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# STRENGTHENING TUBERCULOSIS CONTROL IN UKRAINE

FINAL REPORT



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**Cover photo:** Directly Observed Therapy (DOT) nurse Kateryna Dudnyk from Lysychansk provides her patient with his daily dose of TB drugs. With the USAID support, patient-oriented TB control has become a reality in Ukraine (Credit: Volodymyr Lermontov, under ACSM grant issued by USAID Strengthening TB Control in Ukraine project)

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# CONTENTS

<b>Acronyms</b> .....	<b>iii</b>
<b>Executive Summary</b> .....	<b>1</b>
<b>Overview and Context</b> .....	<b>3</b>
Background of the Tuberculosis Burden in Ukraine .....	3
Strengthening Tuberculosis Control in Ukraine .....	3
<b>Methodology</b> .....	<b>7</b>
<b>Results and Accomplishments</b> .....	<b>11</b>
TB Symptoms Detection and Referral System .....	11
Capacity Building of Primary Health Care Providers in TB Case Detection and the Patient’s Pathway for Further Referral .....	11
Improving TB Infection Control at the Primary Care Level .....	14
Laboratory Diagnostics .....	14
Involvement of Social Services and Civil Society into Work with Hard-to-Reach Populations, Detection of TB Symptoms, and the Referral Process .....	16
Informational Campaign for General Population and TB-Affected People .....	17
Rapid Diagnostics and Quality Diagnosis .....	21
Introduction of Rapid and Effective Methods of Bacteriological and Molecular TB Diagnosis .....	21
Integration of Evidence-Based Diagnostic Approaches to Diagnose TB and HIV ...	23
Upgrading Skills of Laboratory Specialists .....	28
Better TB Treatment .....	28
Introducing Outpatient TB Treatment .....	29
Involvement of the Non-Medical Sector in Patient Support and Increasing Treatment Adherence .....	33
Fast Start of Proper TB Treatment, Including MDR-TB .....	35
Optimization of Drugs Management .....	36
Prevention of New TB Cases .....	37
Development of Safe Medical Environment (TB Infection Control) .....	37
Contact Tracing .....	38

Isonizid Preventive Treatment and Co-Trimoxazole Preventive Treatment for Patients with TB/HIV .....	40
Information Campaigns for General Populations, Training for NGOs and HCW ..	40
Monitoring and Evaluation.....	42
Ongoing Analysis of National TB Program Performance .....	42
Exchange of Experiences, Analysis, and Discussion .....	43
Operational Research .....	44
Sustainability .....	44
Strengthening the TB Control System in Ukraine .....	44
Provided National Protocols on TB, TB/HIV and Cough, MOH Orders, Recommendations, and Guidelines.....	45
Building Human Resource Capacity .....	45
Center of Excellence.....	47
<b>Lessons Learned and Recommendations .....</b>	<b>51</b>
<b>WHY ON-THE-JOB TRAINING? .....</b>	<b>53</b>
<b>ACCELERATING THE START OF APPROPRIATE TB TREATMENT IN ODESA .....</b>	<b>54</b>
<b>ANNEX A. SELECT DOCUMENTS DEVELOPED UNDER THE STBCU PROJECT .....</b>	<b>55</b>

# ACRONYMS

ACSM	Advocacy, communications, and social mobilization
ART	Anti-retroviral therapy
CMCB	Central Medical Counseling Board
CoE	Center of Excellence
DOT	Directly observed treatment
DRS	Drug resistance survey
EQA	External quality assurance
GoU	Government of Ukraine
HIV/AIDS	Human immunodeficiency virus/Acquired immune deficiency syndrome
HCW	Health care worker
IC	Infection control
IPT	Isoniazid prevention treatment
M&E	Monitoring and evaluation
MDR-TB	Multidrug-resistant tuberculosis
MoH	Ministry of Health
NTP	National Tuberculosis Program
OR	Operational research
PITC	Provider initiated testing and counselling
PHC	Primary health care
PLHIV	People living with HIV
R&R	Recording and reporting
SES	State Sanitary and Epidemiological Service
SOPs	Standard operating procedures
STbCU	Strengthening Tuberculosis Control in Ukraine
TA	Technical Assistance
TAG	Technical Assistance Group
TB	Tuberculosis
TIRC	TB Training and Information Resource Center
VCT	Voluntary counseling and testing



# EXECUTIVE SUMMARY

In this final report of the Strengthening Tuberculosis (TB) Control in Ukraine (STbCU) project, which was USAID's flagship program for TB Control in Ukraine during 2012-2017, we present and describe the project's achievements, along with the major changes in the TB and TB/HIV care services in Ukraine that took place with the help of STbCU technical assistance.

The project's goal was to improve the health of Ukrainians by enabling the Government of Ukraine to decrease the burden of TB through quality assurance and systems strengthening measures for routine TB, multi- and extensively drug resistant TB (MDR and XDR) TB, and TB/HIV co-infection services.

STbCU planned all activities with the intention of improving services needed along the TB and TB/HIV patient care pathway, bringing services closer to the patient and making them accessible to all, regardless of socioeconomic status. This report is structured according to the patient-oriented pathway to reflect and emphasize changes that took place in TB services from the patient's point of view.

The report discusses methodologies used by STbCU in daily activities, along with the pros and cons of different methods. Some methodologies applied by STbCU were innovative for Ukraine: developing the capacity of local specialists through cascade training, introduction of a new self-education method via online training, introduction of self-assessment questionnaires to improve the quality of services in health facilities, and involvement of non-medical sector actors in patient support and increasing treatment adherence through small grants.

The main part of the report discusses results that STbCU achieved over the life of the project. Working at the national and regional level, the project expanded replicable models of TB control measures already underway in the USAID-supported regions.

STbCU's technical assistance led to a fundamental mind-shift among Ukraine's health authorities in favor of ambulatory TB treatment, and committed decision makers at national and local levels have begun to revise their approaches and programs. Moreover, patient-centered TB case management, which integrates ambulatory care and effective TB patient support, became a key element of the concept of new National TB Control Program 2017-2021.

STbCU contributed to development of the national infection control (IC) regulations through revision of the law titled "On ensuring sanitary and epidemic wellness of the population," specifically, of the provisions related to IC and medical waste management. The project's recommendations were accepted and incorporated. The law provided the

legal framework for introduction of proper IC measures at TB facilities, AIDS Centers, and PHC facilities.

The Training and Information Resource Centre (TIRC), established and launched by STbCU, became a part of the Ukraine Center for Disease Control (UCDC) portal: [www.tb.ucdc.gov.ua](http://www.tb.ucdc.gov.ua). It is the first large-scale Ukrainian resource on TB that combines interactive learning opportunities, a large library, and a meaningful platform for practitioners to communicate online. For the first time ever in Ukraine, STbCU also produced educational films on TB-related topics for various audiences. A range of STbCU-produced educational films, video training courses and video life stories of TB survivors are now available through TIRC.

STbCU also ensured implementation of an effective external quality assurance (EQA) system for smear microscopy. With technical assistance from STbCU, UCDC and the National Reference laboratory developed national EQA regulations based on WHO-recommended standards for EQA procedures, including annual testing, specifying the number of slides in a panel, employment of all techniques by EQA, and repeated EQA in case of poor lab performance. The MoH endorsed these regulations in June 2016.

This report also discusses the main lessons learned by STbCU over the five years of implementation and offers recommendations about building sustainable efficient and effective TB responding environment.

## SECTION I

# OVERVIEW AND CONTEXT

## BACKGROUND OF THE TUBERCULOSIS BURDEN IN UKRAINE

Ukraine is one of the largest countries in the Eastern Europe, with a population of more than 42 million people. Twenty-five years ago, Ukraine claimed its independence from the Soviet Union and started its way as a democratic state.

The Ukrainian poet Taras Shevchenko described his country thus: “Ukraine is rich, Ukraine is beautiful, and the God gave the Ukrainian people the greatest treasure in the world — land, and in return gave hard fate (plight) with many challenges.” In the modern day, one of these challenges is tuberculosis (TB).

TB, along with HIV infection, remains a considerable problem in Ukraine. Ukraine is among the 27 countries in the world with the highest MDR-TB burden. In 2016, the WHO reported that out of 30 countries with high MDR-TB burden, only four had their incidence increase by 20 percent or more: China, Nigeria, the Philippines, and Ukraine.

Ukraine’s National TB Program (NTP) has adopted the Stop TB Strategy, but various barriers have contributed to the insufficient implementation of several components. As in Soviet times, hospital-based TB treatment continues to be prioritized over outpatient approaches. TB care is still financed through a rigid methodology based on historical three-year budget allocations and the number of occupied TB beds. Finally, provision of directly observed therapy (DOT) is lacking and patient social support is limited.

Despite strong TB-related international technical assistance and significant international funding for TB control programs, Ukraine has yet to fully and adequately implement international recommendations. There is still a need to reduce hospitalization for TB patients, standardize TB ambulatory treatment within primary health services, implement TB patient-centered approaches with provision of integrated medical and social services, and provide essential patient support. The main barrier in shifting from in-patient to outpatient TB-related services is a rigid funding model based on the number of hospital beds in a given facility. Moreover, the vertical TB control service benefits hospitalization-based funding, despite bad and even dangerous conditions in hospitals in terms of infection control and staffing resources. Nevertheless, the current economic crisis and ongoing health reform are challenging the old-fashioned, hospital-based TB service in Ukraine to the point that the idea of ambulatory TB treatment has become increasingly acceptable to the health authorities.

## STRENGTHENING TUBERCULOSIS CONTROL IN UKRAINE

Funded by the United States Agency for International Development the Strengthening Tuberculosis Control in Ukraine (STbCU) project, implemented by Chemonics International Inc., with Project HOPE and the Global Tuberculosis Institute (GBTI) at

Rutgers, the State University of New Jersey, was designed to improve the quality of routine health services and reduce the burden of TB in Ukraine.

The project's goal was to improve the health of Ukrainians by enabling the Government of Ukraine to decrease the burden of TB through quality assurance and systems strengthening measures for routine TB, multi- and extensively drug resistant TB (MDR and XDR), and TB/HIV co-infection services. Working at the national and regional level, the project expanded replicable models of TB control measures already underway in the USAID-supported regions. Over the course of the project, STbCU worked to assure quality DOTS-based TB services, introduce new state-of-art technology in laboratory diagnostics and infection control, improve patient adherence to treatment, and support a range of TB system-strengthening interventions.

In 2012, the project started working in 10 USAID-supported regions, including Donetsk, Dnipropetrovsk, Kharkiv, Kherson, Luhansk, Odesa, the Autonomous Republic of Crimea, and the cities of Kyiv and Sevastopol. The annexation of Crimea in March 2014 made it impossible to continue working in two of STbCU's regions: Sevastopol City and the rest of the Autonomous Republic of Crimea. All activities in Crimea were concluded by the end of March 2014. The security situation in Ukraine beginning January 2014 has also put on hold project activities in Donetsk and Luhansk, two regions most affected by TB. By the end of 2015, STbCU expanded services to Lviv and Kirovohrad oblasts — two regions with high and medium levels of TB burden.

The tasks, as outlined in USAID's contract for the project implementation are as follows:

- Improve the quality and expand availability of the WHO-recommended DOTS-based TB services.
- Create a safer medical environment at the national level and in USAID-supported regions.
- Build capacity to implement programmatic management of multi-drug resistant/extensively drug resistant TB at the national level and in USAID-supported regions.
- Improve access to TB/HIV co-infection services at the national level and in USAID-supported regions.

STbCU provided technical assistance, training, and equipment and commodities to assist Ukraine in improving the quality, scope, and coordination of TB health services. By incorporating modern quality improvement techniques and evidence-based international standards into ongoing reforms of TB control methods, the project improved its management, clinical guidelines, and implementation of health services related to TB and TB-HIV co-infection, as defined by the World Health Organization (WHO)'s STOP TB Partnership. An essential part of this process was ensuring that all the elements of

successful DOTS service delivery are in place, including trained personnel, reliable drug supply and supply chain, equipped laboratories, patient outreach and adherence, and surveillance, monitoring, and reporting systems. This work built on achievements and lessons learned from current TB control programs worldwide and within the region.

The STbCU activity focused on strengthening management capacity for TB drug procurement, stock-keeping, and distribution; thereby ensuring that TB first- and second-line drugs are received in accordance with WHO-approved protocols. This project also provided technical assistance to reach HIV/TB co-infected patients.



## SECTION 2

# METHODOLOGY

To achieve these goals, STbCU worked at the national and regional level.

At the national level, the project supported the Ministry of Health (MoH) of Ukraine to create a supportive legal environment for implementation of improved DOTS-based programs based on international recommendations. Through participation in the MoH Technical Assistance Groups, project specialists contributed to updating national guidance documents, including the National TB and TB/HIV Clinical Protocols, the National Guidelines on Cough Management, the MoH Order on Ensuring TB Laboratories Quality, and the National TB Program for 2017-2021. Working closely with the government, our specialists ensured that the documents incorporated all of STbCU's recommendations, which were based on the World Health Organization (WHO)'s STOP TB Partnership guidelines.

STbCU also promoted effective cooperation with the Ukrainian Center for Disease Control (UCDC), the primary state actor responsible for implementing national TB control policy. This partnership was especially effective in coordinating efforts with local counterparts while implementing the project's tasks, including incorporating all elements of successful DOTS service delivery and infection control into the routine practices of local TB dispensaries, primary health care (PHC) facilities, and AIDS centers.

STbCU closely collaborated with the WHO to achieve several goals, including the implementation of Ukraine's first pilot drug-resistance survey (DRS) in Kharkiv and Kherson oblasts, developed outpatient TB treatment models in accordance with WHO guidelines, and jointly developed a Roadmap on Infection Control for the 2017-2021 National TB Program.

To complement and achieve the project goals, STbCU cooperated and coordinated with several local partners, including other USAID projects working in HIV and TB reform, local NGOs, and private partners. This approach increased the reach of project activities while strengthening the community of practice around TB control in Ukraine.

Local partnerships enhanced the project's work and provided opportunities to create more appropriate interventions for TB and TB/HIV case management. Assisted by local partners, the project introduced evidence-based practices and scaled up replicable models of TB prevention and control measures to the other USAID-supported regions. To achieve these goals, STbCU applied the following methodologies: developing the capacity of local specialists through training, cascade training, and mentoring visits; introduction of a new self-education method via online training; introduction of self-assessment questionnaires to improve the quality of services in health facilities;

involvement of non-medical sector actors in patients support and increasing treatment adherence through small grants; advocacy and roundtable meetings with the field health managers to improve evidence-based decision making on TB control; and targeted communication with patients, their families and friends, health service providers, and the broader public.

STbCU's approach to increasing institutional capacity involved mentorship, transferring skills through cascade training, and providing up-to-date resources on research and best practices in detection, treatment, and infection control in Ukraine and around the world.

To maintain the relationship between training and practice, STbCU developed training programs that grounded theoretical knowledge in practical application. After conducting an initial training course, project TB, MDR-TB, co-infection, and IC specialists conducted up to 906 mentoring visits to confirm that participants actually implemented skills and practices received under training and that patients received quality services.

Mentoring visits were designed to improve the performance of medical staff, address local concerns and challenges, reveal potential obstacles to effective TB control, and identify feasible ways to overcome them. During the visits, the mentoring team helped local staff identify and plan to achieve long-term goals and improve their day-to-day work performance. Mentoring was carried out in a respectful, non-authoritarian way with a focus on improving tangible practices and activities. Such visits were an excellent opportunity to provide on-the-job training to individual health workers or to health facility staff as a whole. Over the course of the project, mentoring remained an effective methodology to achieve sustained improvement of quality medical services.

The project applied a cascade training approach for developing human resources in project-supported regions. According to this methodology, STbCU first trained regional PHC specialists as trainers and then began leading regional training courses for PHC doctors and nurses. Such training in the regions improved the coverage of PHC specialists, helped them focus on region-specific issues, strengthened the capacity of local trainers who became focal points for further training in the regions and will be capable of following up with each participant and providing on-the-job mentoring, if needed.

The project conducted regional conferences for laboratory and clinical specialists, health administrators, chief oblast laboratory diagnostics specialists, chief oblast TB specialists, and local health authorities to discuss sputum smear microscopy EQA results and to plan activities for the next year. STbCU used the participation of oblast health administration and chief oblast specialists in the conferences to facilitate several managerial decisions to improve the quality of pre-laboratory stage, enhance collaboration between laboratory and clinical service, and, consequently, to increase the effectiveness of TB laboratory diagnostics. The conference participants analyzed the reasons for errors both in the EQA results and in routine tests. The project gave the conference participants sets of smear panels for EQA panel testing and the protocols with EQA earlier round results.

To improve the quality of services that dispensaries and AIDS Centers provide to TB and TB/HIV patients and to develop capacity of facility specialists to conduct performance analyses, the project developed and introduced self-assessment forms. Regional TB facilities and AIDS Center specialists began assessing their own performance, the performance of primary healthcare facilities, and the facilities of secondary level medical care during mentoring visits, using this tool. This enabled specialists to obtain strategic information at the local level and to trace improvement of joint actions to combat TB/HIV co-infection at the regional level.

