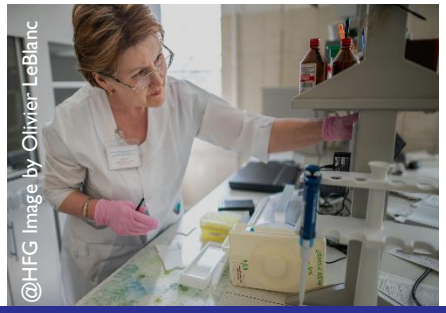


TECHNICAL BRIEF: STRATEGIC PURCHASING APPROACHES FOR THE TUBERCULOSIS HOSPITAL SYSTEM IN UKRAINE

September 2018

This publication was produced for review by the United States Agency for International Development.
It was prepared by Olga Zues, Alexandr Katsaga, Sara Feinstein, Barton Smith, and Sarah Dominis for the Health Finance and Governance Project.

The Health Finance and Governance Project
USAID's Health Finance and Governance (HFG) project helps to improve health in developing countries by expanding people's access to health care. Led by Abt Associates, the project team works with partner countries to increase their domestic resources for health, manage those precious resources more effectively, and make wise purchasing decisions. As a result, this six-year, $209 million global project increases the use of both primary and priority health services, including HIV/AIDS, tuberculosis, malaria, and reproductive health services. Designed to fundamentally strengthen health systems, HFG supports countries as they navigate the economic transitions needed to achieve universal health care.

September 2018

Cooperative Agreement No: AID-OAA-A-12-00080

Submitted to: Scott Stewart, AOR
Office of Health Systems
Bureau for Global Health

Recommended Citation: Zues, Olga, Alexandr Katsaga, Sara Feinstein, Barton Smith, and Sarah Dominis. September 2018. *Technical Brief: Strategic Purchasing Approaches for the Tuberculosis Hospital System in Ukraine.* Rockville, MD: Health Finance & Governance Project, Abt Associates.

Abt Associates | 6130 Executive Blvd.| Rockville, MD 20852
T: 301.347.5000 | F: 301.652.3916 | www.abtassociates.com

Avenir Health | Broad Branch Associates | Development Alternatives Inc. (DAI) |
| Johns Hopkins Bloomberg School of Public Health (JHSPH) | Results for Development Institute (R4D)
| RTI International | Training Resources Group, Inc. (TRG)

TECHNICAL BRIEF: STRATEGIC PURCHASING APPROACHES FOR THE TUBERCULOSIS HOSPITAL SYSTEM IN UKRAINE

CONTENTS

List of Tables

List of Figures

ACRONYMS

ALOS	average length of stay
DR	drug resistant
DS	drug sensitive
GF	Global Fund
HFG	Health Finance and Governance Project
ICD	International Classification of Diseases
MDR	multi-drug resistant
MOH	Ministry of Health
MTB/RIF	mycobacterium tuberculosis/rifampicin resistance
NHSU	National Health Service of Ukraine
PHC	primary health care
PTB	pulmonary tuberculosis
TB	tuberculosis
UAH	Ukrainian hryvnia
USAID	United States Agency for International Development
WHO	World Health Organization
XDR	extensively drug resistant

ACKNOWLEDGMENTS

We would like to thank our Ukraine country partners, including the Ministry of Health and its Center for Medical Statistics, the National Public Health Center (previously the Ukrainian Centers for Disease Control), the National Health Service of Ukraine, and the Ministry of Finance for their support and participation in HFG's work and for their efforts to introduce strategic purchasing and improve health outcomes in Ukraine.

We also express our most sincere gratitude to the health departments in our pilot regions, Poltava oblast, Odesa oblast, Lviv oblast, and Kyiv City for their support, contributions, and hard work in developing and implementing strategic purchasing approaches and in using the data analytics to effect change and improvement. Our appreciation and recognition goes to each participating hospital for its commitment and hard work.

Our appreciation also goes to Dasha Migunov of Abt Associates, who adapted HFG Ukraine presentations made at a multi-country conference in Bishkek in May 2018 into text for the report *Spending Wisely for Improved TB Outcomes: Lessons in Strategic Purchasing for TB in Eastern Europe and Central Asia*. This technical brief and that report were written concurrently, and, in some cases, relevant text is shared across the two documents.

Finally, we would like to thank the team of independent consultants in Ukraine who provided training, technical expertise, and much more to make this work a reality.

EXECUTIVE SUMMARY

Ukraine has one of the highest rates of multi-drug resistant (MDR) tuberculosis (TB) in the world. In 2016, 27 percent of new TB cases and 47 percent of previously treated cases were drug resistant (DR). Despite World Health Organization (WHO) recommendations supporting full outpatient treatment for most TB cases, and literature linking excessive hospitalization with development of MDR, the vast majority of TB cases in Ukraine are treated as inpatients through the vast network of TB hospitals. As of 2016, Ukraine maintained 14,548 TB-specialized hospital beds, representing approximately 10 percent of the country's total hospital beds.

The country currently uses an input-based provider payment system, which encourages hospitalization. To help address this issue, in 2015 Ukraine began exploring strategic purchasing approaches for TB hospitals.

The Health Finance and Governance Project (HFG), funded by the United States Agency for International Development-funded (USAID), worked closely with national and regional partners to develop strategic purchasing approaches for TB hospitals in the country and introduce operating systems for strategic purchasing for TB hospitals. The key operating systems include a cost accounting system; discharged patient system; hospital performance monitoring system; and simulation module for hospital optimization.

HFG developed online tools for each system and provided training and mentoring to participating health departments and hospital staff on using each system. In sum, all 28 TB hospitals across HFG's pilot regions of Poltava oblast, Odesa oblast, Lviv oblast, and Kyiv City completed a cost accounting analysis for 2015–16. Each participating hospital uploaded discharged patient data for every patient hospitalized since 2015, totaling over 34,000 cases to date.

Using data from both the cost accounting and discharged patient systems, HFG worked in concert with country partners to develop a Hospital Performance Monitoring System to analyze TB hospital performance, with the objective of supporting TB decision-makers in making evidence-based decisions on TB hospital optimization. The system provides data analysis across three blocks: oblast/city level; TB hospital level; and cross-regional level. Health departments and hospitals use it to see information across nine types of indicators, including hospitalization structure by International Classification of Disease (ICD)-10 diagnosis; average length of stay (ALOS); admission structure by diagnostic method and drug sensitivity category; cost by type of case; and provider productivity. HFG also designed a simulation module for TB hospital optimization to enable health departments and hospitals to model changes in types of patients, length of stay, or other variables, and see the resulting impact on bed use and cost.

HFG also contributed to the policy dialogue and case-based system design to support introduction of the new payment systems for TB hospitals on the national level. The systems will be piloted beginning in 2019.

As HFG comes to a close, the four operational systems are institutionalized in the four pilot regions and the framework is in place to support national rollout. Continued support by regional, country, and international stakeholders for strategic purchasing will be key to improving resource use and achieving substantive improvements in TB outcomes moving forward.

1. INTRODUCTION

In 2015, HFG began working in Ukraine to introduce strategic purchasing approaches for the TB hospital system. The strategic purchasing was intended to support the country in its efforts to move toward more-efficient and more-effective TB care. Successful modeling of the approach was also envisioned as critical in helping the country prepare for implementation of new health financing approaches for the entire health system.

Ukraine at a Glance

Population: 44.8 million

GDP: 112.9 US$ billion

GDP per capita: 2,522 US$

Life expectancy at birth: 71.2 years

Total health spending as percentage of GDP: 7.6 percent

Government health spending as percentage of GDP: 4.1 percent

World Bank Data, 2017

After the first year of TB strategic purchasing work, the Ministry of Health (MOH) and partner oblasts requested that HFG expand its work to support similar approaches for the general hospital system. As HFG continued its work for TB hospitals, the project also introduced cost accounting, a discharged patient database, a hospital performance monitoring system, and a simulation module for general hospitals in Poltava, Lviv, and Odesa oblasts. Additionally, HFG provided technical assistance to the newly established National Health Service of Ukraine (NHSU) to prepare it for its role as a strategic purchaser, and to support development of a case-based payment system and implementation for the system for general hospitals. The strategic purchasing approaches developed for the TB hospital sector informed much of this broader work.

This technical brief focuses on the development, implementation, and use of the TB strategic purchasing approaches for the TB hospital system.

1.1 Epidemiological Overview

Ukraine ranks amongst the highest MDR TB burden countries in the world (Stop TB Partnership 2018). Ukraine has a TB incidence of 84 per 100,000 population (WHO 2018). In 2016, 27 percent of Ukraine's new TB cases and 47 percent of previously treated cases were DR (WHO 2018).

In total in 2016, 34,088 cases of TB were identified. New and relapse cases accounted for 29,052. Of these, 91 percent were pulmonary cases; 69 percent of the pulmonary cases were bacteriologically confirmed (WHO 2018). The TB treatment coverage rate is estimated at 75 percent, meaning that three-quarters of those with TB begin treatment (WHO 2018). Ninety-seven percent of TB patients know their HIV status; of those who know their status, 21 percent are HIV-positive (WHO 2018).

The TB mortality rate has been declining since 2005, and in 2016 stood at 9.5 per 100,000 population (WHO 2018). The TB mortality rate for those with both HIV and TB in 2016 was 4.6 (WHO 2018). Over the same time period, TB incidence has been decreasing, though incidence of TB-HIV coinfection

has increased.[1] The treatment success rate for new and relapse cases registered in 2015 was 75 percent (WHO 2018).

1.2 Service Delivery System

Ukraine's national TB budget (2017) is $57 million. Seventy-one percent of this budget is funded from domestic sources; 16 percent from international sources; and 13 percent is unfunded. As of 2016, Ukraine has 14,548 TB-specialized hospital beds, down from 23,500 in 2011 (Public Health Center of the MOH of Ukraine 2017).

WHO has emphasized the importance of ambulatory treatment of patients with drug sensitive (DS) TB for many years, citing equivalent clinical outcomes when compared to inpatient treatment and a more patient-friendly approach at the outpatient level. Only recently, however, has more emphasis been given to the potential dangers of hospitalization and its probable contribution to the MDR epidemic in the countries of Eastern Europe and Central Asia, where average lengths of stay are long and infection control measures in aging TB hospitals almost universally inadequate.

Since the acceptance of the Directly Observed Treatment, Short Course strategy in the early 2000s, TB care has partially shifted to the primary health care (PHC) level. Patients generally begin treatment in the hospital and continue treatment at a PHC facility after discharge. While Ukraine's clinical protocols allow fully outpatient treatment, and many TB decision-makers in the country understand that change is necessary, most TB patients in the country continue to be hospitalized for many months. In the HFG pilot regions, an average of 79 percent of newly diagnosed TB patients were treated initially as inpatients in 2016, ranging from 67 percent in Kyiv City to 100 percent in Poltava.2

The TB service delivery system in Ukraine is characterized by an excessive network of TB-specialized hospitals, with nearly 10 percent of the total hospital bed capacity in the country concentrated in standalone TB facilities. The average length of patients' stays at TB hospitals, even with DS TB, exceeds 100 days. The provider payment system is one factor that contributes to the maintenance of the bloated TB hospital system and encourages over-hospitalization.

To address these issues, Ukraine began exploring strategic purchasing for TB services.

---

[1] TB incidence has been decreasing in all oblasts in the country, with the exception of Odesa, which has seen a spike in prevalence since 2013. This spike is generally attributed to the high HIV-TB coinfection rates.

[2] Admission rates were calculated by dividing the number of TB hospital admissions (excluding readmissions and non-TB cases) by the total number of TB cases notified in the region. It should be noted that when calculated this way, the admission rate for Poltava oblast comes out to 104 percent, indicating a potential issue in the data, perhaps from coding of readmitted or non-TB cases, and requires further investigation.

2. STRATEGIC PURCHASING

Strategic purchasing can be a powerful tool to improve the efficiency and effectiveness of health services, but it has not generally been part of the global TB toolkit. This section describes the key elements of strategic purchasing and explains the importance of strategic purchasing for improving TB services, particularly for Ukraine's post-Soviet health system.

2.1 From Passive to Strategic Purchasing

The WHO defines purchasing as "the allocation of pooled funds to providers that deliver health care goods and services to the covered population, as per the defined benefit package." Rethinking purchasing is particularly important in Eastern Europe and Central Asia due to the Soviet legacies of universal health care and expensive hospital-based health systems, combined with the reality of limited health budgets following the collapse of the Soviet Union.

As defined by the WHO, strategic purchasing is "active, evidence-based engagement in defining the service-mix and volume, and selecting the provider-mix in order to maximize societal objectives." In other words, the strategic purchaser should use evidence-based information and analytical systems to decide what to buy, from whom to buy, and how to buy.

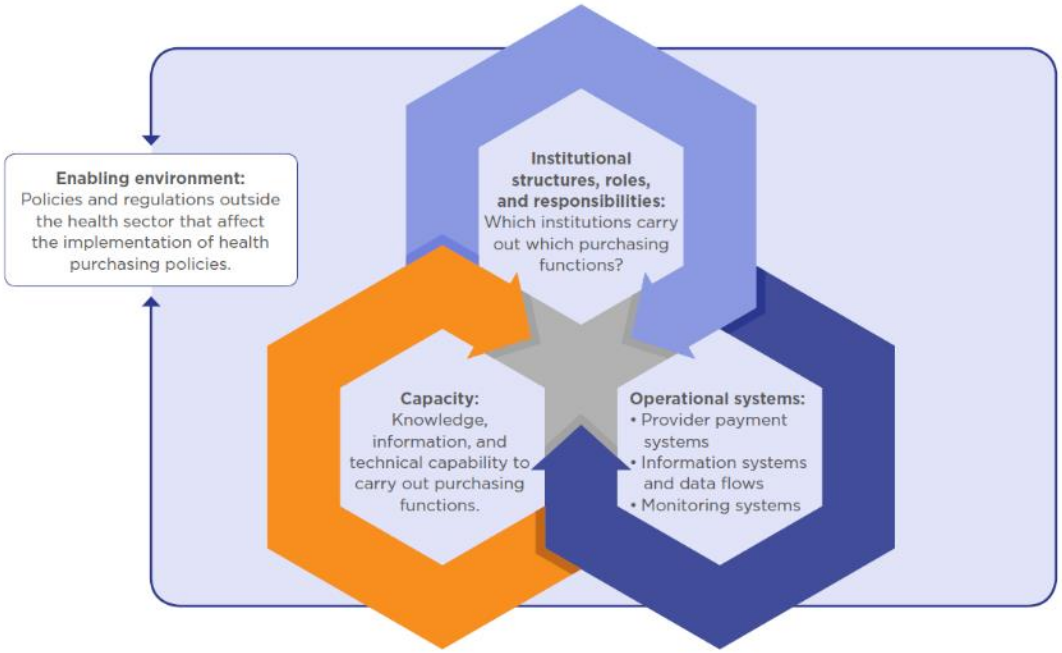
Strong information management systems are critical for strategic purchasing. In fact, strategic purchasing is impossible without high-quality information, because purchasers need to have a clear sense of what they are buying and from whom. This information feeds into the data analytics required for strategic purchasing design and implementation.

Data analytics are essential throughout the lifecycle of strategic purchasing design and implementation. Data analytics for strategic purchasing begin with an analysis of the current situation to understand what services are currently being purchased, whether the right service mix is being delivered, whether any efficiency or quality concerns exist, and what elements of the health system are the cost drivers. The results of this analysis then feed into payment system design or refinement of the payment system. A simulation analysis can then help decision-makers determine whether the proposed payment system can indeed achieve the desired impact. Once the payment system has been implemented, ongoing monitoring is needed to ensure that the system is continuing to achieve the desired impact and to inform potential adjustments.

Through these deliberate decisions, the purchaser can manage overall costs in the system, create intentional incentives, contract with providers selectively, set price and quality standards, and stimulate quality improvement.

Implementation of effective strategic health purchasing requires four interlinking factors: institutional structures, roles and responsibilities; operational systems; capacity; and an enabling policy and regulatory environment. These factors are summarized in the figure below.

Figure 1: Strategic Purchasing Implementation Factors



Source: Unleashing the Potential of Strategic Purchasing (HFG Series: Advances in Health Finance & Governance).

HFG's work in Ukraine has focused primary on the operational systems required for strategic purchasing and on development of the capacity of country and oblast partners to implement and use these systems.

2.2 Strategic Purchasing of TB Services

The goal of strategic purchasing of TB services is to better link limited resources to priority services for better health outcomes for patients. This focus on the patient is a helpful reminder for decision-makers navigating the potential tension between clinical and purchasing outlooks. Strategic purchasing is not about cutting back on spending to save money at the cost of patient care. It is about using resources in the most effective way to achieve the best results (health outcomes) for patients.

> "Remember, if one patient is in the hospital who doesn't really need to be there, he's pulling resources away from the patient in the next bed, who does need to be there."
>
> — Alla Bredikhina, Head of Finance & Economic Unit, Poltava Oblast Health Department

As of 2018, Ukrainian hospitals are still paid based on inputs, with line items such as food, staff salaries, and utilities. Hospital budgets are formed based on historical bed-occupancy levels. As a result, hospitals are not paid for the specific services they provide.

