

Ambulatory tuberculosis treatment in post-Semashko health care systems needs supportive financing mechanisms

S. Kohler,^{*†} D. A. Asadov,[‡] A. Bründer,[†] S. Healy,[†] A. K. Khamraev,[§] N. Sergeeva,[†] P. Tinnemann^{*}

^{*}Institute for Social Medicine, Epidemiology and Health Economics, Charité – Universitätsmedizin Berlin, Berlin, Germany; [†]Médecins Sans Frontières, Nukus and Tashkent, [‡]Department of Health Management, Evidence-based Medicine Centre, Tashkent Institute of Postgraduate Medical Education, Tashkent, [§]Tashkent Paediatric Medical Institute, Nukus Branch, Nukus, Uzbekistan

SUMMARY

The tuberculosis (TB) control strategy in the Republic of Karakalpakstan, Uzbekistan, is being changed to decentralised out-patient care for most TB patients by the Government of Uzbekistan, in collaboration with the international medical humanitarian organisation Médecins Sans Frontières. Ambulatory treatment of both drug-susceptible and drug-resistant TB from the first day of treatment has been recommended since 2011. Out-patient treatment of TB from the beginning of treatment was previously prohibited. However, the

current Uzbek health financing system, which evolved from the Soviet Semashko model, offers incentives that work against the adoption of ambulatory TB treatment. Based on the ‘Comprehensive TB Care for All’ programme implemented in Karakalpakstan, we describe how existing policies for the allocation of health funds complicate the scale-up of ambulatory-based management of TB.

KEY WORDS: tuberculosis; health system; ambulatory treatment; overhospitalisation; financing

OF THE 15 COUNTRIES of the former Soviet Union, 13 are among the world’s 27 high multi-drug-resistant TB (MDR-TB) burden countries. Some of the world’s highest MDR-TB rates are found among new (13–26%) and retreatment TB cases (55–58%) in the Central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.¹ Overall, there are concerns that the cost of MDR-TB control may become unaffordable unless the growing burden of MDR-TB is reversed in the near future with new drugs and diagnostics, as well as scale-up of cost-effective models of care.²

One of Uzbekistan’s highest TB burden areas is the region of Karakalpakstan, home to 1.7 million people. According to its Ministry of Health (MoH), Karakalpakstan’s TB prevalence and mortality were more than twice the national average in 2013 (107.7 vs. 50.8 per 100 000 population and 10 vs. 3.9/100 000, respectively). Its MDR-TB rates are nearly twice the Uzbek average (40.8% vs. 23.2% among new and 78.1% vs. 62.0% among retreatment TB cases in 2010).³ The severity of this situation is perceived to be associated with the desiccation of the Aral Sea and its socio-economic consequences.

In response to the TB burden in Karakalpakstan, the MoH of Uzbekistan, with the support of Médecins Sans Frontières (MSF), launched the DOTS

strategy in 1998. Although the programme was initiated successfully, performance indicators gradually deteriorated. To elucidate the reasons for the declining efficacy of the DOTS strategy, drug susceptibility testing (DST) of TB patients was introduced, starting in four districts of Karakalpakstan. The DST results indicated high rates of MDR-TB.^{4,5} As a result of this, a DOTS-Plus pilot project to identify and treat MDR-TB patients with individualised care was initiated in 2003 for the first time in Uzbekistan.⁶ In 2011, the ‘Comprehensive TB Care for All’ programme in Karakalpakstan introduced treatment for drug-susceptible and MDR-TB patients on an ambulatory basis throughout treatment, eliminating the previous compulsory phase of hospitalisation for TB patients.⁷

Ambulatory treatment is common practice for drug-susceptible TB, whereas MDR-TB patients may receive treatment as either out-patients or in-patients in secondary or tertiary facilities.¹ The World Health Organization (WHO) and MSF recommend that, where possible, patients with MDR-TB, like those with drug-susceptible TB, should be treated as out-patients using ambulatory care rather than hospital-based treatment.^{7,8} Ambulatory TB care is expected to reduce the risk of nosocomial cross-infection with different or more resistant strains of

Mycobacterium tuberculosis during in-patient treatment, and offers patients greater independence during treatment.⁹ Early evidence indicates that ambulatory MDR-TB treatment appears to be cost-effective and no less effective than hospital-based models.^{10,11} However, remodelling an existing in-patient-based TB care system towards a primarily ambulatory model of care can require policy and legislative changes, including changes in health financing mechanisms, to facilitate the adoption of the new treatment model.