**EXHIBIT I. PROS AND CONS OF DIFFERENT METHODS USED BY THE PROJECT**

<b>METHOD</b>	<b>PROS</b>	<b>CONS</b>
Training for health specialists	Defined quality and amount of provided information, proven increase of knowledge in participants, opportunity to provide the latest available information.	Received knowledge is transformed into practice only if there is support of the local health facility management.
Cascade training	Develops local trainers' capacity; these are usually one to three-day local events that makes such training inexpensive.	Local health-sector managers need to use local trainers' capacity.
Mentoring visits	Powerful tool to provide mentoring support at the clinical level by local multidisciplinary expert team.	Requires funds for transportation to be allocated from the local budget.
Information seminars	Provide up-to-date information to relatively large numbers of participants (up to 50) without distracting them from their duties for a long period of time (usually a half-day event).	Level of knowledge gained is not assessed.
Introduction of a new self-education methods: online training	Sustainable training approach, easy to access for trainees at convenient time, no cost to participants.	Use depends on self-motivation.
Introduction of self-assessment questionnaires to improve quality of services in health facilities	Easy-to-use and inexpensive monitoring tool that leads to improved quality of services.	Use depends on self-motivation.
Involvement of non-medical sector into patients support	Has potential to increase treatment adherence and provide social support to TB and TB/HIV patients not typically provided by health workers.	Ongoing decentralization processes in Ukraine indicates that funds for this work would be allocated from the local budget, but no guarantee this will happen
Advocacy roundtables with decision makers	Good approach to directly reach the target audience (decision makers), inexpensive, and easy to implement.	None



### SECTION 3

# RESULTS AND ACCOMPLISHMENTS

For over five years, Ukraine has benefited from ongoing reform of the health care system (HCS) based on three driving principles: people-centered, outcomes-oriented, and implementation-focused. Simultaneously, Ukraine is developing a new country system for public health. Both reforms, first and foremost, involve primary health care and intend to expand the scope of services and to address prevention activities. STbCU supported the MoH to build capacity for primary health care providers and integrate TB case management services into their practice.

The project's vision for health system improvement stressed the need for clearly distributed roles and responsibilities at each level of care and developed a more patient-friendly system that maximizes TB testing and treatment at the PHC level. This was consistent with the UCDC's vision of more decentralized TB services. STbCU developed a patients' pathway tool, which clearly defined the role of PHC providers and other service providers as they related to the services that TB and TB/HIV patients require (see Exhibit 2 next page).

STbCU aimed to implement the continuum of TB service, including fast detection of TB symptoms, referral for specialized care, high-quality diagnosis, proper treatment, prevention of new TB cases, and monitoring and evaluation (M&E).

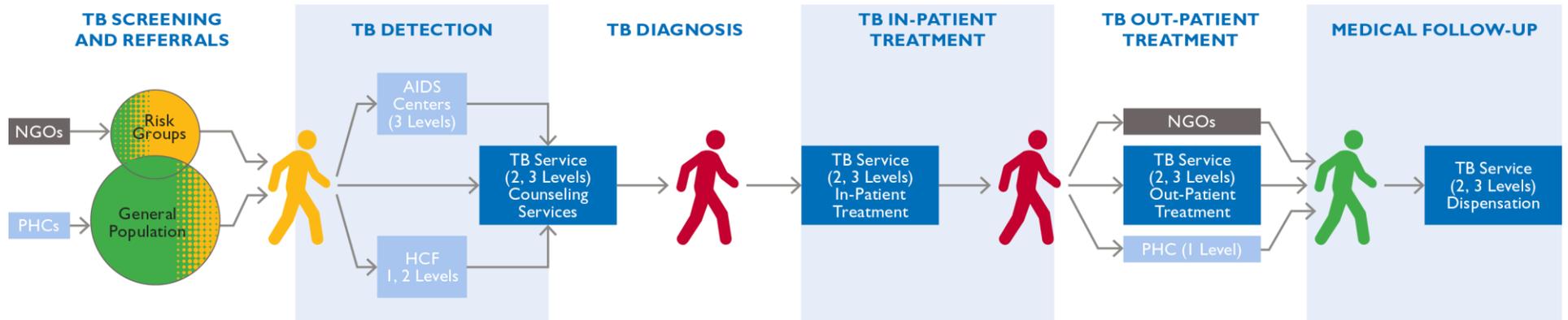
STbCU planned all activities with the intention of improving services needed along the TB and TB/HIV patients care pathway, bringing services closer to the patient and making them accessible to all, regardless of socioeconomic status.

## **TB SYMPTOMS DETECTION AND REFERRAL SYSTEM**

### **CAPACITY BUILDING OF PRIMARY HEALTH CARE PROVIDERS ON TB CASE DETECTION AND THE PATIENT'S PATHWAY FOR FURTHER REFERRAL**

STbCU ensured that clear regulations about the scope of work of PHC providers in detecting patients with TB would be included in the updated National TB Clinical Protocol. At the same time, the project developed operating procedures for PHC centers that became the major part of the MoH's guidelines for the development of local TB case management protocols at PHC facilities. These guidelines outline the roles and responsibilities of PHC doctors and nurses regarding TB control. These are the first TB-related guidelines for PHC facilities in Ukraine that directly address scopes of work for medical personnel and, therefore, support the institutionalization of evidence-based practices in TB detection and management at the regional level. STbCU printed 5,000

**EXHIBIT 2. CONTINUUM OF TB CARE IN UKRAINE: ALGORITHM USED FOR TB POLICY DEVELOPMENT**



	TB SCREENING AND REFERRALS	TB DETECTION	TB DIAGNOSIS	TB IN-PATIENT TREATMENT	TB OUT-PATIENT TREATMENT	MEDICAL FOLLOW-UP
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>Screening interviewing</li> <li>Referral to appropriate health care facility (HCF)</li> </ul> <p><b>Services:</b></p> <ul style="list-style-type: none"> <li>Sputum collection</li> <li>Sample transportation</li> <li>Admission a client to appropriate HCF</li> <li>Motivation kits (for TB screening)</li> </ul>	<ul style="list-style-type: none"> <li>Screening interviewing</li> <li>Sputum collection</li> <li>Sample transportation</li> <li>Sputum microscopy</li> <li>X-ray examination</li> <li>Tuberculin Skin Test (TST)</li> <li>Molecular-gene-testing (MG)</li> </ul>	<ul style="list-style-type: none"> <li>Doctor's consultation, complex of TB diagnostic tests according to national clinical protocols</li> </ul>	<ul style="list-style-type: none"> <li>TB treatment, monitoring of treatment, DOT provision in in-patient TB facility</li> </ul>	<ul style="list-style-type: none"> <li>TB treatment and monitoring TB out-patient models</li> </ul> <p><b>Key services:</b></p> <ul style="list-style-type: none"> <li>DOT in TB facilities,</li> <li>DOT in Primary Health Care (PHC) facilities</li> <li>DOT provided by NGOs,</li> <li>Referral to TB facilities for treatment monitoring,</li> <li>Incentives,</li> <li>Motivational counseling</li> </ul>	<ul style="list-style-type: none"> <li>Periodic medical consultation and TB testing (radiological, bacteriological tests, etc.)</li> </ul>
<b>MAIN FINANCIAL SOURCES</b>	<ul style="list-style-type: none"> <li>GFATM grant (NGOs)</li> <li>Local budgets (NGOs)</li> <li>Local budgets (PHC)</li> </ul>	<ul style="list-style-type: none"> <li>Local budgets (general HCF)</li> <li>Oblast budgets (AIDS Centers and TB facilities)</li> <li>GFATM (reagents and equipment for MG testing)</li> </ul>	<ul style="list-style-type: none"> <li>Oblast budgets MOH budget</li> <li>(re-agents and equipment for, bacteriological solid media, X-ray test, etc. )</li> <li>GFATM (reagents and equipment for BACTEK, MG)</li> </ul>	<ul style="list-style-type: none"> <li>Oblast budgets (TB facilities)</li> <li>MOH budget – National TB Control program (First and Second line TB drugs)</li> <li>GFATM (Second line drugs)</li> </ul>	<ul style="list-style-type: none"> <li>Oblast budgets (TB facilities)</li> <li>MOH budget — National TB Control program (First and Second line TB drugs)</li> <li>GFATM (Second line drugs)</li> <li>Local budgets (PHC)</li> <li>Local budgets (social support and incentives for TB patients)</li> <li>GFATM (DOT provision by NGOs, social support and food kits for patients)</li> </ul>	<ul style="list-style-type: none"> <li>Oblast budgets (TB facilities)</li> </ul>



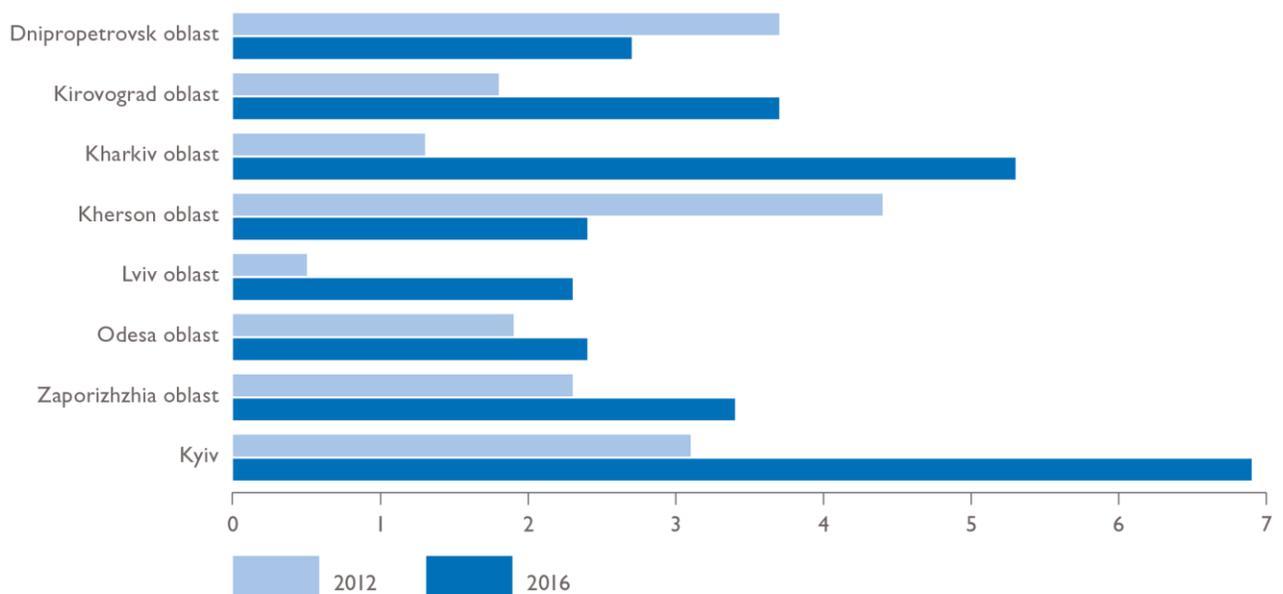
copies of these guidelines and distributed them to PHC facilities in the USAID-supported regions. Key aspects of the guidelines were included in the project-developed manual, *Tuberculosis: Schemes and Charts for PHC Medical Personnel* that was distributed to PHC facilities for daily use.

To strengthen TB service provision at the PHC level, STbCU developed the capacity of 1,440 PHC practitioners through training courses conducted in the Dnipropetrovsk Center of Excellence and helped improve quality of services during 909 mentoring visits to 928 PHC facilities. Six nurses from TB dispensaries learned about the new role of nurses in TB care on a study tour to Tomsk, Russia, in 2012.

At the beginning of project activities, most PHC practitioners refused to work with TB patients. They sent suspected TB cases for x-rays and, if signs of TB were detected, referred them to TB specialists to confirm the diagnosis. Today the situation is different. Mentoring visits verified that PHC facilities in the project-supported regions have local TB protocols in place, with defined scopes of work related to TB detection, treatment, and infection control measures. PHC practitioners use the screening questionnaire for the signs of tuberculosis developed by the project when faced with a patient whose TB-like symptoms have lasted two weeks. In the event of a TB-positive screening, PHC practitioners refer the patient to a specialized TB care facility for sputum test. Thus, patients are referred for further diagnostics by TB specialists only if their sputum microscopy test returns positive for TB.

Taken together, these efforts have resulted in an increase of smear microscopy TB detection rate at the PHC level in USAID-supported regions. Four of these regions reached the WHO recommended rate of 5 percent (see Exhibit 3).

**EXHIBIT 3. SMEAR MICROSCOPY TB DETECTION RATE AT THE PHC LEVEL IN USAID-SUPPORTED REGIONS IN 2012 AND 2015**



## IMPROVING TB INFECTION CONTROL AT THE PRIMARY CARE LEVEL

Infection Control (IC) in health care facilities is a significant area for improvement, and has been the focus of the MoH for more than five years. STbCU contributed to development of the national IC regulations through revision of the law titled “On ensuring sanitary and epidemic wellness of the population,” specifically, of the provisions related to IC and medical waste management. The project’s recommendations were accepted and incorporated. The law became a legal framework for introduction of proper IC measures at TB facilities, AIDS Centers, and PHC facilities.



HIV testing Ella Nazarko, a TB Laboratory Specialist checks the quality of sputum samples.

Photographer: Volodymyr Lermontov within ACSM grant issued by USAID Strengthening TB Control in Ukraine project. Lysychansk, Ukraine. June 12, 2016

With STbCU support, all PHC facilities in project-supported regions developed local IC Plans that include new administrative TB IC measures and standards for personal respiratory protection, which are updated twice a year. This was confirmed during mentoring visits.

PHC facilities also opened sputum collection points and improved practices related to patient selection for sputum collection after TB screening. The organization and management of sputum collection points, including the location, schedule, and availability of trained staff, were closely monitored by multidisciplinary mentoring teams from the oblast TB dispensaries. Local TB specialists were always members of these teams and will continue helping PHC facilities with execution of proper IC measures after the project concludes.

To encourage positive attitudes toward TB IC and promote necessary behavior changes among HCW, the project disseminated handouts on appropriate TB IC measures during visits to health care facilities. These materials were also uploaded to the project’s website and on the TB IC Facebook page.

## LABORATORY DIAGNOSTICS

Accurate TB diagnostics obtained through microbiology tests, results in higher treatment effectiveness. Unfortunately, when the project began, external quality assurance (EQA) of TB laboratories had not been conducted regularly for several years, results were neither properly registered nor properly analyzed, and oblast laboratories had received no performance feedback.

STbCU ensured implementation of an effective EQA system for smear microscopy. With technical assistance from STbCU, UCDC and the National Reference laboratory developed national EQA regulations based on WHO-recommended standards for EQA procedures, including annual testing, specifying the number of slides in a panel, employment of all techniques by EQA, and repeated EQA in case of poor lab performance. The MoH endorsed these regulations in June 2016.

With project support, oblast TB facilities amended the regional orders on EQA of TB laboratory diagnostics and standardized operation of a quality management system. Regional Health Administrations optimized the number and location of Level 1 TB laboratories according to WHO recommendations and improved the quality of laboratory tests and their accessibility for patients.

All three EQA mechanisms: onsite evaluation, panel testing (testing a lab technician's proficiency by allowing the technician to stain, read, and evaluate smears of known status), and blind rechecking are now employed in USAID-supported regions.



Laboratory specialist in Kyiv PHC facility conducts panel testing. With STbCU support, this procedure is institutionalized in Ukraine. Kyiv city PHC facilities have shown 100% accuracy in EQA for the past three years.

For the first time in Ukraine, STbCU and the National Reference Laboratory initiated EQA in Level 2 (district-level) laboratories USAID-supported regions. In 2016, 22 out of the 24 Level 2 laboratories (92 percent) completed EQA of bacteriological investigations via panel testing, and 100 percent of the Level 2 laboratories received mentoring visits from the supervising Level 3 laboratories.

Today, all Level 1, 2, and 3 laboratories in project-supported regions are part of the lab network and covered by all three EQA methods. The proportion of Level 1 laboratories in USAID-assisted areas performing TB microscopy with more than 95 percent correct results in 2015 reached 99.6 percent, exceeding the target of 90 percent.

With project support, 345 laboratory specialists from 10 regions developed new skills and received up-to date knowledge at training courses such as “TB Detection and Diagnostics by Sputum Smear Microscopy,” “Quality Assurance of Tests: TB Bacteriological Diagnostics Using Solid Media,” “Quality Control of Bacteriological Tests,” “Implementation of TB IC Measures in TB Laboratories for Laboratory Specialists,” and “Use of Microsoft Excel in the Work of Laboratory Specialists.”

Laboratory diagnostics specialists in Level 3 laboratories displayed significant improvement on quality of tests, including GeneXpert and BACTEC, and adherence to

the diagnostic algorithm of patient examination after completion of the five-day on-the-job training program organized by the project.

### **INVOLVEMENT OF SOCIAL SERVICES AND CIVIL SOCIETY INTO WORK WITH HARD-TO-REACH POPULATIONS, DETECTION OF TB SYMPTOMS, AND THE REFERRAL PROCESS**

According to WHO data, tuberculosis is vastly underdiagnosed in Ukraine. Case detection at the primary care level is 2.0-2.8 percent, far below the WHO's recommended rate of 5 percent. Selective TB screening in risk groups is often replaced by indiscriminate mass screening, despite WHO recommendations for more cost-effective, targeted screening efforts. Involvement of civil society in TB case detection among hard-to-reach populations is one solution that has already proved its effectiveness in other countries. A range of USAID STbCU project initiatives were aimed at increasing coverage by symptoms-based screening and x-ray diagnostics among various vulnerable groups:

- NGO "Parus" (Kharkiv): The organization works with incarcerated populations and provides peer health education on TB-related issues, symptom-based screening, and referral for sputum tests and x-ray examination (2013-2014). As a result of the initiative, 177 people received peer consulting, 183 received qualified consultations from social workers, 106 underwent testing, and four TB cases were detected. Sustainability of the initiative is ensured by engaging trained peer consultants, who continue their activities both during imprisonment and after release.

