance from the MLSPF.			**X**		**MLSPF, NTP**

Recommended action	Timeline (quarter after action recommended)				Authority responsible
	Q1	Q2	Q3	Q4	
Revise the current law to allow NGO nonmedical workers to apply simple procedures such as sputum collection and observation of intake of anti-TB drugs.			**X**		**MoH, NTP**
Develop guidelines to diagnose and treat latent TB infection among adults.			X		NTP
TB IN CHILDREN					
Disseminate the national guidelines on management of TB among children among clinicians at all levels.	X				NTP
Develop a specific algorithm for diagnosis and treatment of latent TB infection.		X			NTP
Abandon BCG revaccination at the age of 6–7 years.		X			NTP, MoH
Introduce TST before BCG vaccination.		X			NTP, MoH
DRUG-RESISTANT TB					
Ensure DST for all patients.	X	X	X	X	NTP
Monitor and evaluate the adverse reactions to amikacin.	X	X	X	X	NTP, Medicines Agency
Develop national guidelines for palliative TB care.		X			NTP
Develop and adopt a legal framework for compassionate use of anti-TB drugs.		X	X		NTP, MoH
HIV-RELATED TB					
Create a technical working group under the National Coordination Council for HIV and TB Programmes to elaborate a roadmap for TB/HIV implementation.		**X**			**MoH**
Complete implementation of SIME-HIV and cross-check data.			X		National AIDS Programme
Develop mechanisms to ensure diagnosis of TB among people living with HIV without any risk of TB infection.		X			NTP, National AIDS Programme
Develop a mechanism for timely and proper diagnosis, treatment and care of HIV in Vorniceni MDR-TB Hospital.		X			NTP
Plan and budget for IPT for all cases with latent TB infection among people living with HIV.		X			National AIDS Programme
Revise the national guidelines on TB/HIV.		X			NTP
Revise the national guidelines on HIV/AIDS.			X		National AIDS Programme
TB CONTROL IN PRISON					
Establish a national committee with the MoH and MoJ to discuss and agree on direct and effective forms of collaboration.	**X**				**MoH, MoJ, NTP**

Recommended action	Timeline (quarter after action recommended)				Authority responsible
	Q1	Q2	Q3	Q4	
Strengthen technical collaboration with the health authorities in both civilian and penitentiary sectors in the Transnistria region.	X				MoH, MoJ, NTP
Authorities on both sides of the river: jointly identify and pursue international financial and other support.	X				NTP, MoH, MoJ
Ensure drug supply of first and second-line anti-TB drugs in all prisons on both sides of the river.	X	X	X	X	NTP, MoH, MoJ
Ensure infection control in the pre-trial institutions.	X	X	X	X	MoJ, NTP
Ensure monitoring and supervision for all penitentiary institutions in both sides of the river.	X	X	X	X	NTP
Strengthen follow-up of treatment for TB patients after release from prison.	X	X	X	X	NTP, national partners
Properly plan the handover from MoJ to MoH of health care in prisons.				X	NTP, MoH, MoJ
OTHER VULNERABLE POPULATIONS AND SOCIAL DETERMINANTS					
Establish collaboration between the NTP and National Centre for Prevention, Diagnosis and Treatment of Diabetes.			X		NTP, National Centre for Prevention, Diagnosis and Treatment of Diabetes
Revise the legislation adopted by the MLSPF to include more TB patients in eligibility for a disability pension.		X			NTP, MLSPF
Organize screening and treatment of alcohol use disorders among TB patients.			X		NTP
Develop a socioeconomic evaluation of patients to design an individualized TB treatment completion plan.	X				NTP
TB INFECTION CONTROL					
The NCPH and NTP: jointly develop internationally recommended policies for TB infection control.		**X**			**NTP, NCPH**
Appoint multidisciplinary commissions at central and peripheral levels in order to develop the National Infection Control Plan and local infection control plans.		X	X		NTP, NCPH
Build the capacity of the NCPH.	X	X	X	X	NTP, national and international partners, NCPH
Ensure continuing education of staff by the NCPH and NTP on TB infection control.	X	X	X	X	NTP, NCPH
Ensure mechanical ventilation in Vorniceni MDR-TB Hospital (old and new wards) 24 hours a day.	X	X	X	X	NTP
MANAGEMENT OF MEDICINES AND OTHER COMMODITIES					

Recommended action	Timeline (quarter after action recommended)				Authority responsible
	Q1	Q2	Q3	Q4	
Revise the use of capreomycin according to the resistance profile in the country.	**X**				**NTP**
Improve and simplify tender procedures by introducing pool procurement mechanisms and international procurement mechanisms.		**X**			**MoH**
Apply to the Global Fund for a grant for anti-TB drugs with paediatric formulation for the whole country and a grant for first-line anti-TB drugs for the Transnistria region.	**X**				**NTP**
Procure first-line anti-TB drugs in the form of fixed-dose combinations.	X	X	X	X	NTP
Strengthen pharmacovigilance.	X	X	X	X	NTP
Plan for additional funding to treat all diagnosed MDR-TB patients before the end of the Global Fund grant.				**X**	**NTP, MoH**
MONITORING AND EVALUATION					
Revise SIME-TB according to the review recommendations.		**X**	**X**		**NTP**
Assign one staff member dedicated to TB monitoring and supervision in the Transnistria region.	X				NTP, MoH
Ensure distant data validation every month, and report generation/interpretation every quarter (within two weeks after the quarter ends) and year (by the end of April).	X	X	X	X	NTP
Revise the terms of reference of the staff of the NTP Monitoring Unit and Supervision and Training Unit and build their capacity.	X	X	X	X	NTP
Conduct supervision of all basic TB facilities.	X	X	X	X	NTP
HUMAN RESOURCES DEVELOPMENT					
Develop a human resource plan for the NTP.		X	X	X	NTP, MoH
Increase the professional benefits linked to TB occupational hazards and incentives to TB providers linked to outcomes.		X	X	X	MoH
OPERATIONAL RESEARCH					
Develop an operational research agenda.		X			
Conduct operational research and document best practices.			X	X	
ETHICS AND HUMAN RIGHTS					
Revise the exclusion criteria for MDR-TB treatment applied by the national MDR-TB consilium.		X			NTP
Keep records of the work of the national MDR-TB consilium.	X	X	X	X	NTP
Prepare a plan to apply the law on involuntary isolation and treatment at the district level.	X				NTP, local authorities

