JIDC | THE JOURNAL OF INFECTION IN DEVELOPING COUNTRIES

The Armenian SORT IT Course

Shifting from an inpatient to outpatient centered model through transforming the TB financing in ex-Soviet countries

Karapet Davtyan[1,2], Olga Denisiuk[3], Azamdzhon Mirzoev[4], Hayk Davtyan[1], Seda Aghabekyan[2], Maryna Piskorska[3], Anna Tyshkevych[3], Joshua Jayaraj[2], Armen Hayrapetyan[1], Rony Zachariah[5]

[1] *National Tuberculosis Control Program, Ministry of Health, Yerevan, Armenia*
[2] *Tuberculosis Research and Prevention Center NGO, Yerevan, Armenia*
[3] *Alliance for Public Health, Kiev, Ukraine*
[4] *State Educational Establishment Institute of Postgraduate Education in Health care, Dushanbe, Tajikistan*
[5] *Médecins Sans Frontières, Operational Centre Brussels (LuxOR), Luxembourg city, Luxembourg*

Abstract

Introduction: In former Soviet Union countries, tuberculosis (TB) financing largely relies on a hospital-centered model. The World Health Organization favors transformation to ambulatory treatment since it is cheaper and patient-centered. We explored policy and decision maker's perspectives on: a) enabling factors for transformation in Armenia and b) challenges and ways forward in doing so in Ukraine and Tajikistan.
Methodology: Qualitative study of key informants from government, donors and the national TB program.
Results: 52 informants with a mean service record of 20 years were involved. Key enablers in Armenia included collaborative partnership and political will, carefully selecting an adapted financing scheme that avoided financial penalization of hospitals and health workers, and use of operational research. The operational challenges in Ukraine and Tajikistan hovered around the lack of technical capacity and guidance on "how to implement" alternative financing. Shortcomings in strategic planning, uncertainty/fear that existing hospital funding would be cut and reluctance to change were highlighted. Suggested ways forwards to change the current paradigm included country-level technical assistance, capacity building, regional exchanges and operational research.
Conclusions: the perspectives of "those who decide" on transforming TB financing have been highlighted. Taking these perspectives on-board is vital for achieving the end-TB goals.

Key words: operational research; SORT IT; nosocomial transmission; ambulatory TB treatment; financial reform, qualitative research.

J Infect Dev Ctries 2019; 13(5S):002S-009S. doi:10.3855/jidc.10928

(Received 08 October 2018 – Accepted 05 December 2018)

Introduction

In most countries of the former Soviet Union, tuberculosis (TB) management is provided free of charge under the National TB Program (NTP). The TB management follows WHO guidelines and TB service delivery emphasizes hospitalization. Patients with presumptive TB are screened in specialized TB inpatient hospitals/departments or in TB outpatient departments within primary healthcare facilities. Those diagnosed with TB are admitted to hospital during the initial phase of treatment and then treated on an ambulatory basis during the continuation phase.

The financing mechanisms for inpatient and outpatient TB services are different. The TB hospitals receive money from the government through the NTP based on a bed/day occupancy. Revenue generated through these means cover not only for the cost of drugs and food, but also for remuneration of healthcare providers and other hospital-related expenses. As a result, there is a perverse incentive for hospitals to encourage hospitalization as this is a vital source of revenue [1,2]. On the other hand, financing for outpatient TB services is fixed depending on the catchment population of a given health facility. It is not related to a number of TB cases managed. Thus, unlike TB hospitals, outpatient facilities have no direct financial gain or incentives for providing TB care. As a result, outpatient TB physicians are inclined to simply refer patients to the TB hospitals for diagnosis or treatment whenever it is possible as this reduces their workload on one side and supports their colleagues working in hospitals on the other side.