- International Public Organization (IPO) "Labor and Health Social Initiatives" (LHSI): "What you should know about TB" worked out an effective model of TB detection among internally displaced persons using the example of Kyiv city under STbCU's ACSM grant. The team project staff consisted of medical and social coordinators and four social workers designated by the partner Kyiv City Network of the Centers of Social Services for Family, Children and Youth (CSSFCY). Under this grant, this team developed an algorithm that includes TB-related counseling, symptom-based and X-ray testing of internally displaced populations (IDP) and anti-terrorist operation (ATO) participants, with consequent referral to health care facilities if needed. These activities are being provided by social workers simultaneously with social services to save the client time. Within this mechanism, the grantee provided group and individual health education during different social events for IDP from ATO zones and distributed 24,500 symptom-



HIV testing in Kharkiv penitentiary under the project-supported program on "Improving access to TB/HIV co-infection services in penitentiary facilities."

based TB screening leaflets to former ATO combatants and IDPs. A total of 7,095 IDPs and ATO participants received counseling, and 132 sought care to diagnose TB.

- The Lviv Oblast Organization “League of Social Workers of Ukraine”: This grantee aimed to make TB control services more accessible by enhancing community capacity using an advocacy, communications, and social mobilization (ACSM) strategy. Under this grant program, the local TB control programs were developed in Skole and Peremyshlyany raions of Lviv oblast. Local communities and churches agreed to encourage primary health care providers’ involvement in TB detection and involve local social workers into TB-related education and screening. 5000 leaflets on TB case detection for the local communities were distributed. Taking into consideration the regional context of strong communities and church parishes, the grantees prepared and published the manual “Confronting TB at the level of the local communities,” which allows local communities to expand the approaches implemented in selected raions beyond the grant program, thus making sustainability possible.
- NGO “Chas molodi” (“Time of the youth”): This grantee aimed to make TB control services more accessible by enhancing community capacity through an ACSM strategy. In the Odesa portside suburb of Yuzhne, local communities and business developed a corporate social responsibility (CSR) program to increase local business involvement in TB prevention, case detection, and treatment among employees of the portside commercial space. Local businesses signed concept papers committing them to activities including encouraging employees to undergo TB screening, guaranteeing social support for employees with detected TB, workplace saving for the treatment period, and creating favorable working conditions for employees who continue to work while undergoing treatment. To create the proper background for the CSR TB control program, the grantees conducted training for the local communities and social services, held consultations with businessmen, and organized informational campaign including, distributing informational leaflets and playing video-clips on a local TV channel.

### **INFORMATIONAL CAMPAIGN FOR GENERAL POPULATION AND TB-AFFECTED PEOPLE**

On an ongoing basis, USAID STbCU developed and distributed information, education, and communications (IEC) materials for general public, TB-affected people and health professionals, covering gaps in their knowledge about different aspects of TB disease. The publications included:

- Booklets for family members of patients with TB
- “TB screening forms for People Living with HIV and AIDS”
- “Tuberculosis. It’s Easy to Be Healthy” booklet for the general public

- “Fight Tuberculosis. Everything a Patient Should Know to Get Cured of TB” booklet for TB patients

- “The Patient’s Diary” brochure (see next page)

- Poster to increase awareness around TB in AIDS center visitors

- Poster and form with instructions for patients undergoing sputum collection procedures

- Booklet on TB prevention through Isonizid Preventive Therapy (IPT)

- Booklets for internally displaced people (IDP) “Attention! Now it’s time to care about your health!”

- ARV drugs form to create adherence to TB and ARV drugs among people living with HIVA and AIDS who are involved in piloting outpatient model of care in Kryvyi Rih

- Self-appraisal form on ARV and TB treatment adherence

- TB 09 discharge form with a tear-off instruction sheet for patients



The Patient’s Diary was so successful that the project published multiple editions, and at the request of its regional partners, distributed it widely to regional health facilities and partnering NGOs.

All project-developed publications have been made available for download on the project’s web site and TIRC.

For the first time ever in Ukraine, STbCU also produced educational films on TB-related topics for various audiences. A range of STbCU-produced educational films, video-trainings and video life stories of TB survivors are now available, including:

- “Tuberculosis: Educational Film for Physicians and Family Doctors” ([https://www.youtube.com/watch?v=3\\_RwIIIXpgQ&feature=youtu.be](https://www.youtube.com/watch?v=3_RwIIIXpgQ&feature=youtu.be))

- “Tuberculosis: Know, be Aware, Have No Fear,” a film for the general public (<https://www.youtube.com/watch?v=WEl9ayld7PQ&feature=youtu.be>)

- Bringing TB care home (<https://www.youtube.com/watch?v=gJUc2QBRqd0>)

- Video training on TB for PHC doctors (<http://tb.ucdc.gov.ua/navchannya-onlayn/onlayn-treningy/tb-likari-pervynnoyi-lanky>)

- Video-training for medical practitioners on socio-psychological support for TB patients

- TB/HIV: a series for TB and HIV doctors and other medical practitioners.

The films were widely broadcast on national and local TV channels, health facilities, medical universities, and project-organized events for health providers at the national and regional level. Two project-developed educational films (“Tuberculosis: Educational Film for Physicians and Family Doctors” and “Tuberculosis: Know, Be Aware, Have No Fear”) were also posted on YouTube and attracted more than 10,000 views each. At the request of members of the Eastern Europe and Central Asia TB group on Facebook, Russian and English subtitles were added to the films, to make them available for Russian and English-speaking audiences in the region. Targeting different audiences, each of the films applies relevant language and presents arguments intended to change attitudes and behavior of its viewers. Both films were presented at the 2015 APHA Global Public Health Film Festival, which took place during the 143rd APHA Annual Meeting and Expo (Oct. 31 - Nov. 4, 2015) in Chicago.

In addition to delivering new knowledge through publications and videos, the project conducted small information campaigns using face-to-face communication and media. The campaigns were timed to accompany a series of USAID-supported events in cities and towns around Ukraine, called Mistechko USAID (or, “USAID Town”). During these events, the visitors of the STbCU tent (see photo) had fun, won prizes in lotteries, increased their awareness of tuberculosis and had an opportunity to consult with on-site TB specialists. During Mistechko USAID in Crimea, Zaporizhzhia, Dnipropetrovsk, Kharkiv, and Kherson, more than 1,700 local citizens had individual consultations with doctors from local TB facilities on TB prevention, diagnosis, and treatment.



More than 450 people participated at project-organized activities at the USAID Field Day in Dnipropetrovsk.

During the “Shared Breath” TB awareness campaign in Simferopol, 78 people had their portraits taken to accompany their statements on TB, which appeared in an online gallery ([www.stbcu.com.ua/dyhaniye](http://www.stbcu.com.ua/dyhaniye)). The project used these portraits and statements to design a poster (see photo next page) aimed to support and encourage those who hesitate to start their TB treatment, and distributed the poster to other project-supported regions.

**Joint TB awareness campaign with the BIBLIOMIST program.** This campaign, which started as a series of TB awareness meetings for library visitors, was expanded to include a poll of library visitors on “Health of the Residents of Ukraine: Spring 2013.”

The survey was implemented in six major libraries in the southeastern cities of Donetsk, Kramators'k, Luhansk, Odesa, Kharkiv, and Kherson. This category of respondents was chosen to explore public awareness of TB, information sources commonly used by the public to learn about TB and TB-related issues, and the potential for public use of an Internet-based informational resource. The survey results were made public through the project website, at the libraries that participated at the survey, and in print, as a booklet outlining the main research findings.

**Annual World TB Day information and advocacy campaigns.** The project implemented a variety of different activities to support messages promoted by the STOP-TB Partnership world-wide: from the Luhansk flash-mob (<https://www.youtube.com/watch?v=E-RY-t6jFaU>) to blog spots (<http://blog.chemonics.com/>). In March 2014, to commemorate the World TB Day STbCU in partnership with the Kryvyi Rih city administration, city TB dispensary, and the "Zdorovya" center, launched an advocacy campaign aimed to improve the availability of outpatient TB services in the city, which had been hard hit by TB and had a high TB/HIV burden. The campaign included a TB public service announcement that had been placed on a trolley-bus which ran along the longest city street in Europe – 124 km. The video-spot by TV channel Rudana on the launch of the trolley-bus is available here:

<http://www.youtube.com/watch?v=IUyXPhXSY30&feature=youtu.be> : pictures from the event:  
<https://plus.google.com/u/0/photos/108626156718480963394/albums/5993566481359166625>

Several information campaigns were supported by STbCU through its grantees. For instance, the NGO Legal Assistance Public Service organized a photo exhibition depicting TB patients and health care workers who take care of them (<http://paralel-media.com.ua/p75472.html>), and the Charity Fund Perekhrestia (Crossroads) gathered stories of people who have recovered from TB and presented them through the website [www.zhyvy.com.ua](http://www.zhyvy.com.ua) (zhyvy means “Live!” in Ukrainian). Both information campaigns aimed to fight stigma against TB, boost morale of people who have TB, and raise awareness to TB symptoms among general population.

As with most USAID projects, STbCU issued a monthly newsletter. However, we made our newsletter a unique tool by not only featuring project’s activities, but delivering important updates about TB science in brief and simple language. As the result, more



“TB is Curable. Take Care of Yourself and Your Loved Ones,” designed using portraits of participants of the Shared Breath Info Campaign in Simferopol, and their statements about TB.

than 1,000 healthcare providers, TB specialists, academics, and NGO representatives in Ukraine signed up for the newsletter to receive the latest world TB news and research.

## **RAPID DIAGNOSTICS AND QUALITY DIAGNOSIS**

### **INTRODUCTION OF RAPID AND EFFECTIVE METHODS OF BACTERIOLOGICAL AND MOLECULAR TB DIAGNOSIS**

In 2014, considering the high TB and TB/HIV burden, STbCU purchased and installed GeneXpert machines in Kryvyi Rih and Odesa. All patients at high risk of MDR-TB were able to receive proper diagnosis immediately upon seeking medical care. Simultaneously, local TB managers worked with the primary health care providers to accelerate referrals for TB diagnosis and treatment.

After implementation of the Xpert MTB/RIF tests, the amount of time between when patients first seek medical care and when they start appropriate MDR-TB treatment decreased from 104 days to 40.4 days in Kryvyi Rih, and from 125.2 days to 21.2 days in Odesa oblast. Furthermore, the time between initial self-recognition of TB symptoms and MDR-TB treatment also shortened from 88.7 days to 57.9 days in Kryvyi Rih, and from 194.2 days to 79.0 days in Odesa oblast.

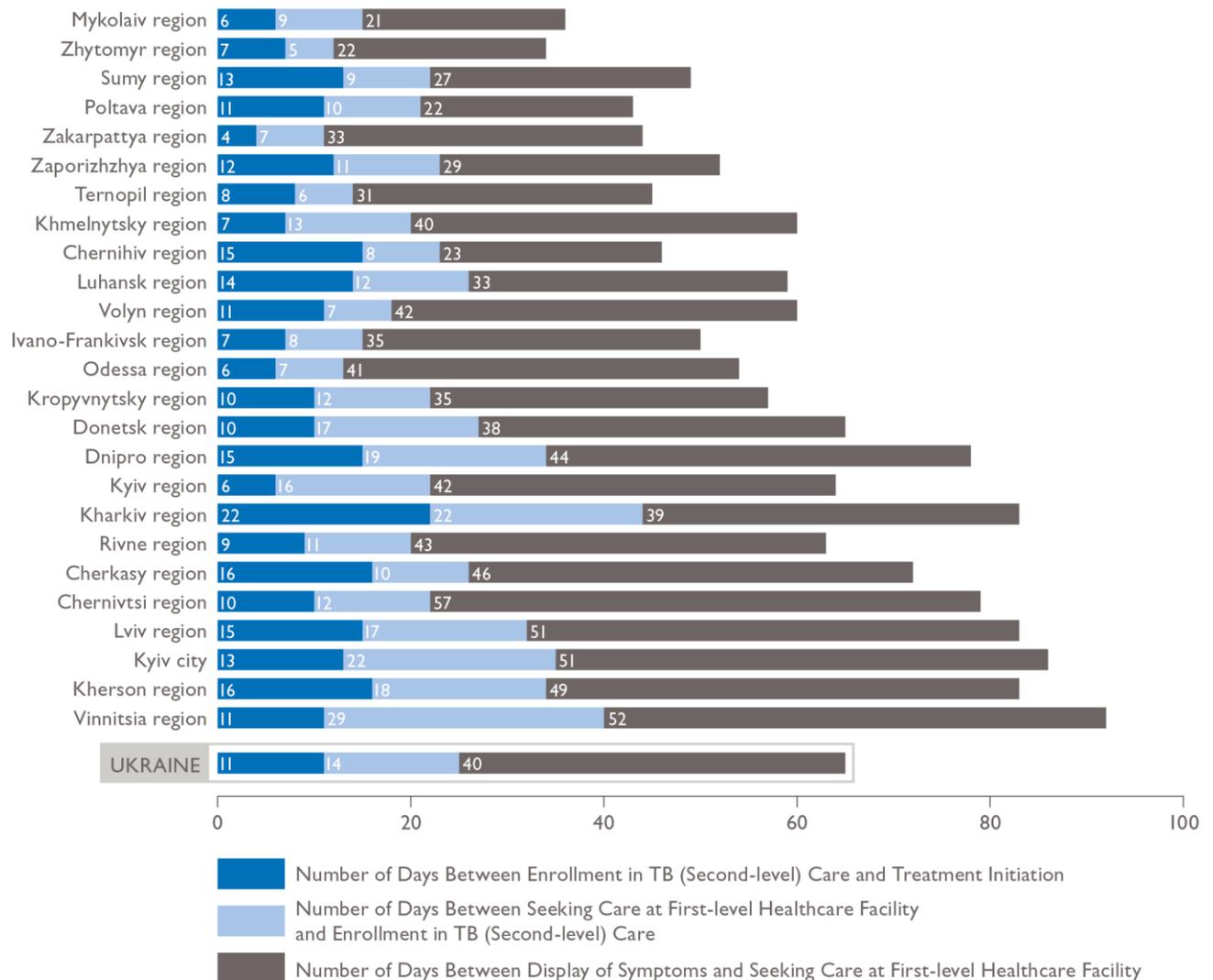
To improve the quality of TB confirmation by the culture test, which is the “gold standard” for TB diagnostics, the STbCU provided EQA of culture tests for specialized (Level II and Level III) bacteriological laboratories. With project support, Level II laboratories underwent EQA for the first time ever in Ukraine. In 2015, 83.0 percent of new TB cases and 79.1 percent of re-treatment cases underwent Xpert MTB/RIF tests. In particular, Xpert tests allowed diagnosis confirmation in 66.1 percent of patients with TB/HIV countrywide, including 36.9 percent of HIV-positive patients with MDR-TB. The Xpert MTB/RIF technique confirmed the extrapulmonary TB diagnosis in 21.1 percent of patients, and it detected MDR-TB in 7.3 percent of patients tested. Xpert MTB/RIF appeared effective in children as well, confirming TB in 38.3 percent of children tested, and MDR-TB in 18.4 percent of children tested. By 2015, liquid media culture tests and DST coverage had reached 97.2 percent of new cases and 96.5 percent of re-treatment cases. Laboratory diagnosis confirmation increased from 55.1 percent in 2014 to 64.8 percent in 2015.



On March 21, 2013, to commemorate the World TB Day, STbCU, in partnership with Luhansk Medical University, organized several events against TB: a dancing flash-mob in the city mall, an online presentation by the Global TB Institute (Medical School of New-Jersey) Executive Director Lee Reihman, and meetings with students of Luhansk universities (Volodymyr Dahl East Ukrainian National University, Luhansk Taras Shevchenko National University, Luhansk National Agrarian University) and high schools. The campaign received broad media coverage, including both regional and main national TV channels (Inter, 5th channel, Ukraine channel, 1st National channel, Donbass channel, LOT, and others). You can watch the flash-mob dance on YouTube here: <https://www.youtube.com/watch?v=E-RY-t6jFaU>

Simultaneously, the project analyzed the overall time to treatment start and reasons for treatment delay. In 2015, the project awarded a grant to a team of MPH student researchers from the School of Public Health of the National University of 'Kyiv-Mohyla Academy.' The research team conducted operational research to identify the average duration of TB treatment initiation and the variables associated with the delay. This operational study has a mixed design and combines retrospective cohort analysis of 41 733 patients first diagnosed with TB in 2014 and qualitative content analysis of 33 interviews with medical staff involved in TB diagnostics and care in five oblasts of Ukraine with both high and low TB burdens. On average, treatment was initiated 25 days from accessing health care. Regions varied from 13 days in Zhytomyr region to 47 in Vinnitsia region with no association with regional TB burden (see Exhibit 4 below).

**EXHIBIT 4. NUMBER OF DAYS BETWEEN SELF-REPORTED SYMPTOM ONSET AND TREATMENT INITIATION AMONG NEW CASES, 2014**



After adjusting covariates, the following variables were found to increase the average treatment initiation time: age under 18 (44 days), extrapulmonary TB (40 days), urban

habitation (28 days), female (28 days), and history of imprisonment (36 days). The qualitative approach revealed the following barriers to timely TB treatment initiation: geographical disconnection, conflicting time schedules, poor laboratory capacity at first-level health care facilities. Motivation of patients to start TB treatment was influenced by stigma toward people with TB in the general population and among health professionals. The operational research led to a recommendation to UCDC (renamed in November 2016 to the Center of Public Health) to revisit diagnostic algorithms for TB among at-risk populations and for extrapulmonary and pediatric TB. The research team also made suggestions on how to use the National TB register (e-TB manager) for ongoing analysis of the treatment onset time and for data verification.

## **INTEGRATION OF EVIDENCE-BASED DIAGNOSTIC APPROACHES TO DIAGNOSE TB, AND HIV**

Following STbCU's recommendations, evidence-based approaches to diagnose TB and HIV were introduced by the updated National TB and TB/HIV Clinical Protocols. Before the Protocols were endorsed, PHC practitioners referred patients suspected of having TB to TB dispensaries for TB and HIV diagnostics. Today, the Protocols specify that, a TB-presumptive patient has to be tested for HIV at the primarily level with fast tests, and that patients with HIV have to be screened for TB with a screening questionnaire. To operationalize these practices, PHC facilities in USAID-supported regions developed local clinical protocols and opened a PHC HIV site.