Recommended action	Timeline (quarter after action recommended)				Authority responsible
	Q1	Q2	Q3	Q4	
ACSM AND COMMUNITY INVOLVEMENT					
Develop a national ACSM strategy and plan.		X	X		NTP, NCPH, national partners
Revise all ACSM material.	X				NTP, NCPH
Conduct ACSM countrywide.			X	X	NCPH, national partners
Revise the composition of the National Coordination Council	X				MoH
Create a platform for NGOs working on TB.			X		MoH
Translate and disseminate The Patients' Charter.			X	X	NTP
HEALTH SYSTEM AND TB CONTROL					
Revise the administrative position of district TB doctors.		X			MoH, NTP
Evaluate and redesign the current financing mechanisms for outpatient and inpatient TB services.		X			MoH, NTP
Redesign the medical education curriculum to better include MDR-TB prevention and control.				X	MoH, NTP
Introduce the Practical Approach to Lung Health.		X	X	X	NTP, MoH
Develop capacity for regular servicing and maintenance of medical equipment.			X	X	MoH
Create a better interface between the health information system and SIME-TB.			X		MoH, NTP
Consider the reduction of TB beds in the National Hospital Master Plan.			X	X	MoH, NTP
Develop and approve a legal framework for the NHIC to contract NGOs for delivery of TB services.		**X**			**MoH, national partners, NTP**
Develop and approve a legal framework to allow delivery of TB services in private facilities.		**X**			**MoH, NTP**

Key to responsible authority abbreviations: Ministry of Health (MoH); Ministry of Justice (MoJ); Ministry of Labour, Social Protection and Family (MLSPF); National Centre for Public Health (NCPH); National Health Insurance Company (NHIC); National Tuberculosis Programme (NTP).

Note: main recommended actions in bold text.

Annex 2

MEMBERS OF THE REVIEW TEAM

Review members (international)

Sevim Ahmedov	Senior Tuberculosis Technical Adviser, USAID, Washington DC, USA
Kai Blondal	Specialist in Respiratory Diseases and member of GLC for the WHO European Region, Reykjavik, Iceland
Andrei Dadu	Technical Officer, TB and M/XDR-TB Programme, WHO Regional Office for Europe, Copenhagen, Denmark
Pierpaolo de Colombani	Medical Officer, TB and M/XDR-TB Programme, WHO Regional Office for Europe, Copenhagen, Denmark **(Team Leader)**
Smiljka de Lussigny	Technical Officer, HIV/AIDS, STI and Viral Hepatitis Programme, WHO Regional Office for Europe, Copenhagen, Denmark
Nigor Muzafarova	Technical Officer, TB and M/XDR-TB Programme, WHO Regional Office for Europe, Copenhagen, Denmark
Pierre Yves Norval	Specialist in Public Health, Director of TBTEAM, Beaumont, France
Cristian Popa	Specialist in Respiratory Diseases, Marius Nasta Institute, Bucharest, Romania
Oriol Ramis	Specialist in Community Medicine, Barcelona, Spain
Sabine Ruesch-Gerdes	Head of National Reference Laboratory for Mycobacteria, Borstel, Germany
Jonathan Stillo	Anthropologist, City University of New York; International Fellow at New Europe College, Bucharest, Romania
Erika Vitek	Senior Tuberculosis Technical Adviser, USAID, Kyiv, Ukraine

Review members (national)

Victor Burinschi	Programme Director, Global Fund PCIMU, Chisinau
Silviu Ciobanu	Communicable Diseases Programme Officer, WHO, Chisinau, Republic of Moldova
Victoria Petrica	Programme Coordinator, Global Fund PCIMU, Chisinau
Valeriu Crudu	Programme Coordinator, PAS, Chisinau
Rita Seicas	Programme Coordinator, PAS, Chisinau
Ecaterina Axenti	M&E Unit, NIPP
Ilie Cernenco	M&E Unit, NIPP

Other members

David Kokiashvili	Monitoring and Evaluation Officer, Global Fund, Geneva, Switzerland
Tatiana Vinichenko	Portfolio Manager, Global Fund, Geneva, Switzerland