Ukraine introduced capitated payment for PHC in mid-2018, and will fully scale up in 2019. While most TB patients receive some of their TB care in outpatient facilities, there may still be a misalignment between the large and growing role of PHC in TB care and the actual provider payment mechanisms for PHC.

2.3 The Path to Strategic Purchasing in Ukraine

In 2017, Ukraine codified into law an intensive program of health reforms, including restructuring of the health financing system and introduction of strategic purchasing. In mid-2018, the country established the NHSU, which will take on the role of single payer and strategic purchaser for health care in the country. The NHSU began paying for PHC using a capitated rate in August 2018, and will begin paying for hospital care using case-based payment on a pilot basis in 2019, with countrywide rollout planned for 2020.

Over the past several years, Ukraine has been preparing for the introduction of single payer and strategic health purchaser and working on establishment of institutional structures, roles, and responsibilities, and the design of operational systems to support purchasing functions. The WHO, World Bank, USAID, and other donors have provided technical assistance in these areas.

HFG worked in concert with the MOH and the health departments of Poltava, Odesa, and Lviv oblasts and Kyiv City to introduce new tools and systems to empower TB decision-makers to better understand the effectiveness and efficiency of the TB hospital system and to allow them to make strategic management and purchasing decisions. Working with local partners, HFG developed and implemented four key operational systems to support strategic decisions for the TB hospital system.

Through implementation of these operational systems, HFG and implementing partners have demonstrated that strategic purchasing approaches can be used successfully to improve the effectiveness and efficiency of TB services even before a new payment system is introduced, with managers making changes to improve efficiency based on data analytics and identification of service delivery challenges and objectives.

3. DATA ANALYTICS FOR STRATEGIC PURCHASING IN TB

The following sections of this brief present the key operational systems that HFG developed and implemented to support strategic decision-making for TB stakeholders and providers in Ukraine. These operating systems support data analytics for decision-making. We present each system, explain the basic process and specificities of design and implementation, and provide some key examples of the data analytics produced from the system.

These key operational systems and their status as of September 2018 include the following:

1. HFG helped the MOH develop a unified **Cost Accounting System,** including methodology, framework, and electronic tools for data collection and analysis. All 28 TB hospitals in HFG pilot regions completed cost accounting analysis for 2015 and 2016.
2. HFG supported TB providers and oblast health authorities in establishing an electronic **Discharged Patient System** based on existing reporting forms. This database is an electronic compendium of the Form 066, which has traditionally been completed in paper copy for every patient upon hospital discharge. The data entry instruments at the provider level and the discharged patients' database at the oblast level are fully functioning and contain information on over 34,000 patients discharged from TB hospitals in HFG pilot regions since 2015.
3. Using data from both the cost accounting and discharged patient systems, HFG developed a **Hospital Performance Monitoring System** to analyze TB hospital performance.
4. HFG designed a **Simulation Module for TB Hospital Optimization,** which is integrated into the Hospital Performance Monitoring System and enables health departments and hospitals to model changes in types of patients, length of stay, or other variables and see the resulting impact on bed use and cost.

3.1 Cost Accounting System

Cost accounting systems play an important role in building effective health care financing systems, and thus in contributing to universal access to essential public health services. Cost accounting analysis is used in a wide variety of tasks including planning and budgeting, setting base rates for provider payment systems, and internal management.

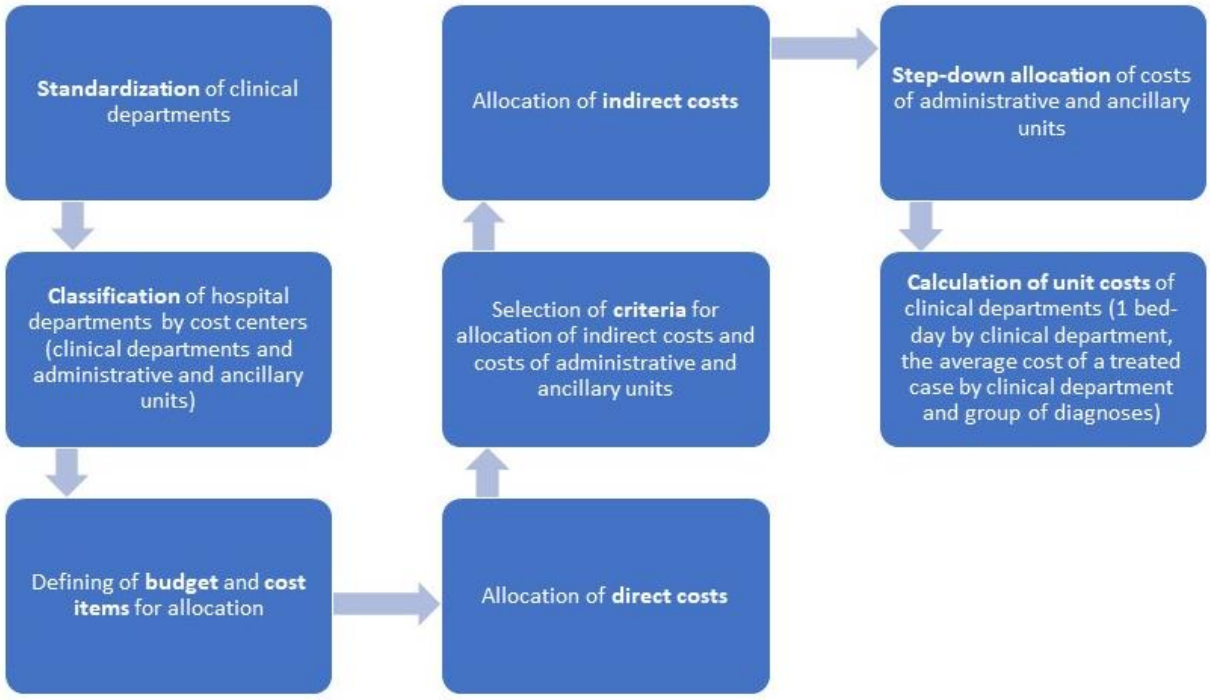
Several methodologies are accepted for cost accounting. The selection of a preferred methodology depends on the information available, health policy objectives, and other factors. It is essential that a standard approach and unified data formats be used in all health care organizations involved in a single costing exercise. This allows correct aggregation of data and comparison of results.

In Ukraine, HFG helped the MOH standardize and unify its approaches to cost accounting. Based on discussion with local and international experts, HFG proposed the widely used standard top-down (step-down) cost allocation method as the basis of the country's cost accounting system.

The step-down cost allocation method is a process of economic calculation that allows allocation of all hospital costs, both direct and indirect, from "higher" administrative and clinical support departments (cost centers) to the clinical departments that create the final "product." This results in estimated full

costs for each "product." In this case, products include a discharged patient, a hospital department bed-day, or an outpatient visit.

Figure 2: Steps for Cost Accounting Data Collection and Analysis



3.1.1 Design of the Cost Accounting System for Ukraine

Cost accounting implementation requires a customized electronic instrument for data collection and analysis, designed for the particular working environment. HFG developed cost accounting instruments for the health care sector in Ukraine ensuring methodological principles and calculations, and simplicity of the data entry and data analysis process for health care providers. HFG designed an initial instrument that uses a simple Excel-based platform to ensure it can be used on any computer and does not require advanced computer skills from hospital staff. HFG also developed a more advanced version of the cost accounting instrument in the SQL platform U-Costing Pro, a platform widely used for other purposes in TB and general hospitals in Ukraine.

Since the results of cost accounting are to be used in a wide range of financing and management areas, it was necessary to ensure the compatibility of the data obtained with other information sources and databases already existing in the country. To ensure this compatibility, HFG designed the cost accounting system using already-existing MOH-approved directories of hospitals and health care organizations/branches (with single codes) that are used in other information systems, as well as with the discharged patient database (see Section 3.2). Before implementation could begin, HFG undertook significant preparatory work, including harmonizing the costing's top-down methodology with aspects of Ukraine's specific procedures and practices in financial and statistical reporting and regulations. HFG also prepared a technical tool and trained hospital and health department finance/economics staff and statisticians who would take part in the exercise.

3.1.2 Implementation of Cost Accounting and Cost Analysis

At the end of 2015, HFG and the Poltava Oblast Health Department conducted the first round of cost accounting analysis in eight TB hospitals in Poltava oblast. The first round of cost accounting revealed an extremely low quality of information in TB hospitals, including drugs not accounted for by department and lack of reliable statistics on consumption in clinical support departments. During the analysis, hospital managers realized the need to improve the situation and took measures that significantly improved the quality of data. This was a significant positive "side effect" of the cost accounting exercise.

In the beginning of 2016, HFG presented the results of the cost analysis for TB hospitals in Poltava at both the regional and national level. Based on the presentations, the MOH and other oblast health departments recognized the importance of this work and expressed great interest in conducting this type of TB cost accounting study in other regions. HFG received requests from the Kyiv City administration and Odesa and Lviv oblast administrations to support cost accounting/cost analysis in all TB hospitals in these areas. In total, HFG supported 28 TB hospitals and 2 TB departments in general hospitals from across four regions (Poltava, Odesa, and Lviv oblasts and Kyiv City), helping them implement cost accounting and conduct cost analysis based on 2015 actual budget and statistical data. In each region, HFG shared the cost accounting instrument and conducted a series of trainings for the finance/economics staff and statisticians from each health department and TB hospital. HFG also conducted mentoring sessions and supported data analysis. In some cases where the local hospitals did not have computers or software available, HFG provided them.

To consolidate the experience and further improve TB managers' capacities, in 2017 a second round of cost accounting analysis was conducted in all four regions based on 2016 actual budget figures and statistical data. Data quality in the second round of cost accounting analysis was significantly higher than in the first round; therefore the results of the 2016 cost analysis were used from then on for the TB hospital performance monitoring system and design of the case-based payment model for TB hospitals.

HFG helped analyze the cost accounting data and produced reports for each of the hospitals and the relevant health department, including an analysis of the budget structure and comparison of performance indicators with those of other hospitals in the region. The results of cost accounting analysis were summarized in the reports produced for each TB hospital. Also, HFG included cost accounting indicators into the TB provider monitoring system, and created operational dashboards for deeper analysis and decision-making at the provider and oblast level.

HFG held meetings with the appropriate health department and hospitals to review and discuss these reports and their implications. The analysis enabled hospitals and health departments to understand the cost volume and cost structure by TB hospital, clinical department, and group of diagnoses, and to benchmark their performance within and across the pilot regions. Selected results are included below in Section 3.1.3.

The cost accounting analysis provided data for informed decision-making to improve TB delivery structure, management, and provider operations. It allowed decision-makers to compare costs and performance of different departments or services within and across TB hospitals. Using the cost accounting data, purchasers and providers of TB hospital services were able to benchmark costs across facilities and think about where it made sense to purchase and provide services from a cost point of view. Cost information was also used to inform decisions about infrastructure investments (such as support for facilities that are providing the same service effectively at a lower cost than others) and to make decisions about restructuring.

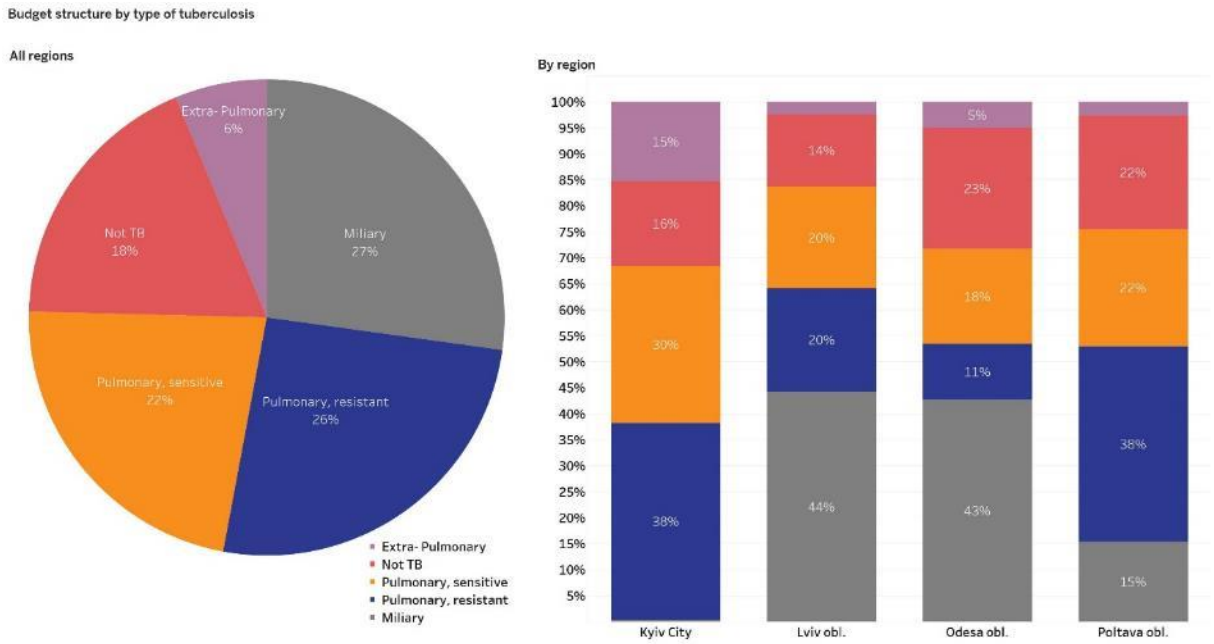
3.1.3 Selected Cost Analysis Results

The figures below illustrate some of the results of the cost analysis, demonstrating the proportions of TB hospital budgets by type of case; cost structures of clinical departments by own and allocated costs; costs per type of case by pilot region; cost variation for a single type of TB case across TB hospitals in one oblast; cost structure by type of expenditures; and average cost per case by drug sensitivity.

3.1.3.1 Proportion of TB hospital budgets by type of case

Figure 3 illustrates the share of the total TB hospital budget in 2016 by groups of patients/diagnoses in each pilot region and as a consolidated total.

Figure 3: Budget Share by Type of Discharged Patient Groups, 2016



Eighteen percent of the TB hospital budget was accounted for by patients who do not have active TB[3] and potentially could receive care on the outpatient level or in general hospitals.

Also notable is that patients with miliary TB accounted for 27 percent of the TB hospital budget of four pilot regions; the total ranged from less than 1 percent in Kyiv City to 44 percent in Lviv oblast. Twenty-six percent of the total budget was devoted to DR TB cases; 22 percent to DS TB cases; and 6 percent to extra-pulmonary TB cases, with significant differences among regions. The high proportion of budget (and numbers of cases) recorded as miliary TB need further clarification. Regional and national counterparts attributed it to lack of clear rules for coding disseminated TB (pulmonary TB that has

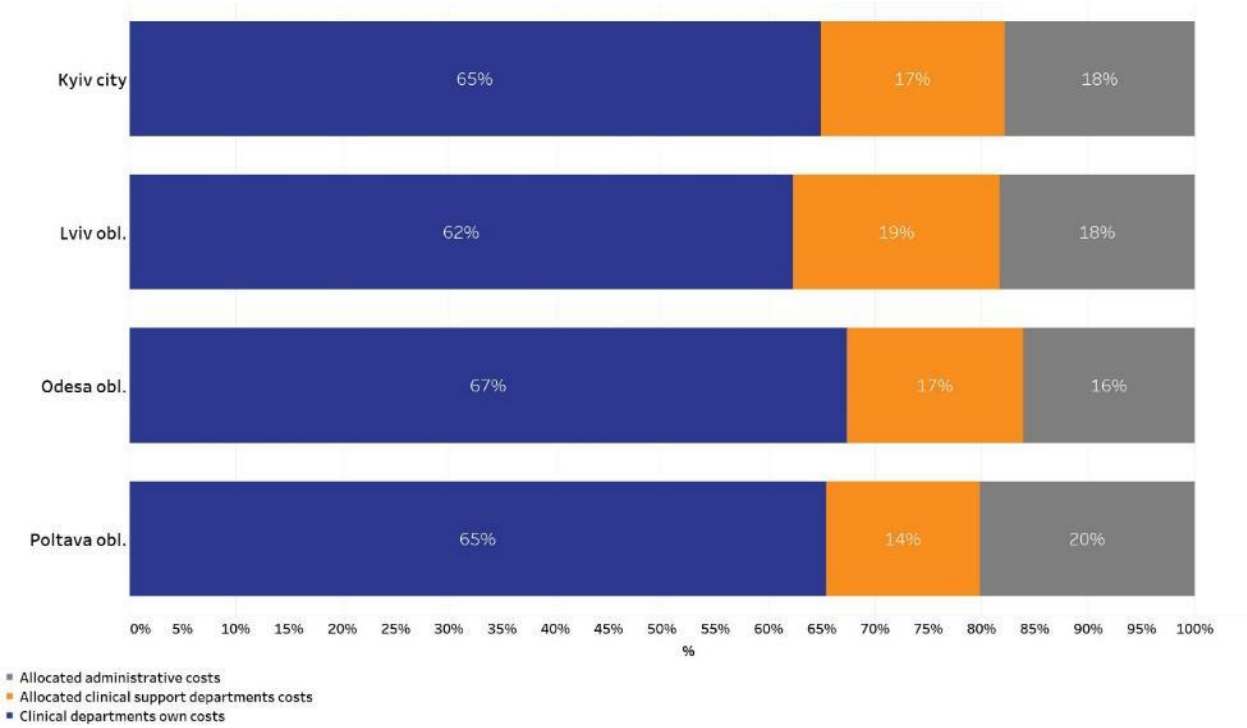
[3] The non-TB group includes patients with a main discharge diagnosis of anything other than active TB, including any ICD-10 code other than TB codes as well as codes Z20.1 "Contact with and exposure to tuberculosis," Z22.9 "Carrier of infectious disease, unspecified," and B90 "Sequelae of tuberculosis."

spread to other organs), resulting in inconsistency in coding cases of disseminated TB as miliary TB cases.