However, hospitalizations are expensive and eat up available funds. For example, in 2012, the overall cost of one TB outpatient visit was about 3 Euros (€) in Armenia, while the overall cost of one bed/day

admission in Armenia was approximately €20, (≈6.7 times costlier) [1]. In Armenia, over 90% of all TB patients were being admitted to hospitals. Over 80% of all TB funding from the NTP was allocated to inpatient care. As a result, the Armenian NTP ended up financially "hand-cuffed" with little or no flexibility to foster ambulatory treatment approaches. It seemed reasonable, that the solution in Armenia was to go for ambulatory care to make financial savings on hospitalizations. The savings could then be re-allocated into ambulatory care.

The transition in this direction in former countries of the Soviet Union (USSR) has been slow. This is likely linked to inherent fear by hospitals that a significant decrease of hospitalisation might result in financial collapse of TB hospitals [1]. This scenario is similar in other post-Soviet states [2,3]. Furthermore, hospitalization *per se* introduces additional risks associated with increase in the risk of nosocomial transmission of *Mycobacterium tuberculosis* to patients and healthcare workers. This is of serious concern particularly with the advent of Multi-Drug Resistant TB (MDR-TB) [4–7].

Based on cost-effectiveness considerations and the imperative to reduce nosocomial TB transmission, the World Health Organization (WHO) recommends minimizing unnecessary hospitalization of TB cases by fostering ambulatory diagnosis and treatment [8–10]. Moving this recommendation into action requires recourse to alternative TB financing mechanisms that not only favor ambulatory treatment but also rationalize hospitalization.

Armenia is unique among ex-Soviet countries in having made progress in this direction while others, including Ukraine and Tajikistan are struggling [2]. Understanding the enabling factors and challenges experienced in Armenia, Ukraine and Tajikistan would be useful to the region. The choice of the mentioned countries is explained by the research team representation on one hand and possibility of comparing the main transition streams in Armenia to other two post-Soviet states belonging to Eastern Europe and Central Asia on the other hand. A PubMed search revealed no studies in this vein.

From a policy- and decision-maker's perspective, we thus conducted a qualitative study to explore the enabling factors allowing Armenia's move away from a hospital-centered model for TB financing and challenges and the possible ways forward in doing so in Ukraine and Tajikistan.

Methodology

Study design

A qualitative study involving key informant interviews with policy- and decision- makers.

Study setting

Armenia, Ukraine and Tajikistan are countries of the former USSR and have been classified among the 27 high-burden countries for MDR-TB [11].

Armenia has a population of about three million people, Ukraine, 45 million (being Europe's largest country) and Tajikistan, eight million people. The countries have urban and rural areas with variable geographic relief. All three countries are committed to achieving the global TB targets in the WHO European region of reducing TB incidence and mortality [12].

The TB management is in line with WHO guidelines, but the levels of implementation are variable due to political instability, leadership changes, resource and other constraints. All countries face human resource shortages for TB control and shortfalls in MDR-TB drugs. The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) and other donors such as USAID, contribute about 60-85% of funds for TB control activities.

Specific – TB financing mechanisms in Armenia, Ukraine and Tajikistan

The Armenian Ministry of Health in collaboration with partners considered revision of the financing mechanism for TB services in 2013 following discussion on the "pros" and "cons" of different approaches with various stakeholders and donors [2,13]. The changes in the financing mechanisms are summarized in Table 1.

Hospital financing based on "per-bed occupation" was progressively transformed and money saved by avoiding unnecessary hospitalization was to be reinvested into an outpatient-oriented TB program and other activities (Governmental decision number 1515N, December 26, 2013) [13].

New criteria for hospital admission and discharge were introduced in 2014 in accordance with WHO recommendations which restricted hospital admissions [14]. For example, new criteria did not allow hospitalization of presumptive TB patient for diagnosing TB without a real justification for hospitalization. Patients were also required to be discharged from hospital early during the intensive phase of TB treatment based on their clinical status. Thereafter, hospital TB services benefited from a new financing mechanism based on fixed and variable

hospital expenses. Importantly, the fixed hospital costs included the salaries of healthcare providers which no longer depended on the number of hospitalized patients. This reduced the thrust for any perverse incentive for hospitalization.

