Analytical report
Factors that impact the expansion of coverage for preventive treatment of TB in Kyrgyzstan

Bishkek, 2025

The report was prepared by Dinara Madybaeva, prime researcher of the Public Foundation “Den Sooluk Nuru”, with the involvement of Lena Zhirnova, responsible for conducting and analyzing the results of in-depth interviews and coordinator of the field part of data collection.

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Abstract

Introduction

According to the World Health Organization, millions of people worldwide continue to suffer from TB, highlighting the need for effective prevention strategies (WHO report, 2022). TB preventive treatment, including chemoprophylaxis for people at risk of TB, is a key component of the fight against the spread of this disease (CDC, 2021). In Kyrgyzstan, in 2019–2022, the average number of contacts of patients with bacteriologically confirmed pulmonary TB and screened for TB was 3.2–3.5 people per index case, of which children account for 35–37%.

Methodology

The aim of the study is to analyze the factors influencing the increase in the coverage of preventive treatment of PTT in Kyrgyzstan. The survey was conducted in all regions, including Bishkek and Osh . The study design is cross-sectional, quantitative and qualitative data collection methods were used, respondents were sampled by a simple random method. The analysis used the method of descriptive statistics and correlation analysis. We calculated Pearson's chi-square and 95% confidence intervals as measures of association. Binary logistic regression analysis was used to analyze the influence of factors. The statistical database SPSS (version 22.0) was used.

Results

A total of 289 respondents were covered with parents of contact children subject to chemoprophylaxis. Factors such as migration status (OR = 3.8; CI = 1.5–9.5), religiosity (OR = 3.0; CI = 1.5–6.0), patriarchal family foundations (OR = 3.2; CI = 1.7–6.0) and incomplete information (OR = 4.3; CI = 1.6–11.9) turned out to be statistically significant factors influencing the coverage of PTT and increasing the likelihood of refusal or interruption of chemoprophylaxis. The level of parental education (OR = 0.7; CI = 0.6–0.9), awareness of PTT (OR = 0.5; CI = 0.3–0.9), and the availability of public transport (OR = 0.5; CI = 0.3–0.9) reduce the likelihood of refusal and interruption of PTT. The current diagnostic algorithm, as well as the process of taking tests and undergoing medical examinations, remain complex for contact children, which may contribute to delays in identifying active TB, refusals from further examination and timely initiation of chemoprophylaxis. There is a need to automate and digitalize accounting processes.

Conclusion

The barriers to preventive treatment of tuberculosis are multifactorial and require a comprehensive approach to overcome them. To successfully combat tuberculosis, it is necessary to eliminate these barriers by facilitating the mechanisms screening, strengthening public awareness programmes, providing psychological support to people affected by TB and their families, increasing funding and more effective management of prevention programmes.

1 Introduction

Tuberculosis (TB) remains one of the most pressing global health problems, despite advances in its diagnosis and treatment. According to the World Health Organization, millions of people worldwide continue to suffer from this infectious disease, highlighting the need for effective

prevention strategies [1]. Preventive treatment for TB, including chemoprophylaxis for people at risk of TB, is a key component of the fight against the spread of this disease [2].

Until now, priority in preventive treatment in the country has been given to children in contact, a 6-month regimen with isoniazid was used, while current WHO recommendations include new short PTT regimens. In 2019-2022, the average number of people who had contact with patients with bacteriologically confirmed pulmonary tuberculosis and were screened for tuberculosis was 3.2-3.5 people per index case, of which children account for 35-37%. According to statistics, the average number of household members in Kyrgyzstan is 4.2 people.[3]

However, despite the availability of effective prevention methods, the implementation of these strategies often faces many barriers. These include both clinical and social factors: from a lack of awareness among the population and health workers about the need for preventive treatment to problems with access to health services and insufficient funding for programs.

In this study, we will review and analyze the main behavioral barriers that hinder its implementation and effectiveness in the Kyrgyz Republic. Understanding these barriers and developing ways to overcome them are necessary steps to achieve the goals of TB control and elimination at the global level.

To date, no previous studies on the challenges of TB preventive treatment in Kyrgyzstan have been published. Such data are useful for two reasons: (i) to identify gaps in existing approaches to TB preventive treatment; (ii) to develop recommendations for changing the identified behavioral barriers to create a favorable environment conducive to scaling up TB preventive treatment among people affected by TB and their contacts.

2 Methodology

2.1 Goals, assessment tasks

The aim of the study is to analyze the factors and barriers (social, economic, psychological and cultural) influencing the increase in the coverage of preventive treatment of STIs in Kyrgyzstan.

Objectives

1. To assess the level of knowledge about tuberculosis and preventive treatment among parents of exposed children subject to PTT.
2. Conduct an analysis of factors influencing treatment acceptance or refusal, including identification of cultural and social norms, people affected by TB and their contacts.
3. To identify the needs and requirements of people affected by TB in relation to improving the support system and educational programmes in the field of TB.
4. Develop recommendations for changing the identified behavioral barriers to create a favorable environment conducive to the expansion of PTT people affected by TB and their contacts.

Research question: What factors influence the expansion of coverage of preventive treatment for

[1]World Health Organization (2022). Global TB situation report

[2]Centers for Disease Control and Prevention (CDC) (2021). TB Prevention and Control in Europe

[3]Guide to diagnostics and prophylactic treatment tuberculous infections, 2023

tuberculosis infection among children in contact with people affected by TB in the Kyrgyz Republic?

Research design.

Cross-sectional study. The study design was chosen based on the goals and objectives of the study.

Timeframe: September -December 2024 (4 months)

Geography – all regions of Kyrgyzstan, Bishkek, Osh

2.2 Sample, selection criteria

The sampling methodology for this study is determined considering resources and time frame.

The survey was conducted using a random sampling method, which ensures that the sample is representative of the total population of subjects being studied.

The sampling frame was a list of contacts eligible for preventive treatment, access to which was provided by tuberculosis coordinators in various regions of the country, as well as in the cities of Bishkek and Osh. This list represents a set of people who have medical indications for tuberculosis prevention, which allows for the selection of respondents relevant to the problem under consideration and guarantees a certain target orientation of the study.

A random selection of 289 respondents was made from the specified list. The random selection process was carried out using standard statistical random selection methods, which eliminates subjective and systematic errors in determining the composition of the sample. The sample consists of respondents representing both large cities and various regions, which makes the results more universal and applicable to the general population of the subjects.

Thus, the sampling methodology in this study guarantees a high degree of objectivity and representativeness, which increases the reliability of the results obtained and their applicability for the formation of recommendations for the prevention of tuberculosis.

It should be noted that the sample size and distribution by regions were calculated by the National Center for Phthisiology (hereinafter NCP) based on the epidemiological situation and statistical data, and are set out in the technical specifications.

A total of 278 respondents is the minimum size of the adjusted sample to ensure representativeness of the research results.

Below is Morgan's table for calculating sample size for quantitative research:

Table 2-1The main elements of the Morgan table, describing the sample size depending on the number of objects in the general population:*

General population (N)	Sample size (n)
100	80
500	217
1000	278
5000	357
10	370
100	384
1,000,000	384

These data are based on 95% confidence level and 5% margin of error.

*The Morgan table is used to determine the minimum sample size needed based on the size of the population. It helps researchers

determine how many people or objects need to be interviewed or studied to obtain statistically significant results.

2.3 Formation of a sample.

From the general list of patients subject to preventive treatment for TB over the past 9 months (January – September 2024), 289 respondents were selected by generating random numbers.

We preliminarily received lists of contacts subject to preventive treatment, including a cohort of children: (1) receiving chemoprophylaxis, (2) completing preventive treatment, (3) interrupting, (4) refusing treatment, as well as (5) a category of children who were not prescribed PTT in the period from January to September 2024 (3 quarters of 2024) without indicating the names and personal data from regional coordinators or heads of the program management department. To ensure an equal proportion of people who started treatment and refused prophylaxis, it was planned to form 2 lists of a group of people and randomly select the required number of respondents in each group. It should be noted that in practice it was found that the number of those who refused treatment is a small percentage of the total number of people subject to PTT. This fact was confirmed during a survey of respondents in in-depth interviews, regional TB coordinators and heads of program management departments. In the current situation, it was decided to survey all those who refused and interrupted chemoprophylaxis without sampling, then in an Excel document, by generalizing random numbers, a list of respondents receiving and completing PTT was formed, according to distribution by region.

During the survey, the number of refusals to participate was taken into account and an additional list of respondents not included in the first sample was formed.

2.3.1 Inclusion criteria:

- parents or guardians of children who are taking and have completed the PTT at the time of the survey*,
- parents or guardians of children subject to PTT, but who refused treatment or interrupted PTT*,
- TB doctors from city and regional TB center (for in-depth interviews),
- respondents over 18 years of age (parents* of contact children subject to preventive treatment).

*if the parents are in labor migration, the children live with relatives - guardians, the survey is conducted among the relative whose contacts are available to the attending physician.

2.3.2 Exclusion criteria for the study:

- people living with HIV* (PLHIV are a key risk group for TB, are subject to preventive treatment for TB infection and are a separate target group of respondents),
- people affected by TB receiving treatment with 1st and 2nd line anti-TB drugs* (excluded as a separate target group for the study),
- parents of contact children subject to PTT who have not reached the age of 18 (persons who have not reached the age of 18 are considered minors and are excluded for ethical reasons),

- parents of contact children subject to PTT who have mental limitations that prevent participation in the study (being intoxicated by psychoactive substances, inability to perceive instructions during participation in the study and adequately respond to them).

*if the parents or guardians of the contact children subject to PTT belonged to this category of persons, they were included in the study.

It should be emphasized that, according to the technical specifications, people living with HIV (PLHIV) are excluded from the study due to time constraints of the study, which do not allow us to expand the sample and include an additional target group of people subject to preventive treatment, in addition to contact children and adolescents.

2.4 Data collection:

To conduct the survey, a structured questionnaire was developed, which was presented in two languages: the state (Kyrgyz) and the official (Russian). The survey was conducted by trained and qualified interviewers who speak both Kyrgyz and Russian. In order to minimize the risks associated with technical failures during the survey, it was decided not to use online platforms for data collection that depend on a permanent Internet connection. All respondents' answers were entered manually into a pre-prepared form developed in Microsoft Excel, which ensured the reliability and stability of the data collection process in the event of possible interruptions in Internet access.

In-depth interviews with staff aimed at obtaining detailed information on current practices and challenges in the field of preventive care. In-depth interviews were conducted with 9 respondents representing medical institutions at the level of regional, district and city FMCs. Respondents were selected based on their professional role and experience in the field of preventive care. The interviews were conducted using a semi-structured guide.

2.5 Data collection procedure:

Quantitative and qualitative methods were used to collect data. For the quantitative method, a face-to-face survey of parents of children who met the inclusion criteria was used, a total of 289 respondents; for the qualitative method, in-depth interviews with phthisiologists of regional FMCs were conducted, a total of 9 key informants.

- Face-to-face survey - parents of contact children who are subject to preventive treatment for SBI. After obtaining informed consent to participate in the study, information was collected from all respondents using a specially developed structured questionnaire.
- In-depth interviews with key informants – TB doctors of primary health care (FMC) and the Bishkek city anti-tuberculosis center, as well as regional coordinators and heads of program management departments. After receiving informed consent, the interviewer conducted the interview using a developed semi-structured questionnaire (guide attached).

To recruit respondents, employees of primary health care (FMC) and/or TB control centers were involved, given that recruiting respondents is a very delicate issue, since in the case of the initial contact of the interviewer directly with the respondent, questions about the confidentiality of information may arise.

The main data collection tool is a structured questionnaire (questionnaire), a semi-structured

questionnaire (guide) for in-depth interviews was also used. Before the start of the study, the questionnaire for patients was tested on 6 patients in Bishkek.
The questionnaire includes a socio-demographic section, a section on awareness of tuberculosis and preventive treatment, a section on socio-cultural norms of behavior, including religious beliefs, questions about the availability of services, quality of service, as well as attitudes toward health and trust in the healthcare system.
In-depth interviews examined issues related to the organization of PTT activity at the local level, whether medical staff (phthisiatricians) in district FMCs are familiar with the material (guidelines and protocols), what difficulties they encounter, what is of greatest interest to patients and vice versa, what solutions for improvement they propose, etc.).

2.5.1 Analysis

The statistical analysis program SPSS (version 22.0) was used to process and analyze the quantitative data. Standard methods of descriptive statistics were used to analyze the data – frequency distribution analysis and contingency tables. The method of correlation analysis was also used – analysis of relationships between variables and comparison of differences between groups. Correlation was used to determine the relationships between socio-demographic factors (age, education, marital status, cultural norms of the family, etc.), the level of knowledge about tuberculosis and attitudes towards health, risky behavior and the practice of timely examination and early diagnosis. We calculated Pearson's chi-square and 95% confidence intervals as measures of connectivity. The value $p < 0.05$ is considered statistically significant. Binary logistic regression analysis was used to analyze the impact of factors.
The analysis of qualitative data was carried out according to the principle of content analysis - thematic coding.

2.5.2 Confidentiality and Ethical Standards

Permission to conduct the study was obtained and approved by the Ethics Committee of the Editorial Board of the Scientific and Practical Journal “Healthcare of Kyrgyzstan”.
Informed consent to participate in the study was obtained individually from each respondent before the start of the interview (written and verbal).
Participants were informed about the purposes of data collection, what was expected of each participant, the expected benefits and risks for the participant, and that the participant could withdraw from participation at any stage of the assessment. The questionnaire did not mention personal data that could identify respondents.
Respondents are from remote and hard-to-reach villages; the survey was conducted by telephone.
Participants' confidentiality was protected throughout the study, during data analysis, and during data dissemination.
No personal data was used, aggregated data was used in the analysis and report. Only members of the research team have access to the answers to questions and audio recordings made during the interviews.

3 Results

3.1 Survey of parents of contact children subject to PTT.

3.1.1 Socio-demographic characteristics of respondents.

A total of 289 respondents were interviewed, including Bishkek 13.8% (40/289), Osh and Osh region 13.8% (40/289), Chui region 38.4% (111/289), Jalal-Abad region 15.9% (46/289), Batken region 8.7% (25/289), Naryn region 5.2% (15/289), Issyk-Kul region 2.4% (7/289), Talas region 1.7% (5/289).

Table 3-1Final sample, cohort of contact children subject to PTT - January-September 2024, n -289

Region	Receives (%)	Completed (%)	Refusal (%)	Interrupted (%)	Not appointed (%)	Total (%)
Bishkek	38 (21.3)	0	0	2 (18.2)	0	40 (13.8)
Osh	12 (6.7)	0	0	0	0	12 (4.2)
Batken region	2 (1,1)	9 (15.5)	1 (7.1)	0	13 (46.4)	25 (8.7)
Jalal-Abad region	22 (12.4)	10 (17.2)	3 (21.4)	6 (54.5)	5 (17.9)	46 (15.9)
Naryn region	1 (0.6)	5 (8.6)	1 (7.1)	0	8 (28.6)	15 (5.2)
Osh region	28 (15.7)	0	0	0	0	28 (9.7)
Talas region	2 (1,1)	0	1 (7.1)	0	2 (7.1)	5 (1.7)
Chui region	69 (38.8)	31 (53.4)	8 (57.1)	3 (27.3)	0	111 (38.4)
Issyk-Kul region	4 (2.2)	3 (5.2)	0	0	0	7 (2.4)
Total	**178** (61.6)	**58** (20.1)	**14** (4.8)	**11** (3.8)	**28** (9.7)	**289** (100)

To analyze the data and identify the relationship between characteristics and coverage of preventive treatment, all respondents were divided into 2 independent groups: 1) covered by PTT, n-236/289 (81.6%) and 2) not covered by PTT, n-53/289 (18.4%).

The table below provides a detailed description of the socio-demographic parameters of the respondents.