3.1.3.2 Cost structure of clinical departments by region

The graph below depicts the cost structure of clinical departments by regions. There is no significant difference in cost structure between the regions. Approximately 65 percent of total cost was accounted for by the clinical departments' own costs and 35 percent of total cost was allocated from the clinical support (17 percent) and administrative (18 percent) departments.

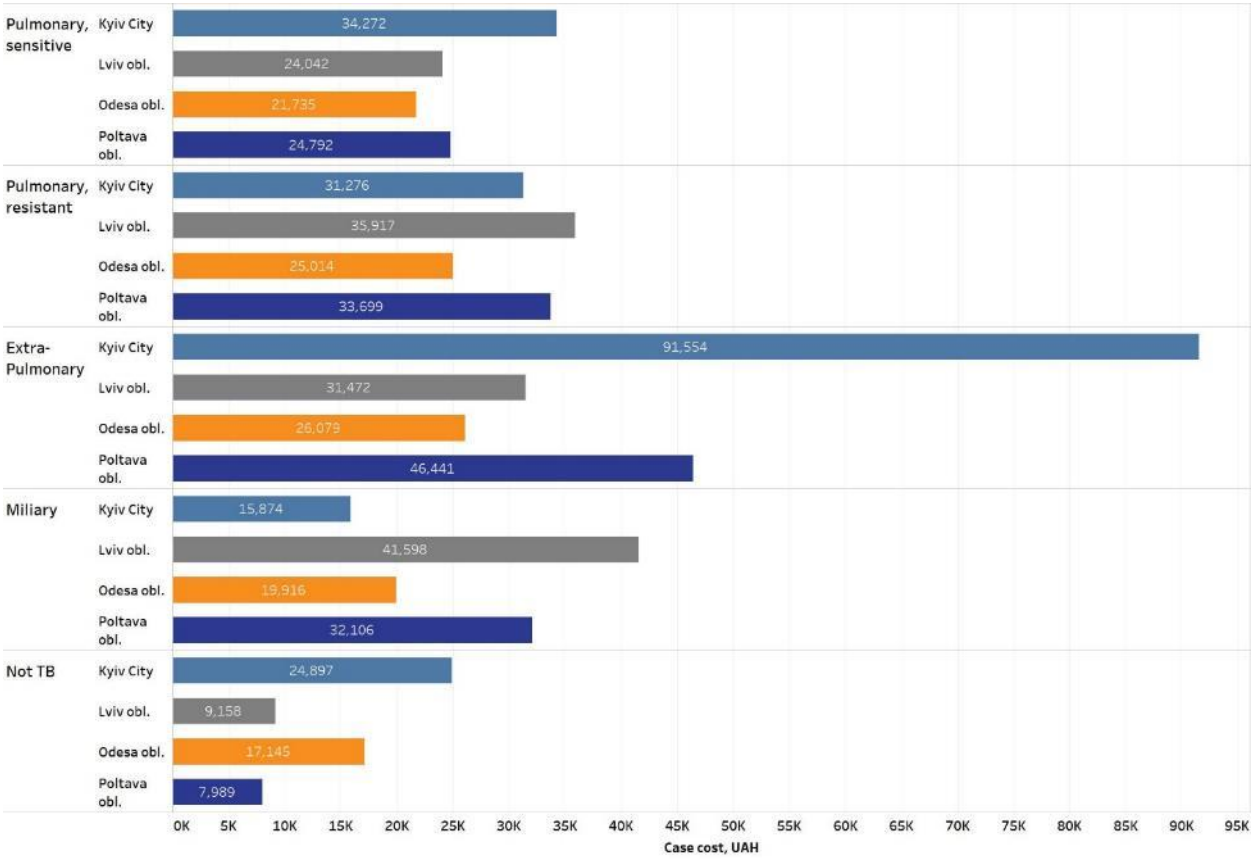
Figure 4: Cost Structure of Clinical Departments by Region: Own and Allocated Costs, 2016



3.1.3.3 Costs per type of case by region

Figure 5 below shows the average cost (in Ukrainian hryvnia (UAH)) per discharged case in the four pilot regions. We compared average cost per case for five groups of diagnoses including pulmonary sensitive TB; pulmonary resistant TB; miliary TB; extra-pulmonary TB; and non-TB diagnoses. These costs are inclusive of medications, but exclude medicines procured by the Global Fund (GF).

Figure 5: Average Cost per Treated Case by TB Type and Region (Excluding Medicine Procured by GF)



Despite the lack of a significant difference in cost structure by region, the analysis reveals a large variation in average cost per case across the four geographic regions.

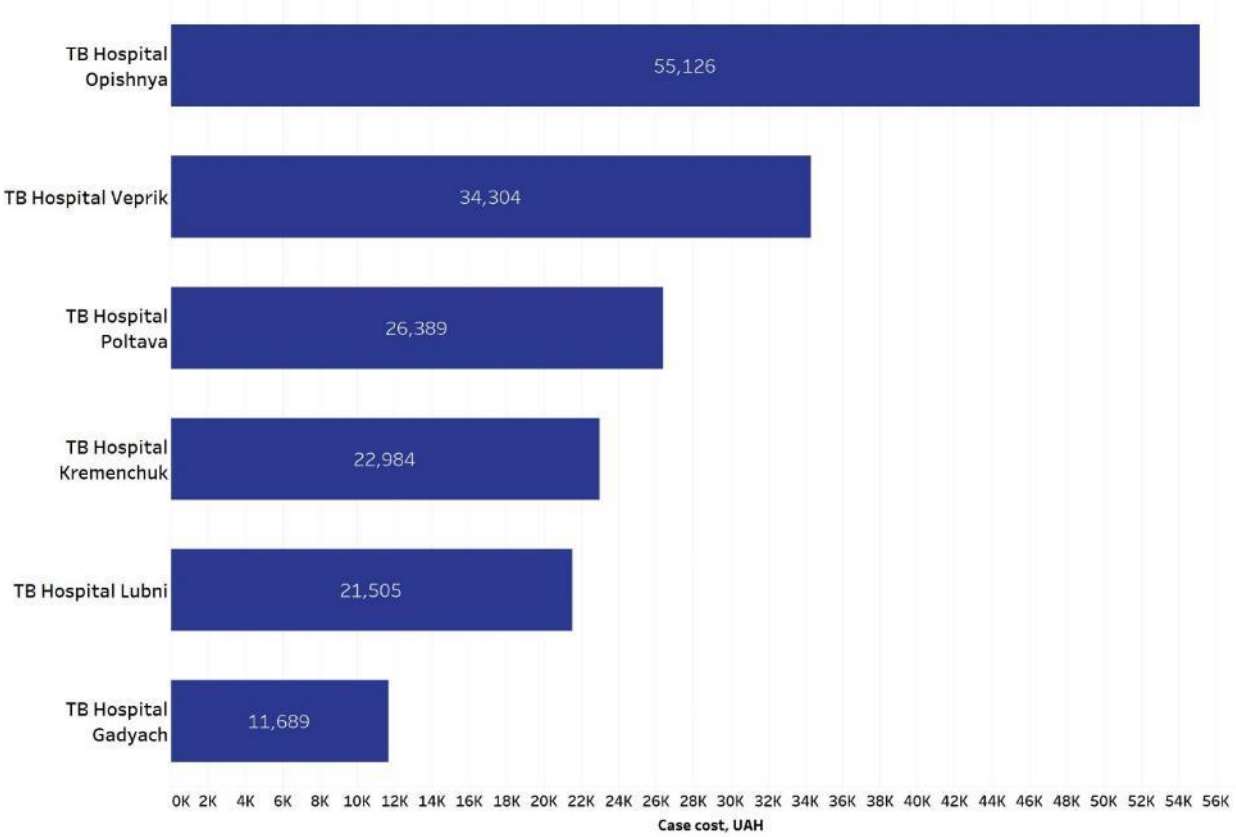
Based on 2016 data, the average cost per case for sensitive TB was 26,210 UAH, with regional averages ranging from 24,792 UAH per case in Poltava to 34,272 UAH in Kyiv City. The average cost per case for resistant TB was 31,476 UAH, with minimum cost per case of 25,014 UAH in Odesa oblast and maximum 35,917 UAH in Lviv oblast. The analysis showed extra-pulmonary TB to be the most expensive, with average cost per case of 48,886 UAH. This was due to specific extra-pulmonary TB services provided only in Kyiv City, making average cost per extra pulmonary case there 91,554 UAH.

As mentioned above, it is significant to note that approximately 40 percent of patients that were admitted and discharged from TB hospitals in 2016 did not have active TB. Those patients were counted in the non-TB group. The average cost of non-TB cases was 14,797 UAH, with regional averages ranging from 7,989 UAH in Poltava oblast to 24,897 UAH in Kyiv City. Across the four pilot regions, the average cost per treated case is highest in Kyiv City.

3.1.3.4 Cost variation for a single type of TB case across TB hospitals in one region

Significant variation was also observed in the average cost per case across hospitals in each region. For example, the graph below shows the average cost per case of pulmonary sensitive TB in different TB hospitals of Poltava oblast.

Figure 6: Average Cost per Case of Pulmonary Sensitive TB by TB Hospital, Poltava Oblast, 2016

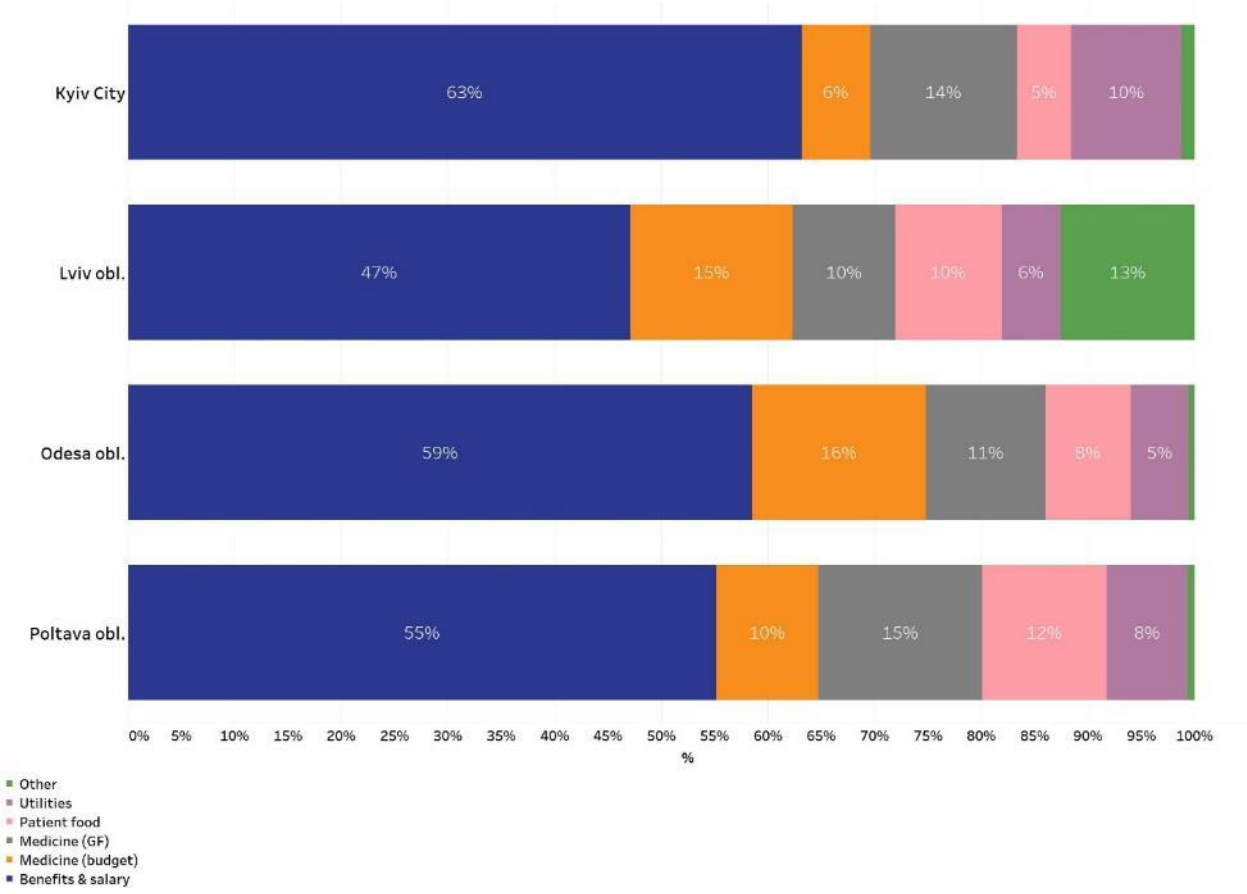


As shown in the graph, the cost of a simple TB case varied by as much as 4.5 times across hospitals within the same region. Such significant difference in the average cost per hospital admission for similar TB cases across hospitals and regions cannot be explained by the needs of specific patients, and requires further investigation. It may be partially explained by the excessively large size (and therefore cost) of some of the TB hospitals in the regions, which are far beyond the requirements of the patient population.

3.1.3.5 Cost structure by type of expenditures

Figure 7 represents cost structure by type of expenditures among regions.

Figure 7: Cost Structure by Type of Expenditures and Regions, 2016

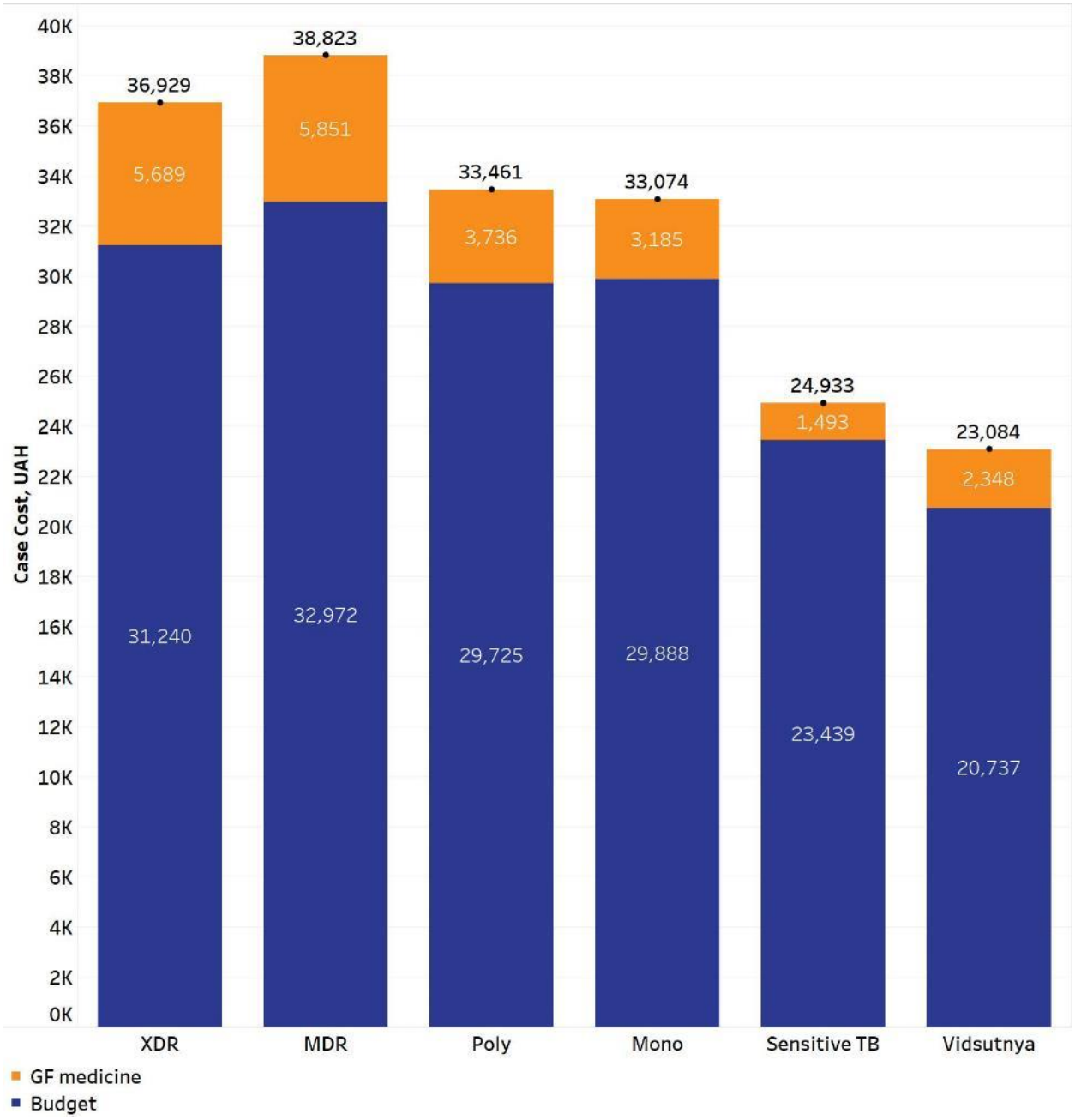


As seen in the graph, staff salaries accounted for from 47 percent (Lviv oblast) to 63 percent (Kyiv City) of total cost. Total expenditures for drugs accounted for 25 percent of total cost in Odesa, Poltava, and Lviv oblasts and 20 percent in Kyiv City; differences in the proportions of budget funding vs. GF support for drugs also vary across regions.

