Evaluation of the Community Based Rapid Testing through Peer-Driven Intervention (PDI+) for at-Risk Populations in Cambodia

REVISED REPORT

HIV Innovate and Evaluate Project

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HIV INNOVATE AND EVALUATE PROJECT

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Summary

Background:

"PDI+" is a peer driven intervention approach to finding new HIV cases, utilizing community-based locations for HIV testing and counseling (HTC). PDI+ was introduced by USAID HIV Flagship Project (Flagship) in August 2016, in collaboration with the National Centre for HIV/AIDS, Dermatology and STDs (NCHADS), as a novel approach in the Cambodian setting to finding new HIV cases among key populations at risk for HIV (KP). This approach was implemented in Siem Reap for men who have sex with men (MSM) and transgender women (TG), in Phnom Penh for MSM, TG, and people who inject drugs (PWID), and in Kampong Cham for entertainment workers (EW). The effectiveness and acceptability of PDI+ had not yet been systematically examined, nor has the cost-effectiveness of this approach been evaluated.

Objectives:

The objectives of this evaluation were:

1. To examine the effectiveness of PDI+ in identifying new cases of HIV, as measured by HIV positive yield, compared to the outreach-based community-based HIV testing and counseling (CBHTC);
2. To estimate the cost-effectiveness of PDI+ as measured by cost/person tested and cost per new case of HIV identified compared to outreach-based CBHTC;
3. To describe the acceptability of, motivations toward the use of coupon for HIV testing, and satisfaction with, PDI+ among target populations of KP (MSM, TG, PWID, and EW); and
4. To identify suggestions to improve PDI+ among KP, implementing staff, and stakeholders.

Methods

A mixed methods design was employed in order to address the objectives, utilizing quantitative and qualitative data collection and analyses. Quantitative data were derived from program databases and exit interviews with clients. The program dataset was used to examine the effectiveness of PDI+ in identifying new cases of HIV, and qualitative data from exit interviews with clients were used to describe the acceptability of, motivations toward the use of coupons for HIV testing, and satisfaction with PDI+, among target populations of KP (MSM, TG, PWID, and EW).

The evaluation focused on the effectiveness of PDI+ implemented in Siem Reap, Phnom Penh, and Kampong Cham from 01 August 2016 through 30 April 2017. Comparison of HIV positive yields and numbers of individual tested were made to the matching time period of the previous year when CBHTC was being implemented, 01 August 2015 through 30 April 2016.

Six focus group discussions (31 total participants) were held with PDI+ implementation teams for each sub-group of KP. Forty eight participants were selected for in-depth interviews. Cost allocation was used to estimate the cost-effectiveness of PDI+ as measured by cost per person tested and cost per new case of HIV identified across sites and compared to outreach-based CBHTC.

Findings:

6,667 total clients received HTC through the two approaches, with a similar number found through PDI+ (3,193), as through outreach HTC (3,474). Clients recruited through PDI+ had an overall higher HIV positivity yield than clients recruited through outreach (2.3% vs 1.2%, respectively, p=0.006). The subgroup analysis showed that among EW, MSM and PWID there were no statistically significant differences in HIV positive yields between outreach-based HTC and PDI+. Among TG, however, there was a statistically significant difference in HIV positive yield between outreach-based HTC and PDI+ (0.3% vs 3.1%, respectively, in Phnom Penh, p=0.004 and 0.9% vs 4.1% respectively, in Siem Reap, p=0.031).

KP were overwhelmingly satisfied with their PDI+ HTC experience, with overall 91% of KP saying that they were satisfied. The largest proportion of clients (49%) received a coupon from NGO staff prior to testing, 44% of clients reported not receiving a coupon at all. Only 4% of all KP reported coming to HTC with a coupon (and no EW did).

The most common main reason given for undergoing HTC through PDI+ was wanting to know one's HIV status (76%), and only 2.7% of KP said their main reason given for undergoing HTC was receiving the incentive (15% for PWID).

Staff recommended using PDI+ mobile teams to perform HTC at hotspots. Indeed only 49.5% of KP received PDI+ HTC at a club or DIC, as initially intended, possibly indicating the limitations of PDI+ in accessing these clients in some geographic areas, necessitating outreach. Staff also recommended considering greater incentives for clients who live further away from the testing location, improving understanding of the PDI+ system among staff, and taking measures to manage potential duplication of clients.

The average total program cost was $73,711 for outreach HTC, and $70,927 for PDI+. The largest average proportional cost categories for PDI+ were IP field office program management/support (17%), IP central office program management (14%), TA (12%), and IP field office Club/DIC (12%). The average cost per HIV test under outreach HTC was $144 (range $73-$330), and under PDI+ was $168 (range $88-$365). The average cost per HIV case detected under outreach HTC was $19,982 (range $6,439-$29,068), and under PDI+ was $7,912 (range $2,048-$17,135).

Conclusion:

Though outreach HTC had a lower unit cost per HIV test, PDI+ was more a great deal cost-effective than outreach HTC in identifying PLHIV among KP, largely because PDI+ had a higher HIV+ yield, resulting in an average cost per HIV case detected under PDI+ of $7,912, which was nearly one-third the cost compared to outreach HTC case detection at $19,982. This finding came despite the fact that there were important shortcomings with regard to how PDI+ was implemented.

Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Anti-Retroviral Therapy
AusAID	Australian Agency for International Development
CoPCT	Boosted Continuum of Prevention to Care and Treatment
CoE	Center of Excellence
EW	Entertainment Workers
GF	Global Fund
GFATM	Global Fund for AIDS, TB and Malaria
HIV	Human Immunodeficiency Virus
HTC	HIV Testing and Counselling
KP	Key Population
MSM	Men who have Sex with Men
NCHADS	National Center for HIV/AIDS, Dermatology and STI's
NECHR	National Ethics Committee for Health Research
OD	Operational District
OW	Outreach Workers
PCA	Principle Component Analysis
PDI	Peer-Driven Intervention
PDI+	Peer-Driven Intervention Plus
PEPFAR	President's Emergency Plan for AIDS Relief
PMTCT	Prevention of Mother to Child Transmission
PRASIT	Project for HIV and AIDS Strategic Technical Assistance
Pre-ART	Prior to Anti-Retroviral Therapy
PWID	People Who Inject Drug
RDS	Respondent Driven Sampling
SOP	Standard Operating Procedure
SRH	Sexual and Reproductive Health
STI	Sexually Transmitted Infection
TB	Tuberculosis
TG	Transgender
UC	Unit Cost
UNAIDS	United Nations Agency for HIV/AIDS
URC	University Research Co., LLC
USAID	United State Agency for International Development
VCCT	Voluntary and Confidential Counselling and Testing

1. Background

1.1. Introduction

Global Context

Globally 19 million (54%) of the 35 million people living with HIV (PLHIV) do not know their HIV status, and 1.9 million become infected annually (UNAIDS, 2014a; 2016a; 2016c). Key populations at risk of HIV infection (KP) and their sexual partners account for 67% of new infections in the Asia and Pacific region (UNAIDS, 2016c). KP include sex workers, people who inject drugs (PWID), transgender (TG) and men who have sex with men (MSM). Polices that support criminalization and stigmatization of sex work, drug possession and use, and discrimination, including in the health sector, are preventing KP from accessing HIV prevention services (UNAIDS, 2016c; Beattie, 2012). As a result, KP are often hard-to-reach and hidden. In addition, the lack of effective and tailored HIV programs for KP at the national and community levels hinders the significant reduction of new HIV infections globally (UNAIDS, 2016b; 2016c).

Several strategies have been employed to reach the estimated 15 million PLHIV who do not know their status, with a primary prevention focus on reaching KP to achieve elimination of new HIV infections by 2030 (UNAIDS, 2014b; 2014c; 2016c; (WHO, 2014). One of the key strategies identified is the use of peer-driven community based interventions using KP social networks to identify high-risk and undiagnosed PLHIV (WHO, 2014). This approach was implemented by the USAID HIV Flagship Project (Flagship) in 2016 in Cambodia, and this evaluation examined this approach.

Cambodia Context

Similar to the global picture, the populations at highest risk of HIV infection in Cambodia are KP, such as entertainment workers (EW), MSM, TG, and PWID. In 2015, only 79% of PLHIV in Cambodia knew their HIV status and the disaggregated NCHADS programmatic data show that a large proportion of KP living with HIV remained undiagnosed (NCHADS, 2016; KHANA, 2016). KP remain critical target populations for the national HIV program and several strategies specific to KP have been developed to close the gap. One of the key strategies is Boosted Continuum of Prevention, Care and Treatment (B-COPCT), implemented since 2013, to identify KP for HIV testing and counseling (HTC) services as a part of the Cambodia 3.0 Strategy, which aims for virtual elimination of HIV infections (NAA, 2015; NCHADS, 2016).