The present Uzbek financing mechanisms of the post-Semashko health care system allocate resources to TB hospitals based on the number of beds provided. The number of beds to be provided is typically extrapolated from past use, and is adjusted according to the facility's bed occupancy rate. This mechanism lacks incentives for referrals to ambulatory care. Ambulatory care is funded based on the population size, age and sex structure of the area served. Regular financing of out-patient care is thus unresponsive to rapidly changing patient numbers. Both financing mechanisms complicate the scale-up of a model of comprehensive ambulatory TB care for drug-susceptible and MDR-TB patients in the Republic of Karakalpakstan, in Uzbekistan.⁷

In the present paper, we present key aspects of the TB services in Karakalpakstan and the traditional financing mechanisms in place for the public health services in Uzbekistan, which characterise the funding of the TB services in Karakalpakstan. We then discuss how the existing financing mechanisms affect the transition from hospital-based TB management to a comprehensive ambulatory TB care programme.

TB SERVICES IN KARAKALPAKSTAN

TB services in Karakalpakstan are organised as part of Uzbekistan's public health care sector. Uzbekistan's health system has evolved from the Soviet Semashko health care model. The public sector constitutes the core of the centralised hierarchical health system, in which the most prevalent mode of regulation is policy formulation. Policies are set by higher administrative levels within the health system, and subordinate levels are expected to follow them. Traditionally, neither fiscal nor other forms of incentive form part of the system used for regulating health care providers.¹² The TB services operate in-patient and out-patient health facilities, which are funded by independent budgets from the Ministry of Finance (MoF).

TB care in some administrative districts, called *rayons*, is provided in collaboration with MSF. The treatment plan for each TB patient is prescribed by TB specialists. All anti-tuberculosis treatment is provided free of charge. Anti-tuberculosis drugs prescribed by the TB services are primarily provided by the Global Fund to Fight AIDS, Tuberculosis and

Malaria (Geneva, Switzerland). MSF supports the TB services with staff, training and diagnostic tools. TB patients were not allowed to receive treatment elsewhere apart from at the public TB services of the regional MoH. In practice, in addition to institutionalised TB care, self-treatment, non-standard treatment provided by doctors and traditional healing are also common.

There are various entry points to diagnosis and treatment. Patients with TB symptoms usually contact the TB services through the pathways described in Table 1. Many patients seek a consultation directly with a designated TB doctor, who is the only medical doctor with the authority to give an official diagnosis of TB. TB doctors are responsible for all TB activities within their *rayon*. Each *rayon* has one head TB doctor, one deputy head TB doctor and other TB doctors. Typically, there are two out-patient TB doctors in *rayons* with a population of up to 50 000, and at least four out-patient TB doctors, one of whom is a TB paediatrician, in *rayons* with a population of 100 000 or more. *Rayons* with in-patient TB facilities also have in-patient TB doctors.

In-patient care

Each TB hospital is headed by a TB doctor who assumes medical responsibilities and acts as the hospital's administrative and financial director. Hospital budgets are closely linked to the number of beds occupied. The number of hospital beds determines the number of staff assigned to the hospital, which only treats in-patients. Other resource needs are determined by the MoH in the same way. The MoF can request the MoH to reduce the planned bed capacity if bed occupancy rate falls below 80% of the targeted bed occupancy of 310 days per year for a prolonged period of time. To date, the MoH has made proactive downward adjustments of TB bed capacity.

In 2013, the estimated operating costs of TB hospitals in Nukus City were as follows: 30% of total expenditure for employees, 10% on food, 55% on drugs, medical devices and diagnostic tools (net of donated drugs and diagnostic tools), and 5% on utilities and other expenses for the maintenance of the TB facilities (e.g., utilities, repair and overhaul, purchase of inventory). In 2013, the average actual cost for maintaining one hospital bed for drug-susceptible TB patients in Nukus City was Uzbekistani som (\$UZS) 30 169 per day and \$UZS 1 206 756 per case treated (\$UZS 3 000 ≈ €1). Maintaining one bed for an MDR-TB patient cost \$UZS 42 477/day and \$UZS 4 247 713/case treated. The average length of hospitalisation was 40 days for patients with drug-susceptible TB and 100 days for patients with MDR-TB.