Table 3-2Socio-demographic data of respondents (gender-age), n - 289

Variables	*n -236 (covered by PTT*)*	*(%)*	*n -53 (not covered by PTT**)*	*(%)*	*χ2*	*p- value*
Age						
0-1 year	9	3.8%	6	11.3%	8.3	0.59
2-3 years	42	17.8%	10	18.9%		
4-5 years	41	17.4%	10	18.9%		
6-10	68	28.8%	12	22.6%		
11-14	62	26.3%	12	22.6%		
15 and older	14	5.9%	3	5.7%		
Floor						
Male	124	52.5%	26	49.1%	0.69	0.73

Female	112	47.5%	27	51.9%		
Child's employment						
home care	68	28.8%	21	39.6%	0.39	0.45
kindergarten	23	9.7%	6	11.3%		
school	145	61.4%	26	49.1%		
BCG						
not vaccinated	3	1.3%	0		0.56	0.99
got vaccinated	229	97.0%	53	100%		
I'm having trouble	4	1.7%	0			

*we included all respondents who had completed PTT or were receiving it at the time of the survey,
**not covered by PTT include all respondents who refused treatment, interrupted it or were under observation by joint decision of parents and doctor.

Age and gender composition:

As shown in the table above, the conducted analysis of age and gender composition did not reveal a statistically significant relationship between the demographic characteristics and the coverage of PTT (p- value >0.05). The proportions of survey participants were evenly distributed between the two groups, while all the observed differences were not statistically significant. The age category of respondents was mainly 10-14 years old in both groups, most of whom studied in school institutions and had the TB vaccination.

It should be noted that the proportion of children aged 0-5 years is more prevalent in the group not covered by PTT, while children over 5 years are more prevalent in the group covered by PTT. However, the correlation analysis did not reveal a statistically significant relationship between age distribution and PTT coverage.

Table 3-3. Socio-demographic data of respondents (education, status, living conditions and employment), n - 289

Variables	***n -236 (covered by PTT*)***	***(%)***	***n -53 (not covered by PTT**)***	***(%)***	***χ2***	***p-value***
Education						
no education	3	1.3%	3	5.7%	***11.5***	***0.04***
initial	1	0.4%	1	1.9%		
incomplete secondary	9	3.8%	5	9.4%		
average	139	58.9%	33	62.3%		
secondary specialized	35	14.8%	3	5.7%		
incomplete higher education	8	3.4%	1	1.9%		
higher	41	17.4%	7	13.2%		
Status						
single	4	1.7%	3	5.7%	*6.2*	*0.44*
married	207	88.5%	46	86.8%		
civil marriage	6	2.6%	0			
Divorced	8	3.4%	2	3.8%		

Widower/Widower	9	3.8%	2	3.8%		
Housing						
own home	157	66.8%	31	58.5%	*5.4*	*0.42*
I rent alone	11	4.7%	1	1.9%		
I rent with others	17	7.2%	2	3.8%		
with parents/relatives	50	21.3%	19	35.8%		
Respondent's employment						
I'm studying	5	2.4%	0		*7.1*	*0.26*
Working	71	34.5%	13	26.0%		
self-employed	41	19.9%	14	28.0%		
housewife	89	43.2%	23	46.0%		
other (pensioner)	28	12.0%	2	3.8%		

Education:

The majority of respondents had secondary education — 172 out of 289 (59.5%), slightly fewer had higher or incomplete higher education (57 out of 289, or 19.7%), as well as secondary specialized education — 38 out of 289 (13.1%). A comparative analysis of the two groups showed a difference: the share of respondents with secondary specialized and higher education is more represented in the group covered by the PTT (14.8% versus 5.7%). At the same time, the share of respondents with primary and secondary education is more common in the group not covered by the PTT. Correlation analysis demonstrated a statistically significant relationship between the level of education and the coverage of the PTT (p- value = 0.04).

Employment:

At the time of the survey, the vast majority of respondents were not engaged in any activity (43.2% and 46%), while 34.5% and 26% of participants were employed, and the self-employed accounted for 19.9% and 28%, respectively. Comparative analysis did not reveal statistically significant differences between the two groups.

Table 3-4Other social characteristics of respondents, n -289

Variables	***n -289 (covered by PTT*)***	***(%)***	***n -53 (not covered by PTT**)***	***(%)***	***χ2***	***p-value***
Migration						
MigrationExternal	18	7.6%	11	20.8%	***8.2***	***0.004***
MigrationInternal	12	5.1%	9	17.0%	***9.1***	***0.006***
IncomeParents	47	19.9%	18	34.0%	***4.9***	***0.03***
IncomeHusband	105	44.5%	27	50.9%		
IncomeWork	51	21.6%	6	11.3%		
IncomePart-time job	56	23.7%	19	35.8%		
IncomeRent	3	1.3%	1	1.9%		
IncomeBusiness	34	14.4%	12	22.6%		
IncomeSocial Payments	40	16.9%	15	28.3%		
Associated diseases	13	5.5%	3	5.7%	*3.2*	*0.13*

External and internal migration factors have a significant impact on the coverage of tuberculosis preventive treatment (PTT). The conducted data analysis revealed a statistically significant relationship between migration and the level of PTT coverage ($p = 0.004$). In addition, a correlation was found between the source of income and PTT coverage. Among respondents not covered by preventive treatment, there was a higher proportion of participants for whom the only source of income was parental assistance ($p = 0.03$).
Interestingly, social factors such as gender, age, BCG status, employment, social status, living conditions and comorbidities did not demonstrate statistically significant association with PTT coverage. At the same time, education level, migration and dependence on parental income demonstrated significant statistical association with the baseline variable - PTT coverage ($p < 0.05$; CI 95%).

The results obtained highlight the need to take into account socio-economic and migration factors when developing programs aimed at increasing the coverage of preventive treatment for tuberculosis infection.

3.1.2 Knowledge of TB and PTT

The level of awareness of respondents about tuberculosis infection (TB) and the goals of TB preventive treatment (PTT) was found to be a significant factor influencing PTT coverage. Data analysis revealed that participants with a high level of awareness demonstrated a significantly higher level of involvement in preventive activities.

The table below presents the results of the data analysis, including the distribution of respondents by awareness levels and their relationship with PTT coverage:

Table 3-5Awareness of TB and PTT, n -289

Variables	***n-236 (covered by PTT)***	***(%)***	***n-53 (not covered by PTT)***	***(%)***	***χ2***	***p-value***
Knowledge of TB and PTT						
Symptoms of TB	146	62.7%	36	67.9%	0.51	0.47
Routes of TB infection	147	62.8%	38	71.7%	1.5	0.2
Ways to protect yourself from TB	109	46.2%	24	45.3%	0.04	0.9
Is TB curable?	209	88.6%	50	94.3%	1.9	0.8
Preventive purpose of PTT	128	54.2%	17	32.1%	***8.5***	***0.004***
Duration of PTT intake	211	89.4%	35	66.1%	***16.8***	***0,001***
PTT Reception Mode	224	94.9%	41	78.8%	***18.8***	***0,001***
PTT interruption	206	87.7%	35	67.3%	***12.1***	***0,001***

The results demonstrate that high awareness is positively correlated with PTT coverage, which highlights the need for educational activities aimed at raising public awareness of tuberculosis and its prevention. The analysis showed that the level of knowledge about TB is equally distributed

between the study groups. However, knowledge about PTT demonstrated statistically significant differences and correlated with PTT coverage (p- value < 0.001).
Thus, it is advisable to begin consultations on PTT at the earliest stages of the diagnostic algorithm among contact children.

3.1.3 Availability of services.

The analysis revealed statistically significant relationships between a number of accessibility parameters and coverage of preventive treatment for tuberculosis infection (PTTI) among the study groups. In particular, it was found that factors such as the need to pay for transport (p = 0.03) and the availability of accessible public transport (p = 0.01) have a significant impact on PTTI coverage.

At the same time, such parameters as knowledge of the place of attachment to a medical organization, costs of tests and radiographic examinations did not demonstrate a statistically significant relationship with the level of PTT coverage.

These findings highlight the importance of improving transport accessibility to enhance the effectiveness of preventive treatment programmes, which are particularly relevant for socially vulnerable populations.

Table 3-6. Availability of services, n -289

Variables	***n-236 (covered by PTT)***	***(%)***	***n-53 (not covered by PTT)***	***(%)***	***χ2***	***p-value***
Accessibility of the CSM						
Paid for transport	161	68.2%	28	52.8%	***4.5***	***0.03***
Knowing the place of registration of the FMC	225	93.5%	49	94.2%	2.4	0.47
Availability of public transport to the CSM	99	42.1%	9	17.0%	***20.9***	***0.01***
Time spent visiting the CSM	213	90.3%	48	90.5%	4.3	0.4
Payment for services	86	36.4%	16	30.2%	0.4	0.4

More than half of all patients (64.7%) did not pay for services during the visit, or paid for X-ray or CT services, while the average bill was up to 1000 soms; no statistical difference was found in the groups.

3.1.4 Stigma

Stigma and discrimination issues showed a significant association with TB preventive treatment (PTT) coverage. According to the analysis, parameters such as refusal of hospitalization and provision of detailed information had a statistically significant association with TPT coverage (p < 0.001 and 0.04) and were more represented in the group with no PTT coverage (15.1% and 3.8%, respectively).

The majority of respondents who indicated refusal lived in the Batken, Jalal-Abad and Chui

regions, which may indicate regional differences in access to treatment.

Table 3-7. Stigma and discrimination issues, n -289

Variables	*n-236 (covered by PTT)*	*(%)*	*n-53 (not covered by PTT)*	*(%)*	*χ2*	*p-value*
Stigma						
Refusal to consult	18	7.6%	4	7.5%	0,007	0.9
Refusal of hospitalization	9	3.8%	8	15.1%	***7.5***	***0.006***
Denial of information	15	6.4%	8	15.1%	***3.8***	***0.04***
Refusal of treatment	6	2.5%	4	7.5%	2.7	0.11
Change of attitude of medical staff	14	5.9%	6	11.3%	1.8	0.18
Rude and dismissive attitude of medical staff	13	5.5%	6	11.3%	2,3	0,1

At the same time, factors such as changes in the attitude of health care workers depending on the patient's status, as well as rude or dismissive behavior on the part of health care workers, did not demonstrate a statistically significant association with PTT coverage.

The findings highlight the need to overcome barriers related to stigma and discrimination to increase the accessibility and effectiveness of prevention programs. It should be emphasized that respondents most often encounter rude attitudes from medical personnel in the above-mentioned areas.

3.1.5 Experience in communication with medical staff

This section of the study was devoted to the analysis of communications between the clinic staff and patients. The included questions covered such aspects as the quality of interaction, the attitude of medical staff, the level of patient trust in medical workers, feedback from staff, and compliance with confidentiality principles.

The study aimed to identify communication barriers and possible causes of decreased trust that may impact coverage of TB preventive treatment (PTT). Particular attention was paid to patients' perceptions of friendliness and quality of consultations with health care personnel.

Table 3-8of interaction with medical staff , n - 289

Variables	*n-236 (covered by PTT)*	*(%)*	*n-53 (not covered by PTT)*	*(%)*	*χ2*	*p-value*
Experience						
Have you undergone a full examination?	232	98.3%	48	90.6%	2.4	0.11

Received feedback on the survey results	222	95.7%	44	83.0%	***5.3***	***0.02***
Consultation on the importance of PTT (TB prevention)	223	97.4%	30	56.6%	38	***<0.001***
Consultation on the consequences of refusing PTT	227	96.6%	34	64.2%	***27***	***<0.001***
Consultation on the PTT regimen	220	95.7%	31	58.5%	***27***	***<0.001***
Answered all questions	223	96.5%	43	81.1%	2.1	0.14
Friendliness	224	96.6%	44	83.0%	2.1	0,1

Analysis of the data presented in the table above showed that parameters such as feedback on the results of the examination, consultations with medical personnel on the importance of preventive treatment for tuberculosis infection (PTTI) and information on the possible consequences of refusing treatment had a statistically significant association with PTTI coverage ($p < 0.001$).

It was found that the group of respondents not covered by PTT received the above types of counseling and information significantly less often. These results emphasize the importance of timely, high-quality interaction between medical personnel and patients to increase adherence to preventive programs. It is necessary to include counseling on PTT issues at the stage of epidemiological investigation, for a better understanding of the importance of preventive treatment and the consequences of refusing examination and treatment.

3.1.6 Socio-cultural norms

Socio-cultural norms are closely interconnected with religiosity, gender aspects, patriarchy and psychological attitudes, both at the level of society as a whole and at the level of individuals.
The survey results presented in the table demonstrate the relationship between the variables under consideration, as well as their statistical significance. Analysis of the obtained data demonstrates the presence of a statistically significant relationship between religious aspects and the coverage of the LT prevention program (LPT). It is observed that the proportion of people not covered by the PTT is significantly higher in the group where the indicators of religiosity and patriarchy in the family are more pronounced ($p = 0.001$).

Table 3-9. Socio-cultural norms , n -289

Variables	***n -236 (covered by PTT)***	***(%)***	***n-53 (not covered by PTT)***	***(%)***	***χ2***	***p-value***
Socio-cultural norms						
According to religion, you can't take medicine.	4	1.9%	4	7.5%	***4.6***	***0.03***
Only higher powers know how long you will live	77	35.6%	27	50.9%	***10.7***	***0,001***
I prefer folk remedies	15	6.9%	3	5.7%	0.06	0.9

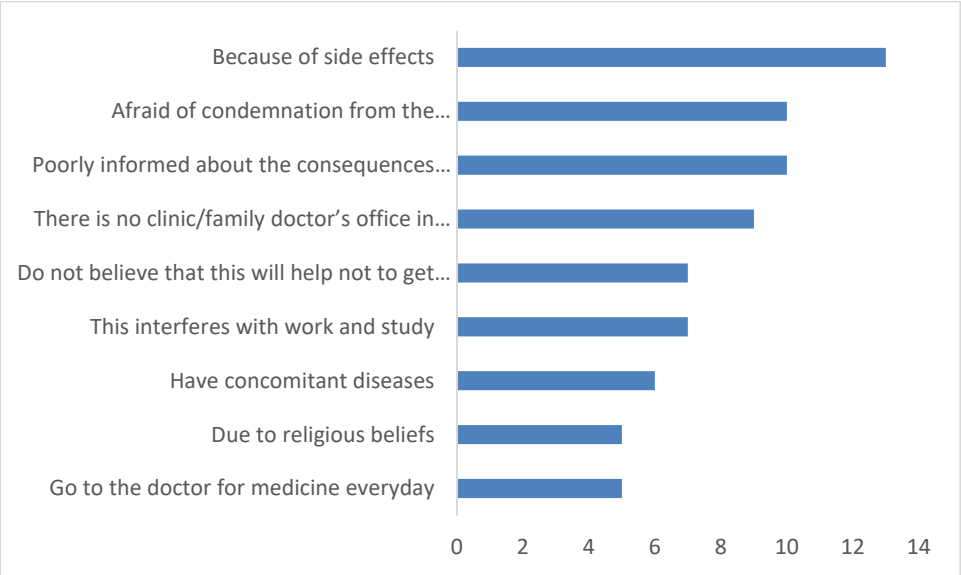
If you are destined to have TB, nothing will save you	25	12.0%	9	16.9%	2.5	0,1
Only prayer can help you heal.	22	10.4%	5	9.4%	0,1	0.7
Patriarchy	45	19.8%	22	41.5%	***11.8***	***0,001***
I trust internet sources	46	20.5%	13	24.5%	1.9	0,1

Given the above, family dynamics should be considered when counseling, especially in cases where the disease affects a young woman living in her husband's family. It is important to clarify who in the family makes key decisions regarding treatment. It is recommended to conduct targeted consultations with heads of families to take into account the socio-cultural and patriarchal aspects that influence decision-making and ensure the most effective intervention.

3.1.7 Reasons for refusals

We asked respondents to indicate the main reasons that prevented them from starting or continuing chemoprophylaxis. The diagram below shows the key reasons for not starting chemoprophylaxis. The most common reason was side effects, mentioned by the majority of participants. The second most popular answer was not wanting others to know about their treatment. The third most important factor was respondents' lack of awareness of the possible consequences of not starting chemoprophylaxis.

