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THE RISING COST OF HIV CASE FINDING IN CONCENTRATED EPIDEMICS

A Cost-Efficiency Analysis for the Kyrgyz Republic

USAID FROM THE AMERICAN PEOPLE

PEPFAR

HP+ HEALTH POLICY PLUS

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Health Policy Plus (HP+) is a five-year cooperative agreement funded by the U.S. Agency for International Development (USAID) under Agreement No. AID-OAA-A-15-00051, beginning August 28, 2015. The project's HIV activities are supported by the U.S. President's Emergency Plan for AIDS Relief. HP+ is implemented by Palladium, in collaboration with Avenir Health, Futures Group Global Outreach, Plan International USA, Population Reference Bureau, RTI International, ThinkWell, and the White Ribbon Alliance for Safe Motherhood.

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Abbreviations

APN	assisted partner notification
CM	community mapping
HIV	human immunodeficiency virus
HP+	Health Policy Plus
HTC	HIV testing and counseling
NGO	nongovernmental organization
PDO	peer-driven outreach
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
UNAIDS	Joint United Nations Programme for HIV/AIDS
UNDP	United Nations Development Programme
USAID	U.S. Agency for International Development

Executive Summary

With growth in the HIV epidemic in Central Asia over the past decade, identification of people living with HIV remains a challenge. In the Kyrgyz Republic, only 66 percent of estimated adult people living with HIV have been officially diagnosed and an estimated 72 percent of people living with HIV who inject drugs are officially diagnosed. Several models have been used for HIV case-finding and harm-reduction efforts for people who inject drugs in the Kyrgyz Republic. The United Nations Development Programme (UNDP), with funding from the Global Fund to Fight AIDS, Tuberculosis, and Malaria, conducts prevention outreach with nongovernmental organizations (NGOs) and clinics working primarily with stable groups of key populations over time who receive harm-reduction interventions, such as needle and syringe exchange programs, condoms, and linkage to other services, including HIV testing. U.S. Agency for International Development (USAID)/Central Asia has used the peer-driven outreach (PDO) model and the community-mapping model for case finding, implemented by PSI, to reach people living with HIV in networks of people who inject drugs. Assisted partner notification has also been used for case finding among sexual partners of people living with HIV who inject drugs and other people living with HIV. However, there are limited data available on the costs of using these methods to identify people living with HIV who inject drugs in the Kyrgyz Republic, which are needed to understand future resource needs to scale up these interventions.

Given the lack of evidence available on the costs associated with the PDO case-finding and community-mapping approaches, the USAID-funded Health Policy Plus (HP+) project conducted a cost-efficiency analysis in the Kyrgyz Republic, where these models are being implemented side-by-side in the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) priority provinces of Bishkek City, Osh City, Osh Oblast, and Chui Oblast. The objectives of this analysis were to: (1) conduct a costing analysis of the PSI HIV case-finding models and UNDP HIV prevention outreach approach to understand baseline or current costs, (2) determine the projected costs of operating PSI HIV case-finding models in Year 4 through Year 5 of the Flagship Project, and (3) determine the projected costs of scaling up PSI HIV case-finding models throughout the Kyrgyz Republic.

HP+ collected data on financial costs at the PSI country office (above-site) level and at the NGO level. The amount of staff time spent on each case-finding intervention was identified as a driver of differences in costs among the PDO, community-mapping, and assisted partner notification (APN) interventions during in-country interviews with PSI country office and NGO-level staff. HP+ calculated PSI country office staff costs, NGO-level staff and consultant costs, rent and other recurrent costs, program costs, and depreciation costs for each case finding intervention. A cost efficiency analysis was conducted to understand the cost per person identified as living with HIV and a scale-up analysis was conducted to understand the costs of scaling up the PDO and community mapping in PEPFAR priority provinces and the remainder of the Kyrgyz Republic.

Current annual case-finding costs in the Kyrgyz Republic totaled US$628,389, or an estimated 60 percent of the Flagship Project's total annual budget. PSI country office above-site costs comprised 46.8 percent of total case-finding costs. Staff costs at the NGO level also contributed a significant cost of US$176,079.

In Year 3, Quarter 1, the average cost per person identified across all models was US$1,851, with costs highest through the PDO intervention (US$3,037) and lowest through community mapping (US$1,283). The average cost per person identified through APN was US$1,874. Cost per person identified was much lower in Year 3, Quarter 1 compared to Year 2; differences in

costs may be due to changes in case-finding intervention implementation. In Year 3, PSI started to integrate PDO and community mapping as one approach, with the latter used to identify new seeds for PDO, rather than exclusively for case finding. The decreased intensity of effort and time needed for community mapping due to this shift may explain the decreased costs for case finding through the community-mapping intervention in Year 3, Quarter 1. By contrast, in Year 3, Quarter 1, the average cost per person identified increased from US$2,561 to US$3,037, mainly due to the low number (15) of cases identified through PDO during this period.

Results from the scale-up analysis indicate that as HIV testing yields decrease from 2.26 percent in 2017 to 0.67 percent by 2021, the cost per person who injects drugs identified as living with HIV is projected to increase from its current US$2,770 per person in 2017 to US$6,961 by 2020. Scale-up of the PDO and community-mapping interventions in the remainder of the Kyrgyz Republic would require between US$968,130 and US$2.3 million to reach the first Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 target—90 percent of all people living with HIV knowing their HIV status—for people who inject drugs.

These findings show that the PDO and community-mapping models are complementary methods to identify people who inject drugs within both known and hidden networks and offer them HIV testing and treatment services. The APN model adds further efficiencies by introducing an algorithm to locate the sexual partners of people living with HIV identified through PDO and community-mapping interventions. Further analysis is needed to explore the costs of scaling up the APN case-finding intervention and case-finding interventions for other populations to identify and offer treatment to the remaining undiagnosed people living with HIV in the Kyrgyz Republic. More research is needed to understand how PDO, community-mapping, and APN costs vary across different country contexts and key populations.

This report also provides information on how case-finding costs are projected to increase in the Kyrgyz Republic as more people living with HIV are diagnosed. As the pool of undiagnosed people living with HIV decreases in the Kyrgyz Republic, the cost per person identified will increase significantly over time and require increased domestic resource mobilization to reach the first UNAIDS 90 percent target. In addition, as the number of individuals on antiretroviral therapy increases, case management costs also will increase, which may result in reduced available resources for case finding initiatives. The results of this cost-efficiency analysis provides valuable information for the Government of the Kyrgyz Republic in making decisions on allocation of resources for its response and priority setting, particularly in light of the full HIV care and treatment cascade.

Introduction

In the Kyrgyz Republic, HIV prevalence is significantly higher among people who inject drugs (12.4 percent) compared to the general population (0.13 percent) (UNAIDS, 2018). HIV cases resulting from sexual transmission are also increasing in Central Asia, particularly among women who contract HIV from their male sex partners who inject drugs. The majority of all reported people living with HIV reside in Bishkek City, Chui Oblast, Osh Oblast, and Osh City (PEPFAR, 2017). Identification of people living with HIV remains a challenge in the Kyrgyz Republic, with only 66 percent of estimated adult people living with HIV and 72 percent of people living with HIV who inject drugs officially diagnosed (PEPFAR, 2017).

Several models have been used for HIV case-finding and harm-reduction efforts for people who inject drugs in the Kyrgyz Republic. The United Nations Development Programme (UNDP), with funding from the Global Fund to Fight AIDS, Tuberculosis, and Malaria, conducts prevention outreach with nongovernmental organizations (NGOs) and clinics working primarily with stable groups of key populations who receive harm-reduction interventions, such as needle and syringe exchange programs, condoms, and linkage to other services, including HIV testing. The U.S. Agency for International Development (USAID)/Central Asia has used the peer-driven outreach (PDO) for case finding and the community-mapping case-finding model, implemented by PSI, to reach people living with HIV in networks of people who inject drugs. PSI also developed an algorithm for HIV case finding among sexual partners of people who inject drugs, known as assisted partner notification (APN). The Government of the Kyrgyz Republic relies on PSI's case-finding initiatives to achieve epidemic control goals because it does not currently operate HIV case finding programs.

Peer-Driven Outreach Model for HIV Case Finding

Peer-driven interventions have been used for more than two decades for HIV prevention, harm reduction, and education efforts for key populations in multiple settings, including Europe, Central Asia, sub-Saharan Africa, and the United States (Broadhead et al., 1998; Sergeyev et al., 1999; Geibel et al., 2012; Matiyash et al., 2012; Stengel et al., 2018). Through PDO interventions, peers educate other participants on core messages, such as HIV prevention, and participants are then invited to, in turn, become peers to educate others (Gwadz et al., 2015). Because peer-driven interventions involve peer-to-peer contact, the relationships provide a basis for respondent-driven sampling, a network-based method for recruiting other peers through a technique similar to snowball sampling (Gwadz et al., 2015). More recently, PDO models have been used as network-based methods to recruit and test hidden populations at risk of HIV, by seeking out and testing individuals through other populations at higher risk of HIV infection.