Interpreters

Natalia Romandas
Maria Postevca
Elisaveta Onofreiciuc
Tatiana Kuzminov

Annex 3

PROGRAMME OVERVIEW

Monday 4 February			
09.00 – 09.45	Briefing with Minister of Health (all international reviewers) Venue: Ministry of Health		
10.00 – 12.30	Meeting of all national and international reviewers Venue: LeoGrand Hotel		
13.30 – 16.00	Presentations and discussion: • Ministry of Health ongoing/planned reforms (roadmap, hospital restructuring, public health centres and laboratories, primary health care reforms) and legal framework relevant for the NTP		
16.30 – 17.30	Presentations and discussion (continued): • NTP links to the health system, human resources, funding etc. • NTP structure, objectives, targets, management, progress		
Tuesday–Friday 5–8 February (work at district level, see Annex 4)			
Saturday 9 February			
09.00 – 11.00	Field team work: preparation of presentations and field reports		
11.00 – 17.00	• Discussion of the field visits in plenary: presentation by each field team and discussion; preparation of field visit reports • Reshuffling experts (international and national) into new groups according to thematic areas based on the chapters of the review report Venue: LeoGrand Hotel		
Sunday 10 February			
	Continuation of field team work Venue: LeoGrand Hotel		
Monday 11 February			
09.00 – 12.00	• National TB Drug Store • National TB Reference Laboratory	• NIPP	• NTP Manager • Ministry of Health (health finance)
14.00 – 16.45	• National Drug Agency • National Centre for Public Health	• Territorial Medical Association, Riscani • Territorial Medical Association, Botanica	• NHIC • Ministry of Labour, Social Protection and Family
17.00 – 18.00	Wrap up (all reviewers): conclusions and recommendations Venue: LeoGrand Hotel		
Tuesday 12 February			
09.00 – 12.00	Roundtable discussion • PAS, Chisinau • Global Fund PCIMU, Chisinau • Soros Foundation – Moldova, Chisinau • AFI, Chisinau • SMIT, Balti • Speranta Terrei, Balti		

	Venue: LeoGrand Hotel		
14.00 – 16.45	• Medical University (in-service training; graduate training) • Ministry of Health (human resources) • National Centre for Public Health	• Municipal TB hospital • NTP (Monitoring Unit) • National Centre for Health Management	• Joint United Nations Programme on HIV/AIDS (UNAIDS) • National Centre for Prevention, Diagnosis and Treatment of Diabetes Complications
17.00 – 18.00	Wrap up (all reviewers): conclusions and recommendations Venue: LeoGrand Hotel		
Wednesday 13 February			
09.00 – 12.00	• Public Private Partnership with Moldcell	• Ministry of Justice (Department of Prison Facilities) • Pruncul Prison	• World Bank
14.00 – 16.45	• National Hospital for Dermatovenereology and Communicable Diseases	Roundtable discussion Venue: LeoGrand Hotel • International Organization for Migration (IOM) • United Nations Children's Fund (UNICEF) • UNODC • UNDP	
17.00 – 18.00	Discussion of main findings and recommendations (all reviewers) Venue: LeoGrand Hotel		
Thursday 14 February			
09.00 – 11.00	Discussion of main findings and recommendations • NIPP • PAS • Global Fund PCIMU • Ministry of Health		
11.30 – 12.30	Meeting with the Minister of Health		
14.00 – 16.30	Working in groups Venue: LeoGrand Hotel		
16.45 – 18.00	Discussion of main findings and recommendations Venue: LeoGrand Hotel		
Friday 15 February			
09.00 – 11.00	Debriefing: main findings and recommendations of the review • NIPP • PAS • Global Fund PCIMU • Ministry of Health • Constantin Iavorschi, Deputy Director, NIPP		
13.00 – 15.00	Wrap up: future coordination and logistics Venue: LeoGrand Hotel		

Annex 4

FIELD TEAM PROGRAMME

Team 1 (South): P de Colombani (Field Team Coordinator), S Ahmedov, J Stillo, E Vitek, D Kokiashvili, V Burinschi, V Petrica, S Ciobanu	
Tuesday 5 February	
09.30 – 12.30	Town of **Cimislia**: district hospital; family medicine centre, TB room. Village of **Ecaterinovca**: family doctor's office.
15.00 – 18.00	Town of **Cantemir**: district hospital; family medicine centre, TB room. Village of **Gotesti**: family doctor's office.
Wednesday 6 February	
09.30 – 13.00	Town of **Comrat** (autonomous region of Gagauzia): family medicine centre, TB room, grocery store. Village of **Chirsova**: family doctor's office.
15.30 – 18.00	Town of **Cahul**: district hospital, TB room; ART site; TB community centre.
Thursday 7 February	
09.00 – 12.00	Town of **Anenii-Noi**: district hospital, TB room; family medicine centre; group of family doctors.
14.30 – 18.00	Town of **Stefan-Voda**: family medicine centre, TB room. Village of **Ermoclia**: family doctor's office.
Friday 8 February	
09.00 – 10.00	Town of **Tiraspol** (Transnistria region): meeting with central health authorities.
10.15 – 13.30	Town of **Tiraspol** (Transnistria region): city TB dispensary; AIDS centre; social centre.
15.30 – 18.30	Village of **Parcani**: village health centre (TB room). Town of **Bender** (Transnistria region): TB hospital, regional reference laboratory.

Team 2 (North): PY Norval (Field Team Coordinator), N Muzafarova, S Ruesch-Gerdes, C Popa, V Crudu, E Axenti	
Tuesday 5 February	
09.30 – 12.00	Town of **Floresti**: primary health care and TB room in the outpatient facility; TB inpatient beds.
15.00 – 17.30	Town of **Soroca**: primary health care and TB room in the outpatient facility (district level); TB inpatient beds. Village of **Zastinca**: family doctor's office.
Wednesday 6 February	
09.30 – 12.00	Municipality of **Balti**: municipal hospital (in/outpatient, TB/HIV, paediatric, MDR); regional reference laboratory.
15.00 – 17.30	Town of **Singerei**: primary health care and TB room in the outpatient facility. Village of **Belicenii-Vechi**: family doctor's office.
Thursday 7 February	
10.00 – 12.00	Town of **Ribnita**: district hospital (TB room, community centre, ART site).
14.30 – 17.00	Town of **Rezina**: primary health care and TB room in the outpatient facility; community centre. Village of **Tareuca**: family doctor's office.
Friday 8 February	

09.30 – 12.00	Town of **Donduseni**: primary health care and TB room in the outpatient facility. Village of **Tirnova**: children's TB rehabilitation centre.