KP in Cambodia are hard-to-reach due to stigma, discrimination, and limited KP-friendly HIV services. For EW, there has been criminalization of sex work since 2008 when the Government of Cambodia outlawed the activities of brothels (KHANA, 2016; NAA, 2015), forcing sex workers to scatter in various entertainment venues such as karaoke, bars, massage parlors, etc. In addition, the Government of Cambodia launched a crackdown on drug-related offenses in January of 2017, that left 4,298 suspected drug dealers and traffickers and 3,569 drug users in prison in the first 163 days of the campaign (Bourmant, 2017), forcing PWID and others who use drugs into hiding. These nationwide policies are barriers for KP to access HIV services.

The United States Agency for International Development (USAID), through the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) has supported the USAID HIV Flagship Project (Flagship), a five-year awardee of USAID, to enhance the impact, reduce costs, and improve effectiveness of the national HIV response through technical innovation and improvements in quality and capacity to deliver sustainable HIV services in Cambodia. One such innovation is the Community/Peer Initiated Testing and Counselling (C/PITC) during outreach, also known as community-based, peer-provided HIV testing and counseling (CBHTC). As part of the B-COPCT, CBHTC is elaborated throughout Cambodia and supported by implementing partners and donors. The Flagship Project's CBTHC efforts have found fewer cases of HIV than expected, indicating suboptimal performance in identifying KP at highest risk for, or infected with, HIV, as shown in Table 1.

Table 1 HIV yield by year under Flagship

KP Group	HIV Positive yield by year (#HIV Positive/#KP Tested)		
	2013	2014	2015
EW	0.72%	0.72%	0.38%
MSM	0.15%	0.49%	0.28%
TG	n/a	1.21%	0.45%
PWID	2.51%	6.49%	1.05%
Total	0.57%	0.71%	0.35%

** No separate data were available for TG in 2013. TG were included with MSM.*

(Source: KHANA Annual Reports)

To address this low HIV positive yield (# HIV cases identified/#individuals tested) and improve case detection efficiency, the Peer-Driven Intervention (PDI+) approach to finding new HIV cases was introduced by Flagship in August 2016 in collaboration with NCHADS, as a novel approach in the Cambodian setting to identify KP living with HIV (NCHADS, 2017). This intervention is described in detail in the following sections. Prior to this study, the effectiveness of PDI+ in Cambodia had not yet been measured, nor had its cost-effectiveness. This evaluation aimed to evaluate the effectiveness and acceptability of PDI+, along with the cost-effectiveness of identifying KP at high HIV-risk and those living with HIV in comparison to CBHTC.

1.2. Background of Peer-Driven Intervention

- *Peer-Driven Intervention – Plus (PDI+)*

Peer-driven intervention (PDI) stems from a research sampling strategy in recruiting participants called respondent-driven sampling (RDS), which has been used to identify study participants that are scattered, difficult to reach, or may be from stigmatized groups (Heckathorn, 1997; 2002). The main feature of the RDS approach is that it recruits peers in a simple chain referral mechanism with the use of incentives for their participation where the recruitment is done by peers rather than professional researchers or outreach workers, which accounts for its powerful effect in convincing peers to participate in studies (Broadhead, 2006; Neaigus, 1998). Adherents to RDS claim the reliability of the approach not only in reducing the bias of the study result in terms of exposed and non-exposed to the program interventions but also in identifying new members of the participants to join the study (Heckathorn, 1997; 2002).

RDS starts with the recruitment of initial “seeds”, or initial recruiters, participants, who will then recruit peers with similar backgrounds. Those recruited by seeds are called recruits, who can then, in turn, recruit others. The recruitment chain continues through successive “waves” until the targeted number of participants are reached (Johnston, Whitehead, Simic-Lawson & Kendall, 2010), see figure 1.

The PDI approach is built on the same theoretical foundation as RDS, but instead of using peers to recruit study subjects, it uses peers to recruit their peers for an intervention. This approach has been deployed to reach hidden and/or stigmatized populations, such as reaching new PWID through PWID networks in Vietnam (FHI 360, 2014). For example, in the Mai Son district of Vietnam, the number of HIV cases detected from the outreach program was low, although there was a large number of PWID in the area. In 2014, a trial of this snowball approach showed that the HIV positivity rate was much higher among clients tested through RTS when compared to other VCCT clients (10.3% versus 2.6%). Most interestingly, the HIV positivity rate among PWID recruited through the snowball approach was greater than in clients recruited by traditional outreach (10.3% versus 3.2%). The result informed the future HIV case detection mechanism as it was seen as likely to cost less than traditional outreach (CDC, 2016).

Based on successes in reaching hidden PWID, the peer-driven snowball approach has been replicated to reach other KP groups and in other settings. For instance, Family Health International (FHI) Vietnam

introduced this approach as one of the core components in the enhanced outreach approach to reinforce community-based HIV interventions for KP. It was used to reach "hard-to-reach" or previously unexposed KP with HIV messages, products and services.

- *RDS and PDI Recruitment*

The first clients are called seeds, and the individuals referred by the seeds are called recruits. Each recruit has a chance to be a recruiter, though, in practice, not all recruits will become recruiters. For example, recruits might refuse to recruit their peers, while others might not successfully recruit their peers. See figure 1.

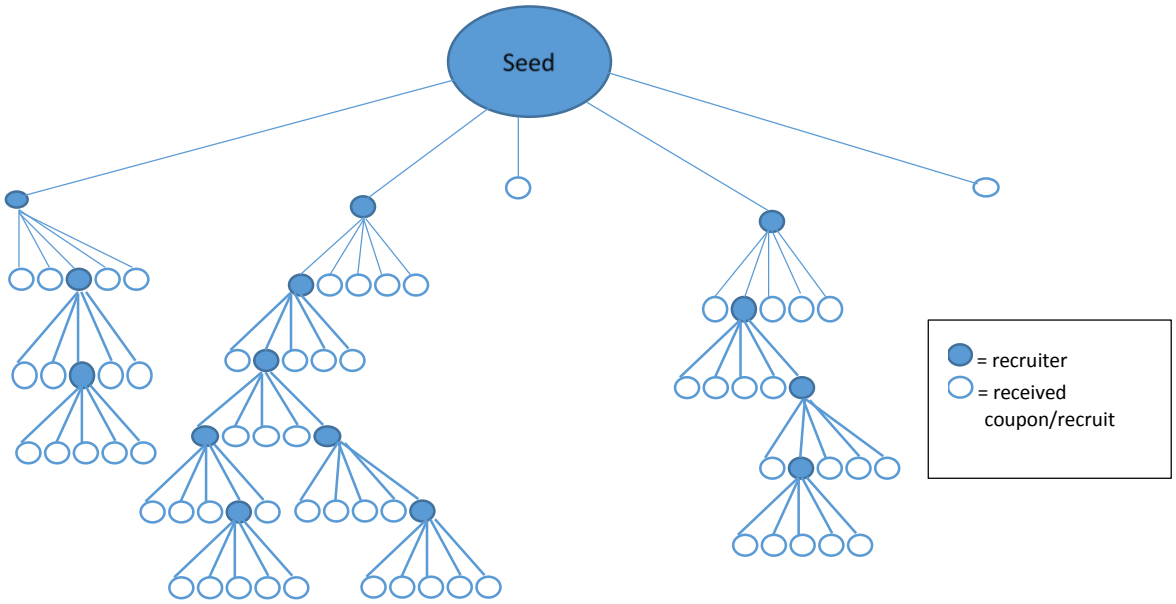


Figure 1 Hypothetical recruitment chain for peer-driven risk tracing snowball

1.3. Program Description

1.3.1. Setting

"PDI+", as coined by Flagship, is a PDI approach to finding new HIV cases, utilizing drop-in centers and KP clubs as community-based locations for HTC. PDI+ was introduced by Flagship in August 2016 in collaboration with NCHADS, as a novel approach in the Cambodian setting to identify KP living with HIV. According to the draft concept note, the primary purpose of PDI+ was "to boost the finding of new cases among KP who are unreached and hard to reach and who do not know their own HIV status, through referring them for HIV prevention programming, HIV testing and counseling (HTC), and care and treatment". Incentives were provided to recruiters and participants (NCHADS, 2017).