A HIV-positive man fills out a USAID-introduced TB screening form each time he comes to his doctor. This form, designed to screen for TB symptoms, improves TB diagnostics among people living with HIV and gives patients the chance for a faster recovery.

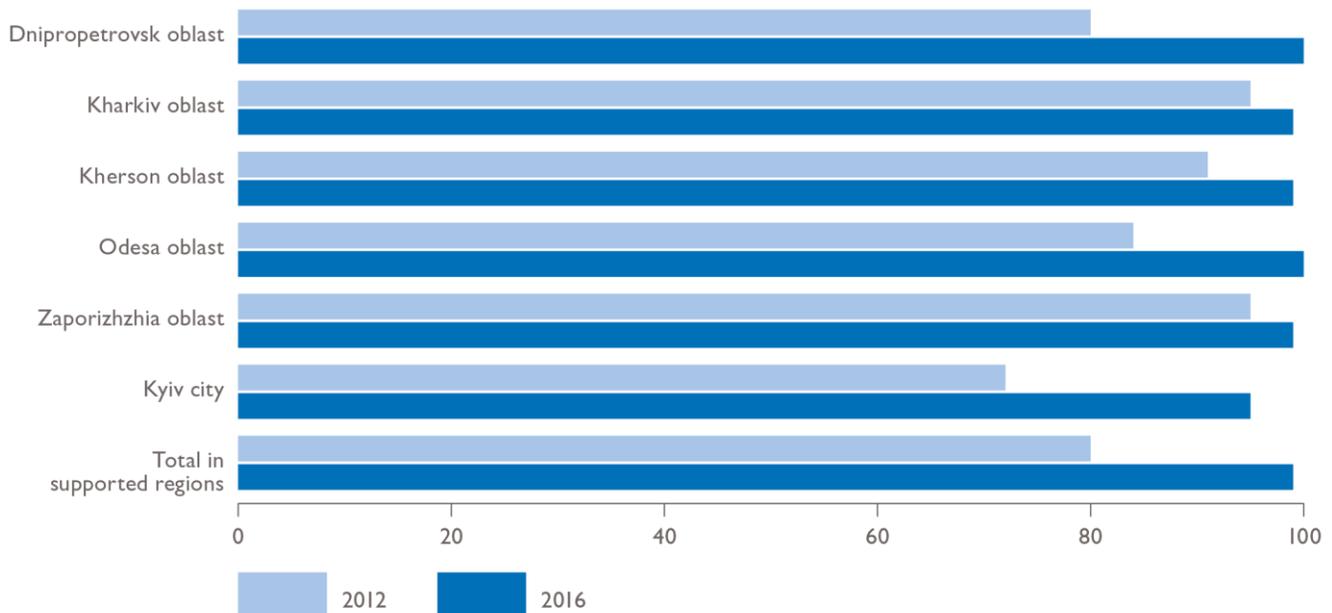
To strengthen the TB/HIV testing reporting system, STbCU developed new recording and reporting (R&R) forms for testing and counseling and trained staff in TB clinics to use these forms. As a result, the efficiency and timeliness of TB/HIV detection improved in TB dispensaries. STbCU also developed amendments to the TB/HIV section of the Draft Order of the Ministry of Health of Ukraine “The Procedure for HIV Counseling and Testing” and the VCT reporting form (form No. 3). Implementation of this order improved early detection of TB/HIV co-infection and will help avoid “losses to follow up” during counseling, HIV testing, and registering at AIDS centers.

Due to the project's technical support, a section on TB/HIV co-infection was included in

HIV/AIDS Regional Programs in Kharkiv, Kherson, Zaporizhzhia, and Kirovohrad oblasts. This section includes activities on TB prevention, screening, and diagnosis among PLHIV and TB/HIV treatment. This has allowed heads of regional authorities to consider the needs in funding these activities from local budgets and improve the organization and monitoring of their implementation. Other pilot regions created their draft programs, but have not yet approved them, due to ongoing reforms to the health care system overall.

Following project recommendations, in-patient TB departments started maintaining logs for tracking ELISA, information about registration in AIDS Centers, prescription of ART, and results of HIV tests to monitor examination and treatment of patients with TB/HIV. As a result of the ongoing advocacy activities, coverage of TB patients with counseling and testing for HIV increased in 2016 compared with the year 2012 from 74 percent to 99 percent (see Exhibit 5).

**EXHIBIT 5. HIV COUNSELING AND TESTING FOR TB PATIENTS, 2012 VS. 2016**



With technical assistance from the project, TB facilities introduced monitoring and evaluation of counseling and testing sites using tools developed by the project: an assessment of patient satisfaction with counseling services, an assessment of counseling sessions by doctors who conducted counseling, and supervision of counseling. Thus, comprehensive assessments of testing and counseling activities were performed, and complete data were obtained. STbCU also developed and published a guide, “Counseling to Establish Treatment Adherence in TB/HIV Co-infected Patients in TB Facilities,” for medical staff of TB facilities and social workers and piloted it in Zaporizhzhia oblast.

The project facilitated introducing a TB screening questionnaire to detect signs of TB in PLHIV into the routine practice of HIV specialists with further referral for TB

diagnostics, including GeneXpert testing. The quality of TB/HIV services improved in AIDS Centers in all project-supported regions: all regions, except Kyiv, have developed action plans for TB/HIV service provision and improving their quality, as recommended by the project, and have endorsed local protocols on TB/HIV co-infection care and TB/HIV indicators. As a result, infectious disease specialists at AIDS centers in all USAID-supported oblasts are now applying internationally recommended practices: earlier diagnosis of TB in HIV-positive cases, screening interviews on symptoms of possible TB among PLHIV, conducting detailed interviews while conducting clinical examinations of HIV-positive patients, and prescribing ART as soon as possible (up to two months from the beginning of TB treatment).

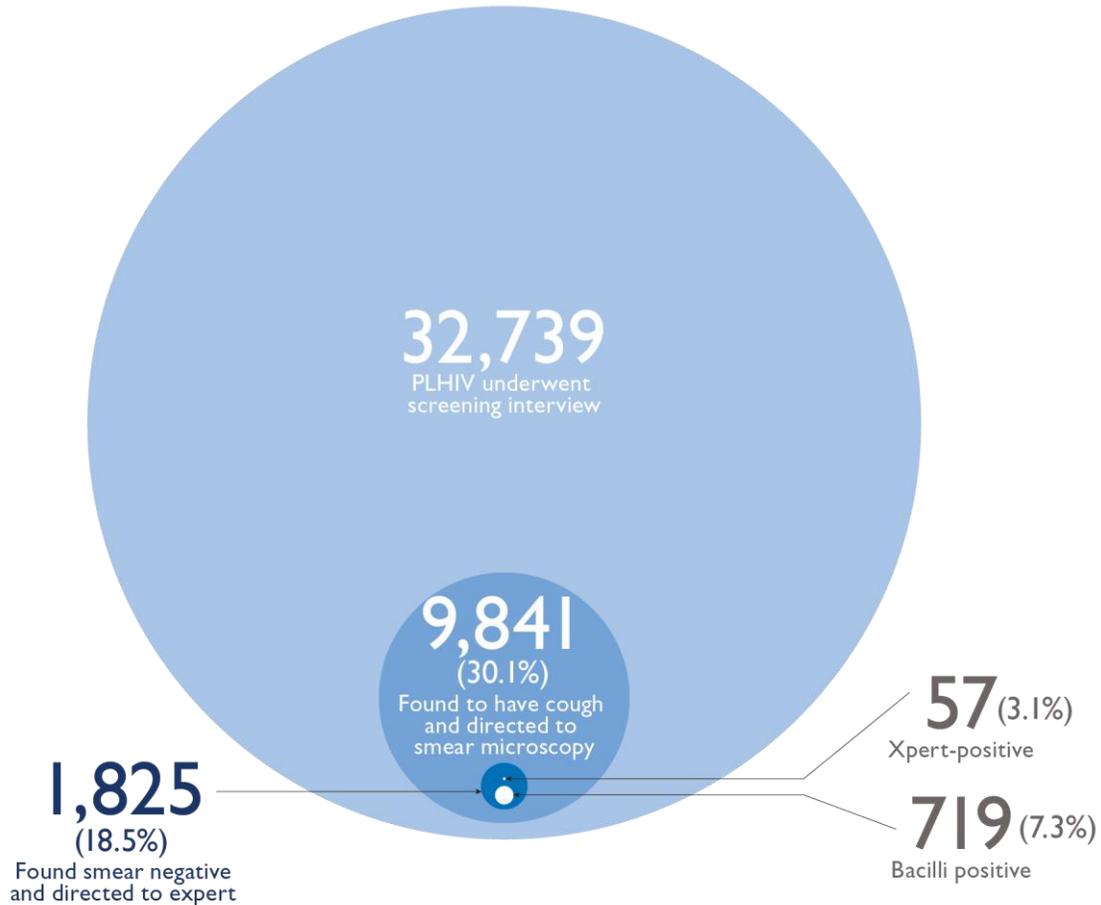
STbCU also developed and distributed posters targeting people living with HIV and AIDS about bringing up TB symptoms with their doctors. AIDS Centers placed these posters next to infectious disease specialists' offices in the pilot regions (see Exhibits 6a and 6b on the next two pages).

In Odesa oblast, STbCU piloted a patient pathway program designed to improve diagnosis of extra-pulmonary (peripheral lymphatic nodes) TB by non-TB specialists. The pilot demonstrated that mandatory HIV testing by all medical specialists, not just TB specialists, for patients with enlarged lymph nodes increased the rate of extra-pulmonary TB detection in PLHIV by four to five times.

Following implementation in 2013-2014 of Xpert MTB/RIF technique as the method of choice for TB case detection in PLHIV, STbCU has continuously provided evidence of the new approach's role in accelerating proper treatment for TB/HIV patients. The use of this molecular technique, supported by consistent screening interviews on symptoms of presumptive TB, has led to a significant increase in TB and MDR-TB laboratory confirmation yields: in the three oblasts with the largest TB/HIV burden (Odesa, Dnipro, and Kherson oblasts), 40 percent of HIV-positive patients with MDR-TB started proper TB treatment within days of seeking medical care due to the new technique.

In view of the high prevalence of extrapulmonary TB among TB/HIV patients in Ukraine (up to 70 percent of all cases), STbCU exercised efforts to improve the case detection and accelerate proper TB treatment in these cases. In collaboration with the National Bohomolets Medical University, the project developed and published the manual "Extrapulmonary and Miliary TB in TB/HIV Patients." The manual summarizes all evidence-based data available and was recommended by the MoH as an educational and reference source for medical students and medical practitioners. In all USAID-supported oblasts, the project organized workshops to present the manual and increase TB awareness among the medical practitioners who are most expected to detect extrapulmonary TB lesions (surgeons, gynecologists, etc.) and introduce a rapid-referral mechanism. As a result, a dramatic increase in the detection of TB in lymph nodes, the most common clinical type of extrapulmonary TB in TB/HIV patients, was registered in Odesa oblast. Every third case was detected by screening.

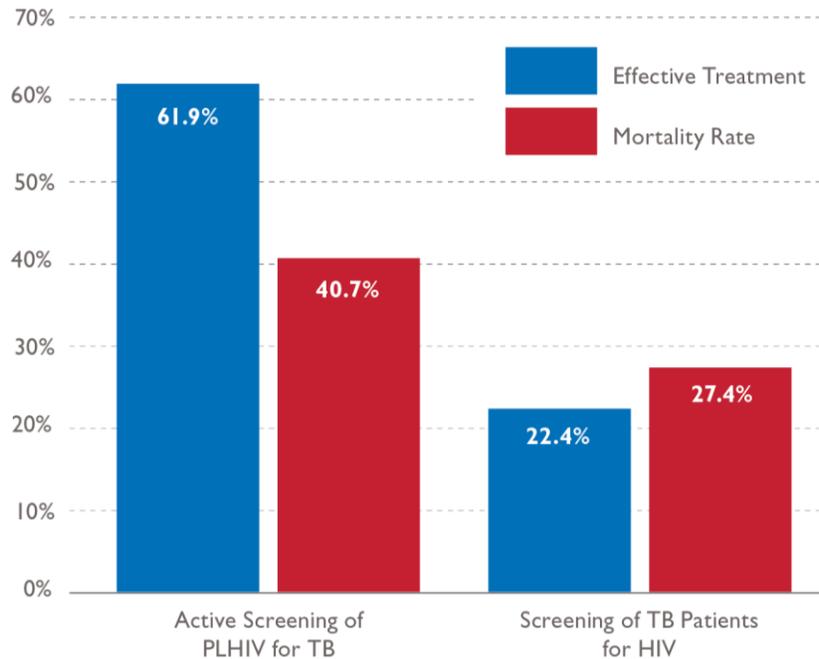
**EXHIBIT 6A. RESULTS OF IMPLEMENTATION OF SCREENING INTERVIEWS AMONG PLHIV**



**Notes to Exhibit 6A:** To improve inpatient TB/HIV case management at the Kirovohrad TB dispensary, the project's TB/HIV specialist, together with Kirovohrad oblast health professionals, developed an algorithm to increase timely HIV detection and patient registration at the oblast TB hospital. This algorithm led to easier and faster HIV diagnoses and case registration, in addition to decreasing HIV testing duplication. This resulted in decreasing the time needed to obtain final test results and, in case of HIV positive results, decreased improved follow-up rates with the AIDS-Center by two to three days, and up to two weeks. As of September 2016, 98 percent of Kirovohrad patients received timely administration of ART, while the average was 70 - 75 percent.

Also in 2016, the project introduced the TB screening questionnaire to improve detection of the signs of TB in PLWH into the routine practice of HIV specialists with further referral for TB diagnostics, including GeneXpert testing. The quality of TB/HIV services in AIDS Centers improved in all project-supported regions. Except for Kyiv, all regions have developed action plans for increasing or improving TB/HIV service provision as recommended by the project, and have endorsed local protocols on TB/HIV co-infection care and TB/HIV indicators. As a result, infectious diseases specialists at AIDS centers in all USAID-supported regions now apply international best practices for TB detection and control, including earlier diagnosis of TB in HIV-positive cases; TB screening for possible TB among PLWH; conducting targeted interviews during clinical examinations with HIV positive patients; and prescribing ART as soon as possible.

**EXHIBIT 6B. RESULTS OF IMPLEMENTATION OF SCREENING INTERVIEWS AMONG PLHIV**

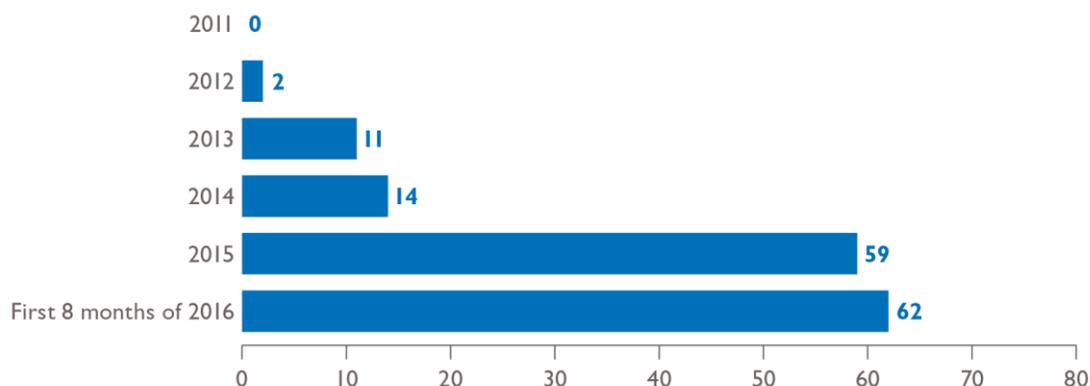


**Notes to Exhibit 6B:** From May 2013 through March 2014, 32,739 PLHIV in the USAID-supported regions were interviewed and almost one third were found to have a cough and directed to smear microscopy. Positive smear test results were received in 719 of these cases (7.3 percent); 1,825 patients with negative smear test results underwent Xpert/RIF tests, and positive results were received in 57 of these patients (3.1%). During the first months of the intervention, the rate of TB case detection by smear microscopy almost tripled, from 3.1 percent in June to 8.4 percent in December, 2013. During this period, smear-negative patients who underwent Xpert/RIF tests yielded 4.9 percent TB case detection and a total of 9.1 percent PLHIV with cough symptoms received TB laboratory confirmation. At the same time, coverage by x-ray screening increased from 61 percent in June 2013, to 73 percent in March 2014, as those patients who had presumptive TB symptoms such as fatigue, weight loss, and sub-febrile temperature were referred for x-ray examination. Ultimately TB was confirmed in 1,268 patients (3.9%) who underwent interview.

In 2015, 59 out of 78 patients (75 percent) were diagnosed with TB/HIV co-infection and TB in their lymph nodes and were registered. In the eight months of 2016, such co-infection was detected in 67 patients (92 percent). The average time between the appointment with a family doctor and TB diagnostics in the patient route was seven days. The average time from lymph node TB diagnostics and the onset of treatment was 1.3 days.

In 2011, not a single patient was diagnosed with TB in their lymph nodes *and* HIV. Only two were diagnosed in 2012; in 2013-15, 11, 14, and 59 people were diagnosed, respectively. In 2016, 161 patients were diagnosed for extrapulmonary TB (Exhibit 7).