In a parallel effort, *per capita* financing in outpatient facilities was to be added to performance-based financing that would be linked to indicators of TB detection and treatment success (Table 1). This reorganization intended for financial savings, should have led to improvements in TB provider- and patient-satisfaction, as well as a gradual reallocation of TB doctors from hospitals to outpatient services.

As a result of the new financial system, there were much fewer hospital admissions, duration of hospital stay reduced drastically and considerable cost savings could be re-diverted to other activities. This has been described further in a best practices document by WHO [2]. Reassuringly, TB success rates in Armenia remained similar before and after the reform, hovering close to 80%. Thus, prudent financial management was not at the expense of favorable patient outcomes [15].

In Ukraine and Tajikistan, the hospital-centered model has largely continued. In Ukraine, TB care is financed through a rather rigid methodology based on budget allocations and the number of occupied TB beds. In both countries, TB financing reforms have been delayed and the *status quo* continues.

Study population, sample and period: The study population included policy- and decision-makers including government officials, donors, TB program managers and TB healthcare providers. The inclusion criteria were as follows: work experience in the field of TB and familiarity with TB financial mechanisms. A total of 20 key-informant interviews were planned per country with eventual numbers adjusted on the basis of achieving information saturation. The study was conducted between June and October 2016. About 30-minute interviews were conducted with the study participants using the qualitative survey semi-structured in-depth interview questions presented in Supplementary Table 1.

Data variables, sources and data collection

Medical doctors (two males and one female) trained in qualitative methods were involved with the interviews in each of the three study countries. Prior to interviews, key-informants were sent an information sheet and an appointment request. Interviewees (key-informants) were purposefully selected after consensual discussions between the researchers. To ensure the quality of the data collection a pre-tested interview guide was used to facilitate interviews which were held in national languages (Armenian, Tajik, Ukrainian or Russian) as desired by the interviewee. Information was transcribed in the language of interview and then translated into English. Repeat interviews in English were conducted with one key-informant in Armenia. After consenting, the interviews were audio-recorded where possible and were accompanied with hand-written notes. Interviews were conducted face-to-face and when not possible, by telephone or skype.

In Armenia, interviews focused on enabling factors for transforming the existing TB financial mechanism and suggestions for sustaining progress, while in Ukraine and Tajikistan, they were centered on challenges and possible ways forward.

Analysis and statistics

A thematic content analysis approach was employed and reported in line with COREQ guidelines [16]. Interview notes were read and coded independently by the first three authors and discussed with another investigator for consensus (the last author). Clusters of linked codes were grouped into categories, emergent themes and verbatim quotes. Data coding and analysis were done manually.

Ethics

The study received approvals from the appropriate national authorities of the three countries including

Table 1. Summary of the reform of the financial mechanism (old and reformed) for Tuberculosis (TB) financing mechanism in Armenia.

Departments	Financial components	Old mechanisms	Reformed (New) mechanisms
Inpatient	- Fixed costs (70%): includes staff salaries and other maintenance costs	Bed/day hospitalization	- Fixed funds based on needs
	- Variable costs (30%): includes costs for hospital care, such as food and medications		- Providing variable costs based on the actual expenses
Outpatient	Fixed financial allocations *per capita* based on the catchment of the population served by the primary healthcare facility		- *Per capita* financing - Bonuses based on the performance indicators such as "Number of diagnosed and successfully treated TB patients"

Ethics approval from Institutional Review Board of Ukrainian Institute on Public Health Policy (Submission ID: 2016-026-01). Voluntary verbal informed consent was sought from all interviewees. The oral consent form included a description of the nature of the research, the risks and benefits of being included in the research, and that the participation was voluntary.

Results

Characteristics of interviewees

The key-informants interviewed included 52 individuals from various backgrounds with an average service record of 20 years (range 5-40). Twenty informants were interviewed in Armenia, 20 in Tajikistan and 12 informants were interviewed in Ukraine, since saturation was reached earlier in Ukraine. The profiles of the key-informants were as follows: 27 were from the Government institutions, eight were from International technical agencies and two were from donor organizations. Twelve were public health medical and monitoring specialists and three were financial officers working in hospital settings.