3.1.3.6 Average cost per case by drug sensitivity

Through the cost analysis, we calculated costs for six categories of TB drug sensitivity including extensively drug resistant (XDR), MDR, poly, mono, and sensitive TB, and vidsutnya. The vidsutnya category is widely used in Ukraine to mean cases for which drug sensitivity cannot be determined, but which in practice most likely include sensitive TB cases.

Figure 8: Average Cost per Admitted Case by Drug Sensitivity, 2016



As demonstrated in the graph above, the average cost per case increased with each level of drug resistance, which is logical given treatment guidelines. The average cost per admitted case with mono, sensitive TB. and vidsutnya was approximately 26,000 UAH and the average cost per admitted case with XDR, MDR and poly-DR TB was approximately 38,000 UAH. Nearly 15 percent of total cost for XDR and MDR TB hospital treatment is accounted for by drugs the GF procured, while the figure is 10 percent for poly and mono TB, and less than 1 percent for sensitive TB.

3.2 Discharged Patient System

Information on discharged patients is a key for strategic health purchasing, as purchasers and providers use it to:

- Analyze which services were provided
- Pay providers based on treated cases
- Monitor provider performance
- Make informed management decisions

At the start of its TB hospital work, HFG conducted a rapid assessment of the existing reporting and information systems already in use at TB hospitals. We examined the two routine reporting systems used by TB providers to report on discharged patients: i) e-TB Manager, an electronic register of TB patients, and ii) Form 066, a general statistical form on discharged patients, traditionally collected in paper format.

e-TB Manager is an advanced online platform and a comprehensive register of TB patients that includes detailed information on treatment regime and outcomes of each TB patient. It serves as a key information system for TB reporting, clinical analysis and planning resources for TB patients. However, e-TB Manager includes information only on patients who were diagnosed and registered with active TB. Given the existing situation in Ukraine, where approximately 40 percent of people hospitalized in TB facilities do not have active TB disease, we cannot consider e-TB Manager as a main source of information for the analysis of TB hospitals performance. It is instead a valuable source for deeper analysis of TB clinical information.

Form 066 is the primary statistical form (not TB-specific) approved by the MOH of Ukraine and used for all hospitals in the country to report on each discharged patient. The form provides a set of data on each case of admission, including patient personal information, admission and discharge dates, main and secondary diagnoses according to the ICD-10, performed procedures according to the MOH classification system, referral, treatment outcome, and other information. Form 066 is completed for every patient admitted and discharged from every hospital in the country.

While Form 066 contained information on diagnosis based on the ICD-10, the original ICD-10 codes do not specify TB drug sensitivity. Given that Ukraine's incidence rates of DR TB are among the highest in the world, it was very important to include this information in any reporting and analysis. After policy discussion on the national level, the MOH agreed to add a TB drug sensitivity field to Form 066, which now requires all TB cases to be marked as DS, mono-resistant, poly-resistant, MDR, or XDR.

HFG recommended using data from this revised form, called Form 066/o (see Annex A), as the main source of information for further analysis of TB hospital performance and effectiveness of the TB hospital network.

While paper form 066 had been required by the MOH, there was no link with the hospital payment system or hospital performance system. Completed forms were generally kept on a shelf. Because the

forms were completed primarily to check a box, information on discharged patients was of low quality and usually in an unanalyzable format. In contrast, in countries where hospital care is paid based on treated case (case-based, DRGs), data on discharged patients is of high quality, standardized, and linked to other information systems.

HFG worked with the MOH Medical Statistics Center to use their platform to create an electronic version of the discharged patient form, a module for data entry, and a customized database to collect the electronic entries. HFG trained staff at each TB hospital to use the module and facilitated the process. In total, 28 hospitals from four HFG pilot regions initially uploaded Form 066 data retrospectively and used the discharged patient system on a daily basis. Drug sensitivity status was also uploaded for each case. To date, the discharged patient database includes information on more than 34,000 discharged cases from 26 TB hospitals across the four pilot regions, as detailed in Table 1.

Table 1: Cases in the Discharged Patient System

Region	# of TB Hospitals	# of Discharged Patients				
		2015	2016	2017	2018	Total
Poltava oblast	8	2,513	2,278	2,077	1,039	7,907
Lviv oblast	11	3,165	3,596	2,680	1,185	10,626
Odesa oblast	3 (merged)	3,148	2,854	2,955	1,618	10,575
Kyiv City	4	1,802	1,503	1,171	550	5,026
Grand Total	**26**	**10,628**	**10,231**	**8,883**	**4,392**	**34,134**

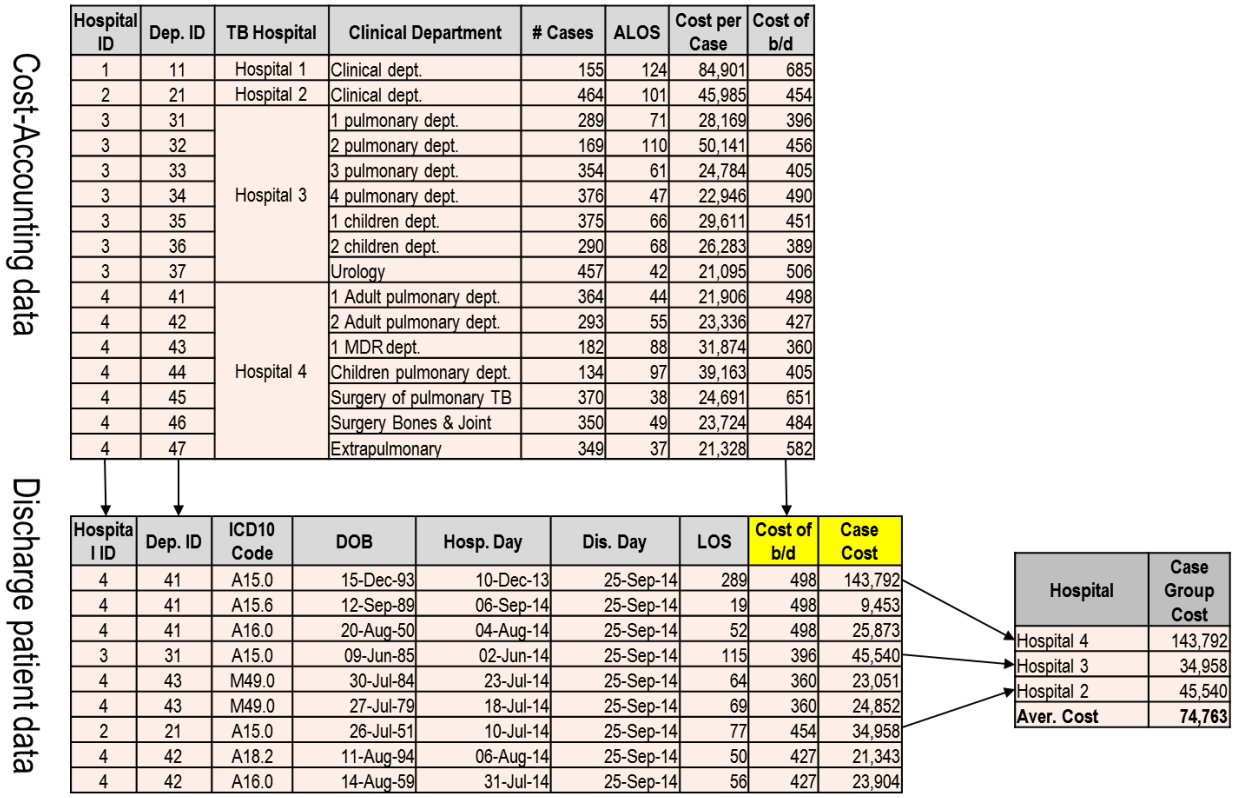
Synthesis and analysis of discharged patient data allowed TB hospital managers and health departments to see a breakdown of their patients by age, gender, diagnosis, drug sensitivity and length of stay for the first time. In effect, they could now understand what services were being provided and purchased. They were also able to compare across facilities and regions.

Analysis of the discharged patient data revealed some inconsistency in coding practices specific to TB diagnosis. Providers often coded patients with disseminated pulmonary TB as "miliary TB," and in some regions listed HIV as the main discharge diagnosis for patients with HIV-TB coinfection who were hospitalized for TB. They also widely used *vidsutnya* (undetermined drug resistance status) as a category of drug resistance. HFG sent a request to the Ukrainian Centers for Disease Control to clarify these issues, and provided recommendations on unifying coding rules for TB hospital reporting. HFG also engaged in policy dialogue at the oblast and national levels to clarify and unify coding rules for these particular situations. However, these issues continue to need to be addressed.

The next step was to link discharged patient data and cost accounting results for all TB hospitals. Several challenges were encountered during this process. In general, there was no standardization in the existing reporting system. TB providers generally produced budget, statistical, and clinical reports separately and did not use a unified coding system to link the data from these reports for further analysis. HFG worked with the MOH Medical Statistics Center and oblast health departments to standardize clinical departments and use unified coding for both cost accounting and discharged patients' systems.

The connection of cost accounting results and the discharged patient database for the joint analysis is presented in the figure below. That linkage made it possible to determine cost per specific type of case and cost per day for each TB clinical department, hospital, and region. This analysis was critical for designing a hospital case-based payment system and monitoring TB hospital performance.

Figure 9: Link Between Cost Accounting and Discharged Patient Data



Hospital ID	Dep. ID	TB Hospital	Clinical Department	# Cases	ALOS	Cost per Case	Cost of b/d
1	11	Hospital 1	Clinical dept.	155	124	84,901	685
2	21	Hospital 2	Clinical dept.	464	101	45,985	454
3	31	Hospital 3	1 pulmonary dept.	289	71	28,169	396
3	32		2 pulmonary dept.	169	110	50,141	456
3	33		3 pulmonary dept.	354	61	24,784	405
3	34		4 pulmonary dept.	376	47	22,946	490
3	35		1 children dept.	375	66	29,611	451
3	36		2 children dept.	290	68	26,283	389
3	37		Urology	457	42	21,095	506
4	41	Hospital 4	1 Adult pulmonary dept.	364	44	21,906	498
4	42		2 Adult pulmonary dept.	293	55	23,336	427
4	43		1 MDR dept.	182	88	31,874	360
4	44		Children pulmonary dept.	134	97	39,163	405
4	45		Surgery of pulmonary TB	370	38	24,691	651
4	46		Surgery Bones & Joint	350	49	23,724	484
4	47		Extrapulmonary	349	37	21,328	582

Hospital ID	Dep. ID	ICD10 Code	DOB	Hosp. Day	Dis. Day	LOS	Cost of b/d	Case Cost
4	41	A15.0	15-Dec-93	10-Dec-13	25-Sep-14	289	498	143,792
4	41	A15.6	12-Sep-89	06-Sep-14	25-Sep-14	19	498	9,453
4	41	A16.0	20-Aug-50	04-Aug-14	25-Sep-14	52	498	25,873
3	31	A15.0	09-Jun-85	02-Jun-14	25-Sep-14	115	396	45,540
4	43	M49.0	30-Jul-84	23-Jul-14	25-Sep-14	64	360	23,051
4	43	M49.0	27-Jul-79	18-Jul-14	25-Sep-14	69	360	24,852
2	21	A15.0	26-Jul-51	10-Jul-14	25-Sep-14	77	454	34,958
4	42	A18.2	11-Aug-94	06-Aug-14	25-Sep-14	50	427	21,343
4	42	A16.0	14-Aug-59	31-Jul-14	25-Sep-14	56	427	23,904

Hospital	Case Group Cost
Hospital 4	143,792
Hospital 3	34,958
Hospital 2	45,540
Aver. Cost	**74,763**

HFG worked with health authorities from the national and regional levels to design operating systems using cost accounting and discharged patient data to monitor TB hospital performance, develop a simulation model for TB hospitals optimization, and design a new payment system.

3.3 TB Hospital Performance Monitoring System

Ukraine's MOH and regional health departments recognize the need to downsize the extensive TB hospital network and shift TB care increasingly out of hospitals toward improved health outcomes, in line with WHO recommendations. However, regional health authorities often encounter resistance to closing TB hospitals from local governments, health care workers, and communities.

The purpose of the TB hospital performance monitoring system was to provide health care managers with the data they needed to clearly understand where and how changes could be made in the TB hospital network to improve resource use and health outcomes, and to more effectively manage the TB hospital networks. The data analytics from the hospital performance monitoring system would allow them to develop plans backed up by data and support their recommendations in the face of any resistance. Specifically, the system was designed to do the following:

- Provide a better understanding of the current situation in TB inpatient care from the health purchasing point of view, specifically:
    - Which services are provided, to which categories of patients, by which providers, and at what cost
    - Which hospitals/ regions are performing well relative to the average, which are outliers4

- Point to particular services, hospitals, or other areas that warrant deeper analysis
- Support ongoing policy dialogue and provide evidence for informed options and decisions in TB hospital network restructuring and optimization toward improved health service delivery for TB patients and introduction of a new payment system for TB hospitals4

The TB hospital performance monitoring system crosswalks data from the cost accounting analysis and the discharged patient system. HFG worked with the regional health authorities to identify the specific questions that need to be answered through the monitoring system; select indicators to help answer those questions; and create a process for data collection, analysis, reporting, and providing feedback to TB providers.

The TB hospital performance monitoring system was introduced first in Poltava oblast at the beginning of 2016, and rolled out to Kyiv City and Odesa and Lviv oblasts later that year.

The TB hospital monitoring system is composed of three "blocks" by level:

1. Oblast/City level: At this level, the system is used to monitor selected indicators to assess TB hospital network effectiveness, specifically:
    - Structure and volume of hospital admission (demographic and clinical)
    - Resources accounted for by each type of services
    - TB hospital productivity
    - Benchmark TB hospital performance
2. TB hospital level: At this level, the system is used to monitor performance indicators for a single TB hospital with the formation of a summary report.
3. Cross-regional level: At this level, the system is used to monitor key indicators at the health system level, including TB hospital performance among regions with the possibility of hierarchical analysis such as disaggregation of the indicators data from the national level to the oblast/city and TB hospital level. This third block has potential to also serve as a national-level monitoring system.

HFG used the BI Tableau 2018.2 application to design operational dashboards for the monitoring system. These dashboards allow interactive analysis of a large number of indicators, as well as simulations of the consequences of making certain managerial decisions.

HFG designed the system interface and interactive elements to be user-friendly and easily accessible to managers and clinical experts with a minimum level of IT knowledge. Users have access to advanced visual representation of the data analytics, which makes the information more accessible, understandable, and usable.

HFG worked with health departments and TB providers to select and prioritize the indicators needed to answer identified policy questions. The following criteria were used for selecting indicators:

- Start with a limited number of indicators. Additional indicators can be analyzed when specific issues emerge in the course of routine monitoring.
- Select indicators that can answer multiple questions and are sensitive to TB service delivery changes.
- Prioritize indicators that support strategic purchasing.
- Selected indicators should be able to be generated from the available reporting systems (e.g., cost accounting and discharged patients) and not require creation of new reporting forms.