Figure 3-1Reasons for refusal or interruption of chemoprophylaxis in Kyrgyzstan, n -25



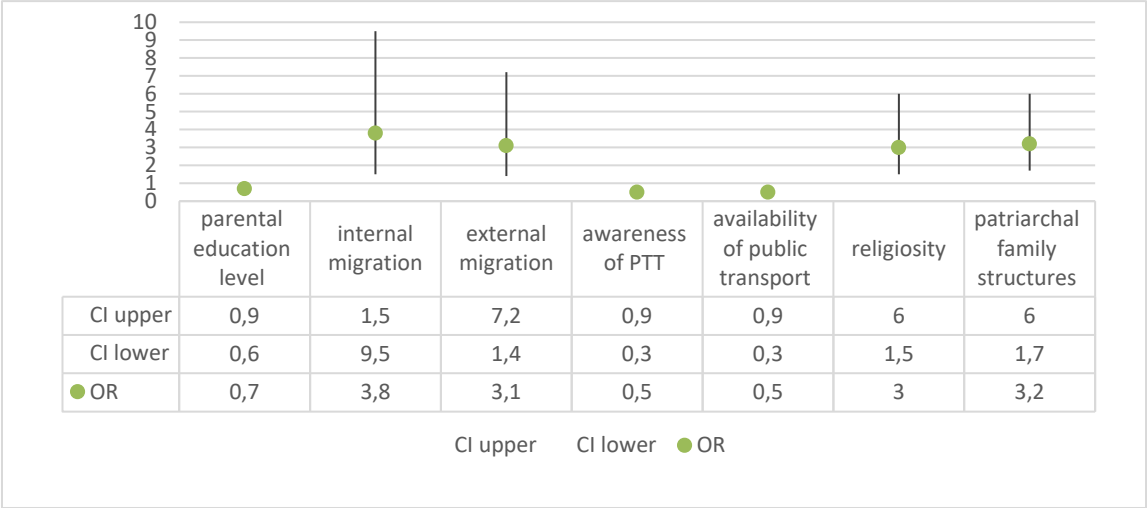
3.1.8 Factors Affecting PTT Coverage

After adjustment, a binary logistic regression analysis was performed to assess factors influencing TB chemoprophylaxis (PTT) coverage. The results, presented in the figure below, showed statistically significant associations of a number of factors with TP coverage.

In particular, factors such as migration status (OR = 3.8; CI = 1.5–9.5), religiosity (OR = 3.0; CI

= 1.5–6.0), patriarchal family structures (OR = 3.2; CI = 1.7–6.0), and incomplete information (OR = 4.3; CI = 1.6–11.9) turned out to be significant factors influencing PTT coverage and increasing the probability of not being covered by PTT.
Whereas factors such as parental education level (OR = 0.7; CI = 0.6–0.9), awareness of PTT (OR = 0.5; CI = 0.3–0.9), and availability of public transport (OR = 0.5; CI = 0.3–0.9) reduce the probability of being in the group not covered by PTT.

Figure 3-2. Binary logistic analysis of the influence of factors on PTT coverage, (CI 95%)



	parental education level	internal migration	external migration	awareness of PTT	availability of public transport	religiosity	patriarchal family structures
CI upper	0,9	1,5	7,2	0,9	0,9	6	6
CI lower	0,6	9,5	1,4	0,3	0,3	1,5	1,7
OR	0,7	3,8	3,1	0,5	0,5	3	3,2

3.2 Interview with staff of the tuberculosis service.

Ten people took part in the in-depth interviews. The National Center for Tuberculosis provided the PF “Den Sooluk Nuru” with a list of doctors working in the program management department of the regional tuberculosis centers as a recommendation for conducting in-depth interviews to study issues of preventive treatment of tuberculosis infection. However, to ensure a multifaceted approach to obtaining detailed information on current practices and challenges in the field of preventive treatment, the respondents included the deputy director of the city anti-tuberculosis hospital, heads of the program management department of the regional tuberculosis centers, a pediatric TB doctor and a nurse of the regional TB center, a doctor of the general practice center, a case manager for working with patients, and a district TB doctor. The survey among respondents was conducted on 3 main topics: 1) the current situation in working with people in contact with TB patients; 2) barriers, resources and reporting; and 3) respondents' recommendations for improving the performance and effectiveness of preventive treatment, as well as expanding coverage.

3.2.1 Current situation regarding work with people who have been in contact with TB patients

Algorithm for working with contacts: Respondents noted 2 main regulatory documents that

healthcare workers rely on when working with contacts: Order of the Ministry of Health of the Kyrgyz Republic No. 429 of June 13, 2018 "Instructions for the care of contacts of patients with tuberculosis" (hereinafter Order No. 429 of the Ministry of Health of the Kyrgyz Republic), as well as "Guidelines for the diagnosis and preventive treatment of tuberculosis infection", 1st edition, 2023 (hereinafter NCT Guidelines). The algorithm for working with contacts is carried out on the basis of Order No. 429 of the Ministry of Health of the Kyrgyz Republic, which describes in stages the functions of each healthcare worker involved in working with contacts. Respondents confirmed that the following algorithm is used when working with contacts: after identifying the index case, first, an epidemiological notification is submitted by the medical institution that identified the TB case to the territorial Center for Prevention and State Sanitary and Epidemiological Supervision. An epidemiologist must visit the place of residence of the index case within 3 days and fill out an epidemiological investigation card. Having compiled a list of contacts, the epidemiologist provides it to the primary health care facility for further examination and observation. The family doctor interviews all contacts for TB symptoms and refers patients for the necessary examination, and then, if TB is detected among contacts or there are indications for PTT, refers them to a TB specialist for treatment. Work with contacts is mainly carried out in the Family Family Clinics and Family Medicine Centers.

Interaction between medical institutions when working with contact people is not always built according to a template. For example, in the Naryn region, the National Center for Tuberculosis and Tuberculosis has its own epidemiologist who works with contact people and promptly responds to the detection of a TB case. This staff member interacts with district epidemiologists and provides all the necessary information to the CEC. In the Talas region, for example, work with contact people is carried out, according to the respondent, at a high level, since 90% of contacts are examined, due to the fact that TB doctors themselves are actively involved in the process of detection and examination and closely interact with family doctors.

"We are doing a good job with contacts…. We are not only examining household contacts. If they know that, for example, parents are sick, then the families of daughters and sons are examined. We do not sit in one place, we cover everyone completely, both workers and students, so as not to miss the disease among contacts. For example, I supervise the Manas district. If a patient is identified, I do not wait for the epidemiologist until he gives all the contacts, I immediately contact the family doctor, together we find out how many contacts there are, and enter them into our database. I immediately say that if there is a cough, adults should give sputum, children a stool test, Mantoux test, X-ray. Family doctors immediately sent me the results. I visit them once a week. If they did not have time to do the tests before my arrival, then the doctors send me everything on WhatsApp, and I immediately say if an appointment is needed, I write everything through WhatsApp"(Respondent from Talas region, medical worker)

However, respondents raised the issue of discrepancies between Order No. 429 of the Ministry of Health of the Kyrgyz Republic and the newly issued Guidelines of the NCP for preventive treatment for 2023. According to the Order, the main criteria for index cases for monitoring their contacts are: a positive sputum smear microscopy result, DR-TB regardless of bacterial excretion , the presence of a lung collapse cavity on radiography, including cases with a negative sputum smear microscopy result, a decreed contingent with a pulmonary form regardless of bacterial

excretion , TB/HIV and TB in children under 5 years of age. Based on the new guidelines, the key groups for the diagnosis and treatment of SBI are people in contact with pulmonary bac confirmed by TB and PLHIV. Although the Order of the Ministry of Health of the Kyrgyz Republic has priority for implementation over the Guidelines issued by the National Center for Phthisiology, medical personnel are trained in the new standards specified in the Guidelines.

"Based on this guideline, we are starting to examine not by order, but contacts of BAC+ pulmonary tuberculosis. And in order 429, it is necessary to examine contacts of patients with a positive sputum smear result, all forms of DR TB, pulmonary TB regardless of bacterial excretion, with the presence of a cavity, including negative sputum smear results, TB/HIV and children under 5 years old. We have connected all contacts with BAC+ TB to this, we have started to examine all contacts of these patients. Well, in general, we examine contacts of all patients" (Respondent from Jalal-Abad region, medical worker)

Diagnostics: The main goal of diagnostics of people in contact with TB patients is to exclude active TB and determine the presence of STI and indications for prescribing preventive treatment. Examination of contacts is the responsibility of the Family Doctor and the Family Medicine Center. The initial examination is carried out by the family doctor, who opens an outpatient card for each patient with a note that the patient is in contact with a TB patient. Work on examining persons in contact with TB patients should be carried out within 14 days after receiving notification of an active TB case. Screening for clinical symptoms of TB is used as diagnostic tools in all regions of the Kyrgyz Republic. Children under 14 are prescribed a tuberculin test and chest X-ray. Only one respondent out of all, namely a respondent from the Naryn region, noted that the Mantoux test is given to children twice - if the test is negative, the doctor waits 8 weeks and does a repeat test to double-check the results. Adults and adolescents are also sent for X-ray or fluorography. Children under 15 years of age are additionally prescribed a median tomogram if the results of the Mantoux test and X-ray are controversial. This procedure is the most problematic analysis in terms of availability. In Bishkek and the Chui region, this procedure can only be done in 2 places - the NCP and a medical facility behind the building of the Ministry of Health of the Kyrgyz Republic. Patients are referred to the NCP for a median tomograph not only from Bishkek and the Chui region, but also from other regions of the republic.

"If the test is positive or the result is questionable, we send you to Bishkek for a tomography scan on a median tomograph to rule out active TB, and preventive treatment is prescribed according to the protocol" (Respondent from Naryn Oblast, medical worker)

The patient bears all the costs of CT and X-ray tomography. Only one respondent from Talas Oblast assured that, even though the Mandatory Medical Insurance Fund must cover 50% of the cost, patients can undergo X-rays free of charge. In all other regions, the cost of the procedure is fully covered if the patient undergoes it not at the place of registration or pays 50% of the cost at the place of registration.

"If the patient undergoes these procedures in the primary health care facility at the place of residence, then he pays 50% of the cost, and if they are not registered - most of them are

migrants - then they pay in full, about 300 soms, I think in the FG for an X-ray. For about 2 years, X-rays were issued to us simply as photographs on a phone, if you have a phone, which the NCP does not accept at all" (Respondent from Chui Oblast, medical worker)

"Everyone who is indicated goes to Bishkek for a quantiferon test and a tomograph. The tomograph at the NCP is free for them. Their travel expenses are paid. According to the law on the protection of the population, local governments must pay their transport expenses" (Respondent from Naryn Oblast, medical worker)

In the presence of TB symptoms and cough, biomaterials are taken for GeneXpert from contact persons of all ages, primarily with bacterioscopy. If children are small and it is impossible to collect sputum, then they are prescribed a stool test instead of a sputum smear, this makes it easier for parents to collect biomaterials for examination.

In addition to tests for diagnosing TBI, a family doctor prescribes a complete blood count and an overall urine analysis for children under 14 years of age. The results of all prescribed tests are entered into the outpatient card and transferred to a tuberculosis specialist. Tuberculosis specialists, as a rule, then bring the patient's case to a consultation and prescribe, if necessary, additional tests, such as a median tomogram or a QuantiFERON test. All respondents, except for Chui Oblast and Bishkek, noted that they do not have the Diaskin test and QuantiFERON test in their arsenal of diagnostic tools, which are included in the New Guide and would be extremely useful during the examination.

" We don't have Quantiferon and Diaskin test yet. Kadyrov (director of the NCP) said that in 2025 we will work on the Diaskin test" (Respondent from Talas region, medical worker)

On average, according to respondents, the examination takes 1 month, sometimes 1.5-2 months. The examination time also depends on the patients themselves, how quickly they can take all the tests and come with the results to their family doctor. Sometimes the patient is sent to a pediatric consultation at the NCP if they doubt the test results.

“And then with all his tests and results we simply sent him to the children’s consultation; the parents brought him themselves. And there, at the consultation, what else would the NCP offer: Diaskin test, Quantiferon , whatever they have under the project. Sometimes Damira (case manager) took them by car to the NCP, then returned. Then after 10 days - the answer, the parents come themselves, without us. ... The parents tell me that there is a long line at the children’s consultation. Nowhere to sit, no toilet. If, for example, it was detected in September, then treatment can begin in the 4th quarter or even in the first quarter of the next year. Sometimes it happens that they do not bring the results. Yesterday, nurses came to me, I asked about the results. They say that the parents still go to Bishkek” (Respondent from Chui Oblast, case manager)

Patients are monitored by family doctors, and family nurses issue medications. If family doctors are concerned about something, or any changes are observed, they contact district phthisiatricians for advice. All prescriptions are made by district phthisiatricians. Often, patients do not trust the

indications of family doctors and contact phthisiatricians directly to double-check the prescriptions.

Purpose of PTT: According to the 2023 NCP Guidelines, chemoprophylaxis of TBI should be prescribed to all children under 5 years of age who have been in contact with bacteriologically confirmed pulmonary TB, while the Mantoux test is not required. A tuberculin skin test is performed on children over 5 years of age, adolescents and adults who have been in contact. If the tuberculin test result is positive and active TB is excluded in persons in contact, preventive treatment should also be started for children aged 5-15 years, residents of orphanages, boarding schools and shelters, as well as pregnant women and women in the postpartum period. PTT is also prescribed to PLHIV without signs of active TB - adults, adolescents and children with HIV over 12 months old, regardless of ART intake, the degree of immunodeficiency and the presence of contact with a TB patient, as well as children with HIV under 12 months old who have had contact with a TB patient.

All respondents noted that at the time of the survey, TB doctors had not yet adapted the new standards for working with contacts in accordance with the NCP Guidelines, therefore chemoprophylaxis is prescribed to persons from among contacts in accordance with the Order of the Ministry of Health of the Kyrgyz Republic, i.e. children under 5 years of age, children under 14 years of age from contact with a patient with TB and a positive Mantoux test, regardless of bacterial excretion , as well as HIV-infected adults. During the survey, all respondents noted that the priority groups for the appointment of PTT are children under 5 years of age, regardless of the results of the Mantoux test, and children aged 5-14 years with a positive Mantoux test.

After the patient has undergone the necessary examination to exclude active TB and the presence of SBI, all test results are forwarded to the district TB doctor. Some respondents answered that preventive treatment for SBI is prescribed only by a decision of the council. In Bishkek and Chui Oblast, for example, the appointment for preventive treatment is discussed at the State Tuberculosis Hospital or at the children's council of the National Center of Physiology with the participation of pediatric TB doctors. Respondents from Naryn, Osh and Jalal-Abad Oblasts also confirmed that all appointments for preventive treatment are made only through a regional council with the participation of district TB doctors and pediatric TB doctors.

"Only the NCP diagnoCEC childhood tuberculosis. The council includes all pediatric TB specialists from the NCP, as well as from the advanced training department, there are 5-6 of them in total. In any case, TB in children cannot be diagnosed by one doctor in the periphery or in the city. We now have online councils " (Respondent from Chui Oblast, medical worker)

"Preventive treatment is prescribed at a consultation. We record everything: how many children receive PTT, what medications we prescribed, what age the children are. We must keep everything under control, so all appointments for preventive treatment are made at a consultation. This is our internal decision, I don't know how other regions do it" (Respondent, Bishkek, medical worker)

While some of the respondents emphasized that the decision to prescribe preventive treatment is made by the TB doctors themselves without bringing this issue to consultation.

"Doctors prescribe isoniazid themselves. We have never gone to a children's consultation with questions about isoniazid chemoprophylaxis. We go if children have any problems or questions, we go to the republican consultation, there sits a children's pediatrician phthisiatrician. Or we write an extract, talk with pediatricians in advance and send patients to Bishkek (NCP)" (Respondent from Talas Oblast, medical worker)

"After consulting with the parents, we made a joint decision that we would observe. But if I had prescribed it, the parents would have agreed to preventive treatment, I myself decided not to prescribe it. We have a regional council, but I did not even refer them to the council. They came from Bishkek and made a remark to me, why did not prescribe it. But I think that observation will be enough" (Respondent from Batken region, medical worker)

As a rule, a TB doctor comes to the consultation with documents and the patient's test results, provides them for review by the doctors present, and a joint decision is made on the treatment regimen. Next, a TB card and an electronic card are filled out for the patient, and all appointments are transferred to the family doctor. Patients are monitored by family doctors. However, respondents claim that patients often interact more with nurses than with family doctors.