Enabling factors allowing progress in implementing a new TB financing mechanism in Armenia

The enabling factors for transforming the current mechanism of TB financing as expressed by policy- and decision-makers in Armenia are summarized in Table 2. Enabling factors were categorized as political, financial and operational research-related. Political willingness with sense of empowerment, feeling of responsibilities among decision-makers and flexibility, carefully selecting an adapted and acceptable financing scheme that did not penalize health workers as well as the introduction of strict criteria for hospital admission and discharge were highlighted as important enablers. Allowing hospital savings (obtained by avoiding unnecessary hospital admissions) to be re-allocated to other useful activities such as improvements in salaries and infrastructure and the usefulness of operational research as a tool for advocacy were also enabling factors.

Despite the progress made so far, interviewees expressed the need to continue progress and ensure sustainability of the current impetus. Areas needing attention included the need to implement performance based incentives for peripheral outpatient clinics (still in premature stages), the need for developing capacity building and guidance documents for further improvements in TB financing, support by health economists and/or financial specialists, introduction of electronic data systems to improve TB monitoring and the need for continued operational research and regional exchanges based on lessons learnt.

Challenges and ways forward for implementing a new TB financing mechanism in Ukraine and Tajikistan

The challenges in moving away from a hospital-centered model for TB financing are summarized in

Table 2. Enabling factors expressed by policy and decision makers for transformation of a hospital-centered model for tuberculosis financing in Armenia (2016).

Category	Enablers	Quote
Political	- Willingness, flexibility and entrepreneurship at the national Tuberculosis (TB) Control program.	*We were flexible, took decisions and justified them.*
	- Baseline situation analysis guided and what needed to change.	*Situation analysis allowed better understanding of the field realities.*
	- Discussions on the "pros" and "cons" of various funding schemes with stake holders facilitated decision-making.	*A working group was created and optimizing technical support to ministry of health.*
	- Implementation of strict criteria for hospital admissions and discharge based on WHO guidelines.	*We avoided unnecessary hospital admissions.*
Financial	- Hospital revenue was replaced with a fixed financing mechanism which covered salaries of hospital workers and allayed their fears.	*We did not have to worry about our future livelihoods anymore.*
	- Hospital savings were re-invested in other activities e.g. improving infrastructure and staff salaries.	*We used our savings to refurbish a training center and improve salaries of health workers.*
	- Reduced hospital activity allowed re-deployment of TB staff to peripheral facilities to support ambulatory TB treatment.	*Up to 10 TB health workers have been reallocated from hospitals to out-patient services.*
	- An integrated financial model which embraced both hospitals and peripheral facilities avoided competition between outpatient and inpatient services.	Not available
Operational research	- Publications from before, during and after implementation show-cased the positive impact of change on the health system.	*Showing data on success reassured sceptics and boosted advocacy*

Table 3. These included shortcomings in strategic planning at national level, uncertainty and fear that existing hospital financing would be cut thereby affecting the livelihood of health workers, finance and budget related constraints, lack of technical capacity in implementation issues and unfavorable attitudes of decision makers and health workers towards change.

Suggestions for making progress towards financial reform included the need for enhancing political will, bringing in experienced health economists to guide country level planning on "how to implement", enhancing the role of WHO in the process, embracing performance based remuneration, fostering regional exchanges of lessons learnt as well as operational research (Table 4).

Discussion

This is the first multi-national study from selected countries of the former USSR assessing the "why" behind enabling factors and challenges for transforming the financing mechanism for TB services. It shows that Armenia made considerable progress, while Ukraine and Tajikistan call for support to tackle the operational challenges related to implementation. In Armenia, key enablers were collaborative partnership and political will, avoiding financial penalization of hospitals and health care workers and enhancing a sense of empowerment and responsibility among decision-makers. Being able to demonstrate positive impact through operational research boosted credibility and advocacy in Armenia [1,2,13,17].