Between 1 August 2016 and 31 January 2017, Flagship implemented PDI+ in Siem Reap, Phnom Penh, and Kampong Cham. A total of 2,377 KP underwent HTC: 1,382 MSM, 711 TG, 155 PWID, and 129 EW. The HIV positivity yield (# HIV reactive tests/# individuals tested) among KP tested were reported to be 2%, 3.8%, 2.6%, and 1.6%, respectively (Flagship, 2017). These HIV positivity yields were higher than those found in CBHTC from 2013-16, which were 0.2%, 0.7%, 0.9%, and 0.3%, respectively (HIEP 2017).

PDI+ was implemented in Siem Reap, Phnom Penh, and Kampong Cham. See table 3.

Table 2 PDI+ locations and Target Groups

Organization	Location	KP Target Group
MHSS	Phnom Penh	MSM
MHC	Phnom Penh	TG
MHC	Siem Reap	MSM & TG
Korsang	Phnom Penh	PWID
PSOD	Kampong Cham	EW

1.3.2. PDI+ Participant Selection and Process

Definition of Seeds and Recruiters:

Seeds were identified from target groups that are at risk of HIV infection and were trained on how to select their peers to take part in the program. Seeds were not required to receive HTC. For EW at high-risk venues, seeds were encouraged to cooperate with entertainment establishment owners or Mekar to recruit EW that are at risk/high risk for HIV and that had not received HTC in the previous six months. Table 2 describes the selection criteria for seeds, recruiters, and participants under PDI+.

Table 3 PDI+ Selection Criteria for Seeds, Recruiters, and Participants

Selection Criteria		
Seeds	**Recruiters**	**Participants**
1. Age 18 years old or above	1. Age 18 years old or above	1. Age 18 years old or above
2. Are from target groups	2. Are from target groups	2. Are from target groups
3. Being at risk or high risk to HIV infection	3. Being at risk or high risk to HIV infection	3. Being at risk or high risk to HIV infection
4. Never tested for HIV in the last 6 months	4. Never tested for HIV in the last 6 months	4. Selected from entertainment establishments or hotspots
5. Can speak and understand Khmer language	5. Can speak and understand Khmer language	5. Never tested for HIV in the last 6 months
6. Respect the rights and maintain confidentiality of their peers who are referred to get tested for HIV	6. Respect the rights and maintain confidentiality of their peers who are referred to get tested for HIV	6. Can speak and understand Khmer language
7. Agree with full consent to involve in the program	7. Agree with full consent to involve in the program	7. Agree with full consent to involve in the program
8. Each KP can only refer their peers from within same KP group (for example, EW referring EW, MSM referring MSM, and so on)	8. Each KP can only refer their peers from within same KP group (for example, EW referring EW, MSM referring MSM, and so on)	
9. Know at least 10 people who have similar characteristics to them		
10. *Optional*: Selected from entertainment establishments or hotspots		

Incentives

Under PDI+ participants receive US$2.50 if they agreed to take a HIV test after passing the eligibility screening and being screened as at risk or at high risk of HIV infection. Initial seeds and recruiters could receive an additional US$2.50 for each person they successfully recruit to be a participant.

The PDI+ Procedure

The PDI+ process follows a series of defined steps as described in figure 2 and below from (NCHADS 2017)

Staff and OW identify potential KP as seeds, including HIV-positive KP. The first seeds are pre-screened using either the tablet-based or the paper-based risk screening tool.

a. Drop-in center or club managers record the names in the registration lists and interview the participants using the KP-specific eligibility questionnaire. Staff seek additional support from OW to verify unique identification cards and the registration lists to see whether or not participants had already been reached with prevention services.
b. Participants meet with staff to be screened for HIV risk, get pre-counseling, and fill in the consent form for HTC. In cases where lay counselors have found out that the participants had already been tested for HIV and the result was confirmed positive, or that the participants are already in HIV care and treatment, lay counselors will not re-administer HIV testing.
c. Participants get tested for HIV and wait for the result.
d. Participants meet with the lay counselor to receive post-test counseling and interpret the result.
e. In case of reactive result, a case manager or outreach workers (OW) will refer that case to immediately get confirmatory testing at VCCT or NGO clinic. If the result is positive after the confirmatory test, the lay counselor will collaborate with the case manager in the community to facilitate the process of registering the case in care and treatment at a preferred Pre-ART/ART place by the KP.
f. Participants meet with the drop-in center or club manager to receive the incentive.
g. Participants who have the potential to recruit their fellow peers and refer them for HTC as part of PDI+ will be asked to become recruiters and receive step-by-step explanation of the program.

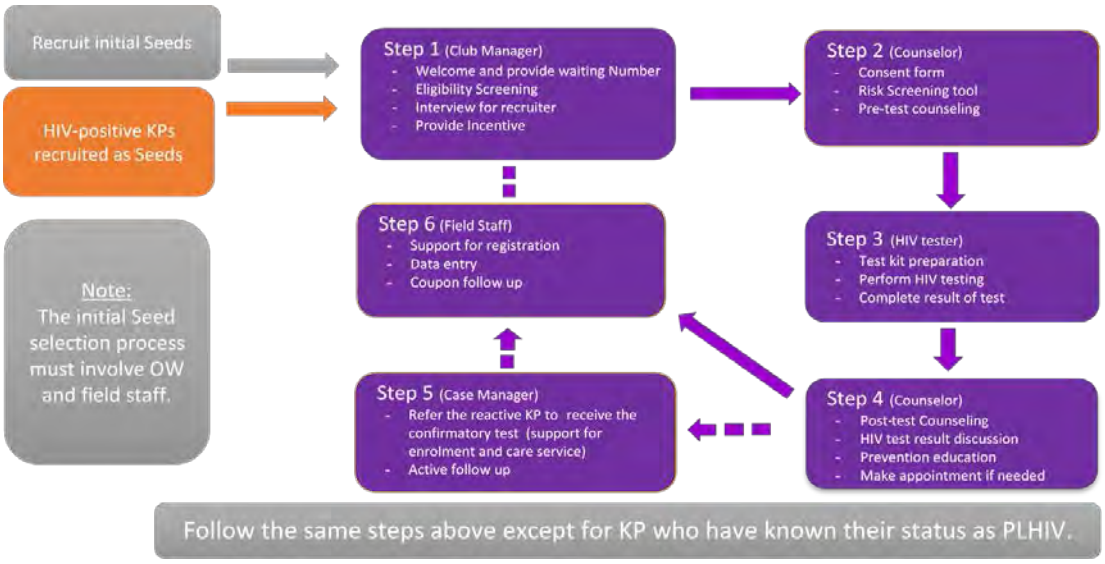


Figure 2 *The flow chart for PDI+ (Source: NCHADS, 2017)*

2. Evaluation Rationale

The effectiveness of PDI+ has not yet been measured, nor has its cost-effectiveness. This evaluation aimed to evaluate the effectiveness and acceptability of PDI+, along with the cost-effectiveness of identifying KP at high HIV-risk and those living with HIV in comparison to CBHTC. This outcome evaluation aimed to provide evidence to guide future HIV testing programs for hard-to-reach key populations in Cambodia.

3. Evaluation Questions

This evaluation was guided by the key questions below:

1. What was the effectiveness of PDI+ in identifying new cases of HIV, as measured by HIV positive yield, compared to outreach-based CBHTC?
2. What was the cost-effectiveness of PDI+ as measured by cost/person tested and cost per new case of HIV identified compared to outreach-based CBHTC?
3. What was the acceptability of, motivations toward the use of coupons for HIV testing, and satisfaction with PDI+, among target populations of KP (MSM, TG, PWID, and EW)?
4. What were suggested improvements (including efficiency) to the implementation of PDI+ from KP?
5. What were staff perspectives on the implementation of PDI+?
6. What were suggested improvements (including efficiency) to the implementation of PDI+ from implementing staff?

4. Objectives of the Evaluation

The ultimate objective of this evaluation was to provide rigorous evidence regarding the effectiveness efficiency, and acceptability of PDI+ implementation. An accurate understanding of what outcomes have been achieved by this program, management practices, and factors affecting the implementation will help inform planning and policy options regarding the improvement and replication of the PDI+ for KP in the country, and facilitate reinforcement of strong points and redress of shortcomings.

The immediate objectives this evaluation were to: 1) examine the effectiveness of PDI+ in identifying new cases of HIV, as measured by HIV positive yield, compared to outreach-based CBHTC; 2) estimate the cost-effectiveness of PDI+ as measured by cost/person tested and cost per new case of HIV identified compared to outreach-based CBHTC; 3) describe the acceptability of, motivations toward the use of coupon for HIV testing, and satisfaction with, PDI+ among target populations of KP (MSM, TG, PWID, and EW); and 4) identify suggestions to improve PDI+ among KP, implementing staff, and stakeholders.