According to the NCP Guidelines, preventive treatment should be prescribed to all children under 5 years of age, contacts of BAC+ pulmonary TB patients, regardless of the test results. All respondents confirm their awareness of this directive, but some of them note that if the test results are good, the child is active, has a good appetite and has no symptoms, PTT is often not prescribed.

"If the Mantoux test is negative, everything is clear radiologically, including in children under 5 years old, we do not prescribe prophylactic treatment, we simply observe according to the protocol.
According to the new guidelines, it should be prescribed to children under 5 years of age, but we are not prescribing it yet, if the test results are good" (Respondent from Naryn Oblast, medical worker)

"We examine them using the Mantoux test, X-ray.... This year I have not prescribed PTT to anyone yet, but last year I entered them into the database. I have 5 children under 5 years old, contacts of patients with pulmonary BAC + TB. They were examined. Their Mantoux test is positive, but the X-ray results are good, all other tests are also good. The children feel cheerful, their general condition is good, so I have not prescribed chemoprophylaxis to anyone" (Respondent from Batken region, medical worker)

With regard to resistant forms of tuberculosis, upon contact with MDR TB according to the PTT Guidelines, it is necessary to prescribe a treatment regimen of 6 levofloxacin as chemoprophylaxis. However, according to the Order of the Ministry of Health of the Kyrgyz Republic, as well as in practice, chemoprophylaxis was not carried out if the index case was diagnosed with DR-TB. In this case, observation every 6 months was recommended. And after the TB patient was removed from the register, observation every 2 years was recommended.

"We also do not prescribe PTT for contacts of MDR and PLR TB, although according to the guidelines, we should prescribe 6 levofloxacin. We are holding off for now, there are no guidelines yet. We have not yet started to include adults in the treatment, but we are planning to" (Respondent from Naryn Oblast, medical worker)

"It happens that children take PTT for a month, and then they develop resistance, and they immediately stop taking PTT" (Respondent from Chui Oblast, case manager)

Treatment: After the council or the TB doctor decides to prescribe PTT, family doctors-pediatricians are sent medications for the patient. And family nurses are engaged in dispensing medications. Only the respondent from Bishkek noted that TB doctors-pediatricians are engaged in dispensing PTT medications in the city.

Since the USAID project has introduced incentive payments for family doctors and nurses in recent years, TB specialists have delegated most of the work with contacts to family doctors. There are a large number of patients per family doctor. And despite the fact that sometimes doctors have only 1-2 TB patients, it happens that patients do not see doctors for months, and the main person with whom they contact is the family nurse. According to respondents, nurses not only interact more with the patients themselves, but also most often contact TB specialists on patient management issues.

"Family doctors often don't even know that they need to talk to patients at least once a month, check for any undesirable effects, examine them, check their hearing, vision, skin, and blood pressure. Most often, this is not done. PTT medications are also given out by a family nurse once a week. Consultations vary, and consultations depend on the doctor. For example, Svetlana Nikolaevna in the Dzhayilsky District explains everything to patients in great detail. In the Panfilovsky District, consultations are mostly intimidating, as well as in the Sokuluk and Alamedinsky Districts " (Respondent from the Chui Region, case manager)

Before the approval of the new PBT Guidelines, the main regimen for preventive treatment was 6N, i.e. patients took isoniazid daily for 6 months. Respondents from all regions confirmed that isoniazid was always available in regional TB centers and there were never any interruptions in its supply, and with the introduction of the new PBT Guidelines, all regions began to receive new combination drugs for preventive treatment, including rifapentine. However, its use has not yet started in all regions. Respondents emphasized that the duration of drug intake is one of the important factors in patients' decision-making about treatment. The emergence of new combination drugs makes it possible to introduce such short-term regimens as 3HP for children over 2 years of age (1 tablet of isoniazid + rifapentine once a week for 3 months, a total of 12 tablets), 1HP from 13 years of age and above (1 tablet of isoniazid + rifapentine daily for 1 month), 3HR for adults and children of all ages (isoniazid + r i f a m p i c i n daily current 3 months), 4R for adults and children of all ages (rifampicin every day current 4 months) . An absolute innovation in the new PTT Guidelines is also the 6 levofloxacin regimen, which is intended for prophylactic treatment of individuals from contact With pulmonary MLU TB who were previously under observation and did not take any drugs as chemoprophylaxis. Although all respondents are aware of this innovation, and the drug is available in regional TB control centers,

no respondent confirmed the start of issuing such a treatment regime for contacts of pulmonary DR-TB patients.

All respondents expressed the need to record the issuance of PTT drugs. At the primary level, family doctors create outpatient cards for contact persons, where, in addition to general information about the patient's health (satisfactory or unsatisfactory), the start date and end date of drug intake are indicated, but the issuance of drugs is not recorded. At the request of respondents, it is also necessary to record the dates of drug issuance together with the name and dose. Also, the card does not record if the patient was diagnosed with TB.

In case of active TB, there is video-controlled treatment, i.e. nurses control the intake of drugs. In case of chemoprophylaxis, there is no such control, parents receive PTT drugs for children in the Family Doctor's Clinic or Family Medicine Center at the place of registration, as a rule, once a week. Previously, drugs were issued in TB offices.

"It happens that a patient lives in one area and works in another, and it is more convenient for him to be seen near work. But doctors there do not accept patients, since he is not registered in that area. It happens that he is registered in another region altogether. In this case, he can be registered in the area where he lives, but only if he has a passport; a certificate from the district officer is not required" (Respondent, Bishkek, medical worker)

Nurses do not monitor or control the intake of PTT drugs. According to respondents, it is necessary to introduce video-controlled treatment for patients on PTT as well. The practice of video-controlled preventive treatment exists only in Bishkek and is gaining momentum in the Chui region, according to the respondent.

Training and information materials: All respondents noted that after the publication of the PTTBI Guidelines, the NTC initiated a one-time 2-/3-day training for health care workers in each region with the participation of representatives of regional TB centers and district TB doctors. While some respondents noted that in addition to TB doctors, family doctors of primary care and doctors of the sanitary and epidemiological service were involved in the training, which was extremely useful for organizing coordinated work regarding contact persons, other respondents named only TB doctors as participants in the training. All respondents noted that this training was introductory, and additional and more in-depth training is needed on preventive treatment with an emphasis on childhood, with the involvement of doctors and nurses of FMCs and GFGPs. In addition to the training materials, it is necessary to add the topic of stopping adverse effects from taking new PTT combination drugs.

"According to the new manual, there was training at speed, but we did not see well what they wanted from us. At some seminars, they also read the topic, they said that they would print out books for us. They printed them out and distributed them, then once there was an hour-long training. Now every week they send a new form, change something there, send a new one by mail. They say that they are bringing it up to the ideal" (Respondent from Chui Oblast, medical worker)

"We only had training once. There wasn't much training on childhood, especially since new drugs are coming in now, we need to conduct training again. Last time we were at a training

with family doctors, organized by UNDP, on detection, diagnostics, treatment, and adverse activity. It would be appropriate to hold another seminar on childhood together with family doctors" (Respondent from Talas Oblast, medical worker)

“The doctors of the Family Family Group did not undergo separate training, but we ourselves give them lectures on new drugs, adverse activity, how to monitor, etc ... ” (Respondent from Osh Oblast, medical worker)

"I know about the new guidelines, but I have not undergone training. We were invited to Osh for training, but I did not participate. I read and studied the guidelines on my own. We have not prescribed the new regimens to anyone yet. The drugs have already arrived. Additional training is needed, as I have questions" (Respondent from Batken Oblast, medical worker)

Useful practices:

1. In the Jalal-Abad region, partners from the non-governmental sector, the organization "Tais+2", are involved in the work to expand the examination of contacts. They are conducting work on examining contacts in 5 districts of the region. Their main role is to involve close contacts in the examination, not family contacts, since work with household contacts is carried out by CEC doctors.

"They have good results, sometimes they identify cases among distant relatives. They have a TB doctor working for them, he calculates index cases from the database and sends them to outreach workers. They start examining close contacts, and the CEC and primary care deal with family contacts" (Respondent from Jalal-Abad region, medical worker)

2. In Bishkek, video-controlled treatment is used to monitor the intake of PTT drugs. That is, patients receive drugs once a week but send a video confirming the fact of drug intake to a doctor or nurse. This allows health workers to monitor the regularity of drug intake without the involvement of a community assistant. This practice is also gaining momentum in Chui Oblast.
3. In the Talas region, Manas district, there are WhatsApp groups with the participation of TB doctors, family doctors, nurses, deputy directors of FAPs and FGs of this district. Thanks to such groups, there is a prompt exchange of information. Group members can exchange messages at any time, quickly resolve issues that arise, and the participation of doctors at the management level contributes to a faster and better solution to the difficulties that arise. The respondent noted that such groups make work easier, especially in remote areas.
4. In the Naryn region, a full-time epidemiologist works in the regional center for combating tuberculosis, who works with contacts and interacts with the CEC.

3.2.2 Barriers, Resources and Accountability

Almost all respondents considered PBT to be a useful practice that practivity the risk of developing active TB in contacts. Since, according to one respondent, contacts are likely to develop TB within 5-10 years of exposure to a TB patient, preventive treatment significantly reduces this risk.

Accounting and reporting forms and reporting: Each regional TB control center has a program management department (OPTTB), where specialists collect statistical data according to the indicators of the accounting and reporting forms. Information is received by these departments from TB doctors at the district level and then summarized at the regional level and transferred to the National Center for Phthisiology. In the OPTTB of the City Anti-Tuberculosis Hospital (GPTB), for example, there are two specialists in childhood who work with children from among contacts - for Bishkek and for the Chui region, they collect reports on contact children monthly. According to the respondent, previously such a practice was only in the City Center for TB Control (CCTC), but after the merger of the CCTC and GPTB, reports for the Chui region also began to be collected monthly, even before the introduction of the new reporting form for PTCI.

"When we were united, I asked to collect reports monthly for both the city and the region. It is easier to collect information this way, and the annual report does not need to be calculated, the information is already ready. We now collect all data monthly" (Respondent, Bishkek , medical worker)

During the interview, respondents mentioned only 2 accounting and reporting forms that record information on contacts. First of all, this is form TB06, which is submitted to the NCP by regional TB control centers quarterly, one quarter after the end of the reporting period. This form records the total number of household contacts for the reporting period, indicating the number of contacts with BAC+ TB patients and DR TB patients, the number of contacts examined during the reporting period, as well as the number of active TB cases detected among contacts, the number of those subject to PTT, indicating the number of those who were prescribed a course of PTT, as well as the number of those who started and completed PTT treatment.

The National Center for Phthisiology has introduced another additional accounting and reporting form separately for the accounting of PTT, which regional TB centers began to fill out since August 2024. In this form, the number of identified TB patients and their contacts is indicated considering age categories: 0-1, 2-4, 5-12, 13-14, 15-17 years old, 18 years old and older. This form is also filled out at the district level, summarized at the regional level and sent to the NCP monthly on the 25th of the current month for each past reporting month. This form also indicates the number of identified TB patients per month, indicating the number of BAC+ TB cases, the number of contacts, and how many of them were examined, TB cases were identified, were subject to PTT, PTT was prescribed, PTT was started with an indication of treatment regimens.

Respondents expressed mixed feelings about the new PTT form. On the one hand, respondents are impressed by the fact that a separate, easy-to-fill form has finally appeared, where information is recorded separately by contacts. On the other hand, not all phthisiologists find this form convenient to fill out.

"The NCP sent us a new reporting form, we report on it, we have already filled out August, September, and October. In this form, we first register those patients who fell ill, the index case, and examine their contacts. For October, we will report in November until the 25th. The new form is very convenient, it is by month, I like it" (Respondent from Issyk-Kul region, medical worker)

"... In total, how many patients we took in a month, the list of contacts, forms of resistance, how many are subject to prevention, how many we received - it's convenient, you can see everything by age right away... I collect this form from the districts, and I sit and ask everyone. The original tables were very long, it was inconvenient to work there. Last month they sent us a new form, shortened, more convenient" (Respondent from Talas Oblast, medical worker)

"There is another form - it is filled out monthly, it is a new form, we have not yet consolidated these forms. There are pros and cons. Everything is too divided by age there. It was possible to make it only 0-5 years, 5-14 years and 15 and up and that's it. But there they divided it right into pieces. Many of our phthisiologists do not like it" (Respondent from Jalal-Abad region, medical worker)

All respondents noted that in the accounting and reporting forms there is always a quantitative difference between the indicators "Subject to PTT" and "Prescribed PTT", which represents the number of patients who have not yet undergone examination or refused treatment. In case of refusal of treatment, the parent or guardian of the child must write a "refusal" certificate indicating that the refusal is voluntary, and the parent / guardian has no claims against the doctor. Answering the question about the number of those who refused treatment, respondents from all regions confirmed that these are isolated cases and are not widespread. Some respondents noted that sometimes the difference between the indicators "Subject to PTT" and "Prescribed PTT" is significant not because of the number of those who refused, but because of confusion in filling out the form. According to one of the respondents, the indicator "Subject to PTT" included only children with a positive Mantoux test before the 2nd quarter of the current year. However, from the second quarter of 2024. This indicator began to include children under 5 years of age with a negative Mantoux test who were in contact with pulmonary BAC+ TB patients and should receive PTT regardless of the Mantoux test results. And the gap between "Subject to PTT" and "Prescribed PTT" existed because TB doctors did not prescribe PTT to children under 5 years of age with a negative Mantoux test.

"There was a gap in the reporting indicators between the number of "Subject to PTT" and "Prescribed PTT", because our phthisiatricians did not prescribe prophylaxis to children under 5 years of age with a negative Mantoux test, although according to the new guidelines they should, they left them under observation. Doctors have not yet fully understood and learned the new guidelines" (Respondent from Talas Oblast, medical worker)

“In the reporting form, in the column “Subject to PTT”, children under 5 years of age with a negative Mantoux test are also indicated, as well as contacts of PTT and MLT, who, according to the new guidelines, should be prescribed preventive treatment , but we do not prescribe it yet, so there is a difference between “Subject to PTT” and “Started treatment”” (Respondent from Naryn Oblast, medical worker)

Respondents believe that it is necessary to standardize and improve the reporting forms for contacts by indicating more detailed information, such as dates and results of examination, dates

of treatment initiation and reasons if treatment has not been initiated, add outcomes (completed, lost to follow-up, interrupted, etc.). Respondents raised the issue of where to record those patients who were examined and started treatment later than the reporting period. A proposal was made to add the column "Started (previous month)".

"We have confusion with the data. There is always a difference between the number of those subject to PTT and the number of those who started treatment. It is not clear from the report why the rest did not start, so questions arise" (Respondent from Bishkek, medical worker)

"When we prepare for the reports, they (NCP) want us to immediately prescribe chemoprophylaxis to children under 5 years of age who have been in contact with BAC+ TB in the same quarter. It is absolutely 100% necessary to prescribe it to children under 5 years of age. But our parents cannot always manage to undergo examination in the same quarter, especially if it was detected at the end of the quarter, how can we put children on chemoprophylaxis in the same quarter" (Respondent from Chui Oblast, medical worker)

"It happens that a patient lives in one area, works in another and is observed in a third. It happens that he is registered and diagnosed in a completely different region" (Respondent, Bishkek, medical worker)

Another problematic issue raised by respondents is the lack of information on monitoring contacts. Namely, respondents noted that contacts should be monitored for 2 years. The registration forms only contain information on the identification of the index case and the list of contacts associated with this case. But if an active process is detected in contact sometime after the examination, respondents are perplexed in what form to indicate this. Also, according to respondents, the receipt and intake of drugs by contacts is not recorded anywhere. The card only indicates the date of prescription, the name of the drug and the date of completion of treatment.