## EXHIBIT 7. PERIPHERAL LYMPH NODE TB DETECTION IN PLHIV IN ODESA



### UPGRADING SKILLS OF LABORATORY SPECIALISTS

STbCU succeeded in developing the capacity of laboratory specialists from all Level 1, 2, and 3 laboratories in the project-supported regions. The following educational approaches were applied: training for the lab specialists of different levels, on-the-job training, educational movies, and conferences. Five laboratory specialists received training on how to use the GeneXpert Platform in Dushanbe, Tajikistan, in 2013. The training was supported by STbCU and conducted by internationally recognized specialists Mariia Yianchevska and Dr. Alexander Trusov (USA).

Each participant received a certificate upon successful completion of STbCU-supported training, which can be used toward routine licensing.

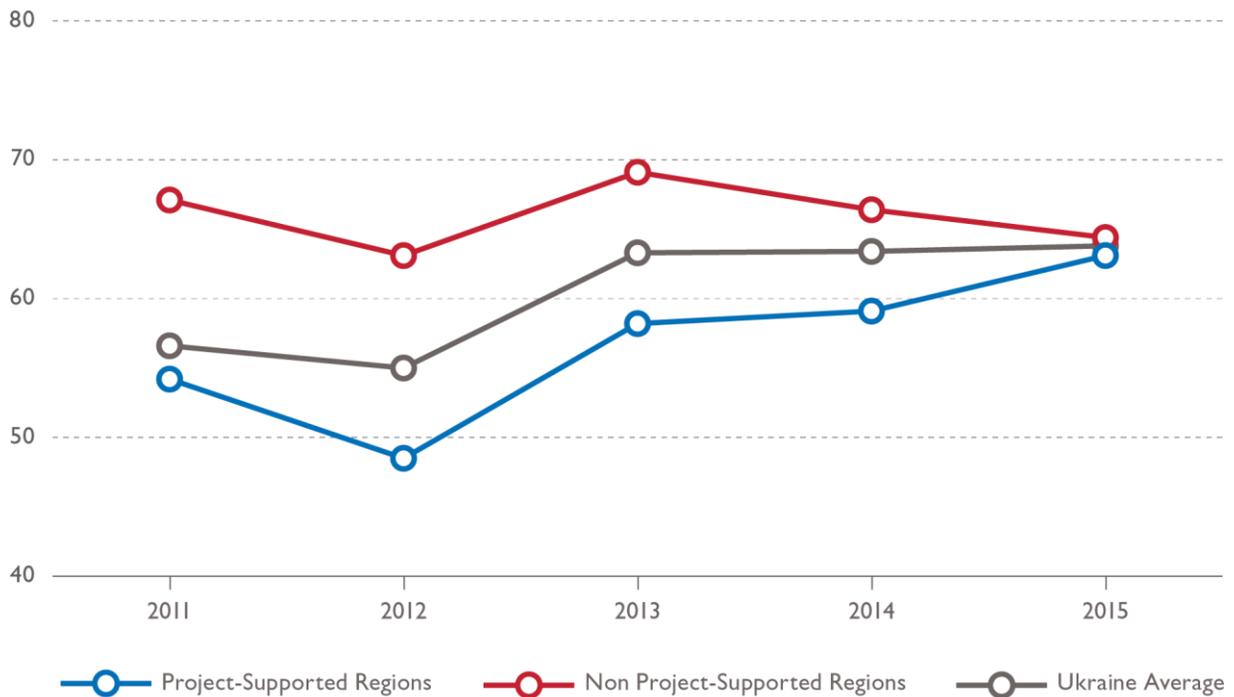
By using mentoring visits, control laboratory tests, visits of national experts, and high-level TB laboratory diagnostics, the project was able to assess retention of knowledge by the trained TB laboratory specialists.

### BETTER TB TREATMENT

Improvement in TB case management can be assessed using WHO recommended indicators: TB incidence, TB treatment effectiveness, and mortality rate. TB incidence in USAID-supported areas in 2015 was 66.8 cases per 100,000 people. The indicator has remained stable during the last few years. This indicates the effectiveness of TB management as a result of improved early TB detection, especially at the PCH level, and the timely beginning of adequate TB treatment.

The mortality rate in USAID-supported areas in 2015 came to 12.8 cases per 100,000 people and is below the estimated rate of 14.3 cases per 100,000 population. During project implementation, mortality rates in the project-supported regions steadily decreased. This indicator is one of the key indicators that demonstrate effectiveness of TB control program and effectiveness of the project activities (see Exhibit 8 next page).

**EXHIBIT 8. TB TREATMENT EFFECTIVENESS RATE IN: USAID-SUPPORTED REGIONS, NON-SUPPORTED REGIONS, AND UKRAINE OVERALL FROM 2011-2015**



### INTRODUCING OUTPATIENT TB TREATMENT

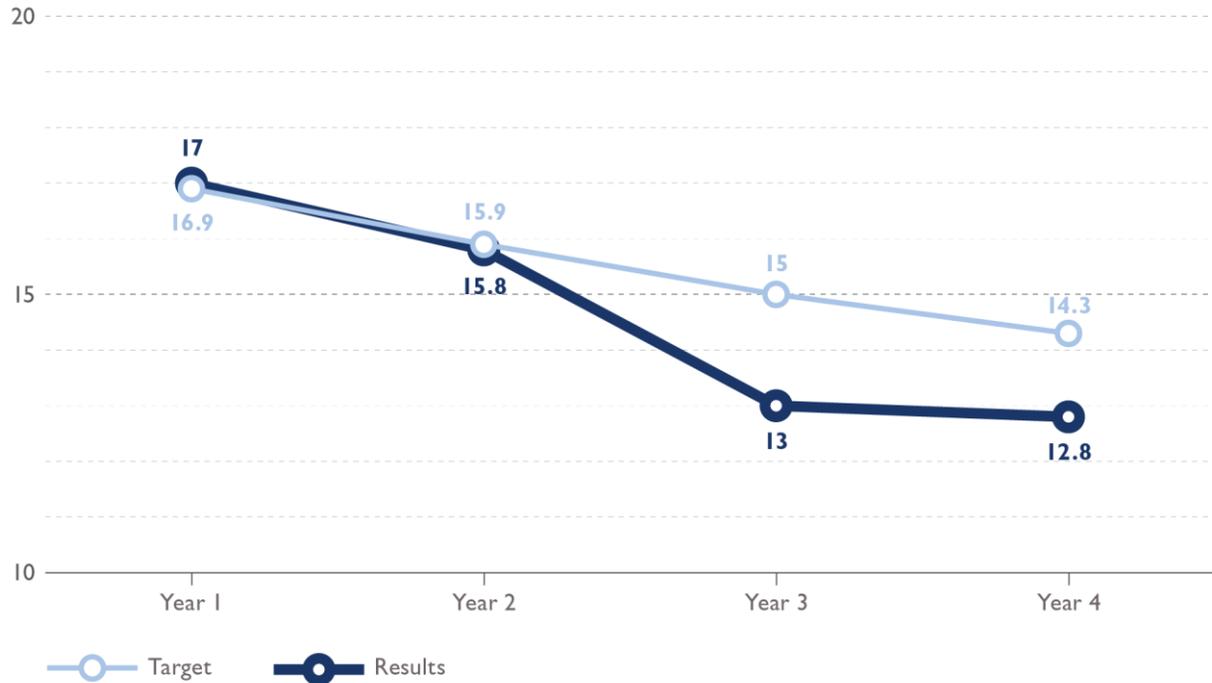
Increasingly, the Ukrainian health system is moving toward a patient-oriented approach. The attitude toward outpatient treatment for TB in the medical community has changed significantly, from rejection to official declaration of outpatient TB treatment as one of the principal gains of the health system reform (see box next page).

In 2014, with STbCU’s support and using WHO protocols, a lead specialist from Kryvyi Rih conducted a cost-effectiveness analysis at inpatient and outpatient levels. The data obtained suggest that the outpatient TB care, excluding cost of medications, chemicals, diagnostic services, and patient-covered costs, is approximately five times less costly than the combined inpatient/outpatient care model. Moreover, 78 percent of the outpatients adhered to the protocols as opposed to only 54 percent under the combined model. Thus, health administration officials in the pilot area were also interested in continuing to evaluate the model and expanding the scope to health outcomes.

In 2015, STbCU conducted a larger scale pilot in Kryvyi Rih to confirm the results and further evaluate health outcomes. The pilot did not focus on creating new types of treatment, but rather on evaluating treatment effectiveness of using new protocols, which favored outpatient-based care, especially at PHC level, comparing them against the old model. As a result, the hospitalization rate for TB patients in the pilot decreased

considerably; but treatment effectiveness and patients' adherence to treatment remained statistically the same (see Exhibit 9 below).

**EXHIBIT 9. MORTALITY RATE IN USAID-SUPPORTED REGIONS FROM 2012-2015**



**BRINGING AN OUTPATIENT MODEL OF TUBERCULOSIS CARE TO KRYVYI RIH**

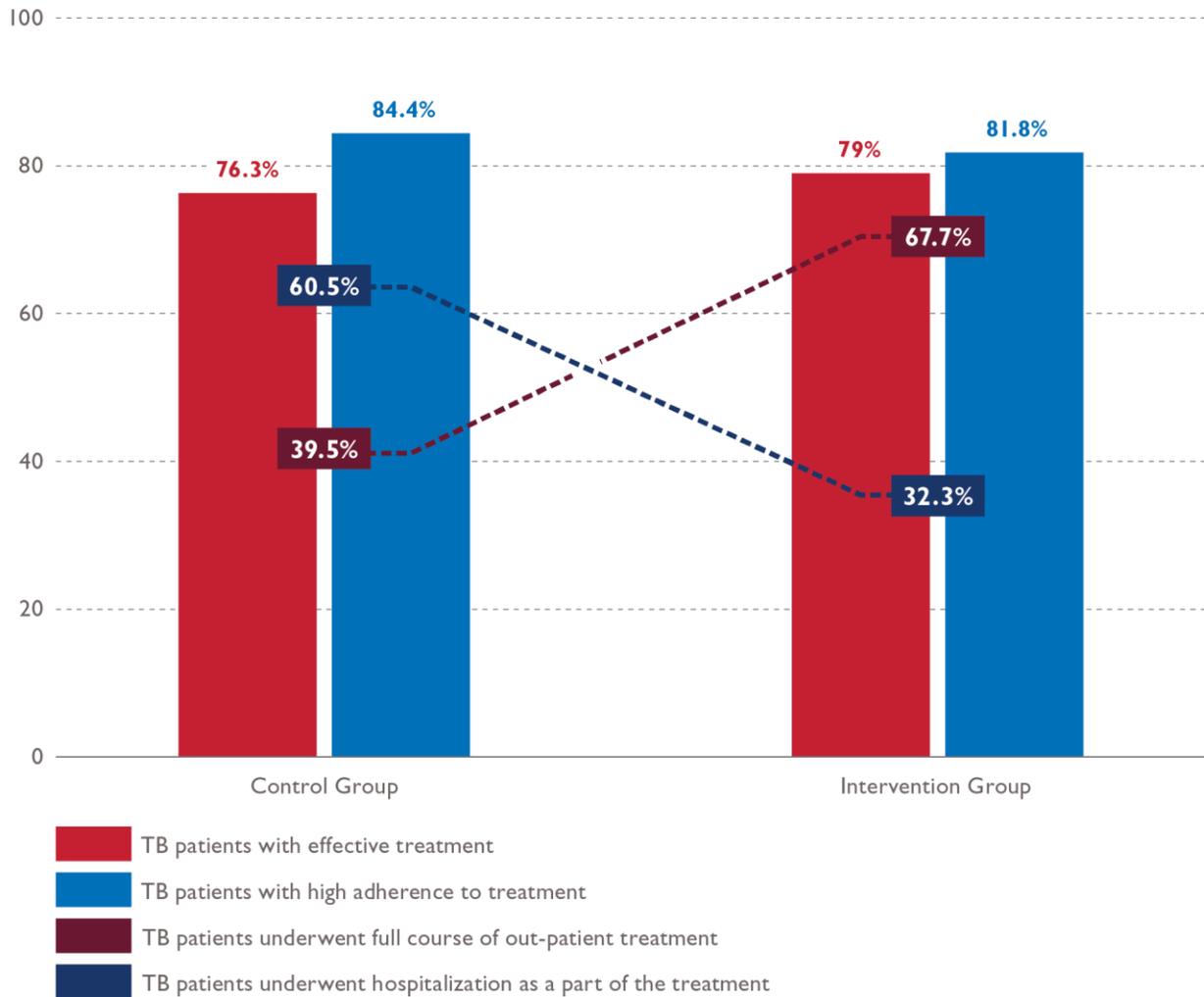


Olena has been providing DOTS-based TB care for more than two years, largely on an inpatient basis. When the Kryvyi Rih pilot began, her patients doubled to 10-11 per day. But she soon realized that the workload was not too heavy. Her patients came in before office hours, which was more convenient for them. If patients want to come in later, it is no problem: they all have Olena's telephone number and arrange for a more convenient time to pick up their medicine. If a patient is absent for a day or two, she and the local TB specialist try to convince him or her to continue treatment. Besides giving out medicine, Olena monitors treatment tolerance in her clients. If there are any side effects, she refers the patient to the family doctor.

As Olena remarked: "I'm used to viewing all of our patients as 'mine'; I don't split them by diagnosis. You need to cure the person, and it is the primary responsibility of family medical physicians. Tuberculosis is curable not only in TB service facilities; it is curable in my own primary health care site, in my office."

To sustain the pilot’s achievement, the Head of Kryvyi Rih TB Dispensary presented pilot results to Kryvyi Rih City Health Administration. He initiated the training series for all primary health care points in the city and some training for NGOs who provide social support to TB patients. As a result, starting in 2017, the TB ambulatory model piloted in one region of Kryvyi Rih is being extended to the whole city (Exhibit 10).

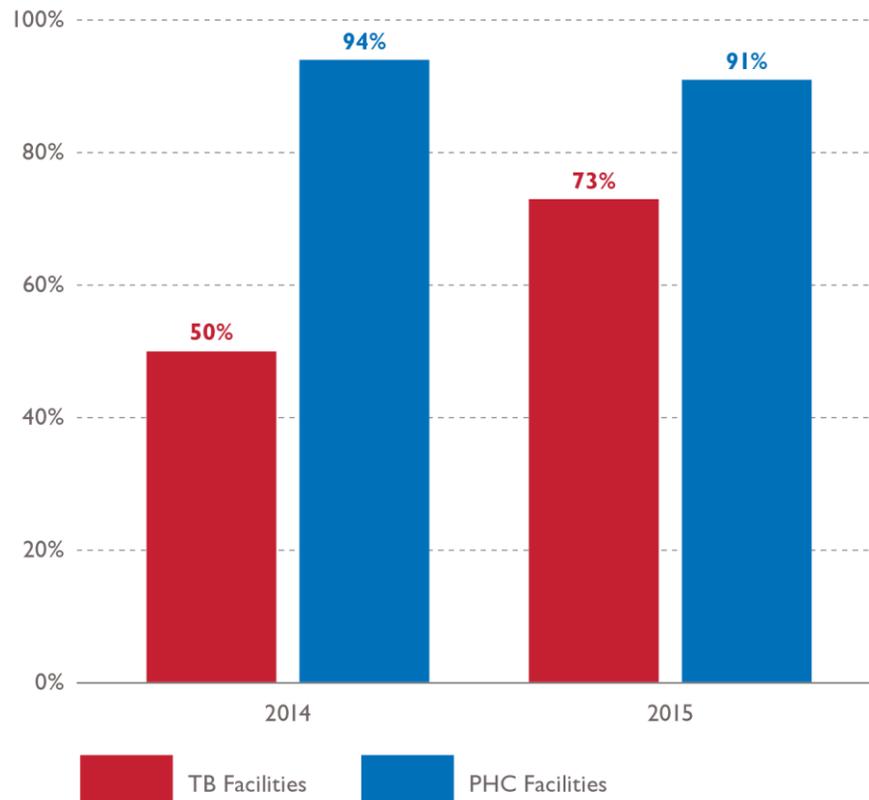
**EXHIBIT 10. TREATMENT MODELS AND TREATMENT EFFECTIVENESS IN CONTROL AND INTERVENTION GROUPS OF PATIENTS IN 2015-2016 KRIVYI RIH PILOT**



While piloting TB ambulatory models in Kyiv City, there were significant achievements, including a 50 percent reduction of TB hospitalization rates, a considerable improvement of TB treatment results in primary health services. In cooperation with Abt, STbCU provided technical assistance to Kyiv City TB services in reforming the process, namely, the reduction of hospital beds and shifting from hospital-based to outpatient care, using evidence-based hospitalization criteria, increase of family doctors’ involvement in TB treatment, and integration of DOT services at PHC level. As a result, in less than in two years (from 2015 to the middle of 2016), the number of patients who

underwent TB treatment in PHC facilities increased from 146 to 620. Moreover, the treatment effectiveness in TB patients in PHC appeared to be much higher than in the TB service (see Exhibit 11).

**EXHIBIT 11. EFFECTIVE TREATMENT IN AMBULATORY TB PATIENTS IN KYIV CITY IN 2014 AND 2015**



The findings of three operational research activities for the STbCU operational research program support outpatient TB treatment and provide some recommendations, in particular:

- A study performed by NGO Center Social Indicators titled “Impact of Different Models of Outpatient TB Treatment on Treatment Outcomes in the City of Kyiv” revealed that TB treatment at the PHC level is the second most successful model: The proportion of patients with treatment success among those who started TB treatment in a TB hospital was 51.4 percent; in a specialized TB treatment outpatient facility, 84.9 percent; in PHC units, 90.2 percent, and under supervision of the Red Cross society, 88.7 percent. In total, 31.6 percent of TB patients in Kyiv received outpatient treatment from the beginning of the course, and 10.3 percent completed the entire treatment course at PHC level.
- The main barriers to effective outpatient treatment are prejudice against outpatient treatment and outdated knowledge about infection control among health

care workers. Excessive amounts of paperwork draws health care workers' attention away from treatment supervision, and the lack of incentives demoralizes medical personnel. An educational campaign among health care workers is needed to tackle stigma and distrust of DOT. Additionally, the motivational system for HCW requires reconsideration to increase quality of the DOT services.