5. Scope of the Evaluation

The evaluation focused on the effectiveness of PDI+ implemented in Siem Reap, Phnom Penh, and Kampong Cham from 01 August 2016 through 30 April 2017. Comparison of HIV positive yields and numbers of individual tested were made to the matching time period of the previous year when CBHTC was being implemented, 01 August 2015 through 30 April 2016.

The evaluation also examined the cost-effectiveness of PDI+ implemented in Siem Reap, Phnom Penh, and Kampong Cham from 1 August 2016 through 30 April 2017, compared to the matching time period of the previous year when CBHTC was being implemented, 1 August 2015 through 30 April 2016. Cost-effectiveness was measured by cost per new case identified and cost per individual tested for HIV.
The evaluation prospectively recruited KP from Siem Reap, Phnom Penh, and Kampong Cham from May 2017 through June 2017 to determine client perceptions of the PDI+, as well as risk factors for HIV among these clients.

Besides the focus on the program effectiveness and cost allocation above, this evaluation also assessed the PDI+ implementation process in order that management practices and factors affecting the implementation can be systematically identified and suggested for improvement.

6. Evaluation Design

A mixed methods design was employed in this evaluation in order that all questions mentioned above could be addressed. The concurrent procedure was applied for both quantitative and qualitative data collection and analyses. The two forms of data were independent of each other.

Quantitative data were derived from two sources: program database and structured interviews with clients. The program datasets were used to examine the effectiveness of PDI+ in identifying new cases of HIV, whereas quantitative data from structured interviews with client were used to describe the acceptability of, motivations toward the use of coupon for HIV testing, and satisfaction with PDI+ among target populations of KP (MSM, TG, PWID, and EW).

Qualitative data were collected from KP and staff of implementing organizations to gain their perspectives and suggested improvement on the implementation of PDI+.
Cost allocation was employed in order to estimate the cost-effectiveness of PDI+ as measured by cost per HIV test and cost per new case of HIV identified compared to outreach HTC. Cost allocation was the process of identifying, aggregating, and assigning costs to activities. This study design was retrospective in nature, leveraging data from past financial records, budgets, invoices, inventories, contracts, etc.

7. Methods

A program dataset from the beginning of PDI+ (August 2016 for MSM, TG, and PWID; November 2016 for EW until 30 April 2017) consisting of risk screening and recruitment network data was used for statistical analysis. The CBHTC program dataset from 01 August 2015 through 30 April 2016, before the commencement of PDI+, was also utilized for comparisons between the two approaches.

In addition to the program datasets, a cross sectional survey utilizing a structured questionnaire was employed with KP clients (EW, MSM, TG, and PWID), and semi-structured interviews were used with KP and staff of implementing organizations to identify suggested improvements of the program and efficiency of the program implementation.

The collection of costing data covered two periods: 01 August 2016 through 30 April 2017 compared to the matching time period of the previous year when outreach HTC was being implemented, 01 August 2015 through 30 April 2016. Cost-effectiveness was measured by cost per new case identified and cost per HIV test.

8. Sampling Procedures

8.1. Sample Size/Number of Participants

8.1.1. Sample Size for Quantitative Data Collection

The population size under the study coverage was small (less than 100,000) and most of the variables in the questionnaire were nominal or ordinal measurement. Furthermore, the characteristics of each sub-group of KP are not the same, requiring independent sample size computations for each sub-group. The formula below was therefore the most appropriate to calculate sample sizes for each sub-group (Rea & Parker, 2005).

$$\boldsymbol{n_0} = [Z_{\alpha}^2[p\ (1\text{-}p)]\ N]/\ [Z_{\alpha}^2[p\ (1\text{-}p)] + (N\text{-}1)C_p^2]$$

- p is a true population proportion. It is unknown. The most conservative way of handling this uncertainty is to set the value p at the proportion that would result in the highest sample size. The

variance of the sample proportions are maximized when the population proportion is ½, meaning that we assume that each sub-group of KP are equally split between the occurrence of the event and non-occurrence of the event.

- C_p: confidence interval in terms of proportion. It is typically set not to exceed 10%. In this survey it is set to be 8 percent (.08) (margin of error). The margin of error is the radius of a confidence interval for a particular statistic from a survey, or the amount of random sampling error in the survey results. Confidence Interval is the range into which the true population parameter will fall, assuming a given level of the confidence.
- Confidence Level is the probability that a confidence interval will include the population parameter.
- $Z_{\propto}$: Z score for various levels of confidence ($\propto$). It is most commonly set at: *1.96 for the 95 per cent level of confidence or 2.58 for the 99 per cent level of confidence.* In this study, it is set at 1.96 for the 95 per cent level of confidence. This level is the probability that a margin of error around the reported percentage would include the "true" percentage.
- N: number of population
- $\boldsymbol{n_0}$: sample size for simple random sampling.

Finally, replacing *p* with .5, we have:

$$\boldsymbol{n_0} = [Z_{\propto}^2(.25)\ N]/\ [Z_{\propto}^2(.25) + (N-1)C_p^2]$$

The above formula was applicable for statistical testing under simple random sampling. This study data, however, were not collected by simple random sampling. Since PDI+ is within the family of respondent-driven sample strategies, it was necessary to adjust the above formula by taking into account the design effect (*deff*), a measure of how different a sample of complex sampling design was from a simple random sample. For this study it was set at 1.5. The final sample size calculation based on above formula is demonstrated in Table 4.

Table 4 Estimated sample size

KP	$Z_{\propto}^2$	#KP*	$Z_{\propto}^2(.25)$	$[Z_{\propto}^2(.25)\ N]$	C_p	$(N-1)C_p^2$	$[Z_{\propto}^2(.25)\ N]/\ [Z_{\propto}^2(.25) + (N-1)C_p^2]$	deff	n
MSM	3.8416	1217	0.9604	1168.81	0.08	8.74	134	1.5	201
TG	3.8416	571	0.9604	548.39	0.08	4.61	119	1.5	178
EW	3.8416	640	0.9604	614.66	0.08	5.05	122	1.5	183
PWID	3.8416	550	0.9604	528.22	0.08	4.47	118	1.5	177
								Total	739

Note: #KP: these numbers are based on the program target.*

It was necessary to have appropriate sample size in order to describe the acceptability of, motivations toward the use of coupons for HIV testing, and satisfaction with, PDI+ among target populations of each sub-group of KP. In this regard, the above estimated sample size was increased in order to ensure sufficient sample size for the description and comparison between locations.
However the sample sizes for EW in Kampong Cham and PWID in Phnom Penh could not be achieved as required by statistical computation above. There were a number of reasons, as described in the section of limitations and challenges. The required and actual sample sizes for this evaluation are illustrated in Table 5 below.

Table 5 Required sample size

NGO	Province	TG		MSM		EW		PWID		Total	
		Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual
MHC	Phnom Penh	100	104							100	104
	Siem Reap	100	100	110	110					210	210
PSOD	Kampong Cham					200	164			200	164
MHSS	Phnom Penh			110	110					110	110
Korsang	Phnom Penh							177	78	177	78
	Total	200	204	220	220	200	164	177	78	797	666

8.1.2. Number of Participants in Qualitative Data Collection

Six focus group discussions (31 total participants) were held with PDI+ implementation teams for each sub-group of KP and implementation sites above. Forty eight participants from the survey were selected for in-depth interviews, especially to probe for more responses toward the PDI+ implementation and to validate their responses provided in the survey interviews.

Table 6 Number of participants in qualitative data collection

Province	KP	#IDI	FGD with PDI+ Implementing Staff	
			#FGD	#Participants
Phnom Penh	MSM	7	1	7
	TG	10	1	5
	PWID	5	1	3
Siem Reap	MSM	9	1	4
	TG	8	1	6
Kampong Cham	EW	10	1	6
Total		48	6	31

8.2. Sampling Strategy

8.2.1. Quantitative

It was originally planned that all KP that came to get HTC at clubs and hotspots through PDI+ would be contacted for the exit interview. The period of contact with clients was expected to happen from 27 June to the end of July 2017. The process would be completed when the target sample size was achieved. However, due to limited number daily clients and PDI+ implementation arrangements during the period of this evaluation, the lists of previous clients of PDI+ were used to contact them for interviews in addition to the exit interviews in order to reach the desired sample size.