"If there are no active processes in contacts within 14 days, we put 0. And after six months, an active process may be detected. This information is no longer taken into account anywhere, and we do not know where to indicate it. We need to adjust this form. Of course, all cases are indicated in the electronic database, but not in the PTT report" (Respondent from Naryn Oblast, medical worker)

Speaking about the electronic database TB-01 for TB diagnosis, one of the respondents pointed out a flaw related to the introduction of the INN into the database. Since the number of foreign citizens, namely citizens of the CIS, Pakistan, Afghanistan, India and China, is growing among the number of patients, there is a problem with registering such patients in the database. Basically, citizens of foreign countries have documents in a foreign language that require translation. And their INN, as a rule, has fewer digits in its composition, and not 14, as is customary in our country. In this case, case managers help them with the registration of the electronic database. There are cases when children without documents are contacts. In this case, parents are still asked to restore or request documents for the child indicating the INN. Treatment is given to the child in a timely

manner, but the INN is indicated in the database after the moment of registration of the patient himself. In this case, due to the difficulty of entering the INN into the electronic database due to the smaller number of digits or its entry after the patient's registration, TB doctors cannot cope on their own without the help of IT specialists from the National Center for Phthisiology.
Despite the comments voiced, respondents from Bishkek and Chui Oblast stated that they are actively cooperating with the NCP to eliminate shortcomings and revise accounting and reporting forms, considering the necessary adjustments and corrections.

> *"In the last month, the NCP has been sending us various colorful tables through the State Program for Preventive Medicine. They (the NCP) said that they are trying to give us different tables to see what we can or cannot do. There is a division by age (in the new PTT form). We said that it is inconvenient for us to do it this way. We were told that for now we are just trying it out" (Respondent from Chui Oblast, medical worker)*

Barriers to effective implementation of PTT from the patient's perspective:
Respondents listed the following difficulties that a patient faces when diagnosing TB and prescribing PTTs, which may influence a patient's decision to take PTTs:

1. *Complicated algorithm for taking tests*

As mentioned in the report, sometimes it takes 1-2 months from the initial consultation with a doctor to the appointment of PTT. Such a long period is explained by the fact that patients often need to go through *a complex route when diagnosing TB.* Before prescribing PTT, the family doctor prescribes several tests for children, such as a complete blood count (CBC), a complete urine analysis, a Mantoux test, an X-ray, a median tomogram (if indicated), and an analysis of gastric lavage/stool test. Urine tests are taken at the family group (FG) at the place of residence, if the FG has a laboratory. If there is no such privilege, parents need to take their children early in the morning on an empty stomach to the district FMC, which is not always located close to home. According to the case manager, most FMCs have queues in the morning for such tests:

> *"If the patient has a car, that's very good. If not, you have to go to the central clinic with all the children to get tested early in the morning. There's a huge queue there. For example, in Sokuluk it sometimes comes to a fight. They've now allocated a separate day for TB patients - Thursday - so that they can come and get all their tests done... And to get an X-ray, they sometimes stand in line for more than a day or go to private clinics." (Respondent from Chui Oblast, case manager)*

It is very difficult for parents of infants to collect urine test; this analysis also takes time. After a personal examination, children are prescribed a Mantoux test. Usually, one ampoule is designed for 4-5 children. That is, before opening the ampoule, doctors recruit the required number of children, which can also take up to 2 weeks. Respondents noted that the introduction of a stool test is a very useful practice and makes it easier for parents, since it is not always possible to collect sputum from small children. But if the doctor still prescribes gastric lavage instead of sputum analysis, this is a problem, since district clinics do not always agree to such an analysis due to fear of incorrectly performing the procedure and damaging the child's lung. As a result, patients are referred to the NCP to undergo this procedure.

"I personally negotiated with the NCP. Early in the morning, a mother with 3 children came to the NCP to do a lavage test for one of them, since it was impossible to collect sputum. They started sending her from one department to another. In the end, she traveled for 3 days, and then they sent her back to the rural surgery. She spent money on a taxi and her nerves. In the end, she didn't give anything, turned around and left. A lot of patients didn't give such tests with small children. Finally, they introduced a stool test" (Respondent from Chui Oblast, case manager)

The situation is further aggravated by the fact that families in remote areas often have several children, including young children, who need to be examined. And if the index case is a mother, who is usually responsible for the children, and she has TB and is feeling unwell, then taking tests with several children early in the morning on an empty stomach in one place, getting an X-ray in another place, a median tomography in a third, and a consultation in a fourth, standing in all the lines in the absence of good conditions in the waiting areas, and sometimes in the absence of the waiting areas themselves, is an extremely difficult task.

2. *Low level of knowledge about the management of adverse activity and the management of TB patients in FGPs in remote areas*

Patients who managed to complete the examination and who were prescribed PTT are under the supervision of district FGPs or FMCs. Usually, patients on PTT have more frequent contact with nurses who give them medications. According to the case manager's observations, nurses in central FGPs and FMCs are better trained and have more information on the management of patients with TB and TBI than nurses in peripheral FGPs. In remote areas, nurses who have poor information are often unable to answer patients' questions about TB. In particular, if a patient experiences adverse activity and does not receive quality advice on how to manage them, there is a possibility that the patient will refuse to take anti-TB drugs or PTT drugs.

"If the patient lives far from the central FG, for example, in villages such as Chaldovar, Kamyshanovka, it is more difficult there, nurses and doctors have poor information. When, for example, a patient experiences adverse activity, they do not know what and how to do. They say, the patient should endure and drink. Only when the patient has been off treatment for several months and is not taking medications, only then does the TB specialist find out about this. We begin to return the patient on an emergency basis" (Respondent from Chui Oblast, case manager)

3. *Refusal of BCG vaccination or TB and PTT treatment for religious reasons*

When asked about refusal of treatment for religious reasons, almost all respondents noted that such cases occur in medical practice. However, with regard to PTT, the problem of refusal of treatment for religious reasons is not widespread. However, there are families that refuse all vaccinations for religious reasons, including the BCG vaccination.

"The number of believers who are difficult to convince to get vaccinated and take medications is increasing, no arguments can convince them. We try to train imams, ask them to talk about such problems with parishioners, but it is difficult to convince the imams themselves. Therefore, the number of refusals from BCG, from all vaccines, is increasing, this issue must be resolved

somehow" (Respondent from Batken region, medical worker)

Sometimes people refuse vaccinations not only for religious reasons, but also because of word of mouth about complications after vaccinations. In this case, doctors try to find an approach to patients, for example, only female doctors go to talks with "covered" women, and explain that receiving treatment should be perceived as a blessing, and refusing treatment is intentional harm to the child's health, which is a sin. Also, respondents suggested that it is necessary to conduct information work with Imams, who in turn know how and can correctly convey information to the population visiting mosques. Such work should be included in interdepartmental plans to combat TB, and Kazyat should be part of the regional coordination commission on public health issues.

"There are no special problems related to refusals, including those based on religious beliefs. There are very few such refusals. We have an interdepartmental action plan to combat TB in the region. It includes the local Kazyat. All structures coordinate their actions and work together. This plan is approved by the governor of the region. Kazyat has activities that they carry out - for example, talks on TB prevention and adherence to treatment, which they conduct during Juma Namaz. If we have any problems related to religious beliefs, we contact them. But in general, we have very few people who refuse vaccination" (Respondent from Naryn Region, medical worker)

4. *Labor migration*

Regular medication intake and the likelihood of treatment interruption are affected by the family composition and the parents' decision to go on labor migration. The absence of parents due to labor migration plays a major role in the decision to start PTT treatment. If a child in the family is under the care of grandparents, aunts and uncles, when the parents are in labor migration, the decision on treatment is made by the guardians, sometimes refusing it without explanation, or due to the lack of any documents identifying the child. Respondents note that in such families, guardians are less motivated to examine the child and are also less interested in being responsible for taking medications. On the other hand, there are situations when PTT treatment was prescribed in the presence of a parent, and then the family decides to temporarily stay abroad or in another region. In this case, the parent often forgets to discuss this issue with the doctor, goes on a trip, not paying attention to the lack of drugs for a long time, which leads to interruption of treatment.

"If there are parents who monitor their children and control the intake of medications, there will be much fewer interruptions than in families where the parents are in migration and the children are looked after by a grandmother or grandfather, for example, who makes the decision on taking medications. In such a situation, there is a risk of disruption of regularity or interruption of medication intake" (Respondent from Osh Oblast, medical worker)

5. *Distrust of the doctor and diagnosis.*

Another reason for potential refusal of PTT and TB treatment mentioned by respondents is mistrust of doctors. According to one respondent, this is because, thanks to technical progress, almost every family has a mobile device and access to the Internet, where patients get information about their diagnosis, anti-TB drugs, and possible side effects. Instead of listening to the doctor's

recommendations, patients begin to double-check their diagnosis in different medical institutions and spend time on open Internet sources or forums. Having read information about all sorts of side effects from drugs, patients tend to be dubious about the doctor's prescriptions for PTT, believing that if the child is healthy and not sick, then there is no need to take such harmful drugs. Respondents noted that often the decision about the child taking drugs is made by the father of the family, whose level of trust in doctors leaves much to be desired.

> *"We have such a mentality that some citizens do not let our specialists into their homes, they even threaten them. For religious, mental, authoritarian, and various reasons. Regarding PTT, they often say, our child is normal, healthy, we are not going to take any substances. Simply because of a lack of understanding. Last year, for example, we had to examine one outbreak with the police, because the father was dysfunctional, an alcoholic. In a family of four girls, two got sick, the father refused to let them in, we had to examine them through the police" (Respondent from the Jalal-Abad region, a medical worker)*

In such cases, respondents noted that they try to explain to the parents that if the child gets sick, it will be more difficult to treat him, he will have to take more medications, and the treatment period may be longer. A respondent from the Jalal-Abad region recommended conducting quality conversations with parents with an emphasis on the importance of taking PTT drugs, the consequences of refusing to take medications, and the priority of the child's health.

> *"It happens that in a family all the decisions are made by a man who does not understand the importance and refuCEC vaccinations, Mantoux tests and treatment. When they write a refusal, the father often makes the decision, believing that the child does not have active TB, which means he is healthy, and why take medicine if you can eat right and not get sick. The reason is not indicated in the certificate itself, but it may be worth it for our records. Our doctors still try to motivate, explain the reasons if suddenly he gets sick" (Respondent from Jalal-Abad region , medical worker)*

6. Duration and form of drug administration

All respondents noted that one of the important factors influencing the decision to take PTT is the duration of treatment. Before the adoption of the new PTT Guidelines, the standard treatment regimen was a 6-month regimen of daily intake of isoniazid by the patient. The parent/guardian collected the drugs from the nurse at the GP practice on a weekly basis, independently monitoring the intake of the drug. Respondents noted that some patients took the drug for 2-3 months and then interrupted it for various reasons - moving or temporary stay abroad, side effects, interruption due to duration, etc. Receiving new combination drugs will solve this problem, since the new regimens include a new drug rifapentine, which, in combination with another drug isoniazid, allows patients to take a short-term course of treatment for 1 or 3 months, 1 tablet per week. According to respondents, this will influence the decision to take PTT and will also reduce the number of interruptions. However, respondents expressed concerns about potential side effects from new drugs and the need for monitoring of patients taking new treatment regimens.

“Although the treatment regimens are shorter, the drugs are combined, we don’t know yet whether there will be refusals or not, we need to observe how patients will react to them” (Respondent from Osh region, medical worker)

In addition to the duration of treatment, there is another difficulty - there are no special water-soluble doses for children that are well absorbed, or doses in the form of children's syrups that taste good. PTT drugs exist in tablet form, which often cause nausea and vomiting in children. The timing of taking the drugs, the form of the drug, the dosage - all this affects the decision to take PTT.

7. *Financial burden*

Among the difficulties that patients experience when diagnosing TB, respondents noted the financial burden. According to a respondent from the Osh region, for example, if a patient needs to undergo a CT scan, it is only available in Osh and Kadamjay . At the moment, there is no free CT for patients when diagnosing TB. This procedure costs up to 3,000 soms, and not all parents can afford to pay for it. According to the doctor, it is not prescribed to everyone, but only to those patients who have difficulties in determining the diagnosis from an X-ray. But even regardless of the need to undergo CT, patients experience economic difficulties associated with other tests and transportation costs.

"It is necessary to mention the financial burden, all examinations are paid for, there is not one child in the family, and there are also adults who need to be examined. They undergo diagnostics in a crowd. Everything is at the expense of the parents, except for the sputum and stool test. And they also want to double-check, they go to private clinics" (Respondent from Chui Oblast, case manager)

Barriers to effective implementation of TB prevention and treatment from the perspective of TB services:

1. *Hiding contacts due to fear of public condemnation*

As soon as a medical institution detects a patient's TB, a notification is sent to the local control epidemiological center (CEC). After the CEC has conducted an epidemiological investigation for 14 days, the list of contacts is sent to the family doctor, who in turn must call everyone for an examination. But as soon as it comes to close contacts, the patient tries to hide them to avoid condemnation from society, so only household contacts come for examination.

"Another problem: at the beginning of this year, I worked at the NGO Antistigma . My main responsibility was to work with contacts. From my own experience, I can say that as soon as a TB patient is identified, patients immediately become lonely, orphans, and unemployed. Patients are afraid of publicity and condemnation. Of course, the CEC demands it. If a patient is not accepted for treatment, the FG immediately issues fines. The FG writes explanatory notes that they called, for example, but people do not come for examination. A minimal number of people come" (Respondent from Chui Oblast, case manager)

According to a respondent from Naryn Oblast, one of the main problems for employees of the anti-tuberculosis service is to identify contacts. According to the NTC indicators, there should be 5-6 contacts per 1 index case. However, in the republic, this indicator is on average 2.5. According to the internal indicators of the NTCBT, 100% of contacts are examined, because only family contacts are taken into account in the accounting and reporting forms, while close contacts are hidden due to the condemnation of TB disease.

> *"It happens that in the index case, the patient claims that there are no contacts at all. If TB is contracted, the patient prefers to register not at the place of residence, so that no one sees or knows him" (Respondent from Naryn Oblast, medical worker)*

They try to solve this problem by establishing a trusting relationship during a conversation between the staff epidemiologist of the National Center for Disease Control and Prevention and the patient.

2. *Lack of a unified approach among doctors when prescribing PTT.*

During in-depth interviews, all respondents representing the anti-tuberculosis service were asked about the criteria for entering a patient in the "Subject to PTT" in the accounting and reporting form and the appointment of PTT. It turned out that some respondents strictly adhere to the standards of the new guidelines and prescribe PTT to children under 5 years of age from among the contacts with BAC+ pulmonary TB patients, while others prescribe PTT only to children with a positive Mantoux test result.

> *"I found out that, for example, in Kara-Bura, 2 children were prescribed, but one was not from one family. It turned out that one had a negative Mantoux test, so the doctors did not prescribe it. In Bakai-Ata, 2 children were not given it out of those who should have received it. Although the Mantoux test was negative, they were supposed to. There is a protocol, children under 5 years old, contacts of pulmonary BAC + TB, regardless of the Mantoux test, should have been prescribed chemoprophylaxis... But in our country, all children receive the Mantoux test. It's just that our phthisiatricians did not prescribe chemoprophylaxis to those who had a negative Mantoux test under 5 years old, i.e. contacts of patients with pulmonary BAC + TB. They prescribed it only to those who had a positive Mantoux test. This was the case before. Our phthisiatricians have stuck with this way of thinking, of course, this is bad. We discussed it at the consultation, I showed them the protocol that they should prescribe chemoprophylaxis" (Respondent from Talas region, medical worker)*

Patients often do not trust family doctors from the Family Group of Doctors and contact the NCP to double-check the diagnosis. Due to the confusion of doctors' ideas about the appointment of PTT, the patient is given ambiguous information. On the one hand, the district TB doctor prescribes PTT, and on the other hand, the NCP doctor cancels the appointment, which gives the patient grounds for mistrust in doctors of the anti-tuberculosis service in general. For example, the case of a manager from the Chui region accompanied several patients to the NCP when their PTT appointment from the district TB doctor was canceled:

> *"At the NCP, doctors sometimes tell patients with extrapulmonary TB that their contacts do not*

need to take any PTT drugs, even though the children have a positive Mantoux test and there are indications according to the median tomogram. Parents refuse PTT treatment for children, and there is no way to explain that the child could have had contact somewhere else. I remember several such cases" (Respondent from Chui Oblast, case manager)

3. *Lack of necessary equipment for contact examination.*

A respondent from Naryn Oblast complained about the lack of a tomograph in Naryn Oblast. If a more detailed examination is required after an X-ray, patients with a controversial diagnosis have to be referred to Bishkek for tomography at the NCP. Such a referral is issued only to contacts of pulmonary BAC+ TB patients with a positive Mantoux test. This procedure at the NCP is free for such patients, but the patient has to spend their time and travel expenses to travel to Bishkek. Travel expenses can be reimbursed to the patient, but only after the trip has been completed. Many patients complain about the lack of funds to cover such expenses, even taking into account that they will be reimbursed. And only after a conversation about the importance of the examination and much persuasion, patients agree to the trip.