- A study titled “Analysis of gaps in the treatment of tuberculosis” is being performed by NGO Center “Social Indicators,” and the draft report and study conclusion have been submitted to STbCU. The preliminary findings revealed mistakes in cases classification and improper management as the reason for most treatment failures.
- The “Let the Fresh Air In” study, performed by the International HIV/AIDS and TB Institute, revealed that patients with less knowledge of TB are more likely to miss treatment. Following these findings, the International HIV/AIDS and TB Institute developed a manual for patient education and socio-psychological support.

#### **INVOLVEMENT OF THE NON-MEDICAL SECTOR IN PATIENT SUPPORT AND INCREASING TREATMENT ADHERENCE**

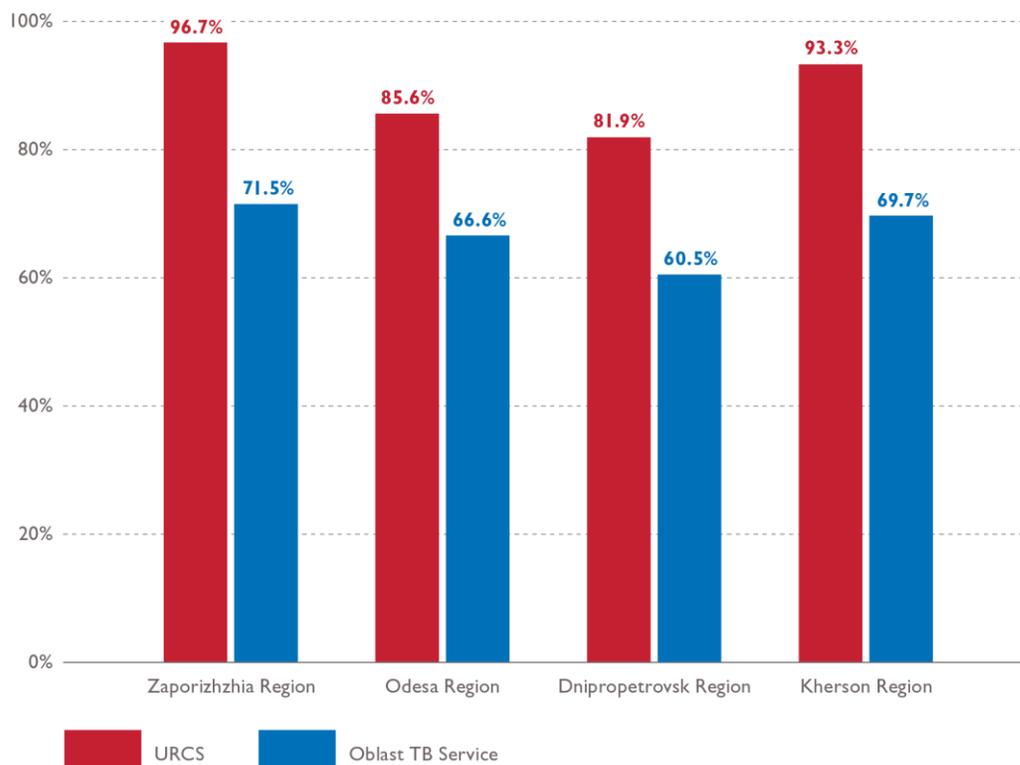
STbCU's grants program contributed significantly to the promotion of TB ambulatory treatment at central and local level. A \$500,000 USD grant to the Ukrainian Red Cross society provided ambulatory-based DOT to more than 1,000 patients in four USAID-supported regions. Red Cross nurses conducted more than 13,000 counseling sessions for TB patients and their families in 10 USAID-supported regions. As a result, treatment for TB patients enrolled in patient support programs was much more effective than in other TB patients in the same regions (Exhibit 12 next page).

Some small ACSM grants and operational researches focused on TB ambulatory treatment contributed to the effective promotion of TB ambulatory treatment based on DOT and patient support. STbCU presented the following conclusions and lessons learned to national-level health authorities and partners at several national forums:

- The national TB register (e-TB manager) shows that ambulatory TB treatment, especially at the PHC level, is more effective than inpatient treatment of TB patients.
- There is a direct correlation between level of knowledge on TB general issues and patients' adherence to treatment.
- There is proven evidence that providing TB patients with psychological and social support improve patients' adherence to treatment.
- Psychological and social support led to a 5 percent decrease of clinical and sub-clinical signs of depression and a 6 to 8 percent decrease of TB patients with fears, emotional self-isolation, TB-related stigma, and indifference toward the future.

- There is no evidence that hospital-based models increase patients' adherence to treatment
- The procedures of referring TB patients from PHC level to TB facilities and vice versa need improvement, as lack of standards in the referral system is the main cause of diagnostics and treatment delays in TB patients
- Some TB and PHC doctors continue to oppose ambulatory TB treatment at PHC level. The former, out of fear of losing their jobs, and the latter, out of fear of contracting TB and the stigma associated with the disease.
- There is a significant need to improve communication skills of health care providers necessary for quality counselling of TB patients.

**EXHIBIT 12. COMPARISON OF TREATMENT EFFECTIVENESS RATES AMONG TB PATIENTS IN URCS GRANT PROGRAM AND REGIONAL TB CONTROL PROGRAM IN 2014 PATIENT COHORT**



Due to STbCU's technical assistance, health administrations in all USAID-supported regions developed and approved local TB control protocols and TB patients' pathways with ambulatory DOT as a primary feature.

## **FAST START OF PROPER TB TREATMENT, INCLUDING MDR-TB**

STbCU supported regional TB specialists to improve the quality of MDR- and XDR-TB case management by bringing treatment practices in line with WHO guidelines and the new updated National Clinical TB Protocol.

Through participation in the regional MDR-Counseling Boards, STbCU consistently assisted in streamlining MDR council operations in USAID-supported oblasts. Project experts assessed the existing regulatory documents, analyzed the work of the MDR Counseling Boards, and the quality of decisions made for compliance with the international recommendations and the updated National Protocol for Managing TB Cases and provided recommendations for work optimization.

By participating in the project's training courses, seminars, and mentoring visits, local specialists developed the capacity to diagnose and manage side effects from second-line drugs therapy, register adverse reactions, and establish a strong drug-management system.

Because of the complexity and rapid development of the MDR-TB case-management program as a part of the current global strategy for TB control, STbCU built capacity of leading TB experts in MDR-TB case management by supporting participation of a group of national TB experts in the first congress of the TB Association of the Russian Federation in St. Petersburg on October 18-20, 2012. The project also supported six TB specialists to attend training on TB and MDR-TB case management in Tartu, Estonia in 2014. In addition, STbCU invited Pierpaolo de Colombani, the chief TB expert from the regional WHO office, to conduct a Skype training on MDR-TB case management for 40 national TB specialists in 2015. Moreover, 388 TB specialists and nurses from TB facilities and health professionals of the State Penitentiary Service participated in seminars organized by the project, gained new knowledge, and improved their skills in managing side reactions to TB drugs, organizing TB drug management at different levels of care, side effect registration, and learned the impact of late side-effect registration on further advancement of MDR-TB.

To improve TB/HIV case management at hospital stage of treatment in Kirovohrad TB dispensary, STbCU TB/HIV specialist, together with Kirovohrad oblast health professionals, developed an Algorithm of timely HIV detection and registration in the patients of Oblast TB hospital and supported its endorsement by a local order. Its implementation helped the doctors to recognize that this algorithm made HIV diagnostics and case registration easier and faster. Cases of HIV test duplication were excluded. This resulted in decreasing of the time to obtain final test results and, in case of HIV+, register the case for follow-up with the AIDS-Center (by 2-3 days and up to two weeks). In nine months after the algorithm was implemented, timely administration of ART was done in 98 percent of patients vs. 70-75 percent at the beginning.

The project assessed the effectiveness of MDR councils in MDR-TB management using the following criteria:

- Proper registration and timely treatment provision (not later than seven days after obtaining DST results).

- Compliance of treatment regimens with national and international protocols.
- Availability of a three months local stock of second- line drugs for each MDR patient.
- Proper treatment monitoring.

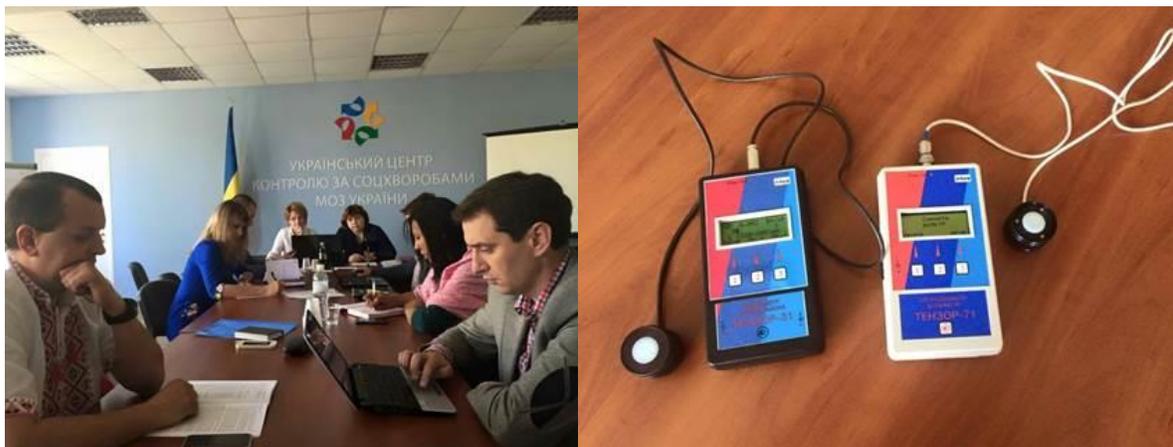
According to these criteria, MDR councils in all project-supported TB facilities are now operating properly.

### OPTIMIZATION OF DRUG MANAGEMENT

With the project support, the monitoring and evaluation departments of TB facilities in the Lviv, Zaporizhzhia, and Kharkiv oblasts and Kyiv city developed capacity in TB drug management. Regional TB specialists are now capable of conducting a self-assessment and analyzing data on TB drug management practices in health facilities, controlling registration and use of TB drugs.

Overall, 142 health professionals of TB and PHC facilities in these regions improved their knowledge of drug management at training activities conducted by the project jointly with the regional TB dispensaries and through on-the-job training. Understanding importance of proper drug management, the heads of Lviv and Kherson Oblasts' TB service organized and held one-day training activities for staff dealing with drug-management issues: TB specialists, nurses of TB facilities, accountants, and M&E specialists. The project supported these activities by making a presentation on “Drug management in the Region.”

Following STbCU’s recommendations, the Kherson oblast health administration developed and adopted local regulations titled “On Improving TB Drug Management” and endorsed the TB drug path and reporting forms for Kherson oblast. UCDC recommended regulations developed by Kherson oblast, served as master for similar orders in all regions of Ukraine.



An STbCU TB IC Specialist, in conjunction with the NGO Infection Control in Ukraine and the UCDC, provides technical assistance and mentoring on the proper use of UV radiometers.

## PREVENTION OF NEW TB CASES

### DEVELOPMENT OF SAFE MEDICAL ENVIRONMENT (TB INFECTION CONTROL)

Before the project started, infection control monitoring in medical facilities in Ukraine (or control over nosocomial TB transmission) was conducted by specialists of Sanitary and Epidemiology Services (SES). These auditors were external to the health care system, and often delivered punitive action, but few results related to improved IC.

The main result of the project in the sphere of IC is organization of an internal audit. Now health care facilities have developed IC plans, created SOPs, and control is implemented through mentoring visits by project-trained specialists.

To start with, STbCU formed a National Expert Group on IC. After proper training, which included two international training events held in Vladimir, Russia in April 2012, the group started providing mentoring, supportive supervision, and on-the-job training to implement managerial, organizational, environmental, and individual TB IC measures in health care and laboratory settings. The group also provided independent expertise on TB IC measures in medical facilities and developed recommendations specific to each region or facility.

STbCU-provided mentoring assistance allowed TB facilities and AIDS Centers in project-supported regions to better plan the implementation of TB IC activities. Doing so reduced occupational TB morbidity which, in turn, reduced the TB incidence among health care workers and other hospital patients. Since the beginning of the project, HCW knowledge of IC increased from 0 to 92 percent; 101 TB facilities and AIDS Centers in the project-supported regions developed and operationalized proper IC plans; and the incidence rate of TB among health care workers decreased from 7.2 in 2012 to 5.6 in 2015.

#### IMPROVING TB INFECTION CONTROL IN ODESA



Central Odesa TB hospital in Odesa is located in a ramshackle building constructed early in the twentieth century. It is impossible to renovate the building to satisfy current TB infection control requirements, in particular, the facility lacks mechanical ventilation. The shortage of health services funding seriously limits environmental control and individual protection. As a result, between 2008 and 2012, 23 employees of the local TB services contracted TB.

Following the recommendations of STbCU's IC specialists, the facility organized proper patients flow, strictly separated smear- and culture-positive patients and patients with MDR- and XDR-TB; revised the layout of the premises to concentrate the high-risk zones and minimize patient interaction, and set shielded UV radiators in all wards and areas where aerosol-producing procedures are performed (bronchoscopy, sputum collection, etc.), waiting rooms, and X-ray departments. The hospital administration also insisted on proper use of natural ventilation and keeping windows open, as weather permits. All healthcare workers used FFP-2 respirators.

As a result of these proper TB IC measures, no new TB cases were registered among employees of Odesa's central TB hospital since 2014.

MoH and UCDC, with the project’s support, started building a legal environment to sustain proper IC practices in HC facilities. Thus, a bill supporting IC practices (“On Healthcare Facilities and Medical Services”) was developed and submitted to the Ministry of Justice for revision. A National IC Roadmap developed with WHO became part of the National TB Control Program for 2017-2021.

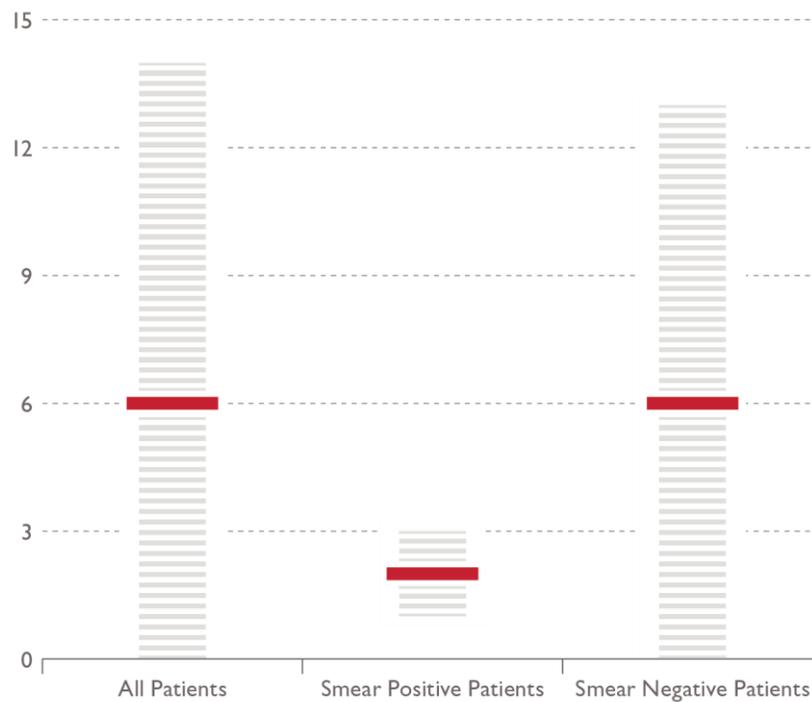
UCDC experts started working on the development of infection control guidelines for the Pathology departments. Such guidelines will help to plan necessary infection control activities and to reduce professional TB morbidity among Ukrainian pathologists.

A complete list of documents developed by STbCU together with experts from the NGO “Infection Control in Ukraine” is provided in Annex A.

### CONTACT TRACING

The prevention of TB transmission among contacts is an important part of the TB ambulatory treatment system. For this reason, the 2015-2106 Kryvyi Rih pilot study stressed TB contact tracing. The pilot study included 143 people who had household contact with TB patients. For the first time in Ukraine, the pilot properly connected TB infection control requirements with the updated models for TB treatment.