The following indicators were selected for the TB Hospital Performance Monitoring System:

	Indicator	Frequency	Objective
1	Number of discharged patients	Monthly	Shows: Trend in hospital admission among TB hospitals. Expectation: Gradual decrease in the total admissions and changes in the admission structure. Substantial increase in hospitalization in any category of TB cases would serve as a warning sign that requires further investigation.
2	Hospitalization structure by ICD-10 diagnosis, selected clinical group, and type of patient	Quarterly	Shows: Current situation analysis and trends—what services are provided and to which group of patients. Expectation: Decrease in the proportion of hospitalized cases that should be treated in the general hospitals or at the outpatient level (avoidable and unneeded hospitalization).
3	ALOS by hospital, type of hospital, type of TB, clinical group, and DR category	Quarterly	Shows: Trend in ALOS. Expectation: Decrease in ALOS in general and for selected conditions in line with WHO and national recommendations.
4	Admission structure by diagnostic method	Quarterly	Shows: Share and trends in admitted cases with bacteriologically confirmed TB and clinically diagnosed TB. Expectation: Decrease in admission with clinically diagnosed TB.
5	Admission structure by drug sensitivity category	Quarterly	Shows: Share and trends in admission with sensitive TB and drug resistant TB (mono, poly, MDR, and XDR). Expectation: Decrease in the admission for pulmonary sensitive TB.
6	Repeated hospital admissions	Quarterly/ annually	Shows: level of repeated and multiple hospitalizations; allows identification of significant cases for further clinical analysis and for measures to reduce repeated or multiple hospitalizations.
7	Structure of comorbidity and complications in discharged patients	Quarterly/ annually	Shows: Clinical analysis and assessing possible effect on ALOS and general treatment outcomes.
8	Set of indicators from cost accounting analysis, including average cost per case for specific diagnoses, type of TB, DR categories, etc.	Annually	Shows: Analysis of resources allocation, cost structure, and cost drivers.
9	General indicators such as bed occupancy rate, patients per doctor/nurse, etc.	Annually	Shows: Productivity of TB providers and TB sector.

At the request of clinical experts from the regions and hospitals, HFG produced additional data analysis for specific indicators particular to individual regions or hospitals. A key strength of the HFG-created monitoring platform inTableau was its nimbleness, allowing information to be rapidly updated and additional types of analysis added.

Performance monitoring on the individual hospital level aimed to provide feedback to TB providers, including analysis of the results of their work and comparison with other hospitals. Very important to the individual facilities was also the analysis of their quality of coding of clinical information and interpretation of the results. HFG produced and printed facility-level monitoring reports, and discussed these with TB hospitals on a quarterly basis. HFG trained health department staff to produce the reports, and the health department will continue to produce the reports after the close of the HFG project.

3.3.1 Examples from the TB Hospital Performance Monitoring System

Examples of dashboards showing the data analytics from the hospital performance monitoring system are provided here both to demonstrate the information and presentation of the TB Performance Monitoring System, and to illustrate selected specific issues facing TB decision-makers and TB hospital managers in the pilot regions and on the national level. In many cases, the TB hospital performance monitoring system made decision-makers and managers aware of the extent of these issues for the first time; in other cases, the data analytics provided concrete data to support their sense that these issues existed.

3.3.1.1 The Matrix of Main Indicators

We developed a hierarchical matrix that shows the value of selected indicators for a certain period of time (quarter, year) and is disaggregated by level:

Country → Oblast → TB hospital → Clinical department

This matrix allows analysis of the causes behind certain trends in a hierarchical sequence. The matrix also includes an advanced element of visualization. Using color gradation of indicator values—the darker color, the higher the value of the indicator—health authorities could quickly rate oblasts or providers and recognize changes in indicator values.

Figure 10 shows the consolidated matrix of main indicators with aggregated data for four pilot regions, and Figure 11 shows disaggregated values of the main indicators for TB hospitals in Odesa oblast. As necessary, these indicators can be disaggregated to the clinical department level in each hospital in the selected oblast.

Figure 10: Main Indicators Matrix, 2017

Figure 11: Odesa Oblast Hospitals

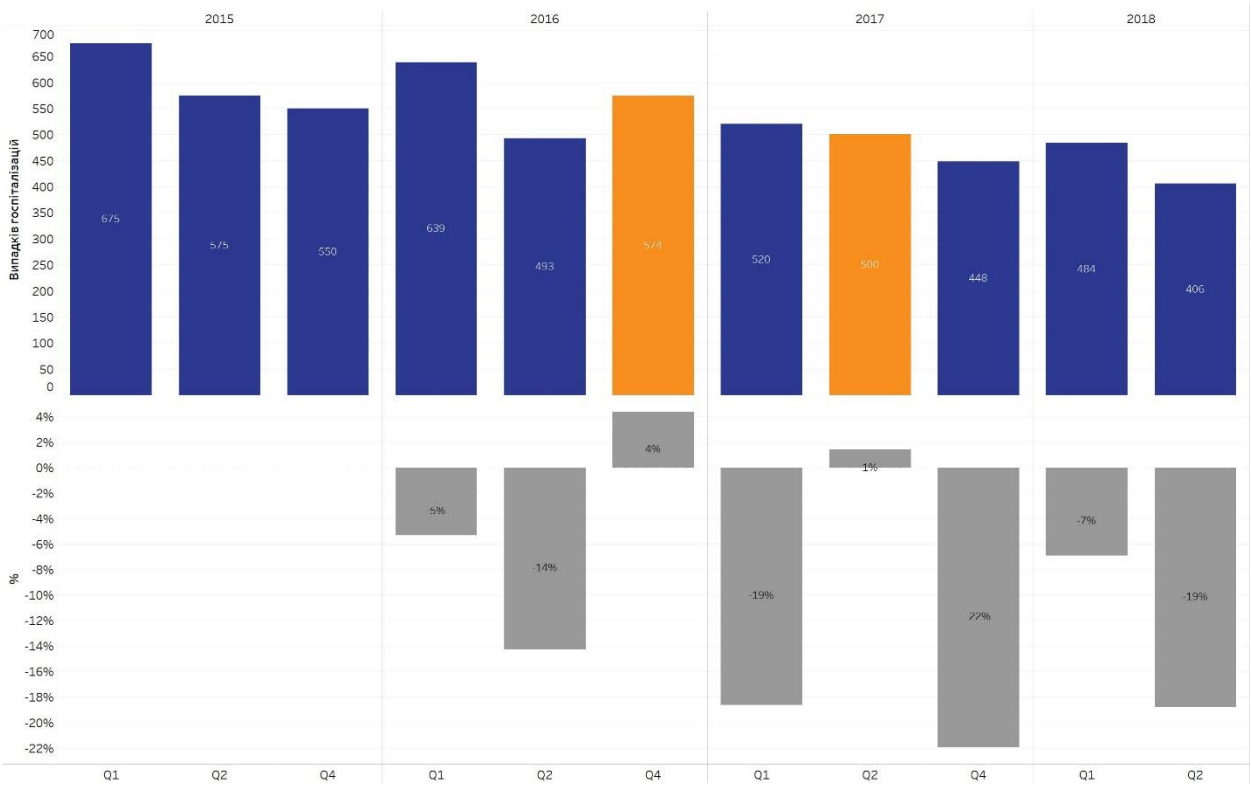
		Cases	ALOS	% of not TB cases	# of diagnosis per case	HIV/1000 patients	% of CD cases	Case cost (UAH)	BD cost (UAH)
	Grand Total	2,955	103.0	25	2.91	260.9	27	35,151	4,126
Odessa obl.	Regional TB Hospital Odessa	1,533	80.1	13	2.35	339.9	32	28,324	1,940
	TB Hospital #2	298	179.2	6	3.20	174.5	0	56,999	484
	TB hospital Odessa	1,124	114.1	48	3.60	176.2	21	34,761	1,702

As Figure 11 shows, Odesa oblast recorded the highest ALOS (103 days), as well as the highest rate of HIV-TB co-infection cases (260 per 1,000 cases), and the highest number of comorbidities per average admission (2.91). The high rate of HIV-TB coinfection and other comorbidities may contribute to longer ALOS.

3.3.1.2 Level of Hospital Admissions (number of cases)

The trend in overall admissions from 2015 to 2018 shows a stable decrease in the number of hospitalizations in TB facilities in all four pilot regions. Figure 12 shows the dynamics of the number of discharged cases in the Poltava oblast. The grey bars show the percentage of cases compared to the same quarter of the previous year. For time periods when admissions increased, the corresponding indicator bar in the upper part of the graph is red.

Figure 12: Trend in Hospital Admission, Poltava Oblast, 2015–2018



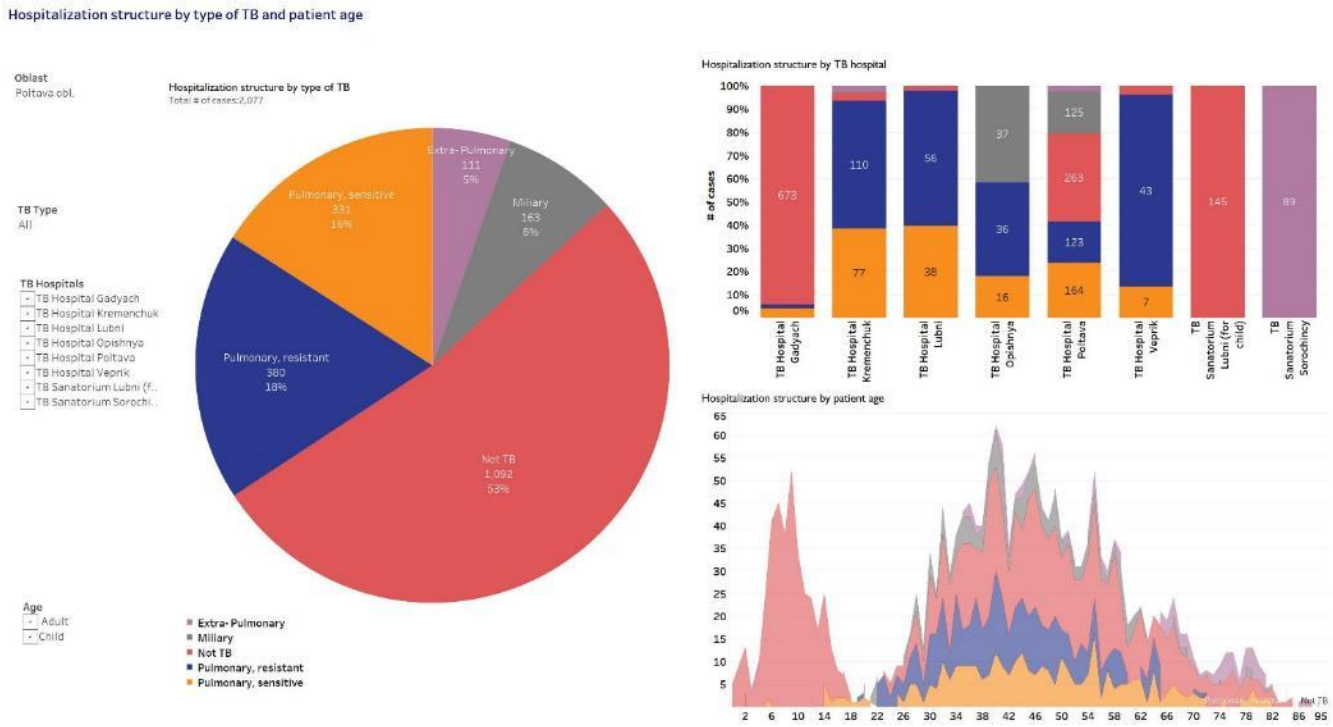
3.3.1.3 Admission Structure by Type of TB

Analysis of the hospitalization structure was very important for answering the questions, "Which services are we purchasing?" and "Who is being treated in TB hospitals?" Many policymakers were very surprised to see the large number of non-TB patients being treated in TB hospitals. These patients could receive care in general hospitals or avoid hospitalization altogether and be treated in outpatient settings.

Figure 13 is a monitoring system dashboard from Poltava oblast, showing hospital admission structure by TB hospital and patient age. We can see that more than 50 percent of discharged patients in Poltava oblast did not have active TB, including a large number of hospitalized children. Outdated clinical guidelines and hospitalization criteria, inconsistencies in interpreting and following clinical guidelines, the

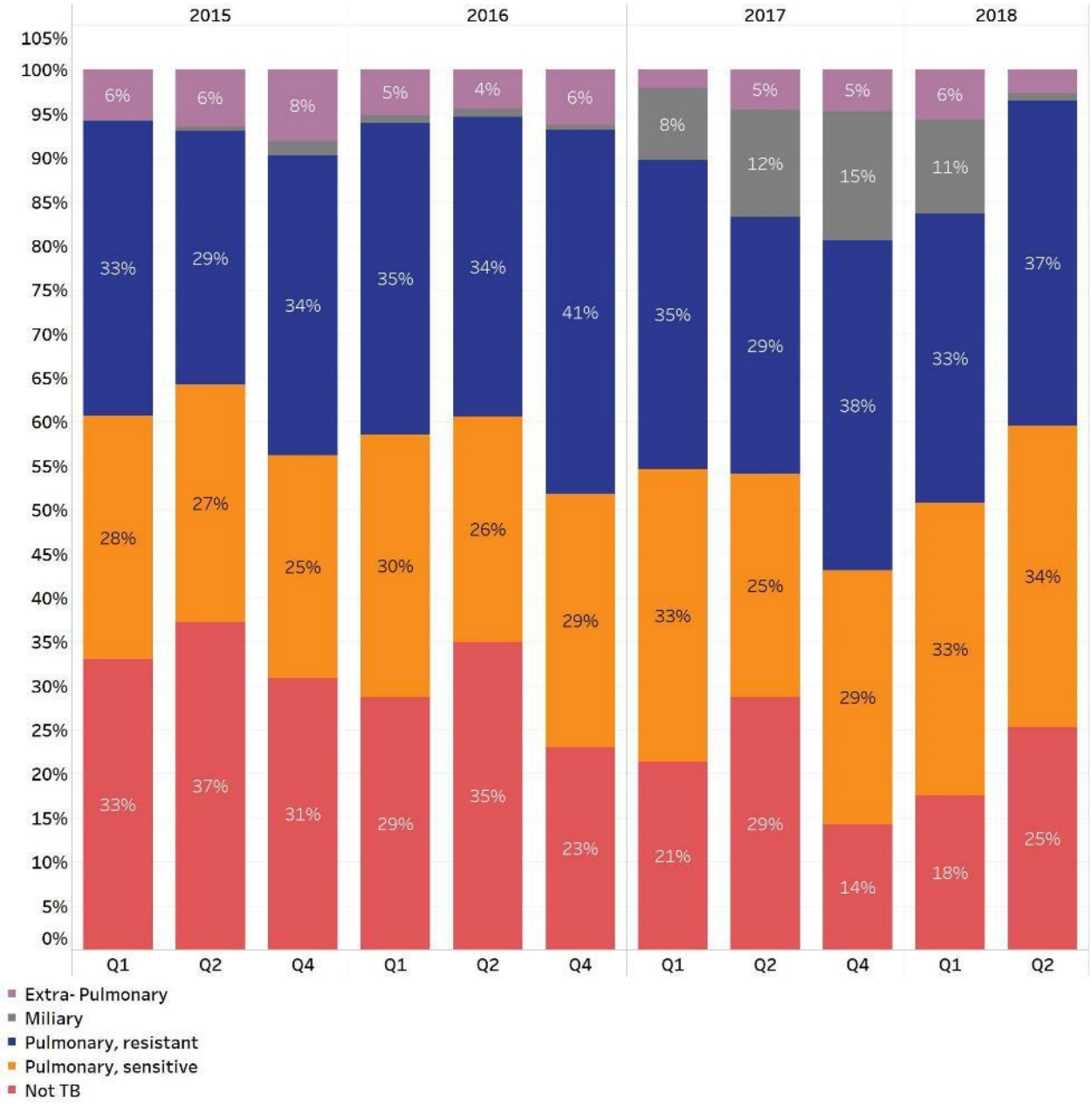
outdated practice of hospitalizing contacts of TB patients and TB suspects, and current line-item payment system incentives to keep hospital beds occupied may explain the high numbers of non-TB patients hospitalized.

Figure 13: Hospital Admission Structure by Type of TB and Patient Age, Poltava Oblast, 2017



Another example of indicator analysis is below. The analysis shows the share of non-TB admission in TB hospitals in Kyiv City and a small positive trend with gradually decreasing non-TB cases alongside an increasing proportion of patients with sensitive and resistant pulmonary TB.