Despite the use of PDO models to educate clients on HIV prevention and recruit clients for HIV testing, few studies have been conducted on the costs or cost-effectiveness of such interventions for HIV case finding. What data are available also indicate significant variation in costs. One study using respondent-driven sampling interventions in India found that the unit cost of identifying one unaware individual living with HIV ranged from $51[1] to $2,072 across 15 sites and among people who inject drugs from $189 to $5,637 across 12 sites among men who have sex with men (Solomon et al., 2017). Other literature has indicated that a better understanding of costs and impact is needed (Macdonald et al., 2017).

[1] All currency presented in U.S. dollars.

PSI began implementing the PDO case-finding model in Year 1 (December 4, 2015–September 30, 2016) of its HIV Flagship Project. This model employs people who inject drugs as "seeds" who are living with and living without HIV and are considered at high risk of HIV infection. These seeds use a coupon and incentive system to refer their networks of injecting and sexual partners for HIV testing. Each recruit receives an incentive (mobile phone credits) for completing an HIV test and learning their result, plus additional mobile credits if their sexual and injecting partners receive an HIV test.

Using the project's monitoring and evaluation tools, country program staff continuously monitor and adapt the PDO strategies used to maximize HIV testing yield. For example, in Year 1, the Flagship Project allowed for unlimited recruitment waves and used seeds living with and living without HIV. Beginning in Year 2 of the Flagship Project, PSI adapted the PDO approach to increase yield: recruitment occurred exclusively through seeds living with HIV and was limited to clients with the highest risk by restricting the provision of coupons to recruits after the second wave of HIV-negative test results. In its current (third) year, the project employs a combination of approaches used in Years 1 and 2: both people living with and living without HIV are recruited, though recruitment usually stops after the second wave of HIV-negative results.

Community Mapping Model for HIV Case Finding

Community mapping models and active case-finding interventions have been primarily used in sub-Saharan Africa and Asia to reduce tuberculosis and HIV transmission (Shapiro et al., 2012). However, the cost-effectiveness of community mapping for HIV case finding remains unexamined in the literature. The limited literature on the cost-effectiveness of community-mapping strategies for tuberculosis control indicates mixed results. One study found that such models can be a highly cost-effective tool, with costs ranging from $1,200 per case actively detected and started on treatment in India, $3,800 per case in China, and $9,400 per case in South Africa (Azman et al., 2014). Another study in urban Uganda found that introducing household contact investigations alongside traditional case-finding strategies was more cost-effective ($444 per additional tuberculosis case detected) than using community mapping with traditional case-finding initiatives ($1,493 per additional tuberculosis case detected) (Sekandi et al., 2015).

In order to meet HIV case-finding targets in Year 2, PSI also introduced the community-mapping model as a method to locate harder-to-reach networks of people who inject drugs and to ensure they are offered HIV testing. The community-mapping model uses peer navigators to implement a structured community-mapping approach to continuously source new networks of people who inject drugs through a carefully planned cycle. This intervention is more demanding of NGO-level staff's time, particularly the peer navigators. Peer navigators are responsible for identifying new sites where clients gather, intensifying outreach services to those sites, and prioritizing their outreach to neighborhoods in which higher rates of undiagnosed HIV cases are found. The benefit of this approach is that it allows for an extension of HIV case detection into networks of people—including the hardest-to-reach people who inject drugs and their sexual partners—who may normally remain out of contact with HIV project workers under the prevention outreach approach.

Assisted Partner Notification

The World Health Organization has endorsed APN as an important public health approach for infectious disease management of sexually transmitted infections and tuberculosis (WHO, 2016). APN has been shown to improve HIV test uptake and diagnosis of partners living with

HIV, particularly when compared to passive referral methods. The World Health Organization recommended its inclusion as part of a comprehensive package of HIV testing and care services (Dalal et al., 2017). Despite this recommendation, partner testing services, such as partner notification, have not been actively prioritized or implemented in many countries.

The cost-effectiveness of APN interventions has been examined in sub-Saharan Africa. One study in Malawi indicated that APN was the most cost-effective method of identifying spouses living with HIV—specifically in settings with low HIV status awareness and HIV prevalence greater than 10 percent—compared to door-to-door provider-initiated testing and voluntary counseling and testing (Armbruster et al., 2011). Another study in Malawi found that provider-initiated partner notification for HIV was a reasonably cost-effective approach to identify new HIV cases and link patients to care earlier (Rutstein et al., 2014). More research is needed to understand whether APN is an appropriate strategy for identifying sexual partners in the Central Asian context.

PSI has been conducting HIV partner testing by assisting newly identified people living with HIV within PSI's case management program with partner disclosure and HIV testing services. In Year 3, PSI introduced the APN algorithm as a formalized process to support people living with HIV partner testing. Under APN, once a person living with HIV is identified by Flagship Project staff or is referred by the Republican AIDS Center, project staff inquire whether they have had a sexual partner in the past 12 months. If the client had one or more sexual partners during this period, they are asked to provide the names of those individuals and to agree to one of the following three options:

1. Dual engagement: PSI's peer navigators support the person living with HIV in disclosing their HIV status to sexual partners and motivate them to get tested.
2. Provider referral: the person living with HIV voluntarily provides a list of their sexual partners to PSI's peer navigator and gives the peer navigator permission to directly and confidentially contact the individuals on the list and invite them for testing.
3. Contract referral: the person living with HIV signs an agreement with PSI's peer navigator that they will disclose their HIV status to sexual partners within an agreed-upon period of time. After this period, if disclosure and referral do not occur, the peer navigator may contact the sexual partner directly to offer voluntary HIV testing without disclosing the status of the person living with HIV.

Purpose of Study

Given the lack of evidence available on the costs associated with the PDO case-finding and community-mapping approaches, the Health Policy Plus (HP+) project, funded by the U.S. Agency for International Development (USAID) and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), conducted a cost-efficiency analysis in the Kyrgyz Republic, where these models are being implemented side-by-side in the PEPFAR priority subnational units of Bishkek City, Osh City, Osh Oblast, and Chui Oblast. The objectives of this analysis were to:

- Conduct a costing analysis of the PSI HIV case-finding models and UNDP HIV prevention outreach approach to understand baseline or current costs in the Kyrgyz Republic
- Determine the projected costs of operating PSI HIV case-finding models in Year 4 through Year 5 of the Flagship Project in the Kyrgyz Republic
- Determine the projected costs of scaling up PSI HIV case-finding models throughout the Kyrgyz Republic

Methodology

PSI Data Collection

Types of Data and Sources

HP+ collected data on financial costs at the PSI country office (above-site) and NGO levels (see Figure 1). Above-site costs included staff salaries and fringe costs, program costs incurred at the above-site level (e.g., external quality-control costs), PSI office rent and recurrent costs (e.g., communications and equipment maintenance costs), and fixed-asset depreciation costs, or the estimated use value of the good per year. HP+ also examined site-level costs from each PSI-contracted NGO for Year 2 of the Flagship Project. These costs included NGO-level staff salaries and fringe costs, program costs incurred at the site level (e.g., refresher trainings and HIV testing costs), rent and recurrent costs, transportation costs, and fixed-asset depreciation costs.