Out-patient care

Out-patient TB care is administered through DOTS corners, operated by out-patient clinics. Clinic staff,

Table 1 Patient pathways to TB care

First contact point	First contact person	Potential diagnostic tests	Referral to	Treatment decision
Out-patient department, polyclinic, SVP*	TB doctor	Sputum sample, fluoroscopy, X-ray	None	In- or out-patient; if out-patient, at health facility or home-based
	General practitioner, internist or pulmonologist	Sputum sample, fluoroscopy, X-ray	TB doctor	None
Branch of SVP (previously FAP)*	Nurse	Sputum sample	General practitioner or TB doctor	None

* Rural health posts.

TB = tuberculosis; SVP = selskie vrachebniye punkt (primary health care facilities); FAP = Feldsher-Accoucheur point (local health post).

which includes ambulatory TB doctors, provide only out-patient treatment and commute between off-site locations. The administration of ambulatory DOTS treatment for TB patients in DOTS corners is typically assigned to one of the clinic nurses, who also performs other tasks in the clinic. The duties of the DOTS corner staff include home visits to TB patients if they do not show up at a DOTS corner for the administration of drugs.

In *rayons* covered by the Comprehensive TB Care for All programme, 38% of TB patients were given ambulatory treatment in DOTS corners from the diagnosis of active TB up to March 2014. Of the total number of patients who received treatment at the DOTS corners, 58% had MDR-TB. Treatment for drug-susceptible patients usually lasted between 6 and 8 months if ambulatory from the start, and between 4 and 5 months if initiated in a TB hospital. The usual duration of ambulatory treatment for patients with MDR-TB was 2 years.

The budget and resources allocated to an out-patient clinic are based on the size of the population of the catchment area. These are adjusted for the age and sex composition of the population in the catchment area, but are not directly related to the number of TB out-patients. Most of the ambulatory care budget funded by the MoF is spent on salaries and related expenses. The costs of transportation incurred by the TB services are not included in the out-patient clinic budget. Instead, each *rayon* is provided with a vehicle to accommodate the various transportation needs, such as visits to patients who do not attend the DOTS corner, visits to very sick patients who receive treatment at home, or commuting between TB facilities.

TRANSITION FROM IN-PATIENT TO OUT-PATIENT TUBERCULOSIS CARE

Although post-Semashko health care systems have a tradition of providing hospital-based care, the Karakalpakstan MoH introduced policy and legislative changes to allow ambulatory DOTS for most TB patients. Before the MoH started the Comprehensive

TB Care for All programme in collaboration with MSF, it was mandatory in Karakalpakstan for all TB patients, irrespective of drug susceptibility, to start treatment in hospital (decree no. 160¹³). Patients diagnosed with active MDR-TB were admitted for an intensive treatment phase of at least 8 months, or longer if additional treatment was needed to achieve sputum conversion. Since the Karakalpakstan's MoH February 2011 '*pricaz*' (decree) no. 39, ambulatory TB treatment from day 1 has been the recommended strategy for both drug-susceptible TB and MDR-TB, unless the patient's condition requires special medical attention that cannot be provided at home or in an ambulatory setting.¹⁴ Thus, a diagnosis of TB per se ceased to require or justify hospital admission. TB patients in areas covered by the Comprehensive TB Care for All programme (nine *rayons* and two cities by May 2014) can therefore now receive treatment for drug-susceptible TB and MDR-TB on an ambulatory basis in DOTS corners without the mandatory in-hospital phase.

As of March 2014, the programme had enrolled 1832 of 4838 newly diagnosed TB patients in the *rayons* where Comprehensive TB Care for All has been implemented; these patients received all treatment as out-patients. Of these, 1055 were diagnosed with MDR-TB, and 777 with drug-susceptible TB. During the same period, about 15 000 patients were admitted to TB hospitals in Karakalpakstan for the treatment of active TB, relapse preventive treatment and palliative treatment, or to confirm disability status due to 'chronic TB'. Putting these 1832 TB patients on ambulatory treatment resulted in an estimated savings of 136 580 bed-days in TB hospitals, or 374 TB hospital beds/year, i.e., an average duration of hospitalisation of 40 days for each drug-susceptible TB patient, and 100 days for each MDR-TB patient given ambulatory treatment throughout.

Before the Comprehensive TB Care for All programme, there were 1425 hospital beds in specialised TB care facilities in the Republic of Karakalpakstan. With the start of the programme, this was reduced by 165 TB beds, and some of the remaining facilities were reconstructed based on decree no. 62 of the

Government of the Republic of Uzbekistan.¹⁵ A further reduction of hospital capacity for TB patients seems feasible, and is planned by the MoH, as the TB bed occupancy rate in Karakalpakstan was 63% of the 310 days/year targeted in 2012, and dropped to 41% in 2013.