Team 3 (Central): A Dadu (Field Team Coordinator), K Blondal, O Ramis, I Cernenco	
Tuesday 5 February	
09.30 – 12.00	Town of **Straseni**: primary health care and TB room in the outpatient facility; community centre. Village of **Sireti**: family doctor's office.
15.00 – 17.30	District of **Ungheni**: primary health care and TB room in the outpatient facility; community centre. Village of **Costuleni**: family doctor's office.
Wednesday 6 February	
09.00 – 16.30	Town of **Tiraspol** (Transnistria region): Prison 2, Prison 3.
Thursday 7 February	
09.30 – 12.00	Town of **Ialoveni**: primary health care and TB room in the outpatient facility; community centre. Village of **Costesti**: family doctor's office.
14.30 – 17.00	Town of **Hincesti**: primary health care and TB room in the outpatient facility; community centre. Village of **Lapusna**: family doctor's office.
Friday 8 February	
09.00 – 13.00	Town of **Vorniceni**: MDR-TB hospital, regional reference laboratory.
15.30 – 17.30	Town of **Criuleni**: primary health care and TB room in the outpatient facility; community centre.

Annex 5

PROFESSIONALS INTERVIEWED

CHISINAU

Institute of Health and Medical Social Assistance

Dorin Rotaru	Director

International agencies

Cornel Riscanu	Health Programme Manager, UNICEF
Angela Capcelea	Programme Coordinator, UNICEF
Ina Tcaci	Programme Coordinator, UNODC
Dumitru Vasilescu	MAF Project, UNDP
Semion Terzioglo	Programme Coordinator, IOM
Irina Guban	Coordinator, Social and Health Sector Coordinator, World Bank
Jarno Habicht	Country Representative, WHO

State University of Medicine and Pharmacy

Constantin Iavorschi,	Head, Chair of Phthisiopulmonology
Aurelia Ustian	Associate Professor, Chair of Phthisiopulmonology
Stela Kulcitkaia	Associate Professor, Chair of Phthisiopulmonology
Adrian Cotelea	Associate Professor, Chair of Phthisiopulmonology
Vasile Zlepca	Associate Professor, Chair of Phthisiopulmonology
Evelina Lesnic	Associate Professor, Chair of Phthisiopulmonology
Valentina Vilc	Head, Teaching Unit, Chair of Phthisiopulmonology
Viorel Prisacari	Head, Chair of Epidemiology

Ministry of Health

Andrei Usatii	Minister
Cristina Gaberi	Head, National Programmes Division
Svetlana Cotelea	Head, Public Health Division
Lilia Gantea	Director, Finance and Budget Division
Aliona Andronatii	Director, Hospital Health care
Marcela Tirdea	Director, Monitoring and Evaluation Unit
Adriana Tudor	Adviser
Andrei Matei	Head, Health Financing, Budgets and Insurance Division
Andrei Romancenco	Head, Department for Management of Human Resources

Ministry of Justice

Veaceslav Ceban	Director, Department for Prison Facilities
Svetlana Doltu	Head, Health Department, Department for Prison Facilities
Angela Ciubotaru	Deputy Director, Health Department, Department for Prison Facilities
Irina Barbiros	Deputy Director, Organizational and Preventive Medicine, Department for Prison Facilities

Ministry of Labour, Social Protection and Family

Oleg Barcari	Head, Social Assistance Reform Department
Diana Doros	Gender Equal Opportunities and Violence Prevention Department

Municipal TB hospital

Maria Cetulean	Director
Vasile Popa	Deputy Director
Carmina Paladi	Head, Treatment Ward 1

Galina Demiscan	Head, Treatment Ward 2
Lidia Marcoci	Head, Paediatric Treatment Ward
Margareta Martiniuc	Head, Laboratory
Liudmila Egorova	Head, Pharmacy

National Centre for Prevention, Diagnosis and Treatment of Diabetes Complications

Natalia Palarie	Director

National Centre for Public Health

Stela Gheorghita	Deputy Director
Stefan Gheorghita	Deputy Director
Anatolie Melnic	National Immunizations Programme
Ecaterina Busuioc	AIDS Centre, Nosocomial Infections

National Drug Agency

Alexandru Coman	Director
Ludmila Bumacov	Deputy Director
Silvia Cebotari	Procurement Department
Elvira Istratii	Pharmacovigilance Department

National Health Insurance Company

Iurie Osoianu	Deputy Director

National Hospital for Dermatovenereology and Communicable Diseases

Iulian Oltu	Director
Lucia Pirtina	Deputy Director and Coordinator of National HIV Programme
Svetlana Popovici	ART Doctor
Rodica Bat	Laboratory Technician
Maria Supostat	Chief Nurse

National Tuberculosis Institute "Chiril Draganiuc"

Liliana Domente	Director and Manager of National Tuberculosis Programme
Ana Ciobanu	Deputy Director
Sofia Alexandru	Deputy Director
Constantin Iavorschi	Deputy Director
Ecaterina Axenti,	Doctor, Monitoring and Evaluation Unit
Ilie Cernenco	Doctor, Monitoring and Evaluation Unit
Ana Donica	Head, MDR-TB Department
Lidia Rivneac	Head, TB Department
Alexandru Buga	Epidemiologist
Elena Romancenco	Head, National TB Reference Laboratory
Ecaterina Stratan	Laboratory Physician, National TB Reference Laboratory
Nadejda Turcan	Laboratory Physician, National TB Reference Laboratory
Angelina Djugostran	Head, Pharmacy