Figure 1. Above-Site and Site-Level Costs Examined

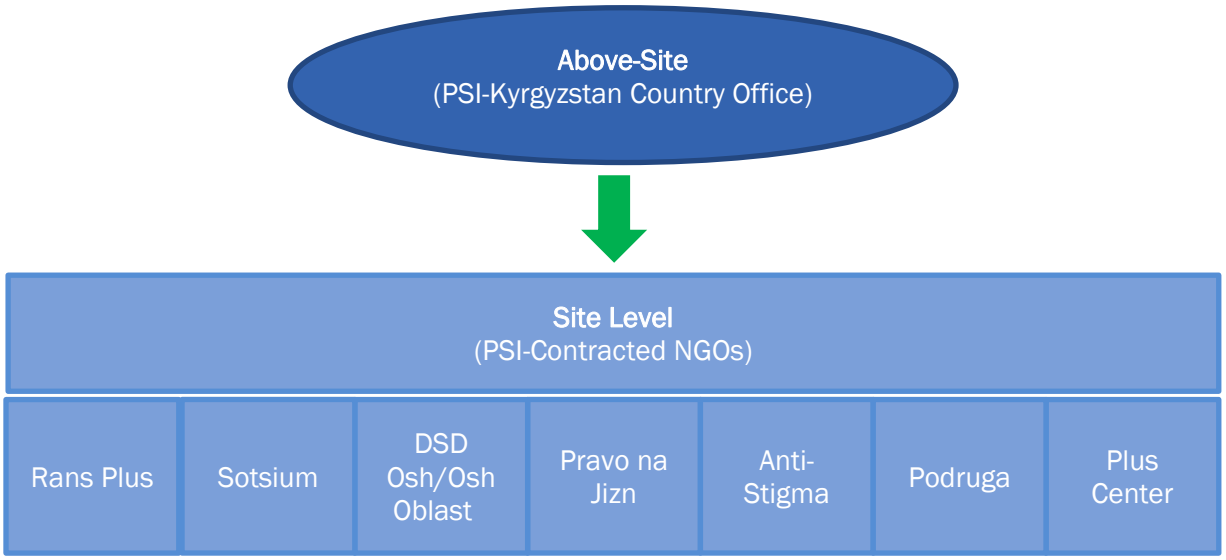


Table 1 lists the detailed cost categories, types of costs, and time periods examined. HP+ also collected programmatic data on testing targets and the number of people tested at each PSI-contracted NGO as well as HIV case-finding targets and the number of people living with HIV at each NGO.

Table 1. Types of Costs Analyzed

Cost Category	Types of Costs	Time Periods Examined
Human resources	Above-site staff salaries and fringe costs (medical insurance costs, social insurance contributions, and income taxes); PSI-contracted NGO-level staff salaries and fringe costs	Flagship Year 2 (Oct 1, 2016–Sept 30, 2017) Flagship Year 3, Quarter 1 (Oct 1, 2017–Dec 31, 2017)
Program costs	Commodities (HIV testing kits, other medical supplies), trainings (orientations on interventions and refresher trainings), transportation costs, consultant services (HIV testing and counseling consultants and psychologists), external quality control costs	Flagship Year 2 (Oct 1, 2016–Sept 30, 2017) Flagship Year 3, Quarter 1 (Oct 1, 2017–Dec 31, 2017)
Fixed-asset depreciation costs	Software, computers, furniture, vehicles, non-computer office equipment	Entire Flagship Project to date
Recurrent non-program costs	Above-site and NGO-level costs, including office rent and maintenance, utilities, equipment maintenance, office supplies, communication expenses, security costs, bank fees, and other non-program transportation costs	Flagship Year 2 (Oct 1, 2016–Sept 30, 2017) Flagship Year 3, Quarter 1 (Oct 1, 2017–Dec 31, 2017)

Estimation of Staff Level of Effort on Case Finding

PSI Country Office Level of Effort

Through in-country interviews with PSI country office and NGO-level staff, HP+ identified the amount of staff time spent on each case-finding intervention as a driver of differences in costs among the PDO, community-mapping, and APN interventions. To estimate time spent by PSI country office staff on each case-finding intervention, HP+ developed a questionnaire and conducted one-on-one interviews with each PSI country office staff member. The main goals of the Flagship Project were to find cases of undiagnosed HIV and manage client antiretroviral therapy initiation and adherence. As such, HP+ assumed that all PSI staff time was related to either case finding or case management.

From each PSI staff member, data were collected on the percentage of work time spent on activities such as meetings, NGO-level field work and communication, management, and technical work. During the interviews, HP+ delineated the proportion of time spent on case finding versus case management for each PSI staff member's listed activities. Lastly, HP+ collected data from each PSI staff member on what proportion of time spent on case finding was specifically for PDO, community-mapping, and APN activities. This approach allowed for separation of case-finding costs from case management and provided specific quantification of each case-finding intervention's cost.

NGO-level Staff Level of Effort

To estimate the proportion of time spent by PSI-contracted NGO staff on each case-finding intervention, HP+ conducted visits to two rural and two urban sites in the Kyrgyz Republic and interviewed each available staff member in the following NGOs:

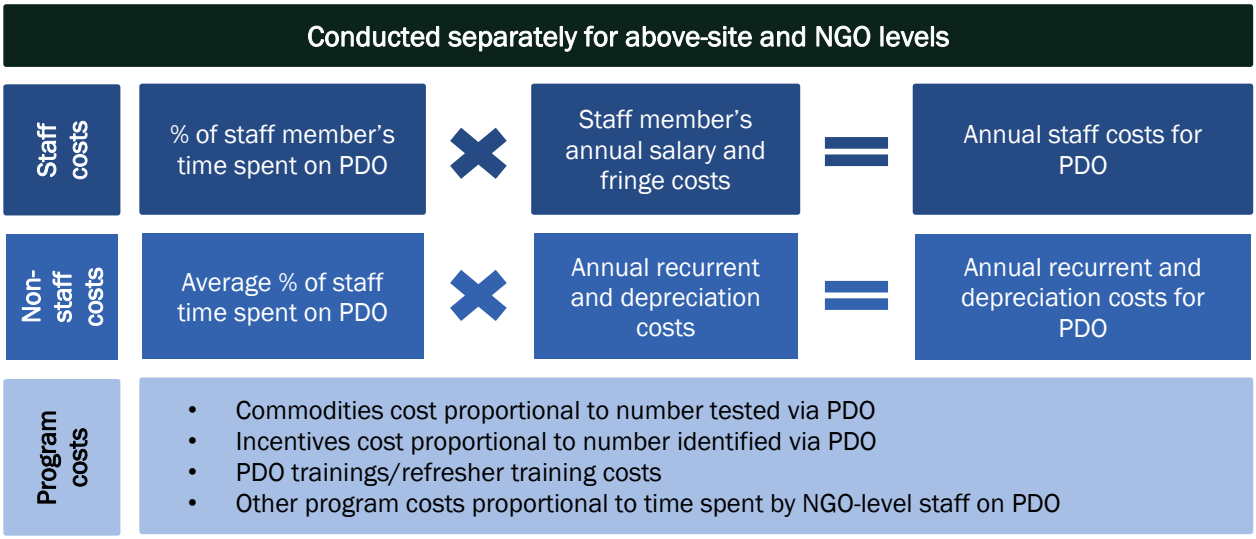
- Anti-Stigma, Issyk-Ata District
- Pravo na Jizn, Sokuluk District
- Rans Plus, Bishkek City
- Sotsium, Bishkek City

At most NGOs, staff positions included peer navigators and senior peer navigators for people living with HIV and people who inject drugs, one to two coordinators, a director, an accountant, and at least one database specialist. During the interview, HP+ documented each NGO staff member's reported proportion of time spent on case-finding versus case-management activities. HP+ further requested that each staff member report the average amount of time spent on PDO, community-mapping, and APN interventions.

PSI Cost-Efficiency Analysis Methodology

PSI country office staff costs. To calculate the annual cost of each PSI country office staff member's time spent on each case-finding intervention, HP+ multiplied the staff member's reported time spent on each on each case-finding intervention—PDO, community mapping, and APN—by their yearly salary and fringe costs. This calculation was conducted for each PSI country office staff member and the costs were aggregated to calculate total PSI country office staff costs for PDO, community-mapping, and APN interventions. An example of this calculation for the PDO intervention is presented in Figure 2.

Figure 2. Methodology for Calculating Staff Costs, by Case-Finding Intervention: PDO Example



NGO-level staff and consultant costs. HP+ applied a similar approach to calculate the annual cost of each NGO-level employee's time spent on each case-finding intervention by using the self-reported data collected at the NGO level from each staff member's time spent on each case-finding intervention. To estimate the proportion of NGO-level staff costs for case finding at sites that were not visited (DSD Osh/Osh Oblast, Podruga, and Plus Center), HP+ used the average time spent by NGO staff at the four visited sites and applied these estimates to calculate the average proportion of time spent on each case-finding intervention for each position at these remaining PSI-contracted sites. HP+ estimated the cost of psychologist consultants' time by distributing consultancy costs across each case-finding intervention based on the actual number of clients served by each intervention. HP+ allocated each HIV testing and counseling (HTC) consultant's costs to the NGOs that provide services at the specific administrative units, and the proportion of the consultant's cost by case-finding intervention was allocated based on the number of clients served through each intervention at each NGO.

Rent and other recurrent costs. HP+ used average PSI country office staff time spent on each case-finding intervention to allocate PSI country office rent and recurrent costs to each case-finding intervention. The same approach was used to calculate the proportion of NGO-level rent and other recurrent costs for each case-finding intervention.

Program costs. PSI country office staff provided detailed estimates of the share of program costs allocated to case finding and the share of costs allocated specifically for the PDO, community-mapping, and APN interventions. These estimates included data on program costs for trainings, refresher trainings, and meetings. HP+ estimated the cost of commodities for each case-finding intervention based on the number of clients tested through each intervention by each NGO, assuming a wastage rate of five percent. For the remainder of program costs, HP+ used the average time spent by staff on community mapping, PDO, and APN as a cost driver to allocate remaining program costs to each specific case-finding intervention.