The introduction of the Comprehensive TB Care for All programme helped reduce TB hospital capacity, but at the same time it significantly increased the workload of the staff in the out-patient clinics. Despite the transition to ambulatory TB care and the resultant savings in the in-patient sector, no additional resources, except for a one-off 50% salary increase for the staff of all TB facilities (decree no. 62), could be allocated to the ambulatory TB services by the MoH due to the population-based funding of ambulatory care by the MoF.¹⁵ After reducing the bed capacity of TB hospitals by 12%, there is still overcapacity, and strategic bed occupancy occurs, e.g., by putting pressure on subordinates to keep beds filled, calling external doctors to refer patients, or not transferring patients to ambulatory care at the earliest possible stage.

CHALLENGES TO OVERCOME

The MoH and MSF, whose aim is to scale up ambulatory TB care, face challenges similar to those confronting the health systems of the former Soviet Union states after independence. Treatment and financing mechanisms are hospital-oriented, despite the fact that several procedures can be carried out more cost-effectively in ambulatory settings, and the ambulatory sector needed for comprehensive out-patient care is underdeveloped and/or under-financed.^{16,17}

Budgeting process

The inflexible financing mechanisms for anti-tuberculosis treatment allocate separate budgets to in-patient and out-patient care. Therefore, savings in the hospital sector, for example, that were achieved through the reduction of the TB bed capacity in Karakalpakstan, cannot be reused directly by the MoH within the TB services to financially strengthen the ambulatory sector. Budget reallocation from in-patient to out-patient TB services requires approval by the MoF, which can, and so far to a large extent does, decide to invest in areas other than ambulatory management of TB.

In-patient care

The current Uzbek health system does not set financial incentives to use fewer TB hospital beds. On the contrary, hospitals face the risk of being allocated fewer resources for TB care in the future if less than 80% of the bed capacity planned for TB in-patients is used. Furthermore, non-financial incen-

tives bias decision-making toward maintaining hospital-based treatment. Failure to use allocated resources might be perceived as a malfunction of the current system, which focuses on monitoring the quantity rather than the quality of the services it delivers. Hospital staff enjoy a higher status, while ambulatory staff in DOTS corners face a higher workload. In-patient TB care is provided in urban settings, unlike ambulatory care, which is mostly carried out in rural areas, where working conditions are more difficult.

Out-patient care

The budgeting process for ambulatory TB care is based on an extrapolation of past financial expenses, adjusted for changes in the population size and the demographic characteristics of the catchment area of an ambulatory facility. As a result, the financing mechanism for ambulatory treatment has not provided more resources in the scale-up of ambulatory anti-tuberculosis treatment. Given that the out-patient budget is unrelated to changing patient numbers, the increasing number of TB patients admitted to ambulatory treatment has reduced the resources available per patient and increased the workload per member of staff in the ambulatory facilities. Some ambulatory TB staff even pay for professional phone calls or transportation out of their own pocket when resources provided are insufficient to cope with the workload.

DISCUSSION: TOWARD FINANCING MECHANISMS THAT STRENGTHEN AMBULATORY TB CARE

The MoH of Karakalpakstan and MSF have experienced the need to look beyond addressing existing input gaps,¹⁸ and they are attempting to find health financing mechanisms that support the scale-up of ambulatory anti-tuberculosis treatment. In principle, it seems possible to achieve both a reduction in the number of TB hospital beds and a strengthening of ambulatory TB care within the health financing mechanisms inherited from the Semashko model. The past regulatory decisions of the Karakalpakstan MoH to allow ambulatory treatment of patients with drug-susceptible and MDR-TB from the day of diagnosis, and to cut hospital capacity for TB patients, are examples. However, the savings achieved by reducing the number of the beds in in-patient TB care cannot be directly reinvested in ambulatory anti-tuberculosis treatment by the MoH without permission from the MoF, or without changing the financing system for the TB services.

A pragmatic approach to resolve these challenges for TB care in Karakalpakstan might combine the following: first, regulation for rough adjustments through decrees that can take effect without delay.

Second, changes to TB care financing mechanisms that implement incentives to support transferring TB patients to ambulatory care and sustainably finance the growing number of out-patients on treatment. Third, consideration of local capacity and contextual factors to scale up TB care quickly, for example by building on capacity already created within past health reforms, such as the development of primary health care, a previously newly developed ambulatory health sector or case-based hospital financing, as is being piloted in other areas of the Uzbek health sector (Table 2).