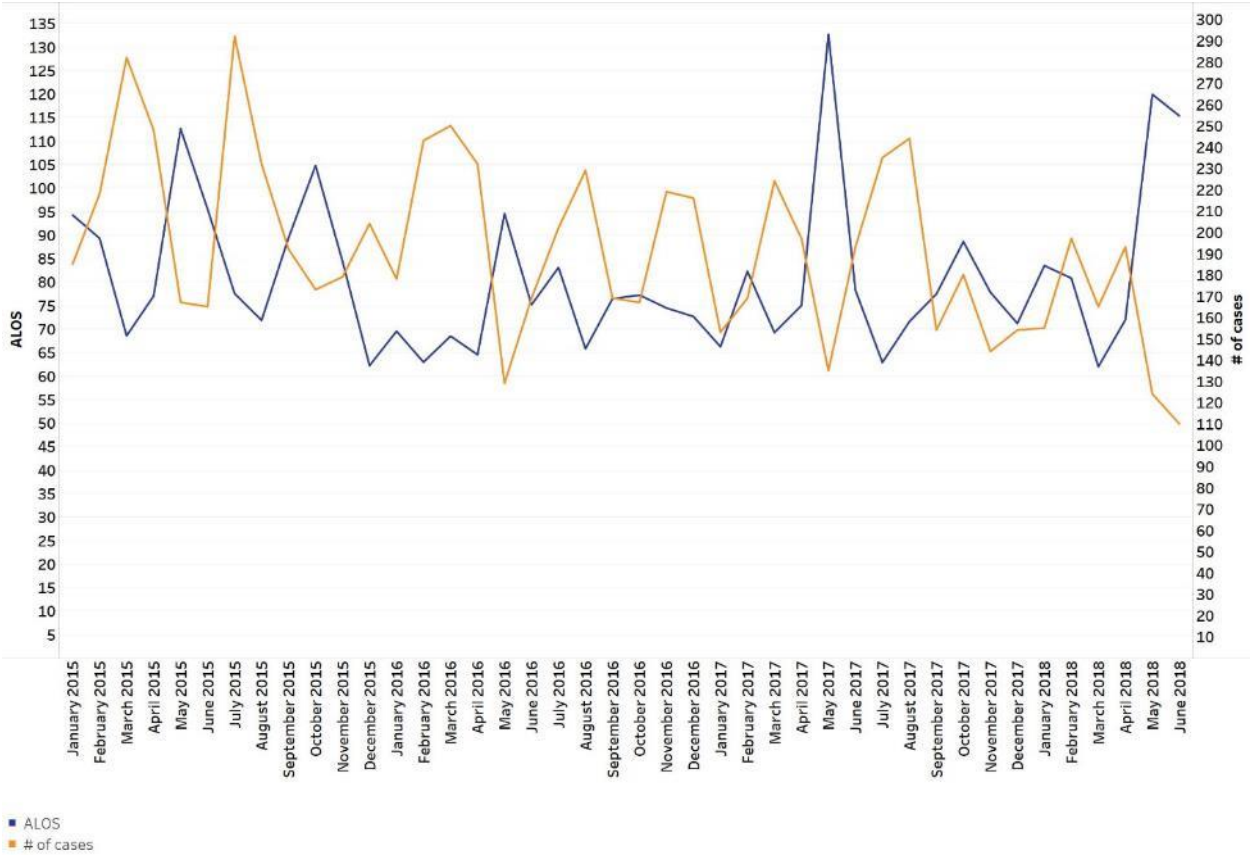
Figure 14: Hospitalization Structure—Share Of Non-TB Cases, Kyiv City, 2015-2018



Average Length of Stay

ALOS is an important indicator for TB hospitals. Although ALOS in TB hospitals decreased somewhat across the oblasts, it remained extremely high. ALOS is strongly correlated with number of cases: the fewer patients admitted, the longer they stay in the hospital. This is most likely a result of the current input-based payment mechanism (# of beds, #of staff) and the continuing practice of ensuring bed occupancy at any cost in order to ensure future hospital funding.

Figure 15: Trend in ALOS and the Number of Discharged Patients



The monitoring system also enables users to see ALOS by TB drug sensitivity (sensitive TB, mono, poly, MDR, and XDR). In general, for most hospitals, the higher the level of drug resistance, the longer the stay in the hospital.

The monitoring system reveals significant variation in ALOS among hospitals in general, even for the same type of clinical conditions. For example, ALOS of patients with pulmonary sensitive TB in TB hospitals in Poltava oblast was 100 days, with a range between 41 and 172 days.

Repeated Hospitalizations

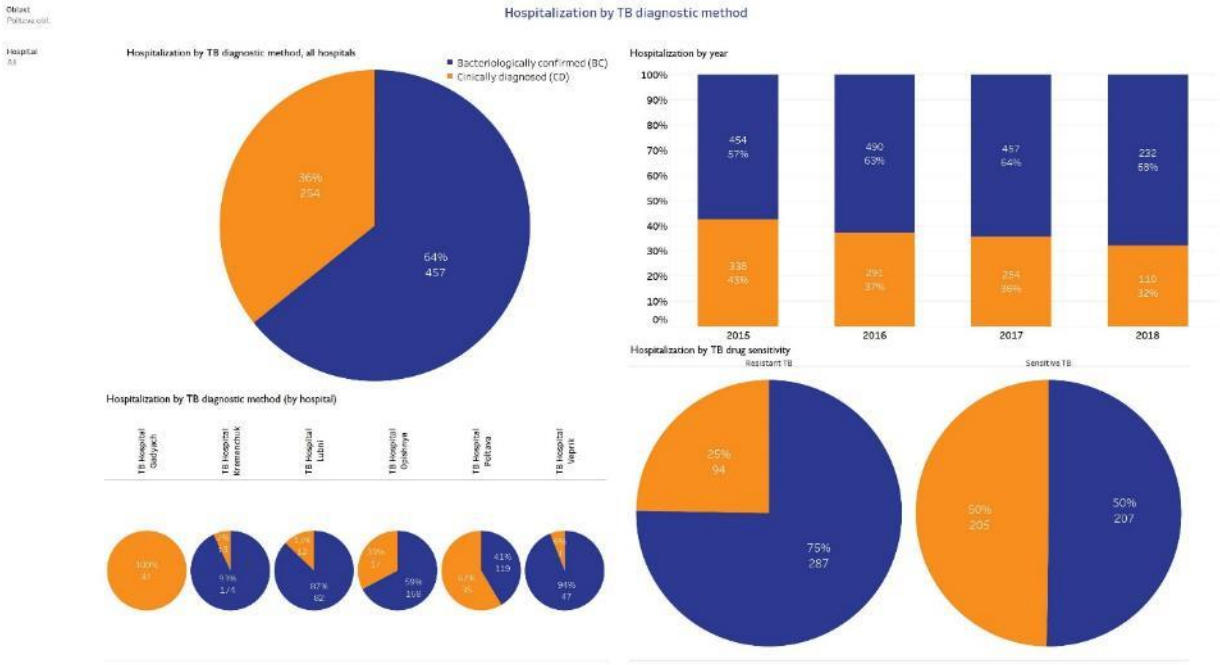
The monitoring platform also allows identification and tracking of patients with repeated and multiple hospitalizations. This analysis is critical for clinicians, as many patients interrupt treatment or end up being re-hospitalized after initial discharge. In many cases, repeated hospitalizations are accompanied by an increase in the level of drug resistance, indicating that the patient may have developed drug resistance due to incomplete treatment or contracted a more drug resistant form of the disease while hospitalized.

TB Diagnostic Methods

Monitoring hospitalization by TB diagnostic method (clinically diagnosed vs. bacteriologically confirmed) is very important, as the percentage of discharged patients with clinically diagnosed TB is still high in Ukraine. This practice goes against both WHO and national clinical guidelines. Figure 16 from the monitoring dashboard on TB diagnostic method indicators shows TB cases from Poltava oblast by diagnostic method, broken down by hospital. While a gradual decrease in the percentage of clinically diagnosed cases can be seen from 2015 to 2017, 36 percent of all pulmonary and extra-pulmonary

respiratory TB patients discharged from TB hospitals in 2017 did not have bacteriological confirmation of TB. Only 50 percent of all discharged DS TB cases were bacteriologically confirmed.

Figure 16: TB Cases by Diagnostic Method, Poltava Oblast



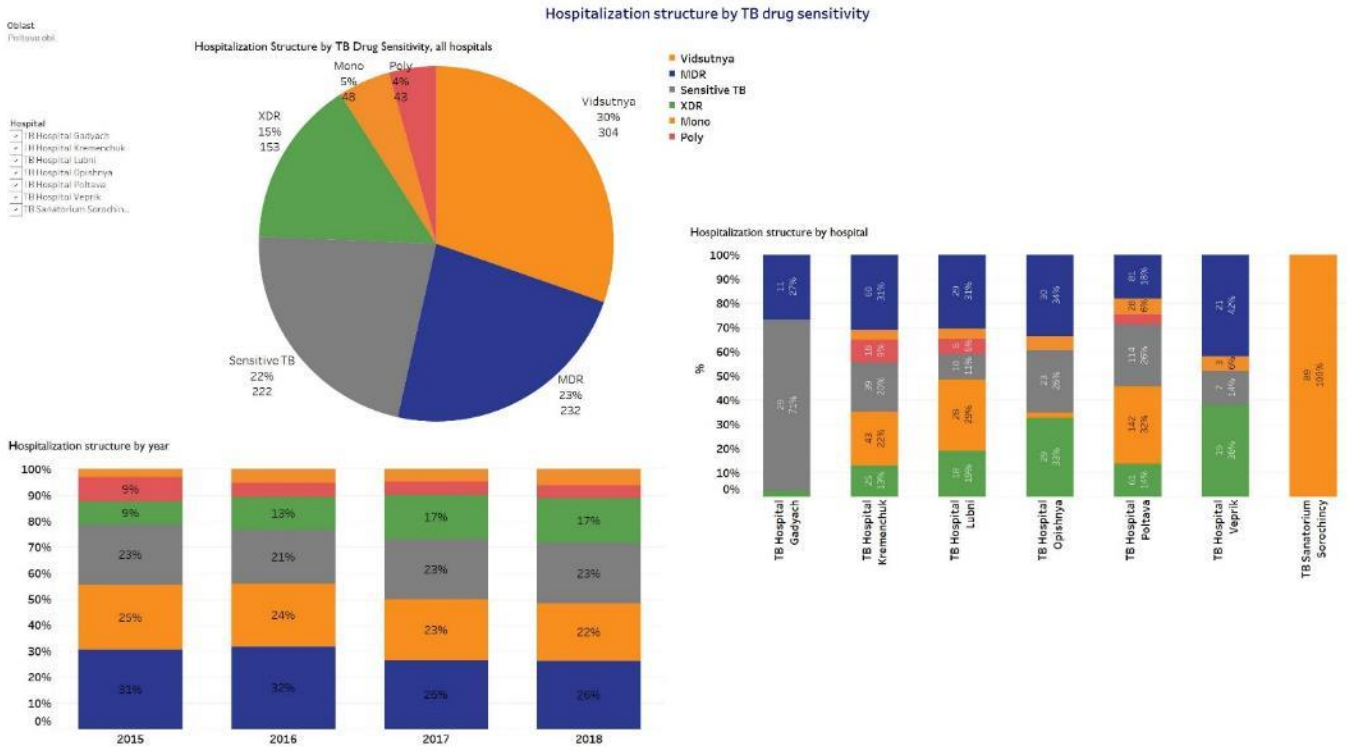
Drug Sensitivity Analysis

One of the remaining problems the TB service system of Ukraine is the large proportion of patients recorded as having "unidentified" drug sensitivity (referred to in Ukrainian as *vidsutnya*). According to local experts, a variety of causes contribute to this situation, related to both diagnosis and quality of the laboratory service. While the number of *vidsutnya* cases has decreased, the percentage remains high.

The general structure of hospitalized TB cases by drug sensitivity categories in the four pilot regions includes 32 percent DS TB; 28 percent MDR TB; 23 percent *vidsutnya*/"unidentified" drug sensitivity; 7 percent XDR; 6 percent mono-resistant; and 3 percent poly-resistant.

An example of the TB drug sensitivity monitoring dashboard is presented below. It shows the indicators for Poltava oblast as a whole, by TB hospitals and time period.

Figure 17: Drug Sensitivity Monitoring Dashboard, Poltava Oblast



3.4 Simulation Model

HFG developed a model, based on the HFG-created TB hospital performance monitoring system, that allows simulation in order to optimize TB hospitals. While the performance monitoring system allows users to see the current situation and trends in TB hospital cases, the interactive simulation model enables users to see the potential consequences of changing variables in TB hospitalization. For example, users can simulate the effects of changes such as decreasing the level of avoidable and unneeded hospitalization or decreasing ALOS for sensitive TB in line with WHO recommendations. The simulation model helps to demonstrate for policymakers the current level of TB hospital network effectiveness (which is very low) and assess options for optimization.

HFG worked with regional health authorities and TB experts to select areas and parameters where changes could or need to happen, and simulated potential effects from these changes. This tool will help users develop plans for changes in the system toward improved resource use and better TB outcomes, in line with WHO recommendations.

The variables for the simulation model included the following:

- Changes in hospitalizations structure
    - Elimination of hospitalization of patients that do not have TB as their main diagnosis
        - *Contact with and exposure to TB (Z20, Z20.1)*
        - *Sequelae of TB (B90.0–B90.9)*
        - *Carrier of infectious disease, unspecified (Z22.3, Z22.9)*

- *Admission with other non-TB diagnoses (all other than TB ICD-10 codes as main diagnosis)*
- Decrease in hospitalizations of patients with clinically diagnosed TB

- Changes in ALOS:
  - Changes in line with WHO and/or national guidelines for sensitive and DR TB
  - Arbitrary changes in ALOS
- Decrease in admission level for patients with sensitive TB:
  - Arbitrary change in the proportion of patients with sensitive TB who should be hospitalized based on international experience and/or national experts

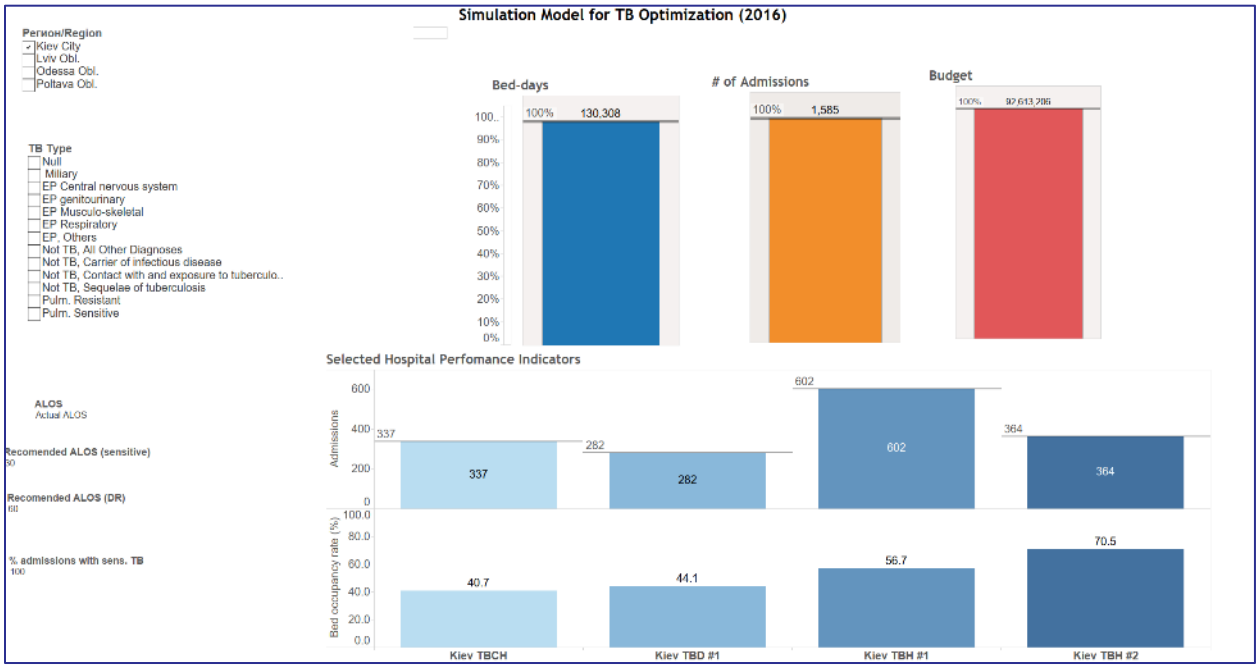
In line with the above variables, the model simulates possible changes in the following indicators of TB hospital performance:

- Number of hospital admissions
- Number of hospital bed-days
- Bed occupancy rate (percent)
- Effect on total TB hospital budget

HFG used the BI Tableau application for the simulation model design, and inputted information from the discharged patients and cost accounting consolidated databases. The simulation model includes advanced interactive elements that allow the user to select changes and visualize their effect on the number of hospital admissions, bed occupancy rate, and total TB hospital budget.

Figures 18 and 19 are screenshots of the simulation model for TB hospital optimization for Kyiv City. The first figure represents the current situation, with actual number of admissions, bed-days and budget, by TB hospital and total for Kyiv City.