Depreciation costs. PSI country office staff provided a list of fixed assets from the Flagship Project's inception, which included detailed information on each asset's purchase date and procurement price, useful life years remaining, and depreciation period. HP+ classified the reported fixed assets into five groups: software, computers, furniture, equipment, and vehicles. The team calculated the per-year depreciation costs, or the estimated use value of each good per year, for assets that were not fully depreciated by using a straight-line depreciation method. This method transferred the cost of a fixed asset uniformly over its useful life. HP+ aggregated these depreciation costs into each group of assets and used average time spent by PSI country office staff on each case-finding intervention as a cost driver to allocate depreciation costs to each intervention. Using personnel-time allocation as a cost driver is a standard approach used in the absence of data that link equipment use to specific interventions.

Cost-efficiency analysis. HP+ aggregated total case-finding costs as well as the costs for the PDO, community-mapping, and APN interventions separately. Costs for each category were divided by the number of individuals tested through each case-finding intervention and, similarly, by the number of newly identified people living with HIV. HP+ also explored cost-efficiency at the NGO-level by removing above-site PSI country office costs, so as to consider NGO-level staff and program costs only (see Figures 3–6).

Given the detailed financial data collected from the PSI country office and each PSI-contracted NGO, costs were not identified as a variable with significant uncertainty. However, because the time spent on case finding by PSI country office and NGO-level staff may vary, HP+ also conducted a sensitivity analysis to explore the cost per person tested and identified as living with HIV as staff's level of effort for case-finding changes. This sensitivity analysis assumes that the current level of effort possible remains fixed or that no additional staff are employed to increase case-finding efforts. This analysis explores the following scenarios:

- Scenario 1: 20 percent increase in PSI country office and NGO-level staff time spent on case finding, which is accompanied by a reduction of 20 percent of staff time spent on case-management activities.
- Scenario 2: 20 percent increase in PSI country office and NGO-level staff time spent specifically on the community-mapping intervention, accompanied by a 20 percent decrease in staff time spent on the PDO and APN interventions.
- Scenario 3: 20 percent increase in PSI country office and NGO-level staff time spent on the APN intervention, accompanied by a 20 percent decrease of staff time spent on the PDO and community-mapping interventions.

Scale-up analysis. HP+ projected the costs of operating the PDO and community-mapping case-finding interventions in PSI's current priority sites, using the current testing strategy that aligns with the first Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 target—90 percent of all people living with HIV knowing their HIV status—to reach people who inject drugs who are also living with HIV. The team also projected the costs of scaling up the PDO and community-mapping case-finding interventions beyond current PEPFAR priority sites in which the Flagship Project is operational. For this analysis, we presented two scenarios that differ in testing strategy:

- Scenario 1: Assumes the use of PSI's testing strategy in Year 2 in the Kyrgyz Republic, with the number of tests proportional to the number of estimated undiagnosed people living with HIV who inject drugs in remaining sites.
- Scenario 2: Assumes a more aggressive testing strategy, with tests doubling the amount described for scenario 1.

HP+ used size estimates and HIV prevalence estimates based on the 2014 Integrated HIV Bio-behavioral Surveillance Survey, which remains the most current data source in the Kyrgyz Republic.

UNDP Data Collection

Types of Data and Sources

Similar to data collected for PSI, HP+ collected financial cost data at the UNDP country office (above-site) and at NGOs that work with people who inject drugs. Above-site costs included staff salaries and fringe costs, program costs, office rent and recurrent costs, and fixed-asset depreciation costs, or the estimated use value of the good per year. HP+ also examined site-level costs from UNDP-contracted NGOs, which included NGO-level staff salaries and fringe costs, program costs incurred at the site-level, rent and recurrent costs, transportation costs, and fixed-asset depreciation costs.

Estimation of Staff Level of Effort on Case Finding

NGO-level Staff Level of Effort

To estimate the proportion of time spent by UNDP-contracted NGO staff on case-finding interventions, HP+ conducted visits to three sites in the Kyrgyz Republic. HP+ interviewed each available staff member in the following NGOs:

- Anti-Stigma, Issyk-Ata District
- Harmony Plus, Karakol City
- Ranar, Bishkek City

At most NGOs, staff positions included peer-to-peer consultants, social workers, outreach workers, consultants working with people who inject drugs, a database specialist, a coordinator, and an accountant. During the interviews, HP+ documented each NGO staff member's reported proportion of time spent on case finding, which was defined as the amount of time spent on finding new clients for UNDP's harm-reduction program.

UNDP Country Office Level of Effort

UNDP's financial cost data on staff salaries isolated the cost of staff time spent working with people who inject drugs. Case finding constitutes a small portion of UNDP's work with people

who inject drugs. HP+ used average time spent by NGO-level staff on case finding among people who inject drugs to estimate UNDP above-site-level costs on case finding.

UNDP Cost-Efficiency Analysis Methodology

UNDP's program focuses on HIV prevention outreach and harm reduction, with goals complementary to the PSI Flagship Project's HIV case-finding and case-management objectives. Although case-finding initiatives are not a major focus of UNDP's prevention outreach and harm-reduction efforts, a small proportion of its scope entails seeking new clients for recruitment into its harm-reduction program. Through this initiative, UNDP may identify new clients living with HIV who inject drugs. HP+ defined this work as UNDP's contribution toward case-finding initiatives. Because UNDP did not report the identification of any people living with HIV who inject drugs in 2017, no cost-efficiency metrics could be developed for the cost per newly identified person living with HIV. As a result, the cost analysis for UNDP focuses on HIV-testing costs among new clients who inject drugs recruited into UNDP's harm-reduction program.

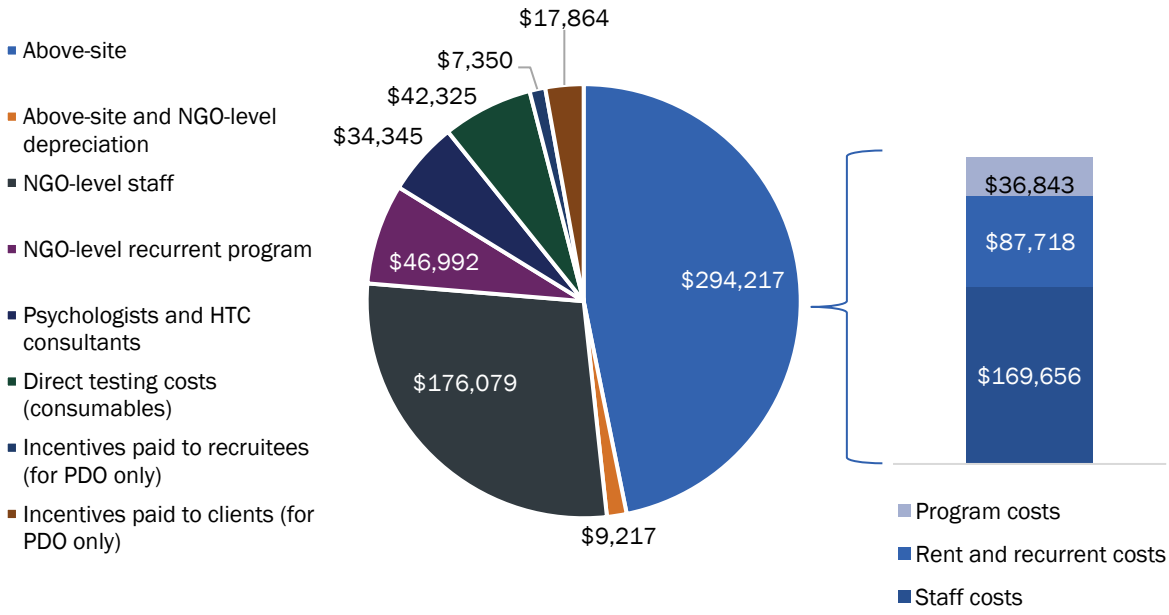
HP+ applied a calculation similar to the one used in the PSI costing analysis to aggregate UNDP staff and program costs at the above-site and site levels. HP+ multiplied the level of effort spent on case finding by the salary information provided by UNDP. Similarly, HP+ used the proportion of time spent on finding cases of people who inject drugs to estimate the proportion of program costs for finding cases of people who inject drugs. HP+ used PSI's data on the price of rapid oral HIV tests to estimate testing costs incurred by UNDP.