NGOs

Victor Volovei	Executive Director, UCIMP
Victoria Petrica	Programme Coordinator, UCIMP
Victor Burinschi	Programme Director, UCIMP
Viorel Soltan	Director, PAS
Andrei Mosneaga	Programme Director, PAS
Valeriu Crudu	Programme Coordinator, PAS
Rita Seicas	PAS
Liliana Caraulan	PAS
Lilian Severin	Director, AFI
Feodora Rodiucova,	President, Speranta Terrei
Oxana Rucsineanu	President, SMIT

Nina Tudoreanu	Project Director, "Pentru Prezent si Viitor"
Liliana Gherman	Director, Public Health Programme, Soros Foundation – Moldova
Vitalie Slobozian	Human Resources Programme Coordinator, Soros Foundation – Moldova

Pruncul Prison Hospital

Mihaela Manea	Deputy Head, Health in Prison

Territorial Medical Association, Botanica

Victor Puiu	Director
Tamara Codreanu	Deputy Director
Viorica Ciubotaru	TB Doctor
Ludmila Burlacu	TB Nurse
Lidia Sula	TB Nurse
Ludmila Dubina	Primary Care Doctor

Territorial Medical Association, Riscani

Valentina Pislari	Director
Elena Rotaru	Deputy Director
Larisa Diordieva	TB Doctor
Elena Rosca	TB Nurse
Olga Rusnac	Infectious diseases physician, HCT

DISTRICTS

Anenii-Noi

Ludmila Rebdev	TB Doctor, TB Room, Family Medicine Centre
Carolina Stratan	TB Doctor, TB Room, Family Medicine Centre

Balti

Raisa Barbuta	District TB Coordinator
Aglaia Craciun	Head, Outpatient Department, Municipal Hospital
Elena Balan	TB Doctor, Outpatient Department, Municipal Hospital
Vera Dubciac	TB Doctor, Outpatient Department, Municipal Hospital
Nina Esan	Head, MDR Ward, Municipal Hospital
Raisa Gitu	Head, TB Ward, Municipal Hospital
Ala Ivanova	Head, Paediatric TB Ward, Municipal Hospital
Petru Alexandriuc	Head, Medical Ward, Municipal Hospital
Valentina Bors	Senior TB Nurse, Municipal Hospital
Angela Vasilian	Nurse Statistician, Municipal Hospital
Nadejda Priscu	Head, Regional Reference Laboratory
Victor Balan	Laboratory Technician, Regional Reference Laboratory
Zinaida Solcan	Laboratory Technician, Regional Reference Laboratory
Elizaveta Cojocari	Laboratory Technician, Regional Reference Laboratory

Bender (Transnistria region)

Nelea Obevzenko	Acting Director, TB Hospital
Alexandr Gribanov	Head, MDR-TB Ward, TB Hospital
Anzhela Malenkaya	Senior Nurse, MDR-TB Ward, TB Hospital
Victor Onufrienko	Head, Treatment Ward 3, TB Hospital
Tatiana Maxim	Head, Regional Reference Laboratory, TB Hospital
Alevtina Rudenko	Head, Pharmacy, TB Hospital
Vera Moldovan	Assistant TB Doctor, Health Centre, Parcani village

Cahul

Olga Dermenji	Coordinator, TB Community Centre
Vasile Saporet	TB Doctor, TB Room, Family Medicine Centre
Alexandru Chedruc	TB Doctor, TB Room, Family Medicine Centre
Olga Plesca	TB Doctor, TB Room, Family Medicine Centre

Cantemir

Nicolae Badanau	TB Doctor, TB Room, Family Medicine Centre
Felixa Butuc	TB Doctor, TB Room, Family Medicine Centre
Feodosia Diacenco	Family Doctor, Family Doctor Office, Gotesi village

Cimislia

Vitalie Gorodnitch	TB Doctor, TB Room, Family Medicine Centre
Maria Caitas	TB Doctor, TB Room, Family Medicine Centre
Iulia Vlas	Family Doctor, Family Doctor Office, Ecaterinovca village

Comrat (Gagauzia)

Anastasia Turcan	TB Doctor, TB Room, Family Medicine Centre
Maria Cora	TB Doctor, TB Room, Family Medicine Centre
Feodosia Mesa	Family Doctor, Family Doctor Office, Chirsova village

Criuleni

Nicolae Covalciuc	TB Doctor, TB Room, Family Medicine Centre

Donduseni

Tatiana Betivu	Director, Children's TB Rehabilitation Centre, Tirnova
Elena Rusu	Ward Head, Children's TB Rehabilitation Centre, Tirnova
Ludmila Prisacari	Senior Nurse, Children's TB Rehabilitation Centre, Tirnova
Veronica Sorocean	Head, Education Unit, Children's TB Rehabilitation, Tirnova
Raisa Carazan	Teacher, Children's TB Rehabilitation Centre, Tirnova
Raisa Furtuna	Educator, Children's TB Rehabilitation Centre, Tirnova
Lidia Cernei	Physiotherapy Nurse, Children's TB Rehabilitation, Tirnova
Vitalie Pricop	Director, District Hospital
Silvia Drumea	District TB Coordinator
Parascovia Saragova	TB Doctor, TB Room, Family Medicine Centre
Svetlana Galusnic	Nurse, TB Room, Family Medicine Centre
Tatiana Gurieva	Laboratory Technician, Family Medicine Centre
Emil Volcanovici	Deputy Director, Family Medicine Centre
Galina Sliusari	Primary Care Doctor, Family Medicine Centre
Victor Josan	Primary Care Doctor, Family Medicine Centre