"We pay for travel expenses ourselves. According to the law on the protection of the population, local governments must pay for their travel expenses. But, nevertheless, travel expenses are a problem. Patients must travel at their own expense, and only then, upon presentation of a certificate, are they reimbursed. It would be good if they were paid immediately. Because of this, there are those who refuse, who do not have the funds for travel expenses. But we explain the importance, persuade them. They borrow and go" (Respondent from Naryn Oblast, medical worker)

4. *Lack of control over the intake of PTT drugs.*

All respondents noted that it is difficult for medical staff to control the intake of PTT drugs. On the one hand, parents themselves must be responsible for the health of their children. Medicines are given to parents weekly by a nurse of the Family Group, and each parent decides whether to give the drugs to the child or not. A medical staff member has no way to check the regularity of drug intake. However, given that there are parents with religious beliefs, an indifferent attitude or mistrust of the diagnosis, medical staff express an opinion on the need to introduce video-controlled treatment, like the practice that already exists to control the treatment of TB patients. A more expensive alternative to control PTT may be a children's hospital, where children can fully receive drugs and all the medical services necessary for a speedy recovery.

"If it were in a hospital, children would take medications and vitamins under supervision, as required. But now they take all the medications at home, especially since they are monitored by family doctors, not TB specialists. Only if the patient has complaints, is he sent to a TB specialist. When it comes to controlled video surveillance in the case of a TB patient, he takes medications as required on an outpatient basis. This makes it more difficult with chemoprophylaxis" (Respondent from Osh Oblast, medical worker)

5. *Insufficient involvement of CEC in certain areas*

A respondent from Issyk-Kul region complained about the insufficient involvement of the CEC in working with contacts. According to the respondent, the CEC should be engaged in epidemiological investigation and compiling a list of contacts, but often this task falls on the shoulders of family doctors and tuberculosis doctors. According to the respondent, the CEC should identify not only household contacts, but also close ones - neighbors, relatives, nearby institutions that the patient may have visited. However, in many areas of Issyk-Kul region, the CEC not only does not carry out this work, but also simply collects information from tuberculosis doctors without visiting the outbreak.

"For example, in Balykchy, the CEC does not go to contacts, they simply take all the information about relatives and friends from the TB office and end their work there …. Kadyrov demands that we examine 6 contacts for every 1 index case, but that is not how it works for us" (Respondent from Issyk-Kul region, medical worker)

6. Lack of funds to cover transportation costs of the regional TB control center

The Naryn Regional TB Control Center has good practice: the center has a full-time epidemiologist who works with contacts and interacts with the CEC, which was mentioned earlier in the report. The center's employees are satisfied with the work of the full-time epidemiologist, emphasizing that now they do not have to wait for the district CEC to visit the outbreak, conduct its work, and then transfer the case to the FMC or FG. But one circumstance affects the efficiency of the epidemiologist's work - the lack of transportation costs for visiting the outbreak. There are many remote villages in the Naryn region. The epidemiologist could visit outbreaks in hard-to-reach villages only when the center's employees go to the districts for monitoring. This monitoring is carried out once a quarter, accordingly, the epidemiologist also could visit hard-to-reach villages and conduct an epidemiological investigation once a quarter. According to the rules, the epidemiologist must visit the outbreak within 3 days, and work with contacts must be carried out within 14 days after the detection of a TB case. However, due to the remoteness of the villages and the lack of transportation costs for the epidemiologist, it is not possible to meet these deadlines.
To sum up this section, it should be noted that all respondents confirmed that refusal of PTTBI treatment is not a problem in the regions and Bishkek. In general, we can talk about 2 types of refusal: the first type is people who refuse to undergo examination for the appointment of PTTBI, and the problem lies in all the listed difficulties that patients face at this stage. The second type is those who have already been examined and refuse PTT treatment by filling out a refusal form. Here we are talking about isolated cases. The main problem lies in finding contacts and motivating them to undergo examinations.

"We have no patients who refuse PTT treatment. Sometimes they refuse to undergo examination, but we persuade them, conduct a conversation" (Respondent from Naryn Oblast, medical worker)

"We don't have any children who refuse to have the Mantoux test, because the test is done at the place of residence. But there are refusers among adults who refuse to have an X-ray. And the parents of only one child refused chemoprophylaxis. Even when talking to this patient, he does not yet fully understand that he is sick. Of course, he has already received and finished the treatment. I talked to him on the phone and realized that he has doubts about his diagnosis and

his illness" (Respondent from Talas Oblast, medical worker)

"Last year we had no refusals when there were 6-month regimes. Everyone agreed to take the drugs. There is no data on refusals for the new drugs yet. There are no refusals for the old regimens, children received isoniazid without refusals" (Respondent from Osh Oblast, medical worker)

"We have TB treatment refusals. Patients do not accept their diagnosis, say that they feel fine, and there has never been TB in their family. We have to explain that anyone can get TB at any time. But if you have a good conversation with the patient, you can convince them that an individual approach is needed. We have no refusals under PTT" (Respondent from Batken Oblast, medical worker)

3.2.3 Respondents' recommendations for expanding the PTT:

Chui region and Bishkek:

Respondents noted that **additional and more detailed training on the new PTT guidelines is needed,** although the NTC conducted one-time training for each oblast, which was described as "superficial." Training on the new guidelines should be conducted with the involvement of CEC physicians, TB physicians, family physicians, and family nurses, as health workers have not yet fully adapted the new recommendations for PTT prescriptions. Respondents expect that training will be included in the new phase of the USAID project.

It was recommended that TB specialists conduct monitoring of the GPs as often as possible and check the work with patients at the PTT. It is also necessary **to review the format of monitoring** of the GPs and TB rooms. According to respondents, monitoring mainly consists of checking the implementation of infection control in a medical institution and is more formal in nature, without addressing the issues of discussing difficulties in working with patients. It is recommended that when conducting monitoring, quality conversations be held with medical staff regarding the problems they encounter in routine work with an emphasis on developing solutions.

In addition to monitoring, which is perceived by employees as a punitive instrument, it is necessary to introduce **a system of incentives** for medical staff for a job well done. Motivational certificates, financial incentives, and holiday greetings were given as examples.

"Sometimes you just need to come and praise... For example, on Medical Worker's Day I made incentive certificates for my nurses, congratulated them that way, it makes their work more pleasant. One nurse was reprimanded during monitoring, I came, talked, explained how it should be done, a week later I rewarded her, now she works very well" (Respondent, Bishkek, medical worker)

Another recommendation concerns **conducting training for family doctors and nurses on TB issues on a regular basis.** For example, during one of the monitoring Sessions of the Ysyk -Ata District Family Doctors' Clinic, incorrect completion of the TB01 form was revealed: information was missing in mandatory fields, and information that should have been filled in by doctors was filled in by nurses due to a lack of understanding of how to correctly fill out this card. The respondent noted that training on routine processes is more effectively conducted at

workplaces in an interactive format with subsequent rechecking of the acquired knowledge and collecting feedback. It is recommended to place special emphasis during training on counseling patients on the relief of adverse effects from taking anti-TB and prophylactic drugs, since it is precisely because of incorrect counseling or lack of response from doctors to patient complaints regarding side effects that is an important reason for interrupting or refusing treatment. This issue is especially acute in remote areas. It was also noted that the material is absorbed better when training for women is conducted by female trainers, explaining that most doctors and nurses are female employees who are embarrassed to ask questions to male trainers.

With regard to the accounting and reporting forms, **it is necessary to review and supplement the reporting forms** containing information on contact people. These forms should contain detailed information, including dates and examination results, a list of reasons why the patient did not start treatment or refused it, and also add a column "Started treatment from the previous reporting period" to the form, or offer options for recording patients who were registered in the current reporting period, but underwent examination/started treatment in the subsequent reporting period. It is necessary to supplement the tables with the outcomes for PTT - "lost to follow-up", "successfully completed", "refusal", "moved", etc., so that when opening the report, there is a complete picture of the patient's case. It is also necessary to oblige the patient to indicate the reason for refusing PTT when writing a certificate of refusal of treatment for keeping records of this kind.

One recommendation was made regarding the maintenance of the electronic patient database. In the INN field, you can enter a number containing only 14 digits, according to the standards of the Kyrgyz Republic. But TB is not limited to Kyrgyz citizens. The electronic database does not allow entering the INN of foreign citizens, which contains fewer or more digits, without the help of an IT specialist at the NCP. **In the electronic database, the INN field needs to be adjusted so that doctors can enter it themselves without outside help.**

The most problematic moment for the patient is the process of diagnosing TB and TBI, which, according to respondents, is of the greatest importance when deciding to take PTT. Often, the patient needs to undergo multiple diagnostic procedures in different places. The situation is significantly complicated by the presence of several children in the family, who also need to take a list of tests and undergo diagnostic procedures on an empty stomach early in the morning, waiting in long lines. Diagnosis of TBI is associated with time and financial costs, which not all patients are ready to bear. Respondents believe that it is necessary **to create a separate children's consultation,** where parents with children can undergo a doctor's consultation, X-ray, tomography and everything necessary for the appointment of PTT in one place.

> *"It would be good if there was a separate children's consultation. So that there would be an X-ray machine, a tomograph, QuantiFERON. You have to wait a whole week for QuantiFERON. And it is not available everywhere. If not, sometimes you have to go to the NCP. If the patient is in Kemin, for example, then he needs to leave at 5 am to arrive at the NCP by 8… It is a big problem if it is the woman in the family who gets sick. She gets sick, and she and her children also need to undergo an examination. No one else needs this. It would be good if all the tests could be taken in one place" (Respondent from Chui Oblast, case manager)*

The process of prescribing PTT is also delayed due to the complicated procedure for deciding on PTT by medical services. That is, when a patient with TB is identified, the first step is to send a notification to the CEC. The epidemiologist's visit does not always take place within the 3 days established by the regulations. Then an epidemiological investigation takes place, after which information about contacts is sent to the family doctor. After collecting the necessary tests, which are delayed by patients due to the complexity of the procedures, the results are sent to a tuberculosis specialist. The tuberculosis specialist brings the case to a consultation for discussion and deciding on PTT. If the decision is controversial, and it is impossible to come to a consensus, then the patient is sent to a pediatric consultation at the NCP, which is held twice a week. Then, after the discussion at the pediatric consultation is completed, the family doctor is notified of the decision made, and only then is the process of prescribing PTT completed. The main recommendation in this complex chain of processes is **to simplify the algorithm for prescribing PTT to patients and create conditions for comfortable TBI diagnostics.**

To increase the detection of TB cases and, consequently, to attract contacts to testing, it is necessary to strengthen **outreach work.** Workers need to visit places with the highest risk of TB and attract people to undergo testing.

> *"Sometimes I think about going to the market and asking those who look bad to get examined. In Latvia they do it this way, they go to where they feed for free, where there are homeless people and drug addicts. A group of social workers talk to them, write complaints, take sputum there and identify them. I only need an X-ray and sputum analysis; I can make a diagnosis without the patient himself. And for medications - that's to the nurse at the Family Family Hospital, they will look after the patients, because they will receive for the treated case" (Respondent from Chui Oblast, medical worker)*

It is very important **to conduct ongoing information work with the population** on the topic of reducing stigma and discrimination against people affected by tuberculosis. The public is insufficiently informed about the nature of the disease and its transmission routes, often demonstrating its dismissive and avoidant behavior. Such behavior is demonstrated not only by people from the environment of a person affected by TB, but sometimes by health workers themselves. One of the respondents gave the example of a patient from Novopavlovka who, after being diagnosed with TB, began to receive angry messages from colleagues who learned about the diagnosis. In addition to the stress received, her TB doctor strongly recommended that she separate from her family and young children, despite the BAC "-" test result and the period of taking medications for more than 2 weeks. As a result, the patient turned to the case manager with a request for help, experiencing stress from stigma and self-stigma, complaining that she felt abandoned and lonely.

When asked about the availability of information materials, respondents noted the absence of information stands or any handouts on the topic of chemoprophylaxis and emphasized **the need to place such information materials on stands in the CMC, GPW, and tuberculosis offices.** with an emphasis on the criteria for prescribing and the importance of taking PTT.

When conducting information work with the population about TB and PTT, it is necessary to focus on the religious category of the population who refuse BCG vaccinations or treatment

for TB and PTT for religious reasons and believe that prayer and visiting a mosque are the main conditions for recovery. Respondents recommended **involving imams to conduct information Sessions on TB and healthy lifestyles** with the population visiting mosques.

Respondents expressed their opinion that after undergoing chemoprophylaxis, **the patient must be prescribed a follow-up examination** in order to check that the process has subsided, and the lymph nodes have returned to normal.

One of the respondents complained that the nurses of the Family Group of Doctors do not know how to correctly process the sputum analysis. The material should be brought to the laboratory by the nurses themselves, who often send the patients themselves or patients with suspected TB. Patients sometimes collect sputum incorrectly, without infection control. **It is necessary to conduct additional instructions on collecting sputum and the procedure for processing this analysis.**

Respondents expressed indignation regarding the system of rewarding family doctors for a treated TB case, citing the fact that most of the work with patients is done by the family nurse together with the TB doctor. **The criteria for assessing the doctor's work and rewarding him for a treated case should be revised.**

> *"In the Family Family Hospital, I interact only with nurses; doctors are completely absent from this system. It's like a lottery; they have a patience for whom they will be paid. And then they get 20% for the treated case. We only work with a nurse. The doctor is only there for the sake of name, so he is listed as the patient's doctor. We write diaries in the database; we communicate only with the family nurse. This is everywhere, I also work in Sokuluk , there the doctor is at least a little bit involved, but basically everything is on the nurse" (Respondent from Chui Oblast, medical worker)*

Small children have difficulty taking bitter-tasting medications, especially in solid form. Respondents said that taking the medication for small children would be much easier if **PTT was given sweetened in the form of children's syrup**.

Short-term PTT courses and new combination drugs are a big advantage when deciding to take PTT.

Jalal-Abad region:

The respondent recommended **reviewing the Order of the Ministry of Health of the Kyrgyz Republic No. 429 of June 13, 2018, and bringing it into full compliance with the new NCP guidelines** for preventive treatment in order to avoid disagreements between medical staff. Since the Order of the Ministry of Health of the Kyrgyz Republic has priority over the NCP guidelines, the CEC continues to follow the order in working with contacts. However, the anti-tuberculosis service began to focus on the new guidelines at the urgent recommendation of the NCP.

The new monthly PTT form needs to be revised. The respondent praised the NCP approach to collecting information monthly and monitoring PTT. However, it was noted that dividing patients into multiple age groups is not a convenient practice for record keeping. **It is necessary to create a more structured grouping of data by age categories - 0-5 years, 6-14 years, 15 and older** . Additionally, the form **needs to be expanded with columns for entering information on monitoring the issuance and intake of drugs,** since the accounting

and reporting forms and electronic databases do not record how many drugs the patient has already taken and how many he or she has missed. The accounting and reporting forms indicate whether the contact is subject to PTT, whether PTT has been prescribed, whether the patient has started taking the drugs and completed them or not. The forms do not contain information on drug intake and treatment interruptions. Given this, it is difficult for regional TB centers to report on the drugs issued.

The respondent expressed a desire to purchase additional diagnostic tools for TBI for the Jalal -Aad region, such as the Diaskin test and the QuantiFERON test, as this will facilitate the diagnostic process, especially for young children.