Results

PSI Case-Finding Costs

Current annual HIV case-finding costs totaled $628,389, or an estimated 60 percent of the Flagship Project's total annual budget in the Kyrgyz Republic. PSI country office above-site costs, which included office rent and recurrent, staff, and program costs incurred at the country-office level, comprised 46.8 percent of total case-finding costs. Staff costs at the NGO level also contributed a significant cost of $176,079, or 28 percent of total annual case-finding costs. PDO incentives for recruitees and clients, recurrent program costs, the cost of HTC consultants and psychologists, fixed-asset depreciation costs, and direct testing costs constituted the remaining quarter of total costs (Figure 3).

Figure 3. Total PSI-Kyrgyzstan Case-Finding Costs, by Cost Category



In the second year of the Flagship Project, 50 percent of PSI-contracted NGOs met or exceeded their testing targets; the remainder of NGOs met their testing targets within a 10 percent margin, with the exception of DSD in Karasuu. In contrast, no NGOs met their case-finding targets in Year 2. In-country interviews revealed that these targets were a significant focus for the Flagship Project in Year 2, and more resources have been invested in HIV case finding, including the development of a new case-finding intervention—community mapping—and continuous adaption of the existing PDO intervention.

This costing analysis confirms that PSI's focus on meeting HIV case-finding targets served as a driver of case-finding costs. More than half (56 percent) of PSI country office staff time was spent on case-finding activities compared to case-management activities. These results were similar at the NGO level, where more staff time was spent on case-finding activities (56 percent on average) compared to case-management activities. On average, peer navigators working with people who inject drugs spent the greatest amount of time on case-finding activities (90–100

percent of their total time), with the majority of their time spent on community mapping (53 percent) and the PDO intervention (38 percent), and a smaller proportion on APN (10 percent).

Figure 4. Current Annual Costs, by Case-Finding Intervention

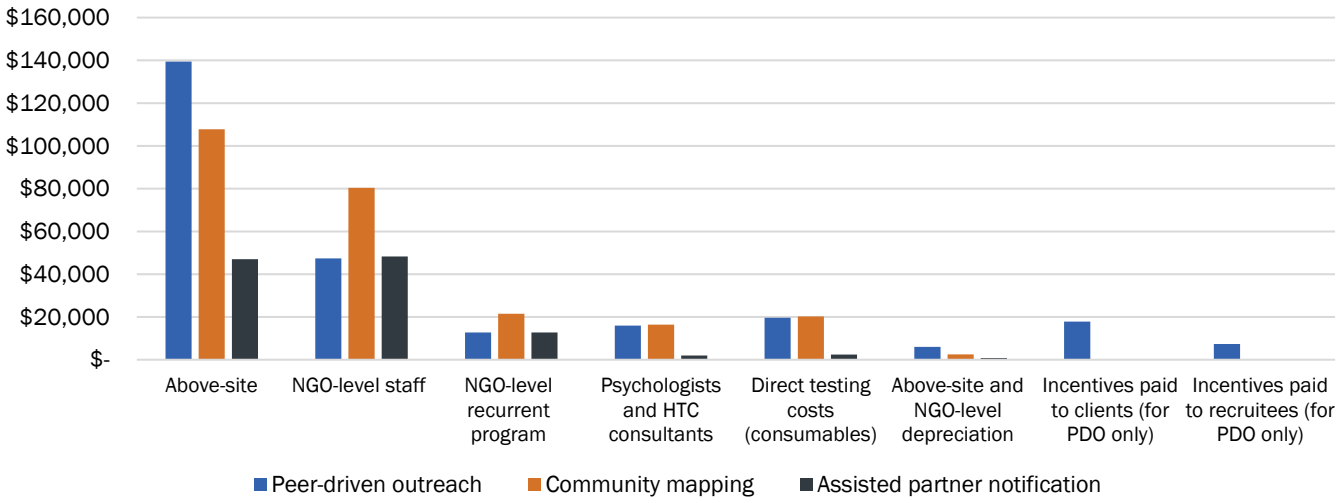


Figure 4 highlights the annual total costs by case-finding intervention. Above-site costs were highest for the PDO intervention, which are driven largely by the high level of effort employed by PSI staff to continuously monitor the PDO model and incentive scheme to maximize yield (Figure 4). The PSI team in the Kyrgyz Republic has carefully monitored the PDO model since Year 1, adapting the incentives used, seeds eligible, and number of waves needed to optimize yield. This level of effort drives the high above-site costs incurred for the PDO case-finding intervention compared to the community-mapping and APN interventions. Above-site costs were also high for the community-mapping intervention, which began implementation in Year 2 and required a significant PSI level of effort spent on training NGO-level staff on the intervention.

NGO-level staff costs were highest for the community-mapping intervention, which demands most of the peer navigators' and the majority of the coordinators for people who inject drugs' time. Across the cost categories depicted in Figure 4, costs were lowest for the APN intervention. PSI country office staff spent time and resources developing the APN algorithm and training NGOs to implement the algorithm and complete the associated paperwork. Although most of NGO-level staff's case-finding time is spent finding people living with HIV who inject drugs, the staff also indicated a significant level of effort was spent on implementing APN. NGO-level staff often need to spend a significant amount of time encouraging newly identified people living with HIV to disclose their status to their sexual partner(s) and educating them on the importance of bringing their partners in for HIV testing.

The average baseline or current cost per person tested was $72, with the average cost highest for individuals tested through APN. The average cost per person identified as living with HIV was $2,856; this cost was also highest for individuals identified as living with HIV through APN ($3,331) (Table 2).

Table 2. Cost per Person Tested and per Person Identified as Living with HIV in Year 2, by Case-Finding Intervention

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$72	$66	$59	$224
Cost per person identified as living with HIV	$2,856	$2,561	$3,034	$3,331

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

HP+ also analyzed the cost per person tested and per person identified using recently available data for Year 3, Quarter 1 (Table 3). The results show decreases in the average cost per person tested and identified as living with HIV: the average cost per person tested decreased by 42 percent to $30 and the average cost per person identified decreased by 35 percent to $1,851. Decreases in the average cost per person identified were driven by decreases in community-mapping and APN costs (58 percent and 44 percent decreases, respectively).

The differences in costs between Year 2 and Year 3, Quarter 1 may be due to changes in case-finding implementation. In Year 3, PSI started to integrate the PDO and community mapping as one approach, with the latter used to identify new seeds for PDO, rather than exclusively for case finding. The decreased intensity of effort and time needed for community mapping due to this shift may explain the decreased costs for case finding through the community-mapping intervention in Year 3, Quarter 1. By contrast, in Year 3, Quarter 1, the average cost per person identified as living with HIV increased from $2,561 to $3,037, mainly due to the low number (15) of cases identified through PDO during this period.

Table 3. Cost per Person Tested and per Person Identified as Living with HIV in Year 3 Quarter 1, by Case-Finding Intervention

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$30	$83	$18	$113
Cost per person identified as living with HIV	$1,851	$3,037	$1,283	$1,874

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

HP+ conducted a sensitivity analysis to understand how costs for each case-finding intervention may change, given changes in staff time spent on each intervention. In the Flagship Project's third year, community-mapping and PDO interventions have been implemented concurrently for several months to optimally locate the hardest-to-reach people who inject drugs. As case finding becomes more difficult, it is feasible that more PSI country office and NGO-level staff time would be required to meet case-finding targets. In scenario 1, HP+ explores a 20 percent increase in PSI country office and NGO-level staff levels of effort for case finding, accompanied by a decrease of 20 percent time spent on case management (Table 4). Under this scenario, total case-finding costs increase to $691,082 per year, the cost per person tested increases from $72 to $79, and the average cost per person identified as living with HIV increases by 10 percent from $2,856 to $3,141 (Table 4).

Table 4. Cost per Person by Case-Finding Intervention for Scenario 1 (20 Percent Increase in Staff Time on Case-Finding Activities)

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$79	$71	$66	$256
Cost per person identified as living with HIV	$3,141	$2,760	$3,345	$3,816

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

During HP+ in-country interviews with PSI, program and NGO-level staff indicated the difficulty of reaching HIV case-finding targets. As it becomes increasingly more difficult to find the hardest-to-reach people who inject drugs, it is possible that the community-mapping intervention will need to be used more, either by increasing the time spent by current staff or increasing the number of staff members who focus on the community-mapping intervention. Increased use of the community-mapping intervention would allow for increased mapping efforts to find new networks of people who inject drugs, including those most hidden. Scenario 2 explores an increase of PSI country office and NGO-level staff levels of effort by 20 percent for the community-mapping intervention, accompanied by a corresponding decrease in staff levels of effort on the PDO and APN interventions (Table 5). While the average cost per person tested and per person identified as living with HIV remains the same, it leads to an increase in community-mapping costs for each person tested and identified as living with HIV, accompanied by decreases in PDO and APN intervention costs (Table 5).