The study findings call for increased country-level technical support from WHO and other technical agencies. In particular, there is need to support strategic planning and the development of clear guidelines on "how to" transform existing financing mechanisms with the help of health economists and financial specialists. The challenge of reforming TB financial mechanisms in other countries in the region is also highly relevant. Different countries use different financing mechanisms

Table 3. Challenges expressed by policy and decision makers in changing the existing model for tuberculosis financing in Ukraine and Tajikistan (2016).

Category		Challenges	Quote
Strategic planning	-	National Tuberculosis (TB) documents are not inclusive of financial strategies.	Not available (NA)
	-	There are no guidance documents on "how to implement" change.	*We need step-by-step guidance on how to implement.*
	-	No capacity building/training of policy and decision makers on TB management and alternative financing mechanisms.	NA
	-	Competent health care economists and/or financial specialists are not available.	*We need financial specialists to show us the way.*
	-	Weak use of collaborative partnerships to catalyze positive change.	NA
	-	Regional authorities are unaware, do not feel mandated, or lack political will.	NA
	-	Frequent turn-over of government official's compromises "action".	*There is disruption of ongoing efforts.*
Uncertainty	-	Fear that there will be no alternative sources of financing for hospitals.	*Funds for the TB hospital may be cut.*
	-	Health workers fear of loss of jobs and reduction in salaries.	NA
	-	TB budgets are already in short fall and the situation may worsen.	NA
Financial considerations	-	Lack of capacity to estimate costs for ambulatory treatment.	*We lack knowledge integrating social support costs into government financing.*
	-	There is no central procurement and supply system for consumables implying local purchase and variable expenditure between regions.	NA
	-	Insufficient knowledge on how to cover social support costs (food, outreach activity) under ambulatory care.	NA
	-	Rigidity/Resistance in changing existing budgeting structure.	NA
Attitude/ motivation	-	Primary care doctors do not get any incentives compared to TB doctors and thus care less.	*Doctors from the 'old school' are conservative, and stick to their traditional practices.*
	-	Low salaries and frequent human resource turnover causes demotivation.	NA
	-	Apathy in changing the current modus-operandi as most TB funding anyway comes from external donors.	NA
	-	Lack of advocacy and "mobilization for change" by health facility workers.	NA
	-	Corruption at various levels.	NA

Table 4. Suggestions made by policy and decision makers for making progress in changing the existing model for tuberculosis financing in Ukraine and Tajikistan (2016).

✓ Political will and advocacy are needed to implement alternative financing mechanisms for Tuberculosis (TB). There should be greater political willingness to prioritize ambulatory treatment in interest of patients.
✓ Health workers in outpatient services should be given performance based salaries. For example, this could be based on TB detection rates and minimizing proportions of adverse outcomes, particularly Lost-to-Follow-up.
✓ Bring in experienced experts including health economists to show "how to implement" alternative and effective TB financing mechanisms.
✓ Capacity building and trainings among decision makers and opinion leaders in the TB field are needed for implementing alternative financing mechanisms that favor ambulatory treatment.
✓ The TB program should embrace WHO recommendations to avoid unnecessary hospitalization of TB patients.
✓ Reduce reliance on international donors and increase government funding.
✓ Enhance regional exchange between countries of lessons learnt, successes and challenges
✓ Operational research should be done while implementing new financial mechanisms.

depending on the economic situation and political and social considerations. For example, TB management in high-income countries is largely dependent on government budgets and/or funded through health insurance schemes [18]. Making strides in this direction would be vital for enhancing TB control in line with the recently released end TB strategy [19,20].

The study strengths were the following: involvement of three countries and focus on perspectives of a range of decision and policy makers, being conducted in accordance with COREQ guidelines [16] and the subject matter was an identified operational research priority at national and international levels. The findings may thus contribute to influencing policy and practice. This study did not consider the perceptions of TB patients or providers as first concerned population for the changes. On the other hand, the study did not seek perspectives of TB patients or providers from other post-Soviet Republics with similar TB financial services in the region. This aspect merits further research.