Floresti

Ion Manole	Deputy Director, District Hospital
Lidia Cislari	District TB Coordinator
Tatiana Rotaru	TB Doctor, TB Ward, District Hospital
Lidia Graur	TB Nurse, TB Ward, District Hospital
Svetlana Ursu	TB Nurse, TB Ward, District Hospital
Ala Galacova	Laboratory Technician, District Hospital
Lolita Svet	TB Doctor, Outpatient Department, District Hospital
Lidia Balan	Senior TB, Outpatient Department, District Hospital
Livia Lacusta	TB Nurse, Outpatient Department, District Hospital

Hincesti

Mihai Cocervei	TB Doctor, TB Room, Family Medicine Centre
Miron Popa	TB Doctor, TB Room, Family Medicine Centre
Ana Rusu	Primary Care Doctor, Family Doctor Office, Lapusna village

Ialoveni

Grigore Profir	TB Doctor, TB Room, Family Medicine Centre
Zinaida Balan	TB Doctor, TB Room, Family Medicine Centre
Valeriu Cernid	TB Doctor, TB Room, Family Medicine Centre
Gheorghe Negru	Primary Care Doctor, Family Doctor Office, Costesti village

Rezina

Nina Postu	District TB Coordinator
Ana Gritco	TB Nurse, TB Room, Family Medicine Centre
Maria Ceban	TB Nurse, TB Room, Family Medicine Centre
Minodora Dobrovolsaia	Laboratory Technician, Family Medicine Centre
Larisa Gritco	Psychologist, Community Centre
Nina Gorea	TB Nurse, Community Centre

Ribnita (Transnistria region)

Anatol Girlea	Director, District Hospital
Natalia Antoniuc	District TB Coordinator
Oxana Goncear	TB Nurse, TB Room, Family Medicine Centre
Irina Kasatkina	Laboratory Technician, Family Medicine Centre
Cristina Gumennaya	Head, Community Centre
Boris Chegrinet	District HIV Treatment Centre, District Hospital

Singerei

Ilie Vizir	District TB Coordinator
Iurie Vieru	TB Doctor, TB Room, Family Medicine Centre
Rodica Vieru	TB Nurse, TB Room, Family Medicine Centre
Felixa Corotinskaya	TB Nurse, TB Room, Family Medicine Centre
Tatiana Rusu	Laboratory Technician, Family Medicine Centre
Angela Ginju	Nurse, Family Doctor Office, Belicenii-Vechi village

Soroca

Olga Samaev	District TB Coordinator
Silvia Pislari	TB Doctor, TB Room, Family Medicine Centre
Zinaida Scoruc	Senior TB Nurse, TB Room, Family Medicine Centre
Lidia Turcan	TB Nurse, TB Room, Family Medicine Centre
Taisia Gostanari	Laboratory Technician, Family Medicine Centre
Oleg Cupriev	Head, TB ward, District Hospital
Galina Frunze	Senior TB Nurse, District Hospital
Ana Chiperi	Medical Procedures Nurse, District Hospital
Valeriu Sochirca	Nurse, Family Doctor Office, Zastinca village
Maia Minascurta	Nurse, Family Doctor Office, Zastinca village

Stefan-Voda

Boris Moraru	TB Doctor, TB Room, Family Medicine Centre
Parascovia Boian	TB Paediatrician, TB Room, Family Medicine Centre
Ivan Niculita	Primary Care Doctor, Family Doctor Office, Ermoclia village

Straseni

Gheorghe Damaschin	TB Doctor, TB Room, Family Medicine Centre
Eugen Nichiforeac	TB Coordinator and Psychologist, Community Centre
Lilia Balaur	Primary Care Doctor, Family Doctor Office, Sireti village

Tiraspol (Transnistria region)

Vasilii Gumenniy	Head, Central Health Authority Transnistria region
Kirill Burchu	Deputy Head, Central Health Authority Transnistria region
Elena Palii	Legal Adviser, Central Health Authority Transnistria region
Oxana Dolgusheva	TB Programme Manager Transnistria region
Nina Loseva	TB Coordinator of Tiraspol and three communities in Slobozia
Tatiana Alexeenco	Head, ART Outpatient Department, City TB Dispensary
Natalia Sazonova	Head, ART Laboratory, City TB Dispensary
Xenia Belevich	Head, Social Support Centre for People Living with HIV
Petr Zubreichuk	Deputy Head, Central Justice Authority, Transnistria region

Vecheslav Pozdnyakov	Director, Health and Social Care Centre, Central Justice Authority, Transnistria region
Anatoliy Frasenyuk	Acting Director, Prison 3
Andrey Golsha	Senior Health Inspector and Epidemiologist, Central Justice Authority, Transnistria region

Ungheni

Ion Buiciuc	TB Doctor, TB Room, Family Medicine Centre
Emilia Dadus	TB Doctor, TB Room, Family Medicine Centre
Maria Paduraru	Primary Care Doctor, Family Doctor Office, Costuleni village

Vorniceni

Victor Vovc	Director, MDR-TB Hospital
Grigore Rusu	Head, MDR-TB Treatment Ward, MDR-TB Hospital
Timofei Popescu	Head, Regional Reference Laboratory, MDR-TB Hospital

Annex 6

PROFILES OF PATIENTS INTERVIEWED

The review team held two focus groups with patients at the NIPP and the municipal hospital in Chisinau. The first group consisted of four MDR-TB patients treated for the first time and the second consisted of five MDR-TB patients previously lost to follow-up. Additional interviews of varying lengths were held with patients over the course of the two weeks of the review. Focus groups and interviews were in held in Romanian or Russian (via consecutive interpretation), depending on the patient's preference.