CONCLUSION

Medical treatment of TB is part of an inherited hospital-based system in Uzbekistan that evolved at a time when alternative anti-tuberculosis treatment options were not considered viable. Health facilities providing ambulatory anti-tuberculosis treatment are currently funded based on the size of the population and the demographic characteristics in their catchment area. As a result, health facilities are not receiving additional financial resources to treat the growing number of out-patients following the expansion of ambulatory TB care. At the same time, TB hospital financing is primarily based on in-patient bed numbers and bed occupancy rates. These typical post-Semashko health financing mechanisms provide hospitals with a financial incentive for keeping patients in hospital rather than discharging them at the first opportunity, and do not incentivise the scale-up of ambulatory anti-tuberculosis treatment. The current financing mechanisms of the TB services in Uzbekistan's Karakalpakstan region therefore hinder the scale-up of ambulatory-based management of drug-susceptible TB and MDR-TB recommended by the WHO and MSF. The likely consequences are higher costs for the health system, an increased risk of

hospital-acquired TB cross-infection through avoidable hospitalisation, and possibly increased treatment default rates in understaffed ambulatory TB services.^{9,10,19} As efforts to innovate systems and disease response can be mutually reinforcing for the improvement of health outcomes, more discussion about health financing mechanisms that support a sustainable adoption of ambulatory treatment approaches for TB in post-Semashko health care systems is needed to guide public health policy.²⁰

Conflict of interest: SK consulted for Médecins Sans Frontières. No other conflicts declared.

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Table 2 Key messages

<p>TB care needs to be scaled up quickly in Karakalpakstan and other regions with post-Semashko health care systems</p> <p>As long as a health care system does not set incentives to optimise the use of hospital-based TB care, it is likely that the hospitalisation rate of TB patients will be above the level desirable in the presence of a comprehensive ambulatory treatment alternative</p> <p>Over-hospitalisation of TB patients can result in investment delays in ambulatory TB care, as necessary investments cannot be afforded within a system that finances a high number of hospital beds for treatment</p> <p>Population-based financing of ambulatory TB care that is not linked to an increase in the number of TB out-patients works against the scale-up of ambulatory care</p> <p>Ambulatory-based management of TB patients can require adjustments of the health financing mechanisms to support the scale-up of ambulatory TB care</p>
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TB = tuberculosis.

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RESUME

La lutte contre la tuberculose (TB) dans la République du Karakalpakstan, en Ouzbékistan, évolue vers une prise en charge décentralisée des soins en externe pour la majorité des patients par le Gouvernement d'Ouzbékistan en collaboration avec l'organisation humanitaire médicale internationale Médecins Sans Frontières. Depuis 2011, le traitement ambulatoire de la TB pharmacosensible ou résistante est recommandé dès le premier jour de traitement. Le traitement en externe de la TB dès sa mise en route était jusque-là

interdit. Le système ouzbek actuel de financement de la santé, qui a évolué à partir du modèle soviétique Semashko, comporte cependant des incitations contraires à l'adoption du traitement ambulatoire. A partir du programme de « Prise en charge complète des soins de la TB pour tous » mis en œuvre au Karakalpakstan, nous décrivons les politiques existantes en matière d'attribution des fonds de santé qui, à notre avis, compliquent l'expansion d'une stratégie de traitement ambulatoire complet de la TB.

RESUMEN

En la República de Karakalpakstán, en Uzbekistán, el control de la tuberculosis (TB) ha evolucionado hacia un enfoque descentralizado de atención ambulatoria de la mayoría de los pacientes tuberculosos por iniciativa del gobierno de Uzbekistán en colaboración con la organización internacional humanitaria Médicos sin Fronteras. A partir del 2011 se recomienda el tratamiento ambulatorio de los casos de TB farmacosensible o farmacorresistente, desde el primer día del tratamiento. En el pasado, estaba prohibido iniciar el tratamiento de la TB de manera ambulatoria.

Sin embargo, el actual sistema usbeko de financiamiento de la salud, derivado del modelo soviético Semashko, ofrece incentivos que se oponen a la adopción de un tratamiento antituberculoso ambulatorio. En el presente artículo, con base en el programa 'Atención integrada de la tuberculosis para todos' que se aplica en Karakalpakstán, se describen las políticas vigentes de atribución de fondos de salud que aparecen como frenos a la ampliación de escala de una estrategia de tratamiento antituberculoso integral ambulatorio.