There are a number of policy and practice implications. First, the identified challenges in Ukraine and Tajikistan focused largely around gaps in strategic planning, uncertainty or fear of changing the existing system and perhaps understandably, reluctance by decision-makers at various levels to induce change. An over-arching problem was thus "lack of capacity" in working out an alternative financial mechanism for TB services that is adapted and acceptable. The fact that national strategic documents are void of this aspect (financing) on even basic practical aspects such "how to calculate needs for ambulatory treatment or social support costs" reveals what needs to be done. As one interviewee put it *"we need step-by-step guidance on how to implement"*. Integrating alternative financing mechanisms as part of strategic planning and linking this to time-bound milestones and targets seems necessary. Doing so will also limit disruptions related to frequent turnover of government officials which was highlighted as a perceived challenge. Of recent Ukraine has articulated "what must change" in terms of current management approaches [21–23].

Second, although Armenia has made considerable progress in the right direction, largely supported by collaborative partnerships, interviewees expressed concern on sustaining gains made so far. Examples of areas needing further attention include the need for clear national guiding documents and developing efficient ways to introduce performance based salaries for ambulatory care.

Third, health-worker attitudes and motivation were highlighted as challenges for inducing change. Understandably where there is no "road map" for the way ahead, even the most optimistic may lose enthusiasm. Ensuring that any alternative financial mechanism does not penalize health workers nor bite into hospital revenues would be primordial. The experience from Armenia where hospitals made savings by avoiding unnecessary hospitalizations which were then re-allocated to training and improving staff salaries is laudable. It shows that a sense of empowerment and responsibility can be fostered if an acceptable approach is put in place.

Finally, the suggestions made by various decision-makers notably the need for country-level technical assistance, capacity building, regional exchanges and operational research all merit urgent attention.

Conclusion

In conclusion, in three countries of the former Soviet Union, we have highlighted important enablers, challenges and ways forward from the perspective of "those who decide". The study results can contribute to the development and implementation of new cost-effective health policies. The saved money could be reinvested into an outpatient TB care which will lead to improved overall healthcare system and management,

especially in low- and middle-income countries. Taking these on board would be vital for enhancing TB control efforts and achieving the end-TB goals. Importantly, this study highlights considerable gaps that currently exist between WHO recommendations to embrace ambulatory treatment approaches and the challenging reality in applying these recommendations in some settings. The enabling factors as well as the challenges identified in the study could be considered by Ukraine, Tajikistan and other post-Soviet states for ensuring further transition of moving away from a TB hospital-centered model to an ambulatory patient-centered model.

Acknowledgements

This research was conducted with support of Joint TDR/EURO Small Grants Scheme for implementation research in infectious diseases. The Small Grants Program is a joint initiative of TDR and WHO Regional Offices under the current TDR Strategy. The TDR is hosted at the WHO and is sponsored by the United Nations Children's Fund, the United Nations Development Program, the World Bank and WHO. The TDR also supports translating research results into policy and improved health practices. We are grateful for the support of WHO/TDR.

The principal investigators of this study were former Structured Operational Research and Training Initiative (SORT IT) alumni. We are thus grateful to the SORT IT program of WHO/TDR for having built our basic capacity to conduct and publish operational research in low- and middle-income countries. We are also grateful to all who participated in the interviews from Armenia, Ukraine and Tajikistan without whom this work would not have been a reality.

Authors' Contributions

Study concept and design: Karapet Davtyan; acquisition of data: Karapet Davtyan, Olga Denisiuk, Azamdzhon Mirzoev; analysis and interpretation of data: All authors.

Funding

The collaborative research was funded by the Joint TDR/EURO Small Grants Scheme for implementation research in infectious diseases.