Kolya, a man in his early fifties with MDR-TB, is married and has a wife and a young daughter. His wife works in a warehouse in Calarasi in the Republic of Moldova. Kolya has worked in construction as a migrant for over 20 years, always taking trips of a few months to Ukraine or the Russian Federation and then returning home. Kolya described horrible conditions living and working as a migrant. He stated: "We are working to maintain our families; we forget we exist". He complained that he had lived in very crowded places with many men sharing a single apartment, and that all they think about is bringing money back to their country. He also said that there was not enough food: "When we have food, we eat; when we do not have food, we don't eat. It isn't cold because it is summertime, but the conditions are bad". While in the Russian Federation in the summer of 2012, Kolya began coughing very hard during his last month of work. He did not seek treatment there, but bought over-the-counter cough medication and continued working until the end of his contract. The cough did not get better and when he returned to Moldova (where he has health insurance) he was diagnosed with primary MDR-TB. Kolya contacted the other Moldovans he was working with in the Russian Federation, but none of them had any symptoms. He does not know whether he was already sick when he arrived in the Russian Federation, or was infected there. When asked how he reacted when he was diagnosed he said: "The most difficult thing was to hear I had TB". He did not know much about the disease other than it was a "difficult disease: I didn't know whether or not you could get treated. I thought very few people could get treated". Now he says he could "give an exam on TB", meaning he knows a lot about it. He was adamant that he will complete treatment, but his economic conditions at home are going to be a challenge. Kolya is worried about what will happen when he returns home. He says he will be "another mouth to feed" yet he will not be able to work during the last 18 months of his treatment. He may never be able to return to the difficult construction work that he has done for the past two decades. He said that the 100 lei (approximately US$ 8) pension he will receive for being a TB patient will not be enough to support his family, even with his wife continuing to work.

Cristina, a woman in her early seventies from the north of the country, was dressed all in red fleece, had long manicured nails and was eager to speak with the group. She was diagnosed with MDR-TB after being treated several times unsuccessfully for pneumonia. She is a retired tram conductor who complained that her pension is small because the years she spent working in Ukraine were not taken into account. Before she was diagnosed with TB she lived in a village, caring for her small grandson while her son and daughter-in law worked in Moscow and Kyiv, respectively. Her son had previously worked on a collective farm, but when she became ill the first time, he had to quit his job there. Now he works in construction in the Russian Federation. Even though she was insured, Cristina put off seeking treatment, instead drinking tea and honey. In total three months passed between the onset of symptoms and when she received a TB

diagnosis. At the beginning, she was diagnosed with pneumonia and had to pay 450 lei (approximately US$ 38) for ten expensive antibiotic injections. These injections did not solve the problem; nor did her following hospitalization for pneumonia. When she was transferred to the hospital in Chisinau she said that she was nearly dead. She said that doctors and nurses were at her bedside for the first four days and expressed appreciation for how they cared for her. Cristina burst into tears several times during the focus group. She is particularly worried about her grandson, who is now under the care of an elderly neighbour. For her, the biggest concern is how she will survive when she is discharged from the hospital. Conditions at home are bad for her. She says that they do not have heat and it is expensive to heat water for bathing with electricity. Her electricity bill was 502 lei (approximately US$ 42) recently, including an earlier overdue amount. This exceeds her retirement pension of 500 lei. Cristina said that she felt lucky to be in the hospital during the winter so she saved money on heat. When asked about how things will be when she goes back home for the continuation phase she said: "I can't imagine – sometimes I don't want to leave [the hospital]". She said that material help would make it easier for patients like her to complete treatment. Stressing the cost of being sick (even when care is freely provided), she said that going to hospital, whether in the district or the capital, costs money: "You have to prepare for it by saving money for transportation, food and clothes to bring with you". She said that no one is expected to make informal payments at the TB hospital, but in other parts of the health care system these payments are necessary. One of the more troubling aspects of Cristina's story is that she was hospitalized in the drug-sensitive TB ward initially, and only when she received an MDR-TB diagnosis after six weeks was she moved to the MDR-TB floor. Given the fact that the Xpert MTB/RIF assay is available on site, she should have had the right diagnosis in days, not weeks.

Sergei, a quiet man in his forties, has worked in Chisinau for 15 years installing windows. He is married and lives with his wife and two children (aged 15 and 4). Because uninsured, he delayed seeking care for two months after symptoms began. He said that at first he began to feel very weak and sweated a lot at night. By the time he went to the doctor, he had already lost 13 kg. Sergei has not seen his wife and children in five months since he began treatment for MDR-TB. He is afraid that he will infect them.