**EXHIBIT 13. AVERAGE NUMBER OF DAYS BETWEEN SMEAR MICROSCOPY RESULTS AND VISITS TO TB PATIENT HOUSEHOLDS**

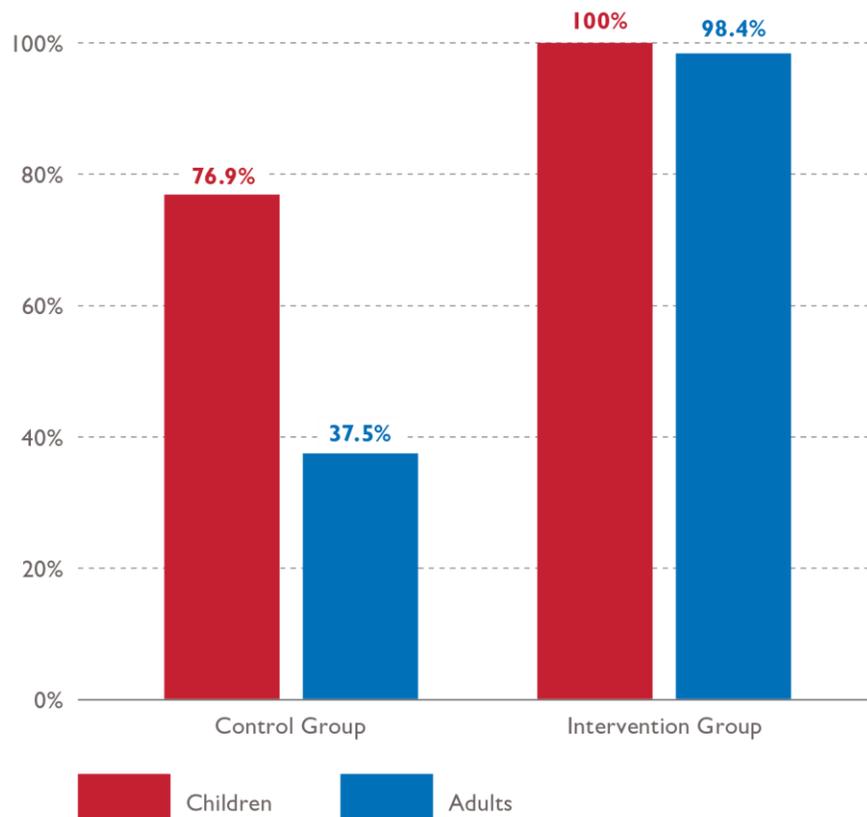


Medical staff on the pilot study visited TB patients’ homes as a part of their routine work, but provided TB patients and their household TB contacts with innovative services, such as education on evidence-based TB protective measures and joint planning of TB infection control activities within the family, while the TB patient was undergoing ambulatory TB treatment. During the visit, medical staff filled out the

designated form (“Organization of TB Treatment Model,”) which was used in deciding where to treat TB patients depending on their living conditions. The visits to households were properly organized for sputum smear-positive TB patients. Medical staff visited patients’ houses one to three days after they received the sputum smear results. Visits to smear-negative TB patients also were conducted, but in longer terms (see Exhibit 13 on previous page).

In contrast with routine practices all over the country, medical staff in the pilot effectively applied TB screening interviewing of contacts and encouraged them to undergo medical examination themselves. As a result, the coverage of TB testing in the pilot increased considerably (see Exhibit 14).

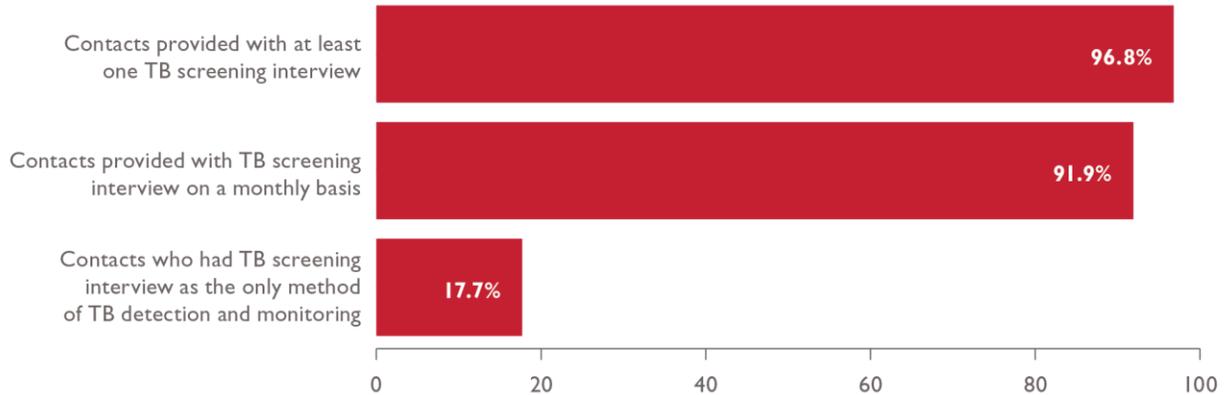
**EXHIBIT 14. COVERAGE OF TB CONTACTS WITH AT LEAST ONE TB SCREENING METHOD\* RECORDED IN THEIR MEDICAL CARD**



\*Screening methods included TB screening interviewing, X-ray examination, tuberculin skin test and sputum smear microscopy when necessary.

Moreover, for the first time in Ukraine, all adult TB contacts were monitored monthly for six months, using the TB screening questionnaire. For some of them, interviewing for TB symptoms was the only method of TB testing (Exhibit 15).

**EXHIBIT 15. MONITORING OF ADULT TB CONTACTS BY TB SCREENING INTERVIEWING**



In addition, all juvenile TB contacts were tested for TB every six months, and were provided with Isoniazid preventive treatment as necessary.

The pilot survey results discredited the fear of TB transmission among household contacts. At the time of initial examination, TB was detected in two percent of contacts (simultaneous detection, dual hotbed). Dynamic monitoring in combination with drug prophylaxis resulted in detecting no TB cases among the contacts of patients under treatment.

The results of the contact tracing were presented to partners as yet another piece of evidence supporting the effectiveness and safety of the ambulatory TB treatment model.

**ISONIAZID PREVENTIVE TREATMENT AND CO-TRIMOXAZOLE PREVENTIVE TREATMENT FOR PATIENTS WITH TB/HIV**

Over the course of the project, prevention of TB and other opportunistic infections became more active in the USAID-supported regions. Coverage of newly detected PLHIV by IPT has increased from 22 percent in September 2013 to 27 percent in September 2014. Coverage of TB/HIV patients by co-trimoxazol preventive treatment has increased even more significantly, from 24 percent in 2013 to 37 percent in 2014. At the same time, significant differences among the regions were discovered. For instance, in Odesa, 42 percent of PLHIV received IPT, and 84 percent of patients with co-infection received co-trimoxazol preventive course. These results significantly exceed the average data.

**INFORMATION CAMPAIGNS FOR GENERAL POPULATIONS, TRAINING FOR NGOS AND HCW**

Baseline research conducted by the project revealed that health specialists were

unaware of TB IC measures and relied on the old-fashioned Soviet approaches to TB Infection Control. STbCU became the first project in Ukraine to focus on changing the attitudes of health workers toward TB IC practices.

At the beginning of the project, after a desk review of existing materials developed by other donor projects, STbCU realized a serious shortage of materials on TB IC. Thus the next step was to develop a range of publications to cover this gap:

- Poster: “Basics of Infection Control”
- Poster: “How to wear a respirator”
- Guide: “Use of UV Radiometers for Controlling UV Irradiation”
- Analytical review: Ukrainian legislation on the use of UV radiators in health facilities, and its comparison with up-to-date foreign regulations, including those in post-Soviet countries
- Booklet brochure: “Tuberculosis. Schemes and charts for PHC medical personnel.” In addition to information about TB symptoms, the TB detection algorithm, sputum gathering, treatment regimens, and possible side reactions, this A5 brochure contains the basics of administrative and personal infection control measures and a link to the STbCU web site for more TB-related information. This publication targets medical personnel of primary healthcare facilities.

In addition to the manuals, guidelines, and posters, STbCU included TB IC issues in its educational videos on TB case management essential procedures for PHCs and TB/HIV co-infection.



The exciting process of shooting an educational video.

Most of the TB IC expert group members came from the State Sanitary and Epidemiology Service (SES) of Ukraine. To save valuable human resources after the SES was abolished, STbCU continued to provide technical support to the TB IC expert group so that it could register as an NGO as “Infection Control in Ukraine.” The NGO continued close partnering with the USAID project, conducting training, mentoring

visits, on-job-training, independent expertise on TB IC measures in medical facilities, and providing recommendations on TB IC.

Together with experts from this NGO, STbCU developed a self-assessment monitoring and evaluation tool for TB IC for internal audit of proper IC practices at health care facilities. The tool was piloted at the Lviv TB dispensary and then proposed to other health care facilities. Use of the tool allows facilities to better plan their TB IC activities and make managerial decisions on priority IC interventions.

In partnership with the NGO, the project maintained and regularly updated the Infection Control page on Facebook. Main users include TB specialists, HIV specialists working in AIDS centers, staff of the sanitary and epidemiological service, and mass media representatives. Besides featuring updates on Infection Control in Ukraine and worldwide, the FB page served as a tool to maintain contact with interested professionals and respond to their requests and discussions.

The project consistently advocated TB IC issues at all levels: in health care facilities, regional administrations, and national powers. During mentoring visits, STbCU and the Infection Control in Ukraine team met with heads of health care departments and chief TB specialists of oblast state administrations. At these meetings, they discussed the implementation of the organizational component at regional level and in local organizations. This enabled the allocation of additional funding from local budgets for the needs of the infection control implementation according to international standards.

## **MONITORING AND EVALUATION**

### **ONGOING ANALYSIS OF NATIONAL TB PROGRAM PERFORMANCE**

Data needed to control and manage the National TB Program (NTP) are collected in Ukraine by two parallel reporting systems: the National TB Statistics System and National e-TB Register.

STbCU supported the MoH and UCDC in their efforts to harmonize these two systems. R&R forms were updated and adjusted to include reporting on adverse reactions to TB treatment, remove duplicated data, and add new options for reporting the results of genetic tests, the need for which appeared once the GeneXpert testing method became operational.

UCDC operationalized two guidelines developed by STbCU that helped to improve the quality of TB data collection system. The project supported development of on-line materials “Analyses and Interpretation of TB Epidemiological Data” and “Guidelines on information system e-TB register data quality control” containing standard operational procedures (SOP) of data verification and entering into e-TB register. Use of the standardized recording and reporting system improved the quality of the data collected and made it possible to collect more detailed data.

STbCU's strong advocacy efforts resulted in indicators related to TB/HIV co-infection being included in the national M&E HIV system and the national HIV e-register. Health departments in all project-supported regions adopted specific TB/HIV indicators for monitoring TB/HIV co-infection. This enabled specialists of TB dispensaries and AIDS Centers to obtain strategic information at the local level, which they used to further improve local TB/HIV co-infection service systems and to increase the proportion of newly diagnosed HIV and TB individuals who undergo diagnostic and counseling services for dual infection.

The project developed a new way to provide technical support to health care facilities based on mentoring to fill the gap between the knowledge and practice of health care professionals and health care administrators. The team made sure to include on-the-job capacity building and educational sessions in every mentoring visit. It also provided consultation on topics relevant to health care providers' responsibilities and any identified shortcomings in their performance. STbCU introduced mentoring visits into routine practice in regions where specialists from the regional TB dispensary and AIDS Center are members of local multidisciplinary teams for mentoring visits. The data obtained during these visits were used to analyze the local situation in each region and to identify the best regional practices so as to scale up replicable and successful models of TB control.

Mentoring visits in USAID-supported regions expanded into a large-scale mentoring campaign. To date, 1,338 health care workers (HCW) have received on-the-job technical assistance on TB diagnostics, treatment, and case management, as well as TB IC practices and coordination of TB/HIV services.

## EXCHANGE OF EXPERIENCES, ANALYSIS, AND DISCUSSION

STbCU provided a platform for regional and national decision makers, as well as TB, HIV and PHC specialists, to share achievements and experience gained in their oblasts with colleagues, present best practices implemented in the regions with STbCU's support, share their experience on implementing positive changes and share experiences of quality data use for evidence-based decision making. During project implementation, four such meetings took place in Kyiv, Kherson, Lviv, Kirovohrad, and Odesa. All participants considered the format of the meetings to be useful, and practice oriented peer discussion led to improvement of TB programs in USAID-supported regions.



Participants of the inter-regional meeting visit the photo exhibition on TB treatment in the Ukraine-controlled part of Luhansk oblast.

## **OPERATIONAL RESEARCH**

Ukraine has long needed large-scale studies to establish the evidence base for managerial decisions in TB control. This data can be provided only by operational research (OR), which has not been conducted in Ukraine until recently. STbCU introduced a system of OR for managerial decisions within the National TB Program, and, for the first time ever in Ukraine, designed and supervised four operational research studies, which meet the WHO OR definition as “the use of systematic research techniques for program decision-making to achieve a specific outcome; OR provides policy-makers and managers with evidence that they can use to improve program operations.” STbCU-initiated operational research results inform solutions that have a significant impact on case detection and cure rates, and help to improve the availability and effectiveness of TB care services.

STbCU shared the results of its completed operational research with the Profile Committee of the National TB board. Findings of the STbCU operational research program were presented at the 47th World Conference on Lung Health in Liverpool, Great Britain.

STbCU initiated five percent allocation for operational research within the National TB Control Program funding for 2017-2021, and proposed the pivotal direction of the next research. This will ensure the sustainability of the operation research initiative. Along with other stakeholders in TB control, STbCU managed to include the issue of TB ambulatory treatment in Ukraine’s overall health reforming process, which will be made official by National TB Control Program.

## **SUSTAINABILITY**

The strength of the project is in its combination of providing services and developing policy at oblast levels. This combination promotes the sustainability of project-supported results.

## **STRENGTHENING TB CONTROL SYSTEM IN UKRAINE**

In addition to the practical education STbCU provided to clinicians and laboratory specialists on up-to-date TB diagnosis, treatment, and infection control, STbCU’s legacy will be its support to national and local reform efforts. Reform of the TB Control System is a part of an ongoing, large-scale Health Care System reform. STbCU provided the government with strong evidence in support of the efficiency and effectiveness of ambulatory treatment for TB patients with the engagement of primary health services. Based on the results of the larger scale pilot conducted in Kryvyi Rih in 2014-2016, STbCU showed that implementation of ambulatory treatment for TB patients is the best alternative to the combined inpatient/outpatient treatment models, providing the same effectiveness at significantly lower costs. Along with other stakeholders, STbCU managed to include the issue of TB ambulatory treatment in the overall health reform process in Ukraine, and this will be institutionalized by the National TB Control Program for 2017-2021.

As a result of joint efforts to advocate TB ambulatory treatment as a part of health reform, in September 2016 the MoH abolished policies on per-bed financing and staffing of the medical system. This means that now the way is opened for appropriate planning of resources to expand TB ambulatory treatment and make local TB control programs much more cost effective.

In the Odesa region, based on STbCU-supported cost analysis, local authorities developed a new integrated TB and HIV Control program for 2017-2021 that emphasizes creating integrated service centers of for TB and HIV patients, reducing the number of TB beds, and rolling out TB ambulatory treatment at the rayon level, based on PHC facilities.

### **PROVIDED NATIONAL PROTOCOLS ON TB, TB/HIV AND COUGH, MOH'S ORDERS, RECOMMENDATIONS, AND GUIDELINES**

Over the life of the project, 45 regulatory, analytical and training documents of national and regional levels were developed. This includes the 18 documents endorsed at the national level, four at the regional level, and 16 taken into consideration in establishing legal regulations.

The documents brought up the following key issues:

- Revision of the national clinical and local protocols on TB, MDR-TB, TB/HI care
- Implementation of IC activities in healthcare facilities of different levels, SOP development
- Implementation of quality assurance in TB laboratories at different levels
- Working out manuals and training materials for medical students and health professionals of different specializations
- Self-assessment questionnaires as tools for assessing, analyzing and improving TB, HIV and TB/HIV services
- Improving the M&E system at the national level.

The full list of documents may be found in Annex A.

### **BUILDING HUMAN RESOURCE CAPACITY**

During project implementation, STbCU supported the MoH to strengthen human resource capacity in TB control. Today, international TB care standards are incorporated into the pre- and postgraduate medical education curricula. Thus, the National Bogomolets Medical University is using a version of the Exemplary National

Educational Program for sixth-year medical students that includes up-to-date knowledge on TB case detection, case management, patient pathways, infection control, and new diagnostic techniques (both molecular and culture). The curriculum was revised with technical assistance from the project. At the university's request, STbCU also updated the second edition of the national textbook on tuberculosis for medical students.

To strengthen the formal medical education system, institutionalize the project's educational activities, and ensure their continuation, STbCU, in agreement with UCDC, included its educational materials into the standardized curricula of postgraduate training of health professionals provided by the National Medical Academy of Post-Graduate Education and other medical universities. The Academy staff hosted six USAID-sponsored, specialized short-term courses on TB control. A total of 116 PHC doctors from Kyiv city, Lviv, and Kirovohrad oblasts received a streamlined, "single-step" update on modern TB practices. All trainees received state certificates for course completion, which will facilitate their future licensing.

In addition, several materials developed with project assistance were included into regular medical education:

- MoH guidelines for local TB case management protocols at primary health care (PHC) facilities
- MoH guidelines on cough management
- MoH guidelines on TB/HIV-associated miliary and extrapulmonary tuberculosis: evidence-based approaches to case management
- The State Sanitary and Epidemiological Service of Ukraine (SES) informational letter on planning and implementation of SES mentoring visits to health-care facilities that provide TB care
- The short-term course on TB case management in PHC facilities approved by the Scientific Council of the National Medical Academy for Post-Graduate Education
- The TB section of the "Standard Academic Curriculum for Pre-Graduate Medical Education.

STbCU integrated evidence-based education on TB infection control (IC) into curricula of Odesa State Medical University. With the project's support, specialists from the university's Healthcare Administration Department developed new guidelines on TB infection control for lecturers and students and started teaching students about modern international approaches to TB IC in September 2015, which would allow young professionals to get basic knowledge and practical skills on IC and to use them in practice.

The project introduced a system of ongoing pre- and post- diploma education on TB, which involves WHO recommendations and best international practices in TB, extrapulmonary TB and TB prevention (manuals for students of medical universities), and TB infection control (an elective within the course on epidemiology).

STbCU developed the concept of online learning and launched Ukraine's first online resource for self-education on TB – the Training, Information and Resource Center (TIRC). The TIRC, established in cooperation with UCDC, is a unique online platform on tuberculosis for professionals and the general public; it is the first large-scale resource on TB in Ukraine that combines interactive learning opportunity, a large library, and exciting opportunities for practitioners to communicate online. Up to 600 users visit the site daily.