References

1. Gillini L, Davtyan K, Davtyan H, Hayrapetyan A, Khachatryan S, Centis R, D'Ambrosio L, Dara M, Migliori GB, Sotgiu G (2013) TB financing in East Europe promotes unnecessary hospital admissions: The case of Armenia. J Infect Dev Ctries 7: 289-292. 10.3855/jidc.3396.
2. World Health Organization (WHO) (2016) Good practices in strengthening health systems for the prevention and care of tuberculosis and drug-resistant tuberculosis. Armenia Reforms in financing mechanisms to strengthen inpatient and outpatient TB services 2015, viii + 24-25 pages (ISBN 978 92 890 5129 3).
3. Migliori GB, Sotgiu G, D'Ambrosio L, Centis R, Lange C, Bothamley G, Cirillo DM, De Lorenzo S, Guenther G, Kliiman K, Muetterlein R, Spinu V, Villar M, Zellweger JP, Sandgren A, Huitric E, Manissero D (2012) TB and MDR/XDR-TB in European Union and European Economic Area countries: managed or mismanaged? Eur Respir J 39: 619-625.
4. Escombe AR, Huaroto L, Ticona E, Burgos M, Sanchez I, Carrasco L, Farfán E, Flores F, Moore D (2010) Tuberculosis transmission risk and infection control in a hospital emergency department in Lima, Peru. Int J Tuberc Lung Dis 14: 1120-1126.
5. Harries AD, Zachariah R, Tayler-Smith K, Schouten EJ, Chimbwandira F, Van Damme W, El-Sadr WM (2010) Keeping health facilities safe: one way of strengthening the interaction between disease-specific programmes and health systems. Trop Med Int Heal 15: 1407-1412.
6. Klimuk D, Hurevich H, Harries AD, Babrukevich A, Kremer K, Van den Bergh R, Acosta CD, Astrauko A, Skrahina A (2014) Tuberculosis in health care workers in Belarus. Public Health Action 4 Suppl 2: 29-33.
7. Mirzoev A, Lucenko I, Pirov K, Dustmatova Z, Akhmedov A, Nabirova D, Suleimenov S, Acosta C, Zachariah R (2016) A countrywide assessment of tuberculosis among health-care workers in tuberculosis health-care facilities in Tajikisthan, 2009-2014. Public Health Panorama 2: 75-79.
8. Migliori GB, Sotgiu G, Rosales-Klintz S, Centis R, D'ambrosio L, Abubakar I, Bothamley G, Caminero JA, Cirillo DM, Dara M, De Vries G, Aliberti S, Dinh-Xuan AT, Duarte R, Midulla F, Solovic I, Subotic DR, Amicosante M, Correia AM, Cirule A, Gualano G, Kunst H, Palmieri F, Riekstina V, Tiberi S, Verduin R, Van Der Werf MJ (2018) ERS/ECDC Statement: European Union standards for tuberculosis care, 2017 update. Eur Respir J 51: pii: 1702678.
9. Migliori GB, Zellweger JP, Abubakar I, Ibraim E, Caminero JA, De Vries G, D'Ambrosio L, Centis R, Sotgiu G, Menegale O, Kliiman K, Aksamit T, Cirillo DM, Danilovits M, Dara M, Dheda K, Dinh-Xuan AT, Kluge H, Lange C, Leimane V, Loddenkemper R, Nicod LP, Raviglione MC, Spanevello A, Thomsen VØ, Villar M, Wanlin M, Wedzicha JA, Zumla A, Blasi F, Huitric E, Sandgren A, Manissero D (2012) European union standards for tuberculosis care. Eur Respir J 39: 807-819.
10. Dara M, Dadu A, Lussigny S, Van Den Bergh B, Rossetti AG, Schreuder B, Yedilbayev A, Hillemann D, Kremer K, Turusbekova N, Zagorski A (2011) Extensive review of TB prevention, care and control services in Armenia. World Health Organization Regional Office for Europe: Mission Report 94 p.
11. World Health Organisation (WHO) (2016) Global tuberculosis report. WHO Library (ISBN 978 92 4 156539 4).
12. World Health Organisation (WHO) (2016) Roadmap to implement the tuberculosis action plan for the WHO European

Region 2016-2020. WHO Library (ISBN 978 92 890 5169 9). Available: http://www.euro.who.int/en/publications/abstracts/roadmap-to-implement-the-tuberculosis-action-plan-for-the-who-european-region-20162020.-towards-ending-tuberculosis-and-multidrug-resistant-tuberculosis-2016 Accessed: 13 Juanuary 2019.