Table 7 Sources of participants in survey

KP	Exit interview	PDI+ client list	Total	
EW - Kampong Cham	0%	100%	100%	*164*
TG - Phnom Penh	51%	49%	100%	*104*
TG - Siem Reap	44%	56%	100%	*100*
MSM - Phnom Penh	46%	54%	100%	*110*
MSM - Siem Reap	15%	85%	100%	*110*
PWID - Phnom Penh	18%	82%	100%	*78*
Overall	27%	73%	100%	*666*

8.2.2. Qualitative

Purposive sampling was used to select staff from the implementing partner organizations, to gain a deeper understanding of the PDI+ implementation at the ground and identify suggested improvements for implementation. A purposive sampling strategy was also used to select KP for qualitative interviews in order to gain insights regarding suggested improvements to the implementation of PDI+. These KP were selected from those who participated in survey. Those who were passive, active, and neutral in providing responses to survey were selected for the follow-up interviews using semi-structured guide.

8.3. Inclusion Criteria

All clients who came to get HIV testing at clubs or hotspots through PDI+ approach as well as previous clients from the list of PDI+ were included in this study. In addition to the inclusion criteria for clients to participate in PDI+ including risk screening and HTC, clients with low risk were included in this study as well in order that their characteristics and motivation could be observed. The selection criteria for participants of PDI+ were: age 18 years old or older, from target groups of KP, selected from entertainment establishments or hotspots, can speak and understand Khmer language, and agree with full consent to involve in the program and this study.

9. Evaluation Team

The evaluation was undertaken by a team possessing academic backgrounds in health and social science, capacities, skills and experience in research and impact evaluation design, management, and analysis. The team consisted of the following people:

- Dr. Christian Pitter, MD, MPH, Chief of Party, USAID HIV Innovate and Evaluate Project, University Research Co. LLC.
- KHUN Sithon, Ph.D. (Demography), M.A. (Population & Reproductive Health Research), B.A. (Sociology), Director of Research, USAID HIV Innovate and Evaluate Project, University Research Co. LLC.
- Yayne Fekadu, MPH, Research Consultant, USAID HIV Innovate and Evaluate Project, University Research Co. LLC.
- Mr. Song Koeun, MBA, Research Operation Manager, USAID HIV Innovate and Evaluate Project, University Research Co. LLC.
- Mrs. Oeng Sothary, B.A. (Sociology), Research Project Officer, USAID HIV Innovate and Evaluate Project, University Research Co. LLC.

Data collection was carried out by a pool of field researchers possessing bachelor degrees in social sciences, and were well equipped with knowledge, skills, and extensive experience in structured and semi-structured interviewing and data collection techniques with KP. They had been engaged in research and evaluation with USAID HIV Innovate & Evaluate Project in addition to their previous fieldwork experience with other organizations. These field researchers were a central part to quantitative data collection of this evaluation. Moreover, the quality of data collected was managed by a qualified data management specialist with experience and skills in data management using tablet computers. Data collection was conducted by Phok Chamreunodam, Kong Veha, Hay Davann, KONG Vanna, Iv Khambrasith, Loeurng Samoeurn, Mao, Sosengphyrun, Ouch Chanrith, Srun Phirath, Som Phanin, Khen Sophal, Hor Danet, and Inn Sieklim.

This external evaluation was carried out by the USAID HIV Innovate and Evaluate project, a project that is independent of the intervention project and the national HIV program in Cambodia. All members of the evaluation team were independent. All field researchers were trained to be independent and followed standard processes of independent evaluation.

10. Data Collection

10.1. Data Collection Team

Three types of data collection teams were formulated: a process evaluation team, a social research team, and a cost allocation team. The process evaluation team was composed of the Director of Research (principal investigator), a research project officer, and a research operation manager. The social research team was led by the Director of Research and coordinated by a research officer and research operation manager. The research operation manager oversaw and ensured quality of fieldwork for data collection. There were 6 field research teams carrying out data collection from clients of PDI+. Each team was composed of 2 senior field researchers, except for EW due larger sample size, three female senior field researchers were designated to collect data these data. The cost allocation was carried out by the director of finance the USAID HIEP, with technical support from the director of research.

10.2. Training for Data Collection

Since field researchers were central to the quantitative data collection, investment was made in order to ensure effective data collection, with the ultimate goal of producing high quality of data. The data collection teams were provided with a six-day training focused on the study background, evaluation protocol including methodology and sampling strategies, fieldwork strategies, questionnaire and tablet computer survey application, consent forms, data collection, and ethical requirements in independent evaluation. Technical personnel from Flagship provided orientation about the implementation of PDI+ approach.

Mock interviews were carried out among the research team. Four days were devoted to pilot interviews with clients from the PDI+ and consultation with PDI+ implementation teams in field to learn more about the implementation process and to arrange for actual data collection plan.

10.3. Fieldwork Management

Fieldwork for data collection was carried out from 26 June to 30 July 2017. Field researchers were stationed at the clubs or hotspots where clients came to get HIV tested through PDI+. After completing the screening process and/or HTC process, clients were contacted by field researchers at the clubs or hotspots for exit interviews. Field research team worked closely with PDI+ teams regarding the selection of appropriate location for an interview and the select of old clients from the list of PDI+ for interviews. The interviews were conducted either at the facility/hotspot or another place agreed by the participants as convenient for private conversation, while ensuring safety for field researchers.

Monitoring data collection was central to ensuring data quality. The project staff monitored data collection activities on a daily basis. A facilitation model was used in order to build a strong research team with a common goal of providing good quality data. A key role of the research project staff was to facilitate the jobs of field researchers who carries out data collection activities. Daily monitoring allowed to oversee the following: 1) completion of interview quota; 2) number of participants completed the interview, 3) number of individuals who refuse to participate in the interview; 4) number of participants who are found to be ineligible for the interview; and 5) the pattern of interview refusal.

Based on monitoring information, the research management team assessed how field researchers were administering study information and the consent form, how the field team checked eligibility, especially to ensure that it was being determined correctly, and how the field researchers conducted the interviews. A fieldwork operation manual for data collection was designed, and this guided the processes of data collection. The social media platform WhatsApp was intensively used by the evaluation team, creating a platform of interactive communication among the field researchers across the study sites and the management team at the central office which allowed the provision of backstopping support from the management team at central office.

10.4. The Instruments

The tablet computer assisted personal interviewing application, SurveyToGo for Android, was used to collect quantitative data from PDI+ clients. The questionnaire was designed in SurveyToGo Studio.
The following four methods were used to evaluate draft survey questions developed by research team in order that content standards, cognitive standards, and usability of the questions were ensured and quality of measurement (validity and reliability) were enhanced. The content standards were related to whether the questions asked about the right things. Cognitive standards referred to the issues regarding whether respondents understood the questions consistently, had the information required to answer questions, and were willing and able to formulate answers to the questions; and, usability standards were in place to ensure the interviewer and respondents were able to complete the questionnaire easily as they were intended.

- Technical team reviews: the subject matter team reviewed the questions to assess whether their content was appropriate for measuring the intended concepts.
- Semi-structured interviews with KP were organized to explore what they knew about the issues that the questionnaire would cover, how they thought about the issues, and what terms they used in talking about them.
- Cognitive interviews: field researchers administered draft questions in individual interviews, probed to learn how the respondents understood the questions, attempted to learn how they formulated their answers.
- Pilot tests: each field researchers conducted at least 3-5 interviews with KP. The interviews were recorded with permission from respondents. The recordings were reviewed by the field researchers and research management team in order to identify questions that were difficult to read as worded or hard for respondents to answer. Then debriefing with field research teams was held to gain their insights into the problems they had in asking the questions or those the respondents had in answering. Data from field pretests were analyzed to identify signs of trouble.

"Free flow" conversations with the PDI+ implementation team at field offices were conducted, affording rich qualitative data regarding the process of implementation and PDI+ management.

To collect costing data, a financial matrix was developed to capture expenditure data from financial records. The costs incurred by the supporting and coordination services carried out by staff from the PDI+ team and Flagship project were included and collated.

10.5. Incentives

Each participant received an incentive of $2.5 for transportation. This incentive was provided to participants who completed the interview.

10.6. Sources of Costing Data

Historical data from the accounting system and other records from Flagship project and implementing partner organizations were collected. The costing data were provided by organizations based on the matrix for costing data input developed by the evaluation team.

11. Data Management

The tablet computer survey software, SurveyToGo, helped centralize data and facilitated data processing, and allowed for monitoring progress, including quotas and interviewers' locations to ensure accurate and timely responses. Data were synchronized to the server after each interview in the field. This tablet computer application allowed for efficient skip patterns and reduced the needed time for data entry and cleaning. Field researchers uploaded completed questionnaire after data have been edited. Data editing was done immediately after completing each interview. Data management specialist was responsible for data management, including:

- Synchronization of data from field researchers,

- Response validation using advanced logic rules in SurveyToGo for Android. The validation rules controlled whether the answers were valid or not,
- Checking data and send feedback to field researchers, and
- Tracking enumerator progress and efficiency.