Table 5. Cost per Person by Case-Finding Intervention for Scenario 2 (20 Percent Increase in Staff Time Spent on Community-Mapping Intervention)

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$72	$60	$67	$201
Cost per person identified as living with HIV	$2,856	$2,354	$3,438	$2,990

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

Finally, a third scenario explores an increase in PSI country office and NGO-level staff time spent on APN (Table 6). As the HIV epidemic becomes more generalized and more people who inject drugs and living with HIV are identified, greater case-finding efforts may shift to their sexual partners. Scenario 3 explores this potential situation, with an increase of 20 percent PSI country office and NGO-level staff time spent on APN, accompanied by a corresponding decrease of time spent on community-mapping and PDO interventions.

Table 6. Cost per Person by Case-Finding Intervention for Scenario 3 (20 Percent Increase in Staff Time Spent on Assisted Partner Notification Intervention)

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$72	$64	$57	$254
Cost per person identified as living with HIV	$2,856	$2,500	$2,927	$3,777

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

PSI Case-Finding Costs, Excluding Above-Site Costs

Excluding PSI country office above-site costs, the average cost per person tested decreased to $38 and the average cost per person identified decreased to $1,519 (Table 7).

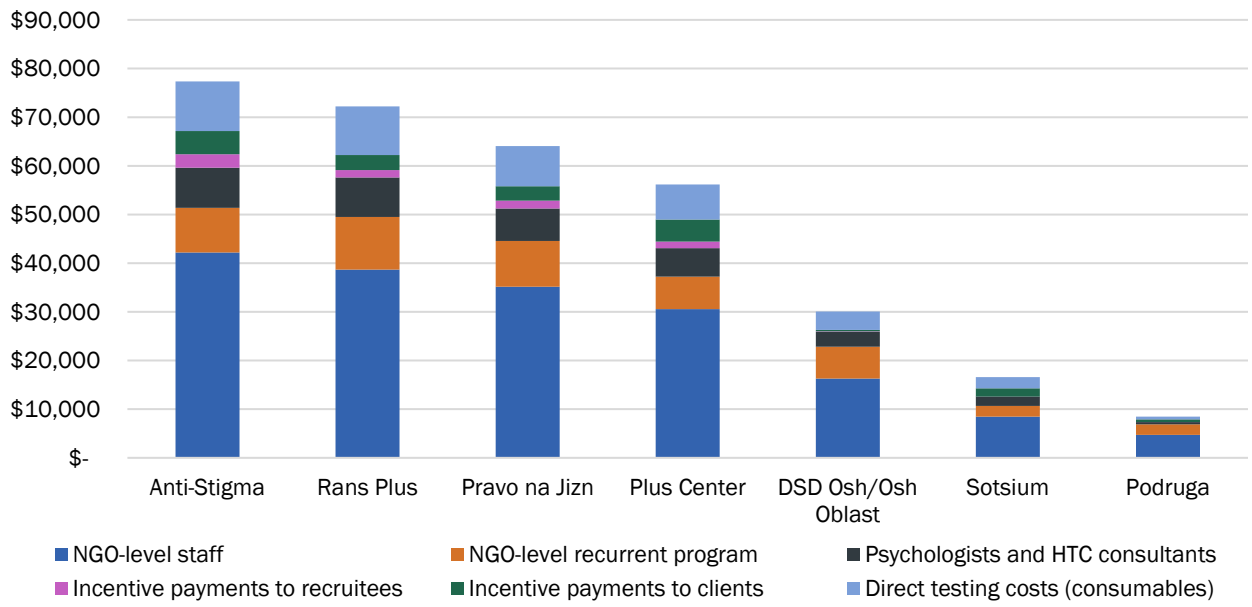
Table 7. Cost per Person Tested and per Person Identified as Living with HIV, by Case-Finding Intervention, Excluding Above-Site Costs

Program Indicator	Average Cost	Cost through PDO	Cost through CM	Cost through APN
Cost per person tested	$38	$31	$34	$131
Cost per person identified as living with HIV	$1,519	$1,220	$1,720	$1,949

Abbreviations: APN: assisted partner notification; CM: community mapping; PDO: peer-driven outreach.

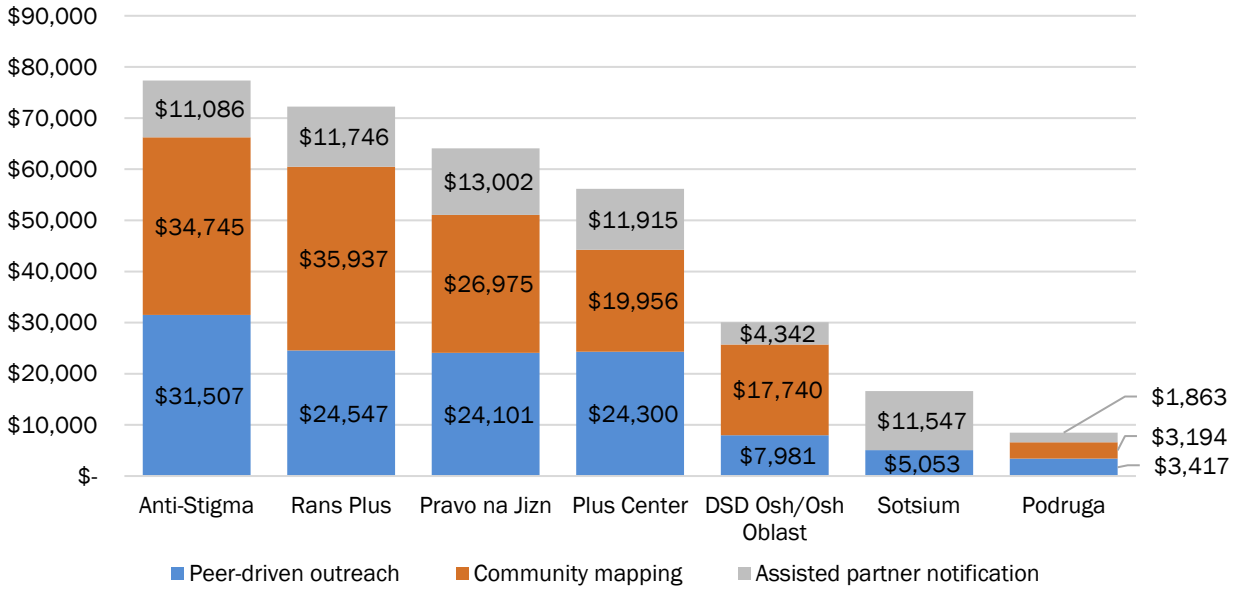
HP+ also analyzed case-finding costs at each NGO, excluding PSI country office above-site costs. The results indicate that annual costs were highest at Anti-Stigma ($77,338) and Rans Plus ($72,231) and lowest at Sotsium ($16,600) and Podruga ($8,474) (Figure 5). NGO-level staff costs were the largest expense at each NGO, comprising more than 50 percent of costs at each organization.

Figure 5. Total Case-Finding Costs, by Cost Category and NGO, Excluding PSI Above-Site Costs



By case-finding intervention, costs for the community-mapping intervention were highest at all NGOs except Plus Center, Podruga, and Sotsium (Figure 6). Podruga's subcontract closed in February 2017, which may explain its very low costs; similarly, Plus Center's subcontract was completed by June 2017. DSD Osh/Osh Oblast continued in the sites where Podruga and Plus Center operated beginning in May 2017.