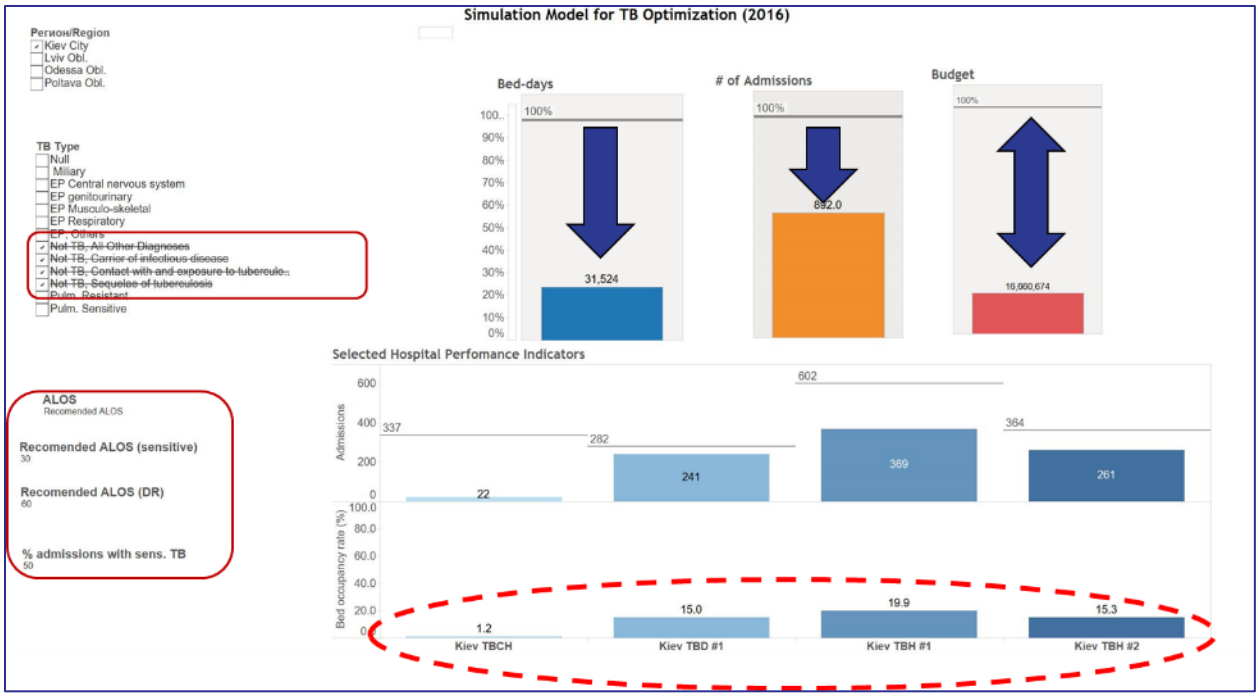
Figure 18: Screenshot of the Simulation Model: Current Situation, Kyiv City



The second figure simulates potential results in TB hospital performance if the following changes happened:

- Exclude all non-TB cases.
- ALOS for patients with sensitive TB is set at 30 days.
- ALOS for patients with resistant TB is set at 60 days.
- The proportion of patients with sensitive TB that should be hospitalized is set at 50 percent of previous year levels.

Figure 19: Screenshot of the Simulation Model:, Potential Results, Kyiv City



The simulation result shows that a significant decrease in number of admissions (by 50 percent) and patient bed-days (by 80 percent) could lead to the potential total savings of more than 80 percent of the total TB hospital budget for Kyiv City. The model shows a dramatic decrease in the bed occupancy rate across the four hospitals, with a resulting estimated bed occupancy ranging from a low of 1.2 percent to 19.9 percent, as compared to the current occupancy rate of 40.7 percent to 70.5 percent. This analysis provides strong evidence that the existing TB hospital network is needlessly large and needs to be optimized.

A step-wise approach to implementing a set of key WHO recommendations on TB hospitalization would reduce the number bed-days for adult patients from the current 590,297 across the four pilot regions. The steps include:

1) Stop admitting patients without TB to TB facilities: yields a 28 percent reduction in bed-days.
2) Reduce the number of patients admitted with DS or mono-resistant TB by shifting to full outpatient management of these cases: if assume that admissions are reduced by half, yields a 45 percent reduction in bed-days.

3) Reduce the ALOS of patients with DS or mono-resistant TB to 14 days: yields a 59 percent reduction in bed-days.

4) Reduce the ALOS of patients with MDR or poly DR TB to 60 days: yields an 82 percent reduction in bed-days.

The implementation of these four steps would result in a total reduction of 482,149 (82 percent) bed-days per year if all four goals were met.

Pediatric bed-days make up only 9 percent of total TB bed-days, so policy changes related to pediatric admissions would have considerably less impact. However, following the same four recommendations for pediatric admissions would reduce the number of pediatric admissions by 96 percent or 55,353 bed-days/year. By simply implementing a policy to not hospitalize children without active TB, the number of pediatric bed-days would be reduced by 81 percent.

Odesa and Lviv oblasts used results from the TB hospital performance monitoring system and simulation model to develop and justify optimization plans for the TB hospital sector and achieve approval for them from the oblast governments. These changes are profiled in Section 4 of this report.

4. USING DATA ANALYTICS FOR CHANGE IN PILOT REGIONS

It is important to note that Ukraine's oblast and city health departments have significant autonomy to administer and organize health care, so their decisions are actionable. Shared data analytics across hospitals and health departments, plus the understanding that the hospitals would soon be paid through a case-based payment system based on services provided, has led to a new management approach and new way of thinking within the health departments.

> "Previously, our economists and statisticians had one set of data, our managers had another set of data, our doctors yet a third set. The HFG activity gets us to a common set of data, to a common understanding, so that we can rationally make decisions.
>
> To tell the truth, we thought we understood everything before. But then, we started [to work on this project] and looked more deeply at our facilities and their use of resources, and how the use of resources affected the provision of quality care and we looked at forecasting, we understood this was a completely different instrument. We saw we needed to redirect resources toward quality of care.
>
> We needed to turn our brains over, to a new way of thinking."
>
> —Dr. Viktor Lysak, Director, Poltava Oblast Health Department

HFG's pilot regions have begun to make changes in clinical practice to address specific areas which the data analytics revealed were not in line with clinical protocols, WHO recommendations, or expected norms, such as high percentages of clinically diagnosed cases vs. bacteriologically confirmed; cases labeled as *vidsutnya*, or unknown drug resistance; hospitalization of patients without active TB disease; long ALOS for both DS and DR TB; and high numbers of children hospitalized. The health departments have also moved to address other resource use issues, such as high-cost non-clinical services (laundry, food service), over-staffing, and low bed turnover. In many cases, in doing so, they have undertaken restructuring of the TB hospital systems in their regions.

4.1 Using Data Analytics for Restructuring: The Case of Odesa Oblast

The Odesa Oblast Health Department studied the data analytics and simulation models in the context of WHO guidelines, their existing information on PHC and hospital care in the oblast, and the need to move toward more-effective and more-efficient care. Using the information, the oblast developed a Strategy for Improving Efficiency of TB Care for the Population of Odesa Oblast, followed by a roadmap for improvement of TB care in the oblast.

Given the high TB-HIV coinfection rate in the oblast (46.9 percent of new TB cases registered in Odesa in 2016 were TB-HIV coinfection) and the analysis of hospitalization patterns, case mix, and costs, Odesa decided to establish a "Center for Socially Significant Diseases" to provide both TB and HIV care. This center replaced the previously existing AIDS Center, Odesa TB Hospital, Odesa Oblast TB Clinic, and Oblast TB Hospital #2. The Health Department was able to make a strong case to the oblast administration for restructuring based on data analytics, specifically based on the current situation with bed occupancy and length of stay. The Health Department also used this information for decision-making and to mitigate any media and public opposition to closure of old facilities.

> "We've never had a fundamental analysis like this before. Now, I'm not afraid to be called up to the podium or asked to answer questions anywhere. There's no reason to worry about those who want to keep the status quo, because I have evidence-based information behind all of my decisions."
>
> —Dr. Svetlana Esipenko, Director of the Odesa Oblast Center for Socially Significant Diseases

In 2017, Odesa oblast officially merged the four facilities. To temper resistance to restructuring from staff towards the closing of facilities, initially all of the medical staff were given positions at the new facility, with the idea that over the longer term many of them could be transferred to other positions in the health care system. As the cost accounting exercise had revealed that food and laundry services were more expensive than the health department had expected, the facility issued an RFP to try to identify outside vendors who could provide these services more efficiently for the new facility.

The restructuring has resulted in an immediate closure of 280 hospital beds, reducing the number of TB beds in Odesa oblast from 1005 to 725, or from 4.7 to 2.8 hospital beds per 10,000 population. The restructuring has been accompanied by notable decreases in the first two quarters of 2018 in ALOS for DS TB and non-TB cases; this may be a result of conscious efforts of both the oblast health department and facility director to reduce ALOS, as well as reduced pressure to keep patients hospitalized in order to justify the facility's existence.

The integrated care model of the new facility means that patients hospitalized for TB can get HIV care during their hospital stay, if necessary, with ARVs administered and even prescribed by doctors at the new facility. The health department estimates a savings of 11.6 million UAH (over $414,000).

Odesa oblast has gone beyond just hospital restructuring, and has created a roadmap for reform, reflecting its holistic approach to improving TB service delivery. In addition to restructuring the hospitals, this roadmap calls for increased outpatient care and strengthening of PHC care. Moving forward, the oblast health department plans to continue to shift patient care from inpatient to outpatient, and looks toward shifting saved resources from the hospital level to TB care at the PHC level. The department plans to work in close collaboration with the NHSU as new payment mechanisms are introduced, and wants to participate in the development of results-based financing for TB on the PHC level.

4.2 The Case of Lviv Oblast

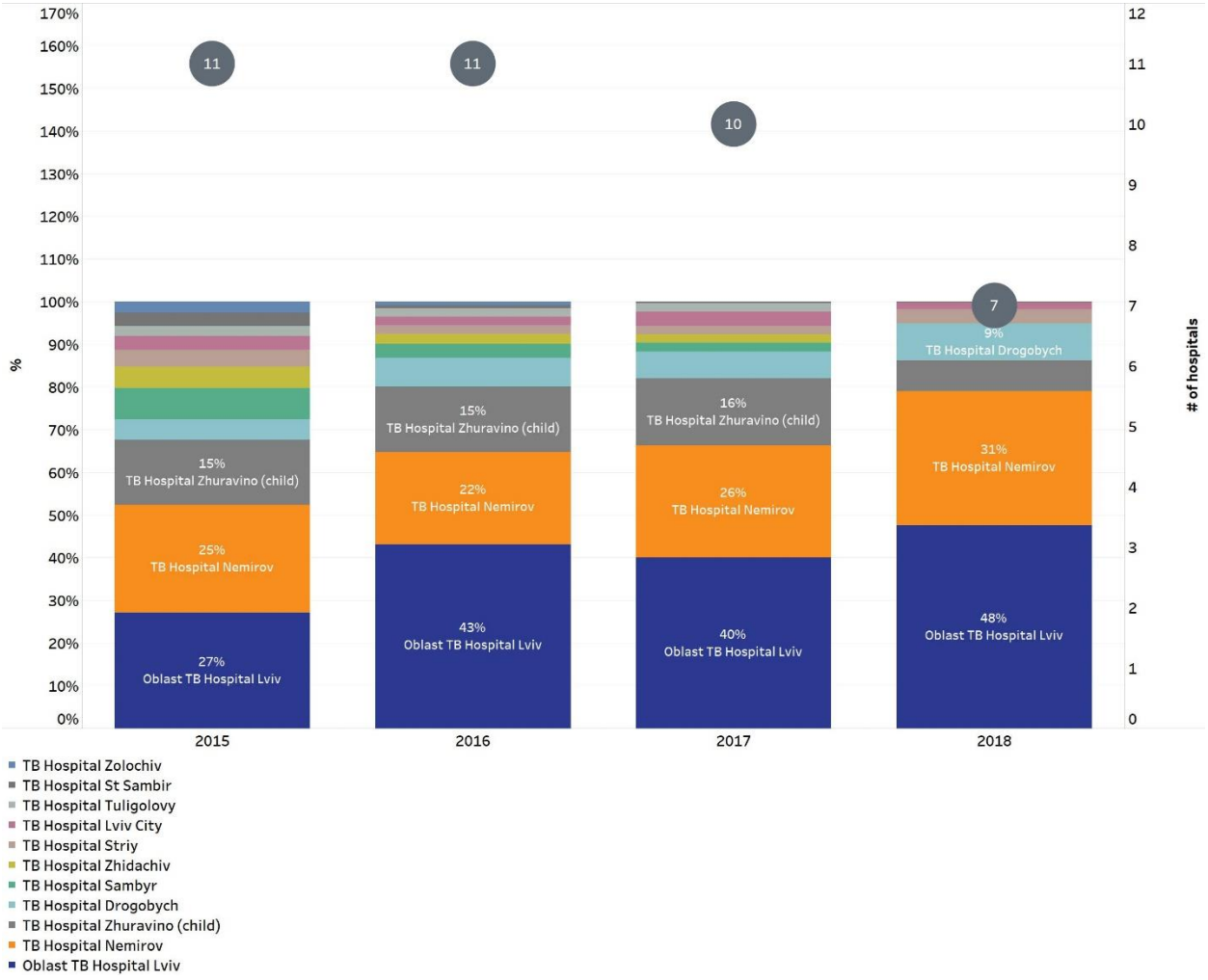
Lviv oblast, which has historically had the largest number of TB hospitals and the highest number of TB hospital beds in the country, despite the lowest numbers of TB patients, has made dramatic strides in closing smaller TB hospitals and reducing the overall number of TB beds. At the start of 2015, Lviv had 1,455 TB hospital beds and 9 TB hospitals; by early

> "The longer a patient is hospitalized, the higher the chance that he'll be exposed and infected with other forms of TB."
>
> —Dr. Lyubomir Rak, Director, Lviv Regional Phthisiopulmonological Clinical Treatment and Diagnostic Center

2018, the numbers had decreased to 635 hospital beds and 5 hospitals. The closures included one facility that had treated approximately 800 total patients in 2017, of whom the oblast reports only 17 should have been treated based on clinical protocols. The largest TB hospital was restructured to serve as a pulmonary hospital.

The shifts in beds and decrease in number of TB hospitals is shown in Figure 20. The numbers in the gray circles indicate the total number of TB hospitals.

Figure 20: Decrease in Number of TB Hospitals and Hospital Beds, Lviv Oblast



Additionally, Lviv had TB sanatorium beds: 400 at the start of 2015 and 305 by early 2018. The oblast retained its 180 TB specialist positions over this three-year period. Over the same time period, the reduction in TB beds allowed the health department to reduce over 169 other staff positions.

Lviv oblast plans to continue to streamline, by closing the remaining 305 sanatoria beds, and converting 100 of them into a rehabilitation center. Once the current 100 children's sanatoria beds have been closed, Lviv plans to set aside 10 beds in a general hospital and potentially a limited number in a general (non-TB) children's sanatorium for school-aged children undergoing chemoprophylaxis because they are close contacts of a recently-diagnosed TB patient and require observation or do not have suitable living conditions at home.

Lviv has an agreement with the oblast administration to reallocate all money saved from TB system optimization to other TB work. As of spring 2018, the oblast planned to use 2 million UAH of saved funds for purchase of drugs and supplies, and 6-7 million for improving the facilities and equipment in the remaining TB facilities.

5. LESSONS LEARNED AND RECOMMENDATIONS

5.1 Lessons Learned

As far as we know, HFG's experience in Ukraine was unique, in that in no other countries have strategic purchasing approaches been developed and implemented specifically for a TB hospital system several years before introduction of a new provider payment system. This process allowed significant tailoring and review of the systems, use of the data for decision-making, and time to prepare for introduction of the new hospital payment system. The process yielded some significant lessons learned, as outlined below.

- **Strategic purchasing instruments can influence the behavior of providers and increase the effectiveness of the TB system even before new payment systems are introduced.** Hospitals and health departments started making changes to make the TB system more efficient and effective once they saw the data on inefficiencies, and opportunities to improve care. New provider payment mechanisms can stimulate further improvements in TB care, but even data alone—when presented well and to the right people—can be a powerful catalyst for change.
- **Buy-in and understanding are necessary for cost accounting to work**. Cost accounting implementation at the hospital level highlighted the need for ongoing training and remote support as facility-level finance specialists and statisticians undertake the cost accounting process; this support is critical to ensure that the facility staff understand both the technical steps and the objectives and importance of the exercise.
- **Reliable and evidence-based analytical information can help reduce resistance to reforms in the TB sector on the part of politicians and the medical community**. Reforms that involve restructuring and optimization are very politically sensitive. Data from the hospital monitoring system empowered TB decision-makers with the evidence to convince the public, the media, and relevant government agencies of the need for restructuring and optimization.
- **Generating political will requires significant time and effort**. Substantial advocacy and negotiation with a number of different stakeholders is required in order to build understanding and ensure strategic purchasing gets the green light from relevant government agencies to move forward. HFG's work in Ukraine underlined the importance of spending time to engage a wide array of key stakeholders at the national level—in this case, the health, finance, and economics ministries, along with key hospital managers—in substantive policy dialogue to ensure common understanding of and communication on key aspects of the process. Identifying champions at each level can help with implementation of new approaches.
- **Making data meaningful for stakeholders can drive improvements in data quality.** Historically, facilities collected data as a pro forma exercise, and data was generally considered to be of poor quality. Implementation experience in Ukraine demonstrated that when a feedback loop is in place and health care facilities have access to valuable analysis based on the data they collect and submit, data quality improves significantly.
- **Visualization of data helps users understand and evaluate the data**. TB decision-makers were very excited when they saw the dashboards with graphs reflecting the data analytics. People who before might have been afraid to delve into the numbers, or thought they were too busy to get

into the nitty gritty of the data, understood and were eager to use the data presented through the graphic dashboards, and those who were "numbers people" realized immediately how powerful these new data analytics could be.