The SurveyToGo application provided solutions to the following types of data errors: 1) domain errors: each question had a domain (or range) of valid answers- an answer outside this domain was considered an error; and 2) routing errors (skip pattern errors): the questionnaire contained routing instructions- A routing error occurred when an interviewer or respondent failed to follow a routing instruction, and a wrong path was taken through the questionnaire.

12. Data Analysis Framework

To address multiple evaluation questions, descriptive statistical techniques including PCA were employed using STATA. Data analysis framework is illustrated in Table 8.

Table 8 Framework for data analysis

	Evaluation Question	Analysis Approach
1.	What was the effectiveness of PDI+ in identifying new cases of HIV, as measured by HIV positive yield, compared to outreach-based CBHTC?	• Comparisons of the number and proportions of HIV positive KP recruited through PDI+ approach and through outreach-based CBHTC approach.
2.	What was the cost-effectiveness of PDI+ as measured by cost/HIV test and cost per new case of HIV identified compared to outreach HTC?	• Resources used during the implementation of PDI+ from 01 August 2016 through 30 April 2017, and before the PDI+ (outreach HTC), from 01 August 2015 through 30 April 2016 were estimated by reviewing administrative and financial records. • The cost per HIV test and cost per new case identified in PDI+ were compared with outreach HTC.
3.	What was the acceptability of, motivations toward the use of coupon for HIV testing, and satisfaction with PDI+ among target populations of KP (MSM, TG, PWID, and EW)?	• Descriptive statistics were used to describe the acceptability of, motivations toward the use of coupon for HIV testing, and satisfaction with PDI+ among KP.
4. **5.** **6.**	What are suggested improvements (including efficiency) to the implementation of PDI+ from KP? What are staff perspectives on the implementation of PDI+? What are suggested improvements (including efficiency) to the implementation of PDI+ from implementing staff?	• An inductive approach was applied for the analysis of qualitative data. Based on this approach, the textual data from qualitative inquiries were condensed into a brief, summary format, developed a framework of the underlying structure of perspectives on the implementation of PDI+ and suggested improvements to the implementation of PDI+ from KP and implementers. Guidance note to finding new HIV cases through PDI+ has served as a basis of qualitative assessment process especially to identify suggested improvements.

13. Stakeholder Engagement

The evaluation questions, objectives, design, and method were formulated based on consultation meetings with various stakeholders including staff of implementing organizations, the technical staff from USAID HIV Flagship project, USAID concerned personnel, and the technical team from NCHADS. The

technical team from NCHADS provided administrative support and participated in field work as part of quality assurance, and technical inputs to ensure that information collected and analysis are useful for the national program.

14. Ethical Considerations

The protocol, data collection tools, and informed consent form were reviewed and approved by the Cambodian National Ethics Committee for Health Research (NECHR) on 7 June 2017, prior to starting of the study. This study was executed in compliance with the approved protocol, with no exceptions.
The consent form was translated from English to Khmer by research project staff who had good knowledge of the study area. Field researchers gave a copy of the informed consent form to every participant to read preceding the interview at all sites and asked participants if they had any questions. In cases of low-literacy, the information sheet and consent forms were read aloud by the field researchers to the participants during the consent process so that the participants could provide their consent with their signature.

The interviews were organized in a safe, private, and accessible location. Interviews lasted approximately one hour. The questionnaire was administered face-to-face with no other person in the setting than the field researcher and the study participant. The research team safeguarded these protections for participants:

- Participation was completely voluntary;
- Subjects were free to withdraw at any time;
- Informed consent was signed in a private setting;
- Confidentiality was guaranteed on all documents and tools used;
- No names was used in written documentation of the study; and
- Field researchers were trained in discussing sensitive issues and protecting respondents' confidentiality and human rights.

15. Limitations and Challenges

Based on statistical computations, exit interviews with 797 clients of PDI+ were required in order to ensure sufficient power for the comparison across the sub-groups of KP. Within the given timeframe of fieldwork for data collection from 26 June to 30 July 2017 only 666 clients were reached for the interviews, and 27% of these clients were interviewed immediately after they completed HTC through PDI+ (exit interviews) while 73% were selected from the lists of PDI+. There were very few clients during this study period, and some days there was no client. During the 35 days of fieldwork for data collection, PDI+ team of MHC in Siem Reap carried out PDI+ for only 8 days for both MSM and TG, and 13 for TG in Phnom Penh. The PDI+ teams were lined up with a number of activities such as making preparations of quarterly reports, meeting with donors, and trainings provided by Flagship. For MSM and PWID in Phnom Penh, MHSS and Korsang carried out daily activities during the study period but there were very few clients reached and some days they did not reach any clients.

For MSM and PWID in Phnom Penh (MHSS and Korsang), there were very few clients reached and some days they did not reach anyone. It was an extremely challenging task for the PWID PDI+ team, as well the

research team, to reach PWID during this study period. The government has implemented a campaign to combat drug dealing including users. In the vicinity of Ta Pang market (PWID hotspot, gathering place to buy drug), police officers circulated every day.

PDI+ for EW in Kampong Cham ended in April 2017. Because data collection occurred in late June 2017, the research team had to use the list of clients who had previously been tested for HIV through PDI+. The required sample for EW in Kampong Cham and PWID in Phnom Penh could not be reached due to a number of reasons such as changed names and working places, non-working mobile phone numbers, etc.

16. Results

16.1. Program Data Analysis

Table 9 shows that 3,193 total clients received HTC through PDI+. Overall, 49.5% of KP were new.[1] Among MSM in Phnom Penh and Siem Reap, 35% and 41% of PDI+ clients were new, respectively; among TG in Phnom Penh and Siem Reap, 76% and 81% of PDI+ clients were new, respectively; among PWID in Phnom Penh 70% of PDI+ clients were new; and among EW in Kampong Cham 30% of PDI+ clients were new. The evaluation was unable to compare the proportions of new clients for HTC between outreach-based HTC and PDI+, because of limitations in the outreach HTC dataset.

Table 9 Type of Client by Program Type and Key Population

Program Type	Client Type	KP Sub-group						Total	Chi-Square Test
		EW - Kampong Cham	MSM - Phnom Penh	MSM - Siem Reap	TG - Phnom Penh	TG - Siem Reap	PWID - Phnom Penh		
PDI+	Old	69.8%	65.3%	59.1%	24.5%	19.3%	29.9%	50.5%	461.720, df=5, p=.000
	New	30.2%	34.7%	40.9%	75.5%	80.7%	70.1%	49.5%	
	Total	100%	100%	100%	100%	100%	100%	100%	
		262	*1115*	*756*	*523*	*316*	*221*	*3193*	

[1] Old clients were referred to those who had been tested at NGO facilities and outreach, whereas those who tested elsewhere and never tested were classified as new clients.

Table 10 shows that the clients recruited through PDI+ had an overall higher HIV prevalence than clients recruited through outreach (2.3% vs 1.2%, respectively, p=0.006), and only among MSM in Siem Reap was the prevalence rate higher under outreach HTC than under PDI+ (2.8% vs 1.6%), though this latter difference was not statistically significant. The subgroup differences in prevalence rates were only statistically significant for TG in Phnom Penh and TG in Siem Reap (p=0.004 and p=0.031, respectively).

Table 10 HIV Status between Outreach HTC and PDI+

KP	Program Type	HIV Status		Total	N	Fisher's Exact Test
		Non-Reactive	Reactive (+)			
EW - Kampong Cham	Outreach HTC	**99.5%**	**.5%**	100%	550	
	PDI+	98.5%	1.5%	100%	262	.221
	Total	99.1%	.9%	100%	812	
MSM - Phnom Penh	Outreach HTC	98.6%	1.4%	100%	736	
	PDI+	98.1%	1.9%	100%	1115	.462
	Total	98.3%	1.7%	100%	1851	
MSM - Siem Reap	Outreach HTC	97.2%	2.8%	100%	288	
	PDI+	98.4%	1.6%	100%	756	.213
	Total	98.1%	1.9%	100%	1044	
TG - Phnom Penh	Outreach HTC	99.7%	.3%	100%	327	
	PDI+	96.9%	3.1%	100%	523	.004
	Total	98.0%	2.0%	100%	850	
TG - Siem Reap	Outreach HTC	99.1%	.9%	100%	233	
	PDI+	95.9%	4.1%	100%	316	.031
	Total	97.3%	2.7%	100%	549	
PWID - Phnom Penh	Outreach HTC	97.4%	2.6%	100%	192	
	PDI+	97.3%	2.7%	100%	221	1.000
	Total	97.3%	2.7%	100%	413	
Overall	Outreach HTC	98.8%	1.2%	100%	2326	
	PDI+	97.7%	2.3%	100%	3193	.006
	Total	98.2%	1.8%	100%	5519	

16.2. Client Survey Results

16.2.1. Characteristics of Participants

Table 11 shows that with the exception of EW, the KP populations interviewed that had undergone PDI+ were not very mobile, with more than 75% having lived in their current location for more than 2 years (compared to only 54% of EW). EW also had the highest incomes, with 32% earning more than $300/month. Most subgroups had primarily young participants, except for PWID, for whom 69% were aged over 30 years.