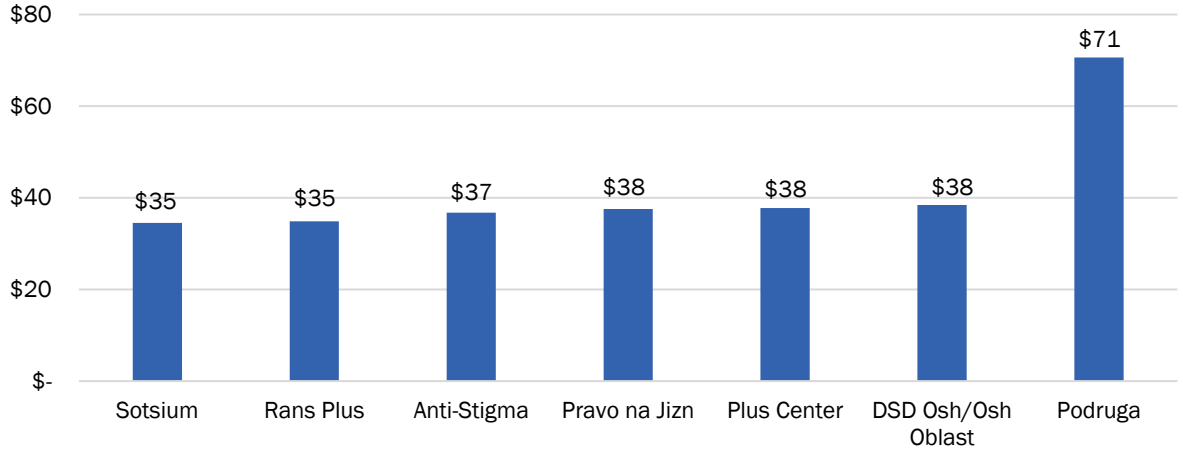
Figure 6. Total Costs, by Case-Finding Intervention and NGO, Excluding PSI Above-Site Costs



Although Sotsium focuses on case-management activities, its case-finding work is limited, mostly accomplished by finding people living with HIV through the sexual partners of newly identified people living with HIV who inject drugs. High costs for community mapping at the NGO level are driven by the significant levels of effort spent on community mapping, as indicated during HP+ in-country interviews with Anti-Stigma, Rans Plus, and Pravo na Jizn. Peer navigators discussed the time-intensive nature of the mapping process, which involves scoping and locating people who inject drugs in new neighborhoods. This process normally takes two to three weeks per neighborhood. Through the community-mapping intervention, peer navigators usually conduct a few scoping visits to a new neighborhood to become familiar with the neighborhood's residents and allow sufficient time to build trust in the appropriate networks, which ultimately reveals whether people who inject drugs live there. Although the community-mapping intervention is more time intensive at the NGO level, it complements the PDO intervention for case finding. Despite the PDO intervention's success in case finding among known networks of people who inject drugs, PSI realized in Year 2 that they needed a new approach to reach unknown or hidden networks. In Year 2, several NGOs—including Anti-Stigma (Jaiyl) and DSD Osh/Osh Oblast—incurred higher yields using community mapping compared to PDO; other NGOs, such as Rans Plus, also saw notable case-finding progress through community mapping.

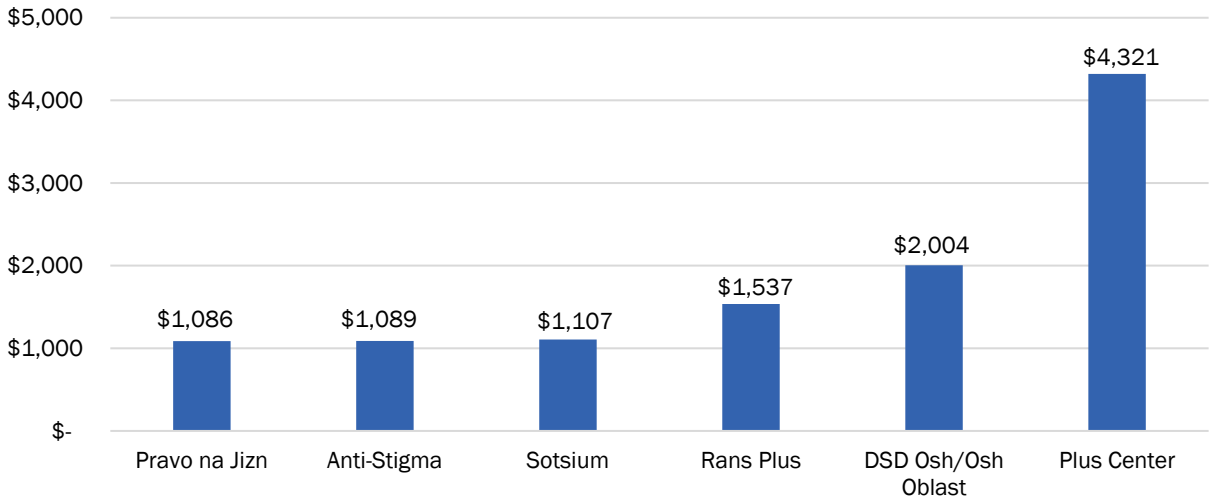
HP+ also presented average cost per person tested at each PSI-contracted NGO, excluding PSI above-site costs (Figure 7). Average testing costs were comparable among the NGOs, ranging from $35 to $38 per person tested, with the exception of $71 per person tested at Podruga, an NGO new to the Flagship Project in Year 2. There was more significant variation in the cost per newly identified person living with HIV; costs were lowest in NGOs closest to meeting their case-finding targets, including Pravo na Jizn ($1,086) and Anti-Stigma ($1,089).

Figure 7. Cost per Person Tested at Each PSI-Contracted NGO, Excluding PSI Above-Site Costs



The higher cost per newly identified people living with HIV at Rans Plus can be explained by its comparable annual costs (Figure 8), compared to Anti-Stigma and Pravo na Jizn, and much lower case-finding yield. Because Plus Center started its work almost halfway into the year, beginning May 2017, its yield was much lower than that of other NGOs, which may explain the high cost per person identified ($4,321).

Figure 8. Cost per Person Newly Identified as Living with HIV at Each PSI-Contracted NGO, Excluding PSI Above-Site Costs



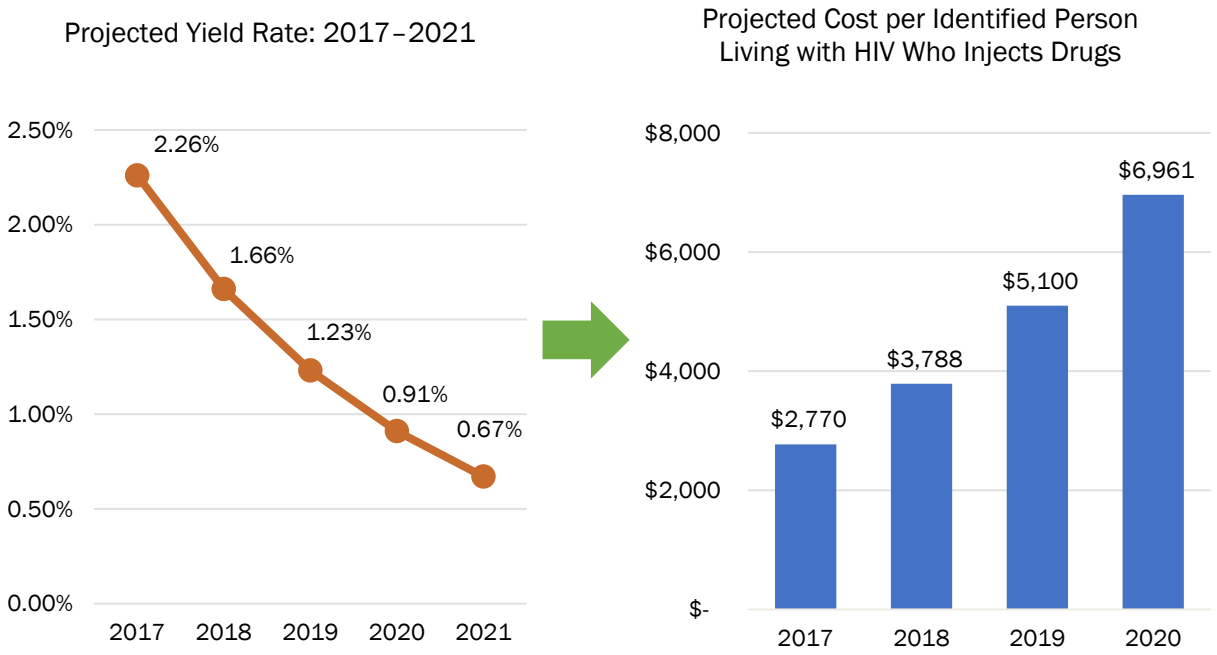
Scale-Up Costs

Projected Costs in Current Sites

HP+ projected the costs of operating the PDO and community-mapping case-finding interventions in PSI's current priority sites using its current testing strategy throughout the year to meet the UNAIDS target of 90 percent of people living with HIV who know their status within the population of people who inject drugs. As more people living with HIV who inject drugs know their status in current PSI priority sites, the projected cost per person identified will

increase due to diminishing yields (Figure 9). HIV testing yields are projected to decrease from 2.26 percent in 2017 to 0.67 percent by 2021. As a consequence, the cost per person living with HIV who injects drugs identified is projected to increase from its current $2,770 per person in 2017 to $6,961 by 2020 (Figure 9).