> *the Diaskin test or Quantiferon are purchased and distributed at the republican level, it would be good for us to have such tests. Especially the Diaskin test. It is a subcutaneous test, the child will be less capricious" (Respondent from Jalal-Abad region, medical worker)*

A respondent from Jalal-Abad region also spoke about the need **to create a system of incentives or motivation for TB doctors** for good work, coverage, monitoring and management of patients, and the return of patients to treatment. The existing incentive system is aimed more at family doctors, who, in the respondent's opinion, are less involved in working with people affected by TB than TB doctors or family nurses and has a demotivating effect on TB doctors. All respondents noted that people affected by TB often contact family nurses and TB doctors much more often than family doctors.

With regard to patients, the respondent, on the contrary, spoke about the need to stop various payments and incentives from international organizations and NGOs, since it is necessary to impose the responsibility for providing patients in difficult life situations with food, coal or covering electricity costs on the local administration: **Sustainable government programs of patient assistance should be developed instead of one-time payments or incentives from NGOs** .

It is necessary **to train medical personnel interacting with patients and their environment in high-quality counseling in** the correct conduct of the initial consultation with the patient and his contacts, to train them in issues of confidentiality of diagnosis and the provision of psychological support to people affected by TB.

> *"You have to approach it carefully. We had a suicide case, for example, a patient hanged himself. They came to his home to examine his contacts. The women started arguing that he would infect everyone. He went and hung himself on an apple tree. Therefore, you have to approach the examination of contacts very meticulously and confidentially. Some of our doctors simply do not want to" (Respondent from Jalal-Abad Region, medical worker)*

According to the respondent, one of the tools for motivating a patient is a good and quality conversation. Using the right and friendly approach, you can find the key to each patient. For example, if the conversation is with a woman regarding a child, you can focus on maternal feelings, explain that there is an infection in the child's body, and you need to take

care of his health, start preventive treatment. If the family is religious, then explain the benefits of treatment from a religious point of view.

> *"We have problems with counseling in the center with parents, we need to learn to find approaches. Here we have a pediatric TB specialist, she has returned many for treatment, little by little she has found contacts, put them on PTT. You can also approach it from a religious point of view - Allah gives you this disease and healing from it, and healing comes through taking our medications. If you do not take them, it contradicts the principles of Islam..." (Respondent from Jalal-Abad region, medical worker)*

The respondent emphasized **the importance and timeliness of introducing new short-term treatment regimens,** since many patients taking preventive treatment complained about the duration of taking the drugs. In the Jalal-Abad region, the process of switching to the 3HP regimen for children under 13 years of age, and from 13 years of age and older - to the 1 HP regimen. However, the respondent expressed concern about the regimens for contacts of patients with MDR-TB. Phthisiatricians of the region express different opinions regarding the appointment of levofloxacin for contacts of MDR-TB patients and concerns related to the provocation of resistance to the drug. All PTT regimens are prescribed through a consultation, taking into account the patient's age.

The main wish expressed by the respondent regarding PTT preparations concerned preparations for young children. Currently, there are no fast-dissolving preparations in the region that are convenient for young children, especially children under 5 years old. It is necessary to order fast-dissolving preparations or preparations in syrup form, since the form of the preparation also affects the regularity or interruption of taking the preparations.

Talas region:

The respondent recommended **organizing separate training on the issues of diagnostics and treatment of children with TB, as well as covering in detail the topic of preventive treatment,** considering the introduction of the new PTT guidelines. Not only TB doctors but also doctors and nurses of the Family Medicine Centers and Family Group Practices who directly treat patients with TB and their contacts should be invited as training participants. After the main training, it is necessary to conduct an additional series of training courses at workplaces to check the assimilation of the material with a detailed analysis of individual cases, prescription of treatment regimens, filling out relevant documentation, etc. The respondent expressed a desire to revise the training format as a whole - to abandon the format of the usual training held in Bishkek by reading presentations and presenting only theoretical data and move on to practical training in the regions with visits to workplaces and discussion of real cases.

The respondent praised the electronic patient database, particularly the TB01 form, in terms of content and ease of completion. However, it was noted that the electronic reports do not match the hard journals filled in by TB doctors. In this regard, the staff of the program management department of the regional TB centers have to visit the NTC in Bishkek quarterly and bring hard journals and reporting documentation to the monitoring department. The respondent expressed the need **to create a reporting system that allows sending all the necessary reporting information to the NCP in electronic form.**

A respondent from Talas Oblast also emphasized that the current Order of the Ministry of Health of the Kyrgyz Republic No. 429 "Instructions for the management of persons in contact with a patient with tuberculosis" does not coincide with the new NCP guidelines for preventive treatment. This leads to confusion in the work of TB doctors who are accustomed to working in accordance with Order No. 429, which has priority over the NCP guidelines. It was recommended **to adjust the Order of the Ministry of Health of the Kyrgyz Republic in accordance with the recommendations prescribed in the NCP guidelines for PTT.**

It is necessary to conduct information work on tuberculosis issues with the population on a regular basis. According to the respondent, the main difficulties in working with patients arise from lack of education, ignorance or misunderstanding of the situation. In relation to patients, doctors need to pay more attention to a quality conversation, explain the information in detail, checking that it is correctly perceived by the addressee. If necessary and with the patient's consent, conduct conversations with the patient's close environment to reduce stigma towards the patient, motivate relatives to help the patient and encourage him to successfully complete treatment, because the patient's psycho-emotional state plays an important role in recovery. In relation to society, it is necessary to conduct information campaigns and **involve the media for a wider coverage of the population.** For example, conveying information about TB through television, social advertising, encourages TB doctors to participate in various television programs with an emphasis on socially significant messages about the importance of being examined when TB symptoms appear, taking medications without interrupting treatment, supporting people affected by TB, etc.

Issyk-Kul region:

Conduct high-quality conversations with parents of children subject to PTT, emphasizing the importance of taking PTT drugs to avoid infection and the transition of the process to the active phase, talk about the consequences of refusing treatment and the difficulties that the family will face if the child gets TB. To conduct high-quality conversations, it is necessary **to train family doctors and tuberculosis doctors in the skills of counseling and providing psycho-emotional support to patients.**

In order to achieve the screening rate of 5-6 contacts per 1 index case, it is necessary **to oblige the CEC to be actively involved in the process of identifying contacts** and to involve in the screening not only people from household contacts, but also close friends, acquaintances, people from nearby stores, institutions that a TB patient may have visited.

> *"I would like the CEC to be more active in working with contacts, but they work well in some of our districts, and not in others. They only examine family contacts, but not close ones - neighbors, relatives. They get all the information from TB specialists and family doctors. For example, in Balykchy, the CEC does not visit contacts, they just take all the information from the TB office and finish their work there" (Respondent from Issyk-Kul region, medical worker)*

Naryn region:

The Naryn Regional TB Control Center has **a full-time epidemiologist.** According to the respondent, this is a unique practice that does not exist in other regional centers. The full-time epidemiologist carries out high-quality and prompt work with contacts and interacts with the

CEC. According to the respondent, thanks to the work of the full-time epidemiologist, 100% of household contacts are identified and examined in the Naryn Region.

> *"In our practice, we have observed that the CEC simply comes and goes, and our epidemiologist works efficiently and thoroughly with contacts in accordance with the Order of the Ministry of Health of the Kyrgyz Republic No. 429. There is a general order of the Ministry of Health on optimization; each program management department should include a full-time epidemiologist, a head of the department, TB specialists depending on the population size, a laboratory specialist, and an IT specialist. It is unknown whether other regions follow this order, but we have a fully staffed staff. We recommend that each region hire an epidemiologist" (Respondent from Naryn Region)*

A full-time epidemiologist is a successful practice that facilitates faster detection and examination of contacts. However, a difficulty has been identified in the work of a full-time psychologist that cannot be resolved by the regional TB control center. The fact is that, according to the Order of the Ministry of Health of the Kyrgyz Republic No. 429, an epidemiological investigation upon detection of a TB case must be conducted within 14 days, the information must be transferred to the family doctor and TB doctor, and all contacts must be sent for appropriate examination. These regulated deadlines are successfully met in most cases, excluding hard-to-reach or remote areas. **The Naryn regional center does not have the funds to cover the transportation costs of an epidemiologist to visit foci in hard-to-reach settlements.** In such cases, the epidemiologist leaves with a monitoring team, which is carried out once a quarter, and, accordingly, the deadlines for the epidemiological investigation are not met. This circumstance delays the entire process of examination of people affected by TB and their registration. The respondent noted that **it is necessary to solve this problem** and allocate funds so that the epidemiologist can work with contact people in a timely manner.

Because of the fear of being judged for having TB, patients often try to register not at their place of residence and claim that they live alone and have no contacts. Only quality conversation helps the patient to open. Sometimes even an epidemiologist fails to conduct such a conversation, and then the TB doctor tries to establish a trusting relationship and find out with whom the patient is in contact. According to the respondent, such work would be significantly facilitated by **a psychologist.**

> *"For example, there was one patient who flatly refused to disclose contacts. But we tried to explain the seriousness of such consequences, what this could lead to. Then he understood and told everything, but it takes a lot of time. Usually, contacts are disclosed within 10 days" (Respondent from Naryn Oblast, medical worker)*

The respondent complained about the lack of a tomograph in the Naryn Regional TB Center. When such an examination is required, patients are forced to go to the NCP in Bishkek and incur time and financial losses. Such trips also affect the timing of the examination and treatment. **The NTC needs a tomograph to avoid additional expenses for patients and an increase in the diagnostic time**. The respondent suggested an alternative idea of concluding a partnership agreement on cooperation with private clinics to provide patients with the opportunity to undergo this procedure in a private institution, subject to the costs being covered

by the state. However, the TB Center does not have the right to finance the procedure, so such an agreement should be drawn up by the FMC and, accordingly, cover the patients' costs. This issue can be discussed jointly with local government bodies, which, according to the respondent, have a separate budget item to cover the transportation costs of families in the TB Center. But instead of covering transportation costs, funds can be used to cover the patient's costs associated with CT in a local private institution, which will save time and time for registration for treatment.

The respondent suggested **involving NGOs to conduct information work with the population,** as well as outreach work. According to him, other regions have such practices, but in Naryn Region there are no NGOs that would engage in such activities.

According to the respondent, the population needs routine information about TB. For these purposes, the One Impact mobile application is actively promoted in the Naryn region. It contains detailed information about TB, patient rights, medical institutions that deal with TB treatment issues, and through this application you can contact a consultant for help. As part of the promotion of this application, patients can receive a food package and seek psychological support or legal assistance. In addition to the application, the National Center for TB Prevention (NCBT) conducts information campaigns dedicated to TB Day, including information Sessions on TB prevention among the population. In addition, the National Center for TB Prevention (NCBT) informs the population about TB when visiting each district with an intelligent X-ray. According to the respondents, these measures are not enough, and it is necessary **to strengthen information work with the population.**

Additional training on the new PTT guidelines is needed for all district TB specialists. The respondent considers the training provided by the NCP to be insufficient.

The respondent recommended that the NCP **develop an electronic database for PTT** that would contain information only on contacts, indicating the index case, a list of its contacts, and a detailed description of interactions with patients. The current electronic forms contain scant data on a single examination of contacts. A separate electronic database for PTT should contain the entire history of observation of contacts over 2 years.

> *"Our database lists contacts and indicates information on a single examination. And we have to observe them for 2 years. For example, there is nowhere to enter the second examination. All information on monitoring contacts should also be in the electronic database. And it will be easier for us to collect information from other pediatricians"*
> *(Respondent from Naryn Oblast, medical worker)*

Osh region:

The respondent's main recommendation for improving work with contact people is **to improve monitoring of patients** taking PTT. Family doctors should provide timely and comprehensive consultations on TB issues, be able to meaningfully answer patients' questions, respond to complaints about side effects and give effective recommendations for their relief. Doctors should also monitor the intake of chemoprophylaxis drugs. In this context, it may be necessary to consider **the introduction of video-controlled treatment** to ensure that the patient takes the drugs on time and regularly.

Since the child population is currently undergoing preventive treatment, the respondent pointed out **the** need **to organize a children's sanatorium for patients taking PTT drugs.** According

to the respondent, parents do not refuse treatment, but the regularity of administration and the fact of taking the drugs remains questionable, since doctors do not check whether parents actually give the drug to their children or not. The regularity of administration is affected by the composition of the family at the time of treatment. The respondent is sure that in families where the child's parents are in migration, guardians do not show interest in timely administration of drugs. In this regard, children's sanatoriums for children from migrant families would be useful, since the child can receive full care and be constantly under the supervision and control of a medical worker. The respondent believes this idea is also relevant because the process of introducing new combined PTT drugs is underway, the action and side effects of which are still poorly studied in the country. The children's sanatorium will allow children taking new PTT drugs to be kept under constant supervision of medical personnel who will be able to provide timely assistance to relieve side effects.

In addition to undergoing basic tests for the appointment of PTT, some patients need to undergo CT if the X-ray shows a controversial result. In this case, patients in the Osh region independently bear the costs of undergoing a CT scan, which reaches 3,000 soms. For many patients, this amount is burdensome and affects the decision to continue the examination. To ease the economic burden, **it is necessary to consider the issue of covering the costs of patients undergoing a CT scan.**

Batken region:

The respondent indicated **the need for refresher training on the new PTT guide.** According to him, not all doctors in the region were able to complete the one-time training organized by the NCP, many did not study the new information. As for himself, the respondent said that he looked through the guide himself but had many questions. In addition to what was said, it turned out that the respondent did not prescribe PTT this year, including for children under 5 years old, even with a positive Mantoux test.

According to the respondent, the population of the region has become more informed on tuberculosis issues and conscious about treatment. According to his observations, people are not afraid to talk about the disease, deliberately do not attend mass activity, because they do not want to infect others. However, incorrect judgments are also observed, this indicates that it is necessary to **strengthen information work with the population and conduct high-quality conversations with patients.**

> *"For example, patients sometimes self-isolate. It is necessary to explain that if they take medications for more than 2 weeks, there is no cough, the patient is no longer dangerous" (Respondent from Batken region, medical worker)*

The respondent noted that in his practice in recent years, there have been no problems with patients subject to PTT, since patients generally did not refuse preventive treatment when it came to the health of children. However, close attention is required for patients who refuse vaccines and inoculations, including the BCG vaccination, as well as anti-tuberculosis treatment for religious reasons. **It is necessary to involve imams and other religious figures who would correctly cover health issues for the population.**

4 Discussion of results

Preventive care is an important aspect of modern medicine aimed at preventing diseases and improving quality of life. In recent decades, there has been a growing interest in this area, due to the increasing incidence of chronic diseases and the aging population (WHO, global report, 2023). This study examines key factors influencing the expansion of preventive care in the Kyrgyz Republic by 2024, including social, economic, medical and technological aspects.
It should be emphasized that the study of factors influencing the expansion of chemoprophylaxis coverage in the Kyrgyz Republic is being conducted for the first time. In 2022, a cohort analysis of the cascade of care for contact children in Bishkek was carried out. The results revealed low coverage of PTT among the 2021-2022 cohort (Kadurov et al., 2023). The results of this study can serve as an evidence base for the development of scientifically based and effective strategies and approaches aimed at increasing the coverage of chemoprophylaxis among children in the Kyrgyz Republic.

The analysis of the study results revealed several significant factors influencing the coverage of TB preventive treatment. First, social factors such as education of parents or guardians (p - value – 0.04, OR = 0.7; CI = 0.6–0.9), awareness of PTT (p - value – 0.001, OR = 2.5; CI = 1.3–4.7), internal and external migration (p - value – 0.004, OR = 3.8; CI = 1.5–9.5) played a significant role in the expansion of preventive treatment. It is necessary to take this aspect into account when counseling and to explain the consequences of interrupting chemoprophylaxis as early and in detail as possible. Raising public awareness of health and disease prevention promotes active involvement of people in prevention programs. Earlier counseling of parents or guardians at the early stages of examination and diagnosis of contact children can significantly increase the motivation to start chemoprophylaxis. Research shows that educational campaigns and information programs can significantly increase participation in preventive activities. Social media and communities influence people's motivation to take care of their health, which also stimulates demand for preventive services. (Jenkins, H. E. et al. 2017). Cultural characteristics also play a significant role, such as religiosity (p - value – 0.001, OR = 3; CI = 1.5–6) and patriarchal family foundations (p - value – 0.001, OR = 3.2; CI = 1.7–6) negatively affected the coverage of PTT. Communication strategies should be developed taking into account the individual characteristics of each family of contact children, which will increase the effectiveness of information and involvement in the process of chemoprophylaxis.