Table 11 Characteristics of Participants

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Duration living in current location								
Less than 1 year	22.0%	4.8%	1.0%	9.1%	4.5%	1.3%	8.7%	123.843, df=10, p=.000
1 - 2 years	23.8%	12.5%	4.0%	14.5%	0.0%	0.0%	10.8%	
2 years and above	54.3%	82.7%	95.0%	76.4%	95.5%	98.7%	80.5%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Duration working in current workplace							-	
Less than 1 year	59.1%	27.9%	18.0%	54.5%	56.4%	29.5%	43.4%	103.166, df=10, p=.000
1 - 2 years	23.8%	26.0%	18.0%	21.8%	16.4%	14.1%	20.6%	
2 years and above	17.1%	46.2%	64.0%	23.6%	27.3%	56.4%	36.0%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Age								
Under 25 years	46.3%	41.3%	39.0%	59.1%	67.3%	10.3%	45.8%	138.923, df=10, p=.000
25 - 30 years	37.8%	37.5%	35.0%	30.9%	19.1%	20.5%	31.1%	
30 years and above	15.9%	21.2%	26.0%	10.0%	13.6%	69.2%	23.1%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Education								
No education	5.5%	1.9%	8.0%	0.0%	1.8%	39.7%	7.8%	256.878, df=20, p=.000
Primary school	54.3%	27.9%	30.0%	20.0%	21.8%	33.3%	33.0%	
Secondary school	31.7%	36.5%	32.0%	19.1%	35.5%	14.1%	29.0%	
High school	7.9%	29.8%	28.0%	44.5%	36.4%	10.3%	25.4%	
University	.6%	3.8%	2.0%	16.4%	4.5%	2.6%	4.8%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Marital status								
Single	12.2%	46.2%	28.0%	42.7%	37.3%	20.5%	30.0%	310.408, df=20, p=.000
Having partner and living together	6.7%	22.1%	19.0%	13.6%	5.5%	14.1%	12.8%	
Having partner but not living together	21.3%	29.8%	53.0%	38.2%	34.5%	2.6%	30.2%	
Married	19.5%	1.0%	0.0%	2.7%	19.1%	37.2%	12.9%	
Divorced/separated/widowed/widower	40.2%	1.0%	0.0%	2.7%	3.6%	25.6%	14.1%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	

Table 11 Characteristics of Participants (Continued)

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Main occupation								
Unemployed	.6%	6.7%	5.0%	11.8%	6.4%	21.8%	7.5%	1072.573, df=55, p=.000
Student	0.0%	2.9%	3.0%	7.3%	22.7%	0.0%	5.9%	
KTV	71.3%	1.0%	1.0%	0.0%	0.0%	0.0%	17.9%	
Massage/Sauna	17.1%	0.0%	7.0%	20.0%	2.7%	0.0%	9.0%	
Beer garden/restaurant/cafe	6.1%	11.5%	12.0%	8.2%	12.7%	1.3%	8.7%	
Beauty shop	.6%	35.6%	38.0%	3.6%	.9%	0.0%	12.2%	
Labor worker	0.0%	1.9%	4.0%	.9%	28.2%	15.4%	7.5%	
Staff at NGO/government/ private company offices	0.0%	2.9%	4.0%	20.9%	10.9%	1.3%	6.5%	
Freelance sex worker	.6%	7.7%	5.0%	2.7%	0.0%	0.0%	2.6%	
Seller at home/market	.6%	9.6%	6.0%	5.5%	0.0%	12.8%	5.0%	
Garbage collector	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	3.9%	
Other	3.0%	20.2%	15.0%	19.1%	15.5%	14.1%	13.5%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Average monthly income								
Under $200	19.5%	42.3%	49.0%	45.5%	58.2%	73.1%	44.4%	89.507, df=15, p=.000
$200 - $300	48.2%	31.7%	32.0%	30.0%	33.6%	19.2%	34.4%	
$301 - $500	20.7%	18.3%	9.0%	14.5%	7.3%	2.6%	13.2%	
$500+	11.6%	7.7%	10.0%	10.0%	.9%	5.1%	8.0%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	

16.2.2. HIV Testing Experience through PDI+

As shown in table 12, 50% of all KP experienced PDI+ HTC at a club or drop-in center, with 25% tested at a hotspot. There was significant variability in the location of last HTC across the groups. KP were overwhelmingly satisfied with their PDI+ HTC experience, with overall 91% of KP saying that they were satisfied.

Only 4% of all KP reported coming to HTC with a coupon (and no EW did). The largest proportion of clients (49%) received a coupon from NGO staff prior to testing, including 75% of Siem Reap TG and 86% of Phnom Penh MSM. 44% of clients reported not receiving a coupon at all, including 68% of EW in Kampong Cham, 62% of MSM in Siem Reap, and 83% of PWID in Phnom Penh.

The most common main reason given for undergoing HTC through PDI+ was wanting to know one's HIV status (76%), and a recommendation from the NGO Korsang was the second most common reason, given by 9% of KP, including 21% of EW, 15% of PWID, and 13% of TG in Siem Reap. Overall, only 2.7% of KP said their main reason given for undergoing HTC was receiving the incentive. 15% of PWID, however, said the incentive was their main reason given for undergoing HTC. While the majority of EW and PWID thought the incentive was attractive (59% and 76%, respectively), most TG and MSM thought the incentive was not attractive (60-78%).

The majority of KP (76%) completed HTC in 30 minutes or less. While the majority of EW and PWID thought the process was fast (64% and 55%, respectively), most TG and MSM thought the process was not fast (58-87%). 67% of KP thought the process of HTC under PDI+ was not complicated, and 92% of KP thought the test result was reliable.

Table 12 HIV Testing through PDI+

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Location of last PDI+ HTC								
Club/DIC	42.7%	29.8%	57.0%	99.1%	27.3%	42.3%	49.5%	
Hotspot	8.5%	13.5%	23.0%	0.0%	69.1%	51.3%	25.1%	
Karaoke	36.0%	0.0%	0.0%	0.0%	0.0%	0.0%	8.9%	636.976, df=30, p=.000
Salon	0.0%	27.9%	6.0%	0.0%	0.0%	0.0%	5.3%	
Massage/Sauna	7.3%	1.0%	0.0%	0.0%	0.0%	0.0%	2.0%	
Rented room/home	4.9%	20.2%	7.0%	0.0%	2.7%	6.4%	6.6%	
Other	.6%	7.7%	7.0%	.9%	.9%	0.0%	2.7%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Satisfaction with the process of PDI+ HTC								
Not satisfied	4.9%	10.6%	13.0%	4.5%	20.0%	5.1%	9.5%	
Satisfied	95.1%	89.4%	87.0%	95.5%	80.0%	94.9%	90.5%	24.714, df=5, p=.000
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	

Table 12 HIV Testing through PDI+ (Continued)