13. Davtyan K, Hayrapetyan A, Dara M, Gillini L, Davtyan H, Centis R, D'Ambrosio L, Sotgiu G, Migliori GB (2015) Key role of tuberculosis services funding mechanisms in tuberculosis control and elimination. Eur Respir J 45: 289-291.
14. World Health Organization (WHO) (2010) Guidelines for treatment of tuberculosis, 4th edition. WHO Library (ISBN: 978-92-4-154783-3).
15. .National Tuberculosis Control Center (NTCC) (2015) Annual reports of the National Tuberculosis Control program of Armenia. Ministry of Health of Armenia.
16. Tong A, Sainsbury P, Craig J (2007) Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. Int J Qual Heal Care 19: 349-357.
17. Davtyan K, Zachariah R, Davtyan H, Ramsay A, Denisiuk O, Manzi M, Khogali M, Van den Bergh R, Hayrapetyan A, Dara M (2014) Performance of decentralised facilities in tuberculosis case notification and treatment success in Armenia. Public Health Action 4 Suppl 2: 13-16.
18. Collins D, Hafidz F, Rostina J (2013) International Workshop on Sustainable Financing for TB Programs, including experiences from HIV/AIDS and Malaria Programs. TB CARE I Indonesia. Management Sciences for Health. 44 p.
19. Suthar AB, Zachariah R, Harries AD (2016) Ending tuberculosis by 2030: can we do it? Int J Tuberc Lung Dis 20: 1148-1154.
20. World Health Organization (2015) The End TB Strategy. Available: http://www.who.int/tb/post2015_strategy/en/. Accessed: 02 December 2018.
21. Evidence-Informed Policy Network (2015) Poor treatment success rate amongst drug resistant drug resistant tuberculosis patinets in Ukraine: What must change? Available: http://www.ifp.kiev.ua/doc/staff/SORT.pdf. Accessed: 02 December 2018.
22. Lytvynenko N, Cherenko S, Feschenko Y, Pogrebna M, Senko Y, Barbova A, Manzi M, Denisiuk O, Ramsay A, Zachariah R (2014) Management of multi- and extensively drug-resistant tuberculosis in Ukraine: How well are we doing? Public Health Action. 4 Suppl 2: S67-S72.
23. World Health Organization (2015) Tuberculosis country work summary: Ukraine. Available: http://www.euro.who.int/__data/assets/pdf_file/0007/274633/Tuberculosis-country-work-summary-Ukraine-en.pdf?ua=1. Accessed: 02 December 2018.

Corresponding author

Karapet Davtyan, MD, MPH, MBA
Tuberculosis Research and Prevention Center NGO,
Adonts str. 6/2, 115
0021Yerevan, Armenia
Tel: 374 -77077793
Email: davkaro@gmail.com

Conflict of interests: No conflict of interests is declared.

Annex: Supplementary Items

Supplementary Table 1. Qualitative survey semi-structured in-depth interview questions.

General questions to describe the study population:
1. Position:
2. Year of experience:
3. Profession:
4. Country:
5. TB field related experience:
In-depth interview questions:
1. Do you have any familiarity with World Health Organization recommendation regarding to the TB financial mechanisms?
2. How do the current Tuberculosis (TB) Financing mechanisms affect the National TB control program (NTP)?
3. Which type of Financing Mechanisms is more preferable for improvement of the NTP?
4. How do the current Tuberculosis Financing mechanisms affect the TB patients' satisfaction and treatment?
5. How do the current Tuberculosis Financing mechanisms contribute to the "patient centered" treatment?
6. What is your opinion about current Tuberculosis Financing mechanisms?
7. What are your suggestions for further improvement of Tuberculosis Financing mechanisms?
8. What are/were the factors preventing the reforms for the current Tuberculosis Financing mechanisms?
9. What could be done to improve the current Tuberculosis Financing mechanisms?
10. Are there enough capacity/knowledge/experts that can make financial reforms?
11. Is there enough willingness to make financial reforms?
12. Is there corruption that prevents the financial reforms?
13. If the government working on making financial reforms?