Secondly, economic conditions Also influence on availability and spreading preventive treatment. The need to pay for travel (p - value – 0.01, OR = 0.5; CI = 0.3–0.9) and the availability of public transport (p - value – 0.03) also had a statistically significant relationship with PTT coverage. In countries with low And average income access To preventive services often limited because of lack of financing And resources. Economic barriers such How Affordability, cost of services, and transportation costs for screening and diagnosis may prevent people from receiving the necessary preventive measures (World Bank, 2022). Meanwhile, as our study showed, transportation costs and necessary CT scan costs incurred by patients during diagnosis and treatment also place a heavy burden on patients with poor economic status.

Third, in the context of the medical aspect, the expansion of preventive treatment is due to the need to develop short-term therapy regimens and liquid forms of drugs (CDC, 2021). The study demonstrated that prolonged use of chemoprophylactic agents for 6 months in tablet form creates significant difficulties in motivating patients and maintaining adherence to long-term treatment, especially among children under 5 years of age.
In addition, systemic barriers that arise in the process of diagnosing and prescribing chemoprophylaxis for tuberculosis can significantly reduce the effectiveness of measures to control this infectious disease. Complex and multi-stage diagnostic algorithms, which include such stages as laboratory tests, X-ray examinations and specialist consultations, can lead to significant delays and patient refusals from a full examination. The results of the study demonstrate long and labor-intensive diagnostic procedures that can cause patients to feel tired and frustrated, which, in turn, leads to a refusal of further examination. Patients often do not realize the importance of each stage of diagnostics, which reduces their motivation to follow the recommendations of health workers. Limited access to medical institutions, the presence of queues for examinations and a long wait for results, the lack of waiting conditions also acted as significant barriers. To overcome these difficulties, it is necessary to simplify diagnostic algorithms, improve patient information about the diagnostic process and its importance (Datiko, D. G et al. 2017).

Another aspect is technological progress that Also provides significant influence on extension preventive treatment. The study revealed the active use of the Internet as a source of information, where contraindications for isoniazid include restrictions for children under 3 years of age, as well as a lot of different unverified information that is not based on evidence. Therefore, it is important to develop online resources, such as mobile applications for people affected by TB, where reliable information will be offered. Development telemedicine and mobile applications For health does preventive services more accessible For wide audiences. These technologies allow patients receive consultations And recommendations By prevention diseases without necessity visits medical institutions (Van Ginderdeuren, E. et al . 2021).

Additionally, a statistically significant factor influencing the coverage of tuberculosis preventive treatment (TPT) is the stigmatizing, condemning and accusatory attitude towards patients with tuberculosis in the part of society in general and the close environment in particular. This factor practivity the disclosure of contacts, reduces motivation and commitment to chemoprophylaxis. There are cases of refusal to be hospitalized and provide detailed information about the disease, which leads to interruptions and cessation of drug intake. Additionally, negative experiences of interaction with medical personnel undermine patients' trust and their willingness to follow recommendations for prevention and treatment (Belgaumkar, V. et al. al. 2018).

Extension preventive treatments are multifaceted processes, which influence various factors. Social, cultural, economic, medical and technological aspects interact Friend With friend, creating obstacles For development preventive medicine in Kyrgyzstan.

4.1 Limitations of the study

This study has several limitations that need to be considered when interpreting the results. First, the lack of an automated electronic database of contacted children limited the ability to obtain complete information on the cascade of services for tuberculosis (TB) preventive treatment. This

made it difficult to analyze delays in testing, determine the date of consultations, exclude active TB, and estimate the number of children who did not complete the full diagnostic and examination algorithm. In addition, limitations included refusals to participate in the survey by respondents who also refused chemoprophylaxis or certain types of examination, which could affect the statistical reliability of the study results. The time frame of the study limited the ability to increase the sample size by involving more respondents not covered by PTT, as well as to expand the study objectives. Thus, the objectives of the study also did not include assessing the quality of PTT intake, adherence and continuity of chemotherapy.

5 Conclusions

The results of the survey and qualitative interviews were analyzed during the study. The main conclusions and recommendations based on the objectives of the study are presented below.

Objective 1. To assess the level of knowledge about tuberculosis and preventive treatment among parents of contact children subject to PTT.

The level of knowledge about TB is equally distributed between the study groups and demonstrates quite high knowledge about TB in both groups, with the exception of ways of protection against TB. However, knowledge about chemoprophylaxis demonstrated statistically significant differences (p- value < 0.001) and correlated with the coverage of PTT, since the group of respondents covered by PTT was more aware of the importance, the purpose of preventive treatment, and the consequences of refusing chemoprophylaxis.

Objective 2. To study the factors influencing the expansion of preventive treatment coverage.

Factors such as migration status (OR = 3.8; CI = 1.5–9.5), religiosity (OR = 3.0; CI = 1.5–6.0), patriarchal family structures (OR = 3.2; CI = 1.7–6.0) and incomplete information (OR = 4.3; CI = 1.6–11.9) turned out to be statistically significant factors influencing PTT coverage and increasing the likelihood of refusal or interruption of chemoprophylaxis.

Parental education level (OR = 0.7; CI = 0.6–0.9), awareness of PTT (OR = 0.5; CI = 0.3–0.9), and availability of public transportation (OR = 0.5; CI = 0.3–0.9) reduce the likelihood of PTT refusal and interruption.

Objective 3. To identify the needs and requirements of people affected by TB in relation to improving the support system and educational programs in the field of TB.

1. **Social factors**

   Public awareness: Low public awareness of tuberculosis and its prevention methods make early detection and chemoprophylaxis difficult. Knowledge of the goals and importance of tuberculosis preventive treatment influences its coverage and effectiveness.

   Stigma: People affected by TB face stigma and judgment, which leads to reluctance to disclose contacts and engage with health care providers. Concealment of contacts hinders active identification and prompt involvement of exposed children in PTB care.

   Migration: frequent changes of residence and labor migration were interconnected and had a negative impact on the coverage of PTT.

2. **Cultural norms of behavior**

   Patriarchy and gender inequality have a negative impact on the expansion of PTT, young women living with their husband's family are the most vulnerable to treatment and chemoprophylaxis of TB.

   Increased religiosity may reduce trust in scientific and medical interventions. Among people who are not covered by preventive treatment for tuberculosis, the proportion of those who adhere to religious beliefs and patriarchal family values is significantly higher.

3. **Economic forces**

   Funding: There is a need to cover transport costs for full screening of exposed children and early diagnosis of TB. Availability of public transport and road charges were statistically significantly associated with PTT coverage.

   Resources from government funding are limited (transportation costs for conducting epidemiological investigations to identify contact people in the regions).

4. **Medical aspect**

   Duration of prophylactic treatment: prophylactic treatment takes several months, which

sometimes makes patients reluctant to adhere to such a long regimen. One of the significant factors influencing the choice of treatment strategy is **the duration of the PTT course** and **the form of drug administration.**

Side effects of drugs are one of the leading reasons for refusing preventive treatment for tuberculosis. Most often, patients report adverse reactions to drugs, difficulties in stopping them, as well as insufficient access to qualified medical advice.

5. **Systemic barriers**. Order of the Ministry of Health of the Kyrgyz Republic No. 429 of June 13, 2018 and the "Guidelines for the diagnosis and preventive treatment of tuberculosis infection" (1st edition, 2023) revealed inconsistencies and the lack of a unified approach to filling out registration forms and managing contact children.
6. **Accounting and reporting**. The accounting system lacks an effective mechanism for monitoring PTT, as well as registration of information on the issuance of drugs (quantity, doses, dates). Heterogeneity in approaches to the appointment of preventive treatment for tuberculosis infection (PTTI). The reporting forms do not have a single unified criterion for reporting persons subject to PTT, and the system for prescribing chemoprophylaxis also requires increased attention from the national program and the NCP.
7. **Automation of processes.** The need to automate and digitalize accounting processes. The introduction of an electronic patient registration database for the purpose of conducting regular cohort analysis will improve the monitoring and management of tuberculosis cases, increasing efficiency and ensuring higher quality of medical care.
8. **Need for detailed training of TB doctors and family group physicians on PTT**. The results revealed a high need for in-depth training of medical personnel, including TB doctors and family group physicians, on issues of preventive treatment of tuberculosis infection (PTT). In remote areas, there is **an insufficient level of training of health workers** on issues of stopping adverse activity and the specifics of managing patients with tuberculosis.
9. **Difficulties in conducting diagnostic measures.** The diagnostic algorithm, as well as the process of taking tests and undergoing medical examinations, remain complex for contact children, which may contribute to delays in identifying active TB, refusal of further examination and timely initiation of chemoprophylaxis.
10. **Access to the full range** of examinations (median and lateral tomography, QuantiFERON or diaskintest) is limited due to the lack of necessary infrastructure and material and technical base in the regions.
11. **Psychological support** for people affected by TB and their families is a pressing issue for expanding the coverage of PTT. The results show that every third respondent experiences guilt and shame due to TB disease, as well as fear of condemnation and rejection by society.

6 Recommendations

1. **Information campaigns and health education work among the population**
   Activity:

- Promotion of educational programs aimed at raising public awareness of tuberculosis, its prevention and treatment. Particular attention should be paid to a detailed explanation of the goals and objectives of PTT, the consequences of refusing chemoprophylaxis, the need for continuous medication and compliance with the treatment regimen.
- Development of materials for wide distribution (booklets, videos, infographics) considering the cultural characteristics and educational level of the target audience (with the involvement of religious leaders and people, NGOs, communities of people affected by TB).
- Social and educational work to reduce the stigma of the disease, as well as ensuring confidentiality and supportive information for patients.
- Establishing interactions with local religious community leaders to explain the importance of TB prevention, which helps increase public confidence in PTT programs.

2. **Early counseling considering sociocultural characteristics**
   Activity:

- Counseling on TB chemoprophylaxis should be offered at the earliest stages of the diagnostic algorithm and evaluation of exposed children.
- Early counselling of parents should be organized considering their level of education, religious beliefs and family status.
- Particular attention should be paid to young women living in married families, as they are more often faced with limited opportunities to make independent decisions, especially regarding the treatment and chemoprophylaxis of children.

3. **Quality counseling, psychological support and training**
   Activity:

- Psychological support should be provided to people affected by tuberculosis, as well as to family members who refuse chemoprophylaxis and do not accept their diagnosis. Psychological counseling can help change behavior toward increased adherence to treatment and decreased psychological resistance to medical interventions.
- Psychosocial counseling for all family members with a focus on supportive empathic mood and thinking.
- Conducting training and seminars for doctors with an emphasis on an individual approach to patients and communication with families.
- Ensure continuity of services, referrals and coordination between health facilities to ensure timely dispensing of medications prior to planned migration of families.

Recommendations to improve access to diagnostics and infrastructure

4. **Optimization of the algorithm and process of diagnostics and examination**
   Activity:

- Implementation and expansion of an electronic registration system for taking tests and undergoing examinations, which will reduce waiting times and increase the availability of medical services.
- Allocation of funds by local governments to compensate for transportation costs for patients, which is especially important for low-income families.
- It is necessary to optimize and streamline examination procedures. Create comfortable waiting conditions for patients, including equipping medical institutions with benches, a rest area and an electronic queue system.
- It is necessary to optimize the work schedule of X-ray rooms, allocating additional time for examinations of children. This will increase the availability of diagnostics, reduce waiting times and ensure timely detection of tuberculosis among the child population.

5. **Development of technological approaches**
   Activity:

- Development and implementation of telemedicine platforms for remote consultation and coordination of actions of medical specialists. This will speed up diagnosis and prescription of preventive drug therapy (PTT).
- Organization of telemedicine consultations to discuss complex cases, which will improve the efficiency and quality of medical interventions.
- Integrating contact TB preventive therapy into apps for people affected by TB.

6. **Improving the availability of services**
   Activity:

- Formation of mobile teams to conduct mobile screening in hard-to-reach or remote areas.
- Organization of online consultations to increase the availability of medical care in cases of relief of side effects or other patient issues.

7. **Coordination, control and development of clear and unified criteria**
   Activity:

- Review the current regulatory legal acts, synchronize and minimize discrepancies between the current orders of the Ministry of Health of the Russian Federation.
- Appoint a **childhood tuberculosis coordinator** responsible for effective monitoring and supervision of the quality of preventive treatment in exposed children.
- Establish uniform standards for filling out accounting and reporting forms (criteria for those subjects to PTT), workflow instructions, information training materials for doctors, and procedural standards.
- Introduce digitalization and automation of accounting to improve the quality of monitoring and cohort analysis of data.
- Increasing the capacity of medical staff, district phthisiologists during monitoring and at work.
- Develop a training module and implement individual training materials (ITM) that will help improve the quality of diagnostics and treatment, as well as increase the level of knowledge of doctors in modern PTT methods.
- Additional training and support for TB specialists and family medicine doctors is required to improve the quality of treatment in remote regions, especially in terms of side effects.

8. **Harmonization of criteria at all levels of healthcare**
   Activity:

- Ensuring the harmonization of developed criteria for contacts subject to chemoprophylaxis and criteria for the appointment of PTT between all levels of medical institutions, including primary care, specialized clinics and tuberculosis care centers.
- Conducting training seminars for healthcare professionals on the application of new standards to minimize discrepancies and subjective approaches to the appointment of PTT.

9. **Monitoring and quality control of PTT**
   Activity:

- The introduction of individual contact patient cards for the purpose of recording and systematizing data on PTT (dispensing of drugs, doses and dynamics of administration) will improve monitoring and ensure more accurate documentation.
- Expanding the practice of video-controlled preventive treatment in all regions.

7 Conclusion

Barriers to TB preventive treatment are multifactorial and require a comprehensive approach to overcome them. Effective TB control requires collaboration between governments, non-governmental organizations and the community at large to ensure access to essential health services.

To successfully combat tuberculosis, it is necessary to remove these barriers by improving access to medicine, strengthening public awareness programs, providing psychology support, increasing funding, and more effectively managing prevention programs.

8 Glossary

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis.

Preventive treatment of tuberculosis infection (PTTI) is a therapeutic measure aimed at preventing the development of an active form of tuberculosis in individuals with latent tuberculosis infection.

Latent tuberculosis infection (LTBI) is a condition in which a person is infected with Mycobacterium tuberculosis but does not develop disease and has no symptoms. People with LTBI are not infectious but may develop active disease in the future.

Active TB is a disease in which the TB bacteria are actively multiplying and causing symptoms such as cough, weight loss, night sweats, fatigue, and fever.

Mycobacterium tuberculosis is the bacteria that causes tuberculosis. Usually it is Mycobacterium tuberculosis, but there may also be other species such as Mycobacterium Bovis and mycobacterium africanum.

The risk of developing active TB is the likelihood that a person with latent TB infection will develop clinically apparent disease, especially if the immune system is weakened.

PTT coverage is the percentage of individuals who received preventive treatment out of those diagnosed with latent TB infection and who are eligible for therapy.

Screening for tuberculosis is a set of diagnostic measures aimed at the early detection of individuals with active or latent tuberculosis, including the use of tests and radiography.

Medical control is a system for monitoring the health status of patients undergoing treatment for tuberculosis or its preventive therapy to assess the effectiveness of treatment and prevent the development of side effects.

Epidemiological investigation is a system of collecting, analyzing and evaluating data on tuberculosis incidence, aimed at identifying trends in the spread of the disease and developing preventive measures.

Anti-tuberculosis drugs are medicines used to treat and prevent tuberculosis.

Tuberculosis test (TT) is a diagnostic method that includes the use of various tests such as the Mantoux test, mycobacterial susceptibility tests or molecular methods to detect infection.

9 List of figures and tables

Drawings:

10 References

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