In addition to containing an extensive library of TB-related publications, reports, and studies, the site also contains regularly updated TB-related news, resources for patients and the general public, and online training courses, such as “TB Case Management for Primary Health Care Specialists” and “Psychological Support to TB Patients.” The courses involve video lectures, PowerPoint presentations, recommended additional resources, and quizzes. Users can choose for themselves when and how they learn. All they need for getting more knowledge about specific TB-related topics is an Internet connection and the will to learn. Users who correctly answer 80 percent of the control questions receive a certificate from the STbCU and a partnering institution involved in the development of a particular training course.

In addition, clinical case studies, an online self-assessment test for medical students (developed in partnership with the National Medical University), and a self-assessment questionnaire on TB/HIV are available at the TIRC web site. In partnership with UCDC, STbCU used the TIRC web site to conduct an all-Ukrainian survey among health specialists designed to find out gaps in knowledge that should be covered by additional training in the future. More 1,500 users answered the questionnaire.

UCDC will administer the TIRC after the STbCU project concludes.

## **CENTER OF EXCELLENCE**

The Dnipropetrovsk Center of Excellence (CoE) became a key element in implementation of the project's cascade training approach. Over the course of the project, the CoE hosted 62 project-supported training courses and improved the knowledge of PHC doctors and nurses, workers of TB Service, laboratory doctors, microscopic and bacteriological laboratory technicians, SES doctors on TB diagnostics and treatment, MDR-TB, TB/HIV, and infection control (see photo next page).

Six lecturers from medical universities updated their knowledge at CoE through USAID-supported training, and incorporated it into the formal medical education. As part of the training program, 41 medical specialists were trained to be trainers. Thirteen of them are currently involved into state and donor-sponsored educational programs. Professors

from Dnipropetrovsk Medical Academy and other leading academic institutions were closely involved the training.

At the same time, the Dnipropetrovsk Oblast TB Facility “Ftiziatria” – a key member of the Center of Excellence – became a clinical resource for the training center, demonstrating best practices for TB and MDR-TB diagnostics and treatment. With STbCU support, the facility:



Hundreds of health care workers improved their skills at the Dnipropetrovsk Center of Excellence.

- Opened an anti-retroviral therapy (ART) site.
- Installed 30 combined UV lamps in high-risk zones, improved the electronic table to record the results of UV lamp output measurement, and created eight sputum collection points.
- Improved TB and MDR-TB case management: Treatment now starts within 3 days of receiving the test results, all cases are reviewed by the Central Medical Counseling Board (CMCB) and oblast MDR-TB counseling board, and second-line drugs are administered only on the basis of the decisions of the two boards.
- Culture and Xpert MTB/RIF test results are sent instantly to a clinicians’ email as soon as they are received.
- Developed and launched a database of TB and MDR-TB cases to standardize data collection and ensure timely information exchange with the field.
- Introduced Internet connection among the CoE’s inpatient departments: all departments now have email accounts, to allow effective information exchange.
- Maintained the facility’s website with uploaded complicated and improperly managed case studies with expert conclusion and references, and local protocols and SOPs. These cases are used for training purposes.

STbCU initiated and supported development of the online training activities of CoE and developed the center’s website <http://ftiziatr.org.ua/obedinenie-ftiziatrov/>. Now the website contains case studies on complicated or mismanaged cases, training materials with multiple-choice questions on the main CoE training topics, and local guidelines and analytics.

The Dnipropetrovsk Center of Excellence shares its positive experiences and lessons learnt with other regions. In particular, Lviv Oblast TB Facility “Ftiziatria,” which is also developing the national level training center with STbCU support, developed its own website, which is being administrated by the local TB managers. The website highlights the local news on TB control, best practices, and collaboration with non-medical services and provides detail on the history, structure, and activities of Lviv oblast TB control services.



## SECTION 4

# LESSONS LEARNED AND RECOMMENDATIONS

Throughout implementation of STbCU, the team experienced both successes and challenges. The following themes can inform other work:

- Joint working meetings with the regional Level 1, 2, and 3 healthcare specialists are effective and highly efficient instruments for resolving local problem and planning next steps to improve TB and TB-HIV case management practices.
- Support from local oblast- and raion-level deputies is essential. Working with local deputies, in addition to local health authorities, is crucial for developing and implementing necessary policy reform. For example, in Kryvyi Rih, local deputies allocated funds for social support to TB patients; in Odesa oblast, deputies of the oblast Health Care Committee adopted TB and HIV services reforms advocated by STbCU; and in Lviv oblast, a local deputy asked the project to support the development of IC SOP for a general (non-TB) hospital.
- The ongoing reform of the health system in Ukraine has transferred the responsibility for financing of TB, TB/HIV, treatment, and prevention almost entirely to the local level (except for the purchasing of drugs). Advocacy targeting local authorities and support for TB detection, outpatient treatment, IC, and especially social support to TB and TB/HIV patient in the regions should be an integral part of project activities.
- Infection control cannot be considered separately from the health care reform, because current funding formulas, clinical protocols for hospitalization, and uncontrolled use of antibiotics hamper infection control progress.
- For new skills and practices received at training courses to be implemented, they should be supported by local health administration through local protocols and orders. Knowledge not used a year after training is mostly lost. This should be taken into consideration while planning new training activities.

## RECOMMENDATIONS

STbCU developed recommendations for the national and local stakeholders based on its experience. To further improve quality of TB care and reduce the TB burden in Ukraine, we recommend that:

- TB control financing mechanisms should be developed for per capita budgeting TB patients.

- National TB care standards and protocols should be standardized and annually reviewed.
- Regulations should be developed for non-medical (social and psychological) services for TB patients.
- Ongoing in-service education of PHC specialists should be institutionalized, including online education, use of apps, and other innovative technologies. TB educational programs for pre- and in-service health care workers should be reviewed and updated.
- A European model of public health education and practice should be adopted, including the core functions of hospital epidemiologist and monitoring and evaluation specialist. Pre-service and in-service training programs should be developed for public health specialists.
- ISO standards should be introduced for the TB laboratory network.
- An IC unit should be established to coordinate IC activities in the National Public Health Center.
- National IC Regulations should be brought up to WHO recommendations.
- Development and endorsement of the regional TB Programs should be initiated and funds allocated for TB services (which are not funded from the National budget), including non-medical services, infection control, TB diagnostics and treatment, integration among different levels of medical services, mentoring, and logistics.

## SNAPSHOT

# WHY ON-THE-JOB TRAINING?

**Mentoring visits are common international practice.**



PHOTO: Marina Kulik, III Level TB Laboratory, Zaporizhzhia

**Yakymivka laboratory specialists' work became safer with new exhaust ventilation cabinet**

Every health professional needs a mentor; daily routine often keeps us from noticing our own mistakes. This is why the USAID “Strengthening TB Control in Ukraine” (STbCU) Project’s cascade training program includes mentoring visits to the health care workers it trains, at their workplace, to see how they apply their training, persuade the facility administration of the need for changes, and correct mistakes.

The laboratory of Yakymivka Central Raion Hospital is one of the best the project works with. It passes all its external quality assurance tests with the highest marks. The team of the hospital and its outpatient sites understand TB detection. Doctors here correctly select patients eligible for sputum smear microscopy and the nurses check the quality of sputum samples. The level of TB detection here is significant (3 to 5 percent) and the level of poor quality samples is low (3.1 to 3.3 percent).

But there is always room for improvement. Mentoring visits continue to focus on infection control, which was once a problem here. The laboratory was small and located in an area where zoning was impossible. The exhaust ventilation cabinet didn’t work. In 2014, the mentoring team recommended that the hospital buy a new ventilation cabinet and revise the building plans. When it visited Yakymivka again in 2015, nothing had changed: the ventilation cabinet was still broken, and the laboratory staff was still exposed to a high risk of infection. The team had to tell the facility administration that the facility could not operate without appropriate infection control and a safe working environment. In 2016, the laboratory was allocated larger premises, making it possible to create separate “clean” and “contaminated” zones, and given a new ventilation cabinet for work on biologically hazardous samples.

Other TB detection activities also improved. In 2016, fewer people were referred for sputum smear microscopy, with better results; the TB detection rate reached 7.7 percent, and the rate of poor quality samples dropped to only 1.9 percent, one of the best results in Ukraine.

## SNAPSHOT

# ACCELERATING THE START OF APPROPRIATE TB TREATMENT IN ODESA

**GeneXpert increases testing accuracy while reduces testing time.**



PHOTO: Viktoriya Gultai, USAID STbCU Communication specialist

**Laboratory specialist of Odesa oblast TB facility Olena Nikolaevska working with USAID-provided GeneXpert MTB/RIF machine**

*"Thanks to this new procedure, one-fourth of HIV-positive patients with MDR-TB are detected. We could not have detected their TB with our previous approaches."*

— Dr. Svitlana Yesypenko,

*Deputy Director,  
Odesa Oblast TB Facility*

Odesa oblast has one of the highest tuberculosis (TB) and TB/HIV co-infection burdens in Ukraine. The spread of drug resistance complicates matters further. In 2014 alone, 674 new multidrug-resistant tuberculosis (MDR-TB) cases were detected here. The GeneXpert molecular diagnostic technique provides rapid, reliable detection of these cases. This technology is crucial for people living with HIV, whose lives can often be saved only with timely diagnosis.

Before 2014, Odesa's only GeneXpert machine could not keep up with the demand for it. Local health care providers had trouble detecting early TB symptoms, contributing to average treatment delays of 125 days.

"We understood the limitation of our existing equipment, but even the most sophisticated technique is useless without proper, fast patient referral processes," said Dr. Svitlana Yesypenko, deputy head of the oblast TB facility.

Odesa officials looked to USAID for help. The USAID Strengthening Tuberculosis Control in Ukraine project bought an additional GeneXpert machine for the oblast and worked to streamline patient pathways for people living with HIV. With project support, the oblast TB facility organized screening processes for TB symptoms and rapid HIV testing at the primary health care center. "A simple screening questionnaire helps select people who need TB testing," explains Dr. Yesypenko. "Now we can immediately refer these patients for GeneXpert testing. Thanks to this new procedure, one-fourth of HIV-positive patients with MDR-TB are detected. We could not have detected their TB with our previous approaches."

From now on, patients no longer need to visit a specialized AIDS center to get HIV testing. In 2016, 20 percent of TB/HIV patients received their TB and HIV diagnostics at primary healthcare clinics.

"Diagnostic procedures that now only take 21 days would have taken 125 days last year," said Dr. Yesypenko. "GeneXpert diagnostics and proper referrals have resulted in a sixfold decrease in diagnostic time. For HIV-positive people with MDR-TB, this is the difference between life and death."

## ANNEX A

# SELECT DOCUMENTS DEVELOPED UNDER THE STBCU PROJECT

1. Проект наказу МОЗ України “Про затвердження Державних санітарних правил та норм розташування, облаштування та утримання протитуберкульозних закладів”.

Draft of the MOH Order “On Endorsing State Sanitary Rules and Norms Related to Locating, Equipping, and Maintaining TB Facilities.”

2. Проект Стандарту з інфекційного контролю за туберкульозом в лікувально-профілактичних установах, місцях довгострокового перебування людей та проживання хворих на туберкульоз.

Draft TB Infection Control Standard for Health Care Facilities, Congregation Sites, and Residence Places of TB Patients.

3. Керівництво з використання УФ-радіометрів для контролю ультрафіолетового бактерицидного випромінювання у закладах, що надають допомогу хворим на туберкульоз.

Guideline on the Use of UV Meters to Control Germicidal UV Irradiation in TB Care Facilities.

4. Рекомендації «Індивідуальний захист органів дихання в контексті інфекційного контролю».

Recommendations: “Respiratory Protection for Infection Control”

5. «Консультавання з формування прихильності до лікування пацієнтів з ко-інфекцією ТБ/ВІЛ у протитуберкульозних медичних закладах». Посібник для медичних та соціальних працівників.

Counseling to Establish TB/HIV Treatment Adherence in TB facilities. Guideline for Health Care and Social Workers.

6. Методичні підходи до розробки локальних медико-технологічних документів в закладах первинної медичної допомоги.

Guidelines on Development of Local Medical Regulations for Primary Health Care Facilities.

7. «Опис моделі амбулаторного ведення випадків туберкульозу, що впроваджується фтизіатричною службою міста Кривий Ріг у співпраці з закладами первинної медичної допомоги, СНІД центром та НУО».

TB Outpatient Care Model Implemented by Kryvyi Rih TB Service in Collaboration with PHC Facilities, AIDS Center, and NGOs.

8. «Звіт за результатами дослідження «Впровадження амбулаторних моделей лікування хворих на туберкульоз та ВІЛ- асоційований туберкульоз у промисловому місті» на прикладі м. Кривий Ріг».

Report on the Outcomes of TB and TB/HIV Outpatient Care Models Pilot survey in Kryvyi Rih.

9. Наказ МОЗ: "Про організацію управління якістю досліджень в лабораторіях, що здійснюють мікробіологічну діагностику туберкульозу".

MoH Order: On Organization of TB Laboratory Diagnostics Quality Assurance.

10. Навчальний посібник, затверджений методичним кабінетом МОЗ. Позалегеновий і міліарний туберкульоз у хворих на коінфекцію ТБ/ВІЛ.

МОН-approved manual, *Extrapulmonary and Miliary TB in TB/HIV Co-Infected Patients*.

11. Навчальний посібник, затверджений методичним кабінетом МОЗ. Профілактика туберкульозу .

МОН-approved manual, *TB Prevention*.

12. Навчальний посібник, затверджений методичним кабінетом МОЗ. Соціо-психологічна підтримка хворих на туберкульоз .

МОН-approved manual, *Sociopsychological Support of TB Patients*.

13. Відео-тренінг із можливістю отримати сертифікат «Ведення випадку ТБ та ТБ/ВІЛ у закладах первинної медико-санітарної допомоги».

Video-training: "TB and TB/HIV Case Management in PHC Facilities" (with possibility of certification)

14. Відео-тренінг із можливістю отримати сертифікат «Медико-психологічне консультування хворого на туберкульоз».

Video-training: “Counseling of TB Patients” (with possibility of certification).

15. Навчальний фільм «Туберкульоз» для лікарів закладів первинної медико-санітарної допомоги.

Training video: “Tuberculosis,” (for primary health care providers).

16. Навчальний фільм «Знай, стережись, не бійся» для хворих на туберкульоз і загального населення.

Educational video: “Know, Beware, Don’t be Scared,” for TB patients and the general population.

17. Матеріали 5-денного тренінгу для лікарів ПМСД «Ведення випадку ТБ та ТБ/ВІЛ у закладах первинної медико-санітарної допомоги».

Materials for five-day training course for PHC providers: “TB and TB/HIV Case Management in PHC Facilities”.

<http://tb.ucdc.gov.ua/biblioteka/rozdil/treningovi-materialy/materialy-treningu-dlya-treneriv-tot-dlya-simeynykh-likariv-vedennya-vypadku-tuberkulozu-tb-v-zakladakh-pervynnoyi-medyko-sanitarnoyi-dopomogy-pmsd>

18. Матеріали 3-денного тренінгу для медичних сестер ПМСД «Ведення випадку ТБ та ТБ/ВІЛ у закладах первинної медико-санітарної допомоги».

Materials for three-day training course for PHC nurses, “TB and TB/HIV Case Management in PHC Facilities”.

19. Матеріали 5-денного тренінгу для лікарів фтизіатрів «Ведення випадку мультирезистентного туберкульозу».

<http://tb.ucdc.gov.ua/biblioteka/rozdil/treningovi-materialy/materialy-treningu-vedennya-vypadku-multyrezystentnogo-tuberkulozu>

Materials for five-day training course for TB specialists: “MDR-TB Case Management.”

20. Матеріали 5-денного тренінгу для лаборантів лабораторій I-го рівня «Організація лабораторної діагностики туберкульозу методом прямої бактеріоскопії мазка мокротиння. Контроль якості досліджень».

<http://tb.ucdc.gov.ua/biblioteka/rozdil/treningovi-materialy/materialy-treningu-z-diagnostyky-tuberkulozu-metodom-mikroskopiya-mazka-mokrotynnya>

Materials for five-day training course for Level I laboratory specialists: "TB Laboratory Diagnostics by Sputum Smear Microscopy. EQA."

21. Практичний посібник з переліком ключових індикаторів для медичних працівників відділів моніторингу та оцінки протитуберкульозної служби «Аналіз та інтерпретація даних щодо епідемічної ситуації з ТБ».

A practical guide with a list of key indicators for health professionals and departments of monitoring and evaluation for TB services: "Analysis and Interpretation of Data on the Epidemic Situation of TB."

22. Tuberculosis Prevention: Tutorial for Students, Interns, and Medical Doctors

<http://tb.ucdc.gov.ua/uploads/files/prophilaktica.pdf>

23. Sociopsychological Support for TB Patients for Adherence to Treatment

[http://tb.ucdc.gov.ua/uploads/files/metod\\_chniy\\_pos\\_bnik\\_soc\\_opsiholog\\_chna\\_p\\_dt\\_rimka\\_31\\_03\\_2017\\_nov\\_final\\_preview\\_2\\_.pdf](http://tb.ucdc.gov.ua/uploads/files/metod_chniy_pos_bnik_soc_opsiholog_chna_p_dt_rimka_31_03_2017_nov_final_preview_2_.pdf)

24. Video training: TB/HIV Co-infection

<http://tb.ucdc.gov.ua/navchannya-onlayn/onlayn-treningy/ko-infektsiya-tuberkuloz-vil>

25. Video training: Diagnosis of Extra-pulmonary Tuberculosis

<http://tb.ucdc.gov.ua/navchannya-onlayn/onlayn-treningy/diagnostyka-pozalegenevogo-tuberkulozu>



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