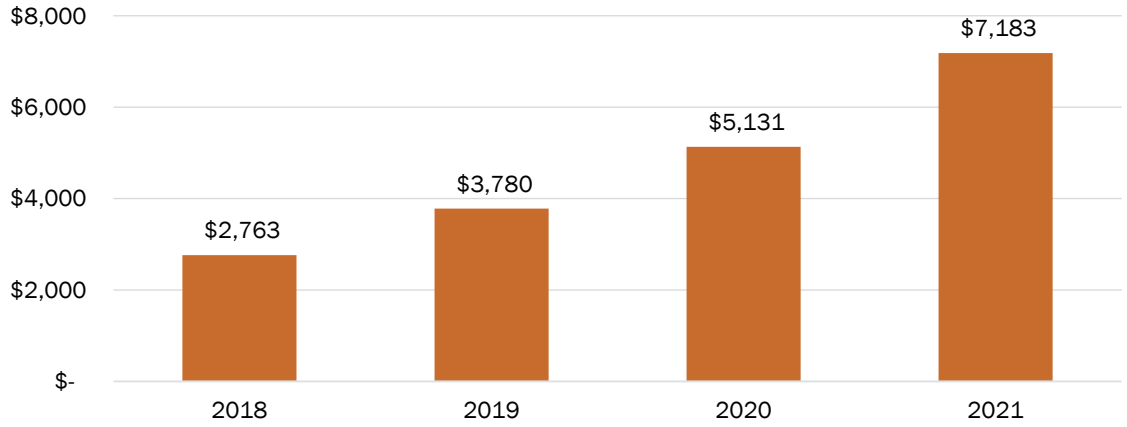
Figure 9. Projected Cost per Identified Person Living with HIV Who Injects Drugs in Current PSI Priority Sites



Projected Scale-Up Costs in Remaining Sites

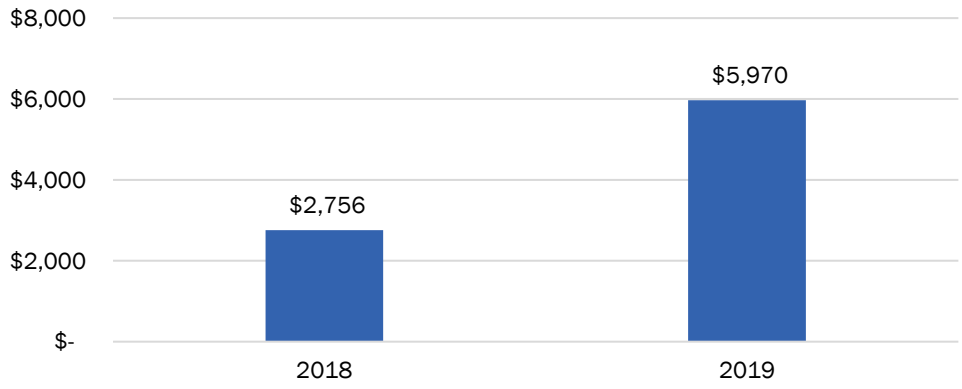
HP+ also projected the costs of scaling up the PDO and community-mapping case-finding interventions beyond current PEPFAR priority sites in which the Flagship Project is operational. The first scenario projects scale-up costs to remaining sites in the Kyrgyz Republic, assuming the use of PSI's Year 2 testing strategy in current sites (Figure 10).

Figure 10. Projected Cost per Identified Person Living with HIV Who Injects Drugs in Remaining Country Sites (Scenario 1)



Scale-up of the PDO and community-mapping interventions in remaining sites will require $574,632 over four years to meet the first USAIDS 90-90-90 target among people who inject drugs in the country (Figure 10). A second scale-up scenario assumes the use of a more aggressive testing strategy, with double the tests described for scenario 1 (Figure 11). Under this aggressive testing strategy, the first "90" goal can be met for people who inject drugs within two years, at a lower total cost of $484,065 over the two-year period (Figure 11).

Figure 11. Projected Cost per Identified Person Living with HIV Who Injects Drugs in Remaining Country Sites (Scenario 2)

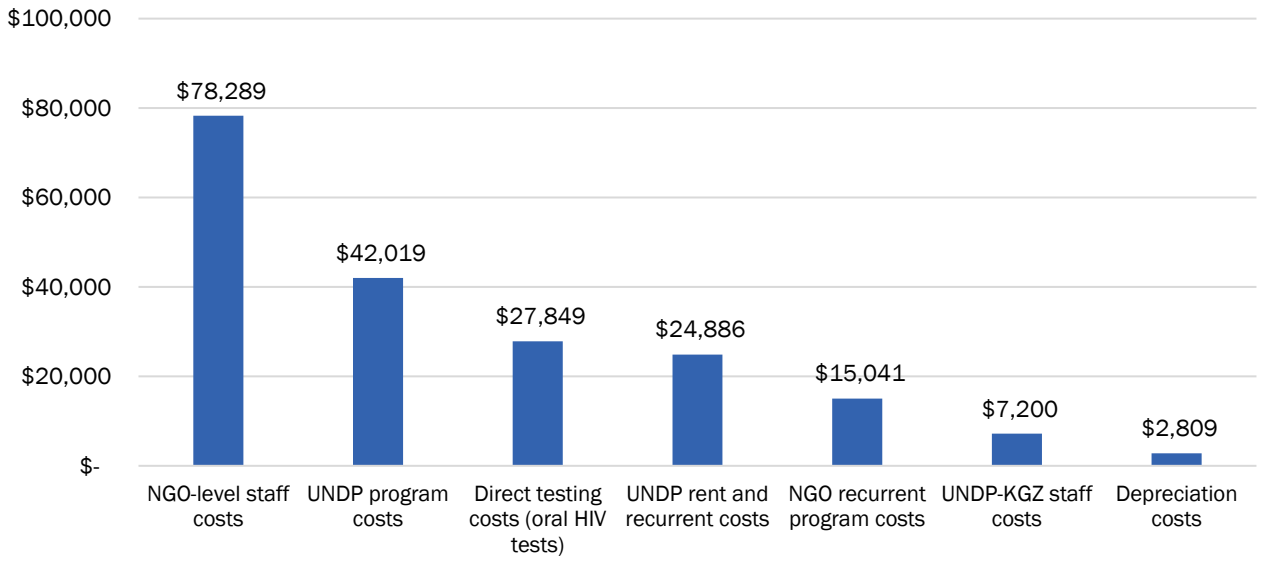


UNDP HIV Testing Costs

UNDP's program focuses on prevention outreach and harm reduction, with goals complementary to the PSI Flagship Project's case-finding and case-management objectives. Although case-finding initiatives are not a major focus of UNDP's prevention outreach and harm-reduction efforts, a small proportion of UNDP's scope entails seeking new clients for recruitment into its harm-reduction program. Through this initiative, UNDP may identify new clients living with HIV who inject drugs. HP+ defined this work as UNDP's contribution toward case-finding initiatives. Because UNDP did not report the identification of any people living with HIV who inject drugs in 2017, HP+ could not develop cost-efficiency metrics related to the cost per newly identified person living with HIV. As a result, the cost analysis for UNDP focuses on HIV testing costs among new clients who inject drugs recruited into UNDP's harm-reduction program.

During the annual 2017 calendar year, UNDP's HIV testing costs totaled $198,094, with 8,033 clients who inject drugs tested for HIV. The cost to test each client who injects drugs was $24.66. NGO-level staff salaries and fringe expenses were the greatest cost ($78,289 per year), with program costs constituting another significant expense ($42,019) (Figure 12).

Figure 12. UNDP HIV Testing Costs, by Cost Category



Conclusions

This report adds to the limited literature available on the costs of finding cases of people living with HIV who inject drugs in Central Asia. Our PDO case-finding cost of $2,561 per new case is comparable to one study's PDO case-finding cost per new case among people who inject drugs in India ($2,072 per new case) (Solomon et al., 2017). More research is needed to understand how PDO, community-mapping, and APN costs vary across different country contexts and key populations. Our report also provides information on how the costs to locate the remaining unidentified people living with HIV are projected to increase in the Kyrgyz Republic as more people living with HIV are diagnosed.

These findings show that the PDO and community-mapping models are complementary methods to identify people who inject drugs within both known and hidden networks and to offer them HIV testing and treatment services. HP+ has confirmed that the APN model adds further efficiencies by introducing an algorithm to locate sexual partners of people living with HIV identified through PDO and community-mapping interventions. Further analysis is needed to explore the costs of scaling up the APN case-finding intervention and case-finding interventions for other populations to identify and offer treatment to the remaining undiagnosed people living with HIV in the Kyrgyz Republic.

As the pool of undiagnosed people living with HIV decreases in the Kyrgyz Republic, the cost per person identified will increase significantly over time and require increased domestic resource mobilization to reach the first UNAIDS 90 percent target. In addition, as the number of individuals on antiretroviral therapy increases, case-management costs also will increase, which may result in reduced available resources for case-finding initiatives. The results of our cost-efficiency analysis provides valuable information for the Government of the Kyrgyz Republic to consider as it sets priorities and decides on the allocation of resources for its HIV response according to the full HIV care and treatment cascade.

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