Mircea is a 28-year-old man from near Stefan-Voda. He lives with his wife and elderly parents. He has worked in construction since he was 18, first in Romania and later in the Russian Federation. His family is not well-off, but their house is one of the nicest in the village because he has built a stone wall around it, laid a mosaic of bricks in the courtyard and installed a new gate. Mircea is proud of the work he has done at home, which was possible because of the money he saved from work in the Russian Federation. Mircea told the group that he was living in an apartment in the Russian Federation with four other men working in construction when he began having chest pains. He did not seek treatment there, but when he returned to Moldova, even though he does not have insurance, he went to a clinic in a nearby town and was diagnosed with pneumonia. He took a course of antibiotics, for which he paid out of pocket, but still had chest pain. He went to two more doctors and was treated with antibiotics for pneumonia each time, again paying out of pocket. The third doctor asked for a sputum test but this was negative. The doctor suggested going to a private clinic for a bronchoscopy (for which he had to pay 235 lei – approximately US$ 20). He did this and the results were positive for drug-susceptible TB. Mircea did not know anything about TB when he was diagnosed, but now says he knows a great deal. He explained that in the beginning he slept in a separate room from his wife, and he still uses a separate set of dishes (as suggested in hospital). He has nearly finished treatment and is eager to get back to work. While sick, he had to borrow a lot of money from his friends to

survive. He said he is lucky he could do this, but needs to go back to construction work so that he can pay these people back.

Olga is a young, stylishly dressed woman in her mid-twenties from Chisinau who works as a cashier in a grocery store. Upon returning from the seaside in August 2012, she went for her required annual fluorography (required of all people who work in food service) and was found to have TB. Olga comes from a middle-class family, is the mother of two small children, is well-educated and lives a relatively comfortable life. She has been taking first-line anti-TB drugs from her territorial medical association for the past five and a half months. She insisted on having ambulatory treatment from the very beginning so that she could continue caring for her children. The afternoon we met she was taking her pills between gulps of soda. She said that she did not understand how she could be sick because she never had any symptoms. She was frustrated she had to leave her job and was eager for the treatment to be over. She said that her tests had all been negative, but that the fluorography had shown some "infiltrates" that were abnormal. In her medical records she has been smear-, culture- and Xpert MTB/RIF assay-negative throughout her treatment. It may be that she never had TB at all.

Stefan, a tall 33-year-old man with MDR-TB and HIV, is from the north of the country. He started a life of petty crime when he was young and has been imprisoned for the majority of the past 12 years. When he was not in prison he worked in construction, usually with concrete. He was diagnosed with HIV in 1997. In 2009 Stefan was diagnosed with MDR-TB and has been receiving treatment for it in prison. He has already received the one-time 1510 lei (approximately US$ 128) given by the Ministry of Justice to prisoners returning home, but he has no home to return to. He does not know where he will go or what he will do after he is released from prison, but he hopes to finish his MDR-TB treatment in a hospital.

Mihai, a mechanic and wedding musician in his early forties, is a friendly man quick to make jokes and eager to tell his story. He has MDR-TB and was lost to follow-up in the past. In 2001 his wife went to Italy for work. She never returned and moved there permanently with their child and her parents. He was alone and became depressed and started to drink too much. This was when he was first diagnosed. He said he had worked at many weddings, singing and playing the accordion in cellars. It was hard work. He said that, by the time he was diagnosed, "half of my lung was flooded with water". He didn't want to go to the doctor, but his mother forced him to. His mother came every day to bring him food at the hospital. Mihai is very grateful for the care at the hospital and especially for the second-line anti-TB drugs: "The drugs are very good. They are strong, but good". He has a difficult time with side-effects – both ethionamide and cicloserin are difficult for him to tolerate and he has headaches, nausea and insomnia because of them. Mihai is adamant that he will complete his treatment this time. When asked what he will do afterwards, he said he will move back to his mother's house and, when he is well enough, return to being a wedding performer. He said that because his lungs are damaged, he will try to compensate for this by pre-recording his songs and lip-syncing while he plays the accordion.

Vlad, a pale, small 24-year-old man, only speaks Russian and has had MDR-TB since he was 18. He worked in construction in Chisinau, where he said he was exposed to someone who had TB. Vlad started his treatment late and abandoned treatment follow-up because he was caring for his disabled mother. Now he is back in hospital, under treatment for MDR-TB, and his younger sister is caring for both their mother and grandmother. Vlad described himself as "a most difficult patient": he had to be hospitalized after becoming very ill and losing 10 kg when he was first diagnosed. He said he stopped his first treatment after only two weeks because he was his

mother's only caregiver and could not agree to six months of hospitalization. As a result, his lungs are now severely damaged and he becomes out of breath easily.

Radu, a lawyer in his mid-thirties with bright blue eyes and a short beard, is from the north of the country. He has MDR-TB, developed after stopping previous treatment. Before, he used to travel to different countries in the region and also within the Republic of Moldova and the Transnistria region selling things. He complained a great deal about how he was unable continue the ambulatory phase of treatment because of his travelling. He also said that doctors did not protect confidentiality in the past – that he wanted to keep his status as a TB patient a secret, but the requirement to go to the TB section daily for treatment revealed his infection to many people. Radu gets easily irritated. He suggests that for people like him who must travel some sort of card linked to their main treatment record should be introduced. He said this would allow him to be in the three communities where he has family or business and still receive his treatment. However, because he is an MDR-TB patient, this would be complicated.

Gheorghe, a man in his early fifties, has MDR-TB and multiple losses to treatment follow-up. He is a former soldier, still proudly showing around his medals from the Chechen and Transnistrian wars. He abandoned treatment follow-up and describes himself as a difficult patient. He also has psychological problems and becomes upset very easily. He said that he is a veteran and should be receiving a larger pension. He also claimed that the food in the hospital is not good enough. It is difficult to speak with Gheorghe: he dominates the conversation in the focus group, but is unable to describe exactly what his main issues are. He is not receiving any psychological support while undergoing appropriate MDR-TB treatment, but it is clear that he is gravely in need of it.

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