- **National clinical protocols and terms are interpreted differently across oblasts, complicating data interpretation or comparison of data across oblasts.** Some oblasts interpreted the clinical protocol to require a minimum hospitalization period of 60 days for any hospitalized TB patient, while others felt the protocol allowed for discharge at two weeks. Similar differences in interpretation or terminology affected whether a patient was recorded as "bacteriologically confirmed." Understanding these differences was important for HFG and for national stakeholders when trying to compare data analytics across oblasts.
- **Institutionalization is critical for sustainability.** The strategic purchasing work in Ukraine was deeply institutionalized, with systems and tools "handed over" to partners for piloting early in implementation. Partners have played an integral role in providing feedback to allow adaptation and adjustment of tools and approaches based on implementation realities and user needs.

5.2 Recommendations

The TB strategic purchasing tools and approaches are institutionalized in the pilot regions. Health departments report that they intend to continue to use the systems introduced by HFG, citing them as excellent management tools. At the national level, building blocks and implementation steps are in place for the new case-based payment system to be introduced for the TB hospital system, as well as for the broader general hospital network.

However, Ukraine will continue to need support as it moves forward with strategic purchasing and continued streamlining of the TB system. Transitioning to strategic purchasing will require that a new output-based payment system for TB hospitals be introduced.

The strategic purchasing systems introduced at the hospital and regional levels have been institutionalized and adapted, and expanded to meet the needs of general hospitals and the NHSU at the national level. However, regional, national, and international stakeholders need to provide continued support for the national rollout of the systems to the country's remaining regions, and the introduction of the new case-based payment for hospitals. It is imperative that partners work together on further development and institutionalization of national policies for moving toward strategic purchasing. It is particularly important to sufficiently solidify the plans quickly so that any change in government following the 2019 presidential and parliamentary elections will not push the country off of its current trajectory toward strategic purchasing. Taking the reforms process to the next level requires that regional health departments and the NHSU receive continued technical support.

Specific recommendations are outlined below:

- **Tuberculosis experts and health financing experts need to sit at the same table.** Worldwide, TB experts and health financing experts often move in separate circles, both on the government side and in donor agencies and donor-funded projects. In many cases, this means that provider payment schemes are designed without regard for the objectives of the country's national TB program. It is imperative in Ukraine that donor TB projects, donor health financing or health systems projects, the MOH of Health National Center for Public Health, and the NHSU continue to work together as strategic purchasing is rolled out countrywide. As Oblast Health Departments think about restructuring TB care in their regions, they will need to engage with the NHSU to ensure, as much as possible, that payment incentives align with desired service delivery changes.

- **Hospital managers would benefit from using additional clinical indicators together with data from the Hospital Performance Monitoring System.** Clinical data available at the time of patient admission is used for making initial placement decisions (hospital vs. outpatient treatment; ward and room selection for infection control, if hospitalized), choosing an appropriate drug regimen, and scheduling the timing of follow-up testing. As the monitoring system is based on data available at the time of discharge, it does not necessarily reflect the clinical picture on which decisions were made at the time of hospital admission (e.g., a patient might have had negative sputum microscopy and negative molecular-based testing at admission, but be later classified as "bacteriologically confirmed" based on culture results that were returned weeks after admission). Helpful indicators might include: 1) percentage of patients who have results of rapid molecular-based testing at the time of admission; 2) percentage of patients who are rifampin-resistant at time of admission based on results of rapid molecular-based testing; 3) percentage of patients with drug-sensitive pulmonary TB (PTB) based on results of rapid molecular testing at time of admission who are discharged within two weeks; 4) ALOS of patients with drug-sensitive PTB based on results of rapid molecular testing at time of admission; 5) percentage of patients with clinically diagnosed PTB at time of admission; and 6) ALOS of patients with clinical diagnosed TB status at the time of admission.
- **Strategic purchasing for TB hospital care should consider payment per hospital admission (case-based payment).** The NHSU could consider integrating into the national hospital case-based payment system (to be piloted in the country beginning in 2019, and rolled out in 2020) the classifications for TB groups developed by HFG and using cost accounting results for the group relative weights. To form TB groups for payment, HFG proposes using the following classification criteria: main ICD-10 diagnoses; localization of TB, diagnostic method; drug sensitivity category; selected co-morbidities; age; statistical representativeness (number of cases in each clinical group); and cost difference. Further steps are needed to define hospitalization criteria and recommended ALOS for the specific groups that account for a significant number of TB admissions such as TB/HIV coinfection and miliary TB, as well as policy adjustments to the group weights to ensure financial incentives that are appropriate and consistent with policy and desired service delivery improvements.
- **Strategic purchasing should specifically promote improved TB care on the PHC level.** While the scope of HFG's work in Ukraine was limited to the TB hospital level, improved outpatient care for TB is essential to improved TB outcomes. This is especially true as hospital optimization and improved adherence to WHO recommendations will increase the role of PHC in TB service delivery in the country.
- **The NHSU might want to consider specifically purchasing case detection; rapid detection of drug resistance; and treatment success.** As Ukraine ramps up strategic purchasing, HFG recommends that TB stakeholders study the issues below and consider engaging in policy dialogue with the NHSU and other relevant partners and contributing to development of appropriate indicators and payment mechanisms across the TB continuum of care. This is especially important as high case detection and treatment success rates have long been recognized as key to controlling TB epidemics. In countries with a high MDR burden, widespread implementation of rapid molecular-based testing as part of the initial diagnostic approach is also now recognized as essential.
    - **Consider purchasing case detection.** To avoid over-diagnosis of TB, only bacteriologically confirmed cases should be included (based on positive sputum microscopy, rapid molecular-based testing, or culture). The per-case payment should be large enough to motivate enhanced vigilance and testing of patients who present with symptoms of TB, and active case finding among high-risk populations, but does not need to compensate PHC

providers for additional work. Work flow should be considered (who orders which test and who is involved in sputum collection) when determining who should be paid.

- **Consider purchasing rapid detection of drug resistance.** As mentioned above, the WHO now recommends incorporation of GeneXpert-mycobacterium TB/rifampicin resistance (MTB/RIF) testing into initial diagnostic algorithms in countries with a high MDR burden, such as Ukraine. Full outpatient treatment of patients with drug-sensitive TB who are not severely ill should be the default clinic path. This necessitates the exclusion of MDR TB through rapid molecular testing *prior to making a decision about hospitalization*. Starting an MDR treatment regimen in cases identified as rifampicin-resistant through rapid molecular testing while waiting for culture confirmation is an accompanying WHO recommendation to maximize treatment efficacy and reduce the risk of disease transmission, in hospital or out. Because this is a new clinical path requiring behavior change, targeting completion of such testing with a bonus payment could lead to more-rapid implementation. It is important to avoid unintentionally motivating excessive testing with GeneXpert MTB/RIF, which costs about $10 per cartridge. Accordingly, one option would be to pay for only notified TB cases that were tested with GeneXpert MTB/RIF as part of the initial diagnostic evaluation. Another option would be to implement a bonus payment for all bacteriologically confirmed cases (as recommended above) but pay a higher amount if the initial evaluation included rapid molecular-based testing.
- **Consider purchasing treatment success**. The additional work done by both PHC and hospital providers to supervise treatment of TB patients is significant, and provider motivation is likely to affect the quality of delivered care. Shifting to full outpatient treatment will increase the duration of outpatient Directly Observed Treatment by 50 percent for DS cases (from four to six months) and much longer for treatment of MDR TB. To improve treatment success rates, consider paying providers for management of cases resulting in desired treatment outcomes (cured or completed treatment). The compensation should be in proportion to the additional burden of work: a base amount (x) for successfully treated TB cases where the intensive phase was completed in the hospital; a larger amount (e.g., 1.25x) if a portion of the intensive phase of treatment was also managed at the outpatient level; a larger amount still (e.g., 1.5x) for drug-sensitive cases managed without hospitalization to start the intensive phase; and the largest amount for management of MDR cases (e.g., 4x, with the amount adjusted downward for each month the patient spent in the hospital). Again, workflow should be considered when deciding how to distribute bonus payments between providers (PHC physicians, nurses, and TB physicians), the Kyrgyz Republic is the first FSU country with experience implementing this type of system, and should be studied before implementing such a system in Ukraine.

- **TB hospital managers should periodically review data and coordinate strategic planning with providers responsible for overseeing TB case detection at the PHC level.** For optimization of TB treatment success and minimization of nosocomial transmission of drug resistant TB, TB patients referred for hospital admission should arrive with results of rapid-molecular testing. A national effort directed at early (outpatient) molecular-based testing will be an essential part of scaling up full outpatient treatment of TB.
- **Donors should present a united front and support next steps in strategic purchasing.** While there are many different and valid approaches to cost accounting and many types of software that could be used to create a hospital monitoring system, donors should respect the work that has been done to date and the decisions that Ukraine has made regarding strategic purchasing instruments and approaches, and help the country move forward on the current trajectory.

ANNEX A: FORM 066/o

ЗАТВЕРДЖЕНО
Наказ Міністерства охорони здоров'я України
14.02.2012 № 110
(у редакції наказу Міністерства охорони здоров'я України
21.01.2016 № 29)

Найменування міністерства, іншого органу виконавчої влади, підприємства, установи, організації, до сфери управління якого (якої) належить заклад охорони здоров'я	**МЕДИЧНА ДОКУМЕНТАЦІЯ**
Найменування та місцезнаходження (повна поштова адреса) закладу охорони здоров'я, де заповнюється форма	Форма первинної облікової документації **№ 066/о** **ЗАТВЕРДЖЕНО** Наказ МОЗ України
Код за ЄДРПОУ	№

КАРТА ПАЦІЄНТА, ЯКИЙ ВИБУВ ІЗ СТАЦІОНАРУ, № _____

Номер відповідної форми стаціонарного хворого (003/о, 003-1/о, 096/о, 097/о (підкреслити)) _____

1. Дата госпіталізації (число, місяць, рік) (година) (хвилини)

2. Прізвище, ім'я, по батькові пацієнта _____

3. Стать: чоловіча – 1; жіноча – 2 4. Дата народження (число, місяць, рік) 5. Вік _____ (кількість повних років) 6. Громадянство _____ (код країни)

7. Документ, що посвідчує особу 7.1. Номер документа, що посвідчує особу

8. Постійне місце проживання/перебування: місто – 1; село – 2 _____ (область, район, населений пункт, вулиця, будинок, квартира)

9. Поштовий індекс _____

10. Місце роботи, посада _____ (для дітей, учнів, студентів – найменування навчального закладу)

11. Ким направлений пацієнт _____ (найменування та код закладу охорони здоров'я) (код за ЄДРПОУ)

12. Діагноз при госпіталізації _____ (код за МКХ-10)

13. Відділення госпіталізації (код) _____ (профіль ліжок) 14. Відділення виписки (код) _____ (профіль ліжок)

15. Госпіталізація: ургентна – 1; планова – 2

16. Строк госпіталізації (до 6 годин – 1; 7 – 24 години – 2; більше 24 годин – 3)

17. Госпіталізація з приводу цього захворювання в цьому році: вперше – 1; повторно – 2

17.1. Повторна госпіталізація з приводу цього захворювання до 30 днів: так – 1; ні – 2

18. Результат лікування:
виписаний(а) з одужанням – 1; поліпшенням – 2; погіршенням – 3; без змін – 4; помер(ла) – 5; переведений(а) до іншого закладу охорони здоров'я – 6; здоровий(а) –7

19. Дата виписки/смерті (число, місяць, рік) (година) 20. Проведено ліжко-днів _____

21. Діагноз заключний клінічний (у випадку травми – вказати її вид: виробнича – 1; невиробнича – 2)

Назва діагнозу		Код за МКХ-10
Основний		

Додаткові діагнози: ускладнення основного діагнозу – 1; супутнє захворювання – 2 ☐

21.1. Категорія резистентності: відсутня –1; чутливий ТБ – 2; монорезистентний ТБ – 3; полірезистентний ТБ – 4; мультирезистентний ТБ – 5; туберкульоз із розширеною резистентністю – 6 ☐

22. У випадку смерті хворого:

22.1. Патологоанатомічний діагноз

Основний	Код за МКХ-10	Ускладнення основного діагнозу	Супутні захворювання

22.2. Із пункту 11 лікарського свідоцтва про смерть № _____

Код за МКХ-10:

☐ I. а) _____ (безпосередня причина смерті)

☐ б) _____

☐ в) _____

☐ г) _____

приблизний час між початком захворювання і смертю

(б, в, г – захворювання та патологічні стани, що зумовили безпосередню причину смерті; основна причина смерті зазначається в останньому заповненому рядку)

II. Інші суттєві стани (конкуруючі, поєднані, фонові (підкреслити)), які сприяли смерті, але не пов'язані із захворюванням чи його ускладненням, яке безпосередньо є причиною смерті:

_____

У разі смерті жінок під час вагітності або після пологів у період до одного року зазначити тиждень вагітності _____, день післяпологового періоду _____, тиждень після пологів

23. Медичні процедури та хірургічні операції

Дата (число, місяць, рік)	Час (години, хвилини)	Код процедури/ хірургічної операції	Назва процедури/ хірургічної операції	Спеціаліст (прізвище, ім'я, по батькові, реєстраційний номер)	Вид анестезії*	Анестезіолог (прізвище, ім'я, по батькові, реєстраційний номер)	Ускладнення (код за МКХ-10)

24. Обстеження на RW ☐☐☐☐☐☐ (число, місяць, рік) 25. Онкологічний профілактичний медичний огляд ☐☐☐☐☐☐ (число, місяць, рік)

26. Обстеження на ВІЛ-інфекцію ☐☐☐☐☐☐ (число, місяць, рік) 27. Обстеження органів грудної порожнини ☐☐☐☐☐☐ (число, місяць, рік)

28. Інвалід війни – 1; учасник війни – 2; учасник бойових дій – 3; особа, яка постраждала внаслідок Чорнобильської катастрофи – 4; інша пільгова категорія _____ (вказати яка) – 5 ☐

(категорія _____; посвідчення: серія _____ № _____)

Лікуючий лікар _____ (прізвище, ім'я, по батькові, підпис) ☐☐☐☐☐☐☐☐☐☐ (реєстраційний номер)

Дата «_____» _____ 20____ **року**

*Анестезія: відсутня – 1; місцева – 2; загальна – 3; інша – 4.

{Форма в редакції Наказу Міністерства охорони здоров'я № 29 від 21.01.2016}

ANNEX B: BIBLIOGRAPHY

Cashin, Cheryl, Rena Eichler and Lauren Hartel, Unleashing the Potential of Strategic Purchasing (HFG Series: Advances in Health Finance & Governance), Health Finance and Governance Project, 2018. Available at: https://www.hfgproject.org/unleashing-potential-strategic-purchasing/.

Joint Learning Network for Universal Health Coverage, Results for Development (R4D), PATH, PharmAccess Foundation Using Data Analytics to Monitor Health Provider Payment Systems: A Toolkit for Countries Working Toward Universal Health Coverage, 2017, Available at: https://path.azureedge.net/media/documents/DHS_jln_full_toolkit.pdf.

Özaltın, Annette and Cheryl Cashin, eds. Costing of Health Services for Provider Payment: A Practical Manual Based on Country Costing Challenges, Trade-offs, and Solutions. Joint Learning Network for Universal Health Coverage, 2014. Available at: http://www.jointlearningnetwork.org/uploads/files/resources/JLN_Costing_Toolkit_Interactive_FINAL.pdf.

Public Health Center of the MOH of Ukraine. Tuberculosis in Ukraine. Analytical and Statistical Reference Book, 2017.

Stop TB Partnership. High Burden Countries, 2018. Available at: http://stoptb.org/countries/tbdata.asp. Accessed on 28 August 2018.

World Bank. Ukraine Public Finance Review (English). Washington, D.C.: World Bank Group, 2017. http://documents.worldbank.org/curated/en/476521500449393161/Ukraine-Public-finance-review Accessed on 23 May 2018.

World Bank. World Bank in Ukraine: Overview. https://www.worldbank.org/en/country/ukraine/overview, Accessed on 28 August 2018.

World Health Organization. Ukraine Tuberculosis Profile, 2018. Available at: https://extranet.who.int/sree/Reports?op=Replet&name=%2FWHO_HQ_Reports%2FG2%2FPROD%2FEXT%2FTBCountryProfile&ISO2=BR&LAN=EN&outtype=html. Accessed on 28 August 2018.

BOLD THINKERS DRIVING
REAL-WORLD IMPACT