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
PDI+ HTC coupon source								
Came to get HIV test with a given coupon in hand	0.0%	19.2%	1.0%	.9%	1.8%	2.6%	3.9%	306.287, df=15, p=.000
Came and got a coupon from my peer at HIV testing place	0.0%	10.6%	0.0%	3.6%	1.8%	0.0%	2.6%	
Came and got a coupon from NGO staff at HIV testing place	31.7%	56.7%	75.0%	85.5%	34.5%	14.1%	49.4%	
Did not get any coupon	68.3%	13.5%	24.0%	10.0%	61.8%	83.3%	44.1%	
Total	100%	100%	100%	100%	100%	100%	100%	
	164	*104*	*100*	*110*	*110*	*78*	*666*	
Main reason for accepting coupon for PDI+ HTC?								
Received money (incentive)	1.9%	3.3%	2.6%	0.0%	4.8%	15.4%	2.7%	89.316, df=55, p=.002
Close distance	0.0%	0.0%	1.3%	0.0%	2.4%	0.0%	.5%	
Confidentiality	1.9%	0.0%	0.0%	2.0%	2.4%	0.0%	1.1%	
Free service	1.9%	5.6%	3.9%	1.0%	0.0%	7.7%	3.0%	
cleanliness	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	.3%	
Friendly staff	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	.5%	
Get knowledge about HIV	7.7%	3.3%	0.0%	1.0%	2.4%	0.0%	2.4%	
Want to know HIV status	51.9%	77.8%	75.0%	85.9%	83.3%	53.8%	75.5%	
Due date of appointment	3.8%	3.3%	3.9%	0.0%	0.0%	7.7%	2.4%	
Recommended by Korsang	21.2%	5.6%	13.2%	5.1%	2.4%	15.4%	9.1%	
Other services available	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	.3%	
Other	3.8%	1.1%	0.0%	4.0%	2.4%	0.0%	2.2%	
Total	100%	100%	100%	100%	100%	100%	100%	
	52	*90*	*76*	*99*	*42*	*13*	*372*	
Completion time for the entire process of PDI+ HTC								
Under 15 minutes	5.0%	5.2%	8.6%	4.1%	15.0%	31.9%	10.1%	101.069, df=15, p=.000
15 - 20 minutes	18.8%	3.1%	16.1%	12.4%	17.0%	24.6%	15.3%	
21 - 30 minutes	57.5%	53.6%	58.1%	41.2%	49.0%	34.8%	50.5%	
30+ minutes	18.8%	38.1%	17.2%	42.3%	19.0%	8.7%	24.2%	
Total	100%	100%	100%	100%	100%	100%	100%	
	160	*97*	*93*	*97*	*100*	*69*	*616*	
Perceived completion time for entire process of PDI+ HTC								
Not fast	36.3%	86.6%	77.4%	71.1%	58.0%	44.9%	60.4%	89.922, df=5, p=.000
Fast	63.8%	13.4%	22.6%	28.9%	42.0%	55.1%	39.6%	
Total	100%	100%	100%	100%	100%	100%	100%	
	160	*97*	*93*	*97*	*100*	*69*	*616*	
Process of PDI+ HTC								
Not complicated	82.5%	52.6%	47.3%	76.3%	69.0%	59.4%	66.7%	48.348, df=5, p=.000
Complicated	17.5%	47.4%	52.7%	23.7%	31.0%	40.6%	33.3%	
Total	100%	100%	100%	100%	100%	100%	100%	
	160	*97*	*93*	*97*	*100*	*69*	*616*	

Table 12 HIV Testing through PDI+ (Continued)

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Result of PDI+ HTC								
Not reliable	3.1%	4.1%	9.7%	7.2%	17.0%	7.2%	7.6%	
Reliable	96.9%	95.9%	90.3%	92.8%	83.0%	92.8%	92.4%	
Total	100%	100%	100%	100%	100%	100%	100%	19.348, df=5, p=.002
	160	*97*	*93*	*97*	*100*	*69*	*616*	
Attractiveness of incentive for PDI+ HTC ($2.5)								
Not attractive	40.6%	77.9%	75.0%	60.2%	67.3%	24.4%	57.4%	
Attractive	59.4%	22.1%	25.0%	39.8%	32.7%	75.6%	42.6%	
Total	100%	100%	100%	100%	100%	100%	100%	88.340, df=5, p=.000
	160	*104*	*100*	*103*	*107*	*78*	*652*	

16.2.3. PDI+ Recruitment Process

The majority (63%) of clients reported that the NGO staff asked them to recruit their peers using the coupon. However, of those that were asked to recruit peers, only 26% said they received a coupon. This figure was lowest for MSM in Siem Reap (9%) MSM in Phnom Penh (11%), and EW (12%). Of clients that were asked to recruit peers, most (75%) said they received an explanation of how to do so, and most thought the process was well explained, as were the peer selection criteria and the benefits of peer recruitment.

The vast majority (90%) of recruiters said they were “satisfied” with being a recruiter, and most (71%) said their main motivation for recruiting their peers was to help their friends get an HIV test. Only 7% of recruiters reported their main motivation for recruiting peers was to get money. This figure was highest for PLHIV, 20% of whom reported this. The most common reasons given by recruiters of why peers that receive a coupon might not come for HTC were fear of knowing HIV testing result (25%) and limited time off work (25%).See Table 13.

Table 13 PDI+ Recruitment Process

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Did NGO staff tell you to recruit your peers to come to get HIV testing by using US$2.5 coupon?								
No	43.9%	33.7%	44.0%	30.9%	22.7%	47.4%	37.1%	
Yes	56.1%	66.3%	56.0%	69.1%	77.3%	52.6%	62.9%	
Total	100%	100%	100%	100%	100%	100%	100%	20.939, df=5, p=.001
	164	*104*	*100*	*110*	*110*	*78*	*666*	

Table 13 PDI+ Recruitment Process (Continued)

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
Did you get any coupon from staff at SMARTgirl/ Mstyle/Srey Sros Clubs/ Hotspots or Korsang to recruit your peers to come for HIV test?								
No	88.0%	53.6%	37.5%	89.5%	90.6%	61.0%	73.7%	87.762, df=5, p=.000
Yes	12.0%	46.4%	62.5%	10.5%	9.4%	39.0%	26.3%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
	92	69	56	76	85	41	419	
If yes, did you get any explanation on how to recruit your peers?								
No	20.7%	13.0%	19.6%	51.3%	29.4%	0.0%	24.6%	50.189, df=5, p=.000
Yes	79.3%	87.0%	80.4%	48.7%	70.6%	100.0%	75.4%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
	92	69	56	76	85	41	419	
The process of recruiting my peers was well explained)								
No	5.5%	18.3%	11.1%	16.2%	23.3%	0.0%	12.7%	17.798, df=5, p=.003
Yes	94.5%	81.7%	88.9%	83.8%	76.7%	100.0%	87.3%	
Total	100%	100%	100%	100%	100%	100%	100%	
	73	*60*	*45*	*37*	*60*	*41*	*316*	
The criteria of selecting my peers were very clear to me								
No	9.6%	28.3%	17.8%	18.9%	16.7%	2.4%	15.8%	15.122, df=5, p=.010
Yes	90.4%	71.7%	82.2%	81.1%	83.3%	97.6%	84.2%	
Total	100%	100%	100%	100%	100%	100%	100%	
	73	*60*	*45*	*37*	*60*	*41*	*316*	
Staff explained to me well benefits of recruiting my peers								
No	4.1%	28.3%	11.1%	8.1%	33.3%	12.2%	16.8%	29.557, df=5, p=.000
Yes	95.9%	71.7%	88.9%	91.9%	66.7%	87.8%	83.2%	
Total	100%	100%	100%	100%	100%	100%	100%	
	73	*60*	*45*	*37*	*60*	*41*	*316*	
How satisfied are you to be a recruiter?								
Not satisfied	5.4%	14.5%	7.1%	11.8%	16.5%	2.4%	10.3%	10.749, df=5, p=.057
Satisfied	94.6%	85.5%	92.9%	88.2%	83.5%	97.6%	89.7%	
Total	100%	100%	100%	100%	100%	100%	100%	
	92	*69*	*56*	*76*	*85*	*41*	*419*	

Table 13 PDI+ Recruitment Process (Continued)

Variable	Key Population							
	EW - Kampong Cham	TG - Phnom Penh	TG - Siem Reap	MSM - Phnom Penh	MSM - Siem Reap	PWID - Phnom Penh	Total	Chi-Square Test
What is your main reason to be a recruiter?								
Get money	4.3%	5.8%	3.6%	5.3%	9.4%	19.5%	7.2%	
Want to help friends to get HIV test	81.5%	71.0%	67.9%	72.4%	71.8%	48.8%	71.1%	37.762, df=25, p=.049
What to help friend to get HIV prevention knowledge	8.7%	15.9%	17.9%	10.5%	10.6%	12.2%	12.2%	
Want to fight against HIV	0.0%	2.9%	1.8%	5.3%	1.2%	4.9%	2.4%	
Want to introduce this HIV testing service to friends	4.3%	4.3%	5.4%	3.9%	1.2%	9.8%	4.3%	
Other	1.1%	0.0%	3.6%	2.6%	5.9%	4.9%	2.9%	
Total	100%	100%	100%	100%	100%	100%	100%	
	92	*69*	*56*	*76*	*85*	*41*	*419*	
What do you think will be the most important reason that those who receive a coupon but will not come to get HIV testing?								
No risk behavior	6.5%	2.9%	0.0%	9.2%	1.2%	0.0%	3.8%	
Fear of knowing HIV testing result	23.9%	27.5%	30.4%	22.4%	20.0%	34.1%	25.3%	138.857, df=40, p=.000
Afraid of other knowing HIV status	9.8%	4.3%	0.0%	1.3%	1.2%	2.4%	3.6%	
Shame of sexual identity	2.2%	10.1%	17.9%	26.3%	14.1%	0.0%	12.2%	
Not understand the benefit of HIV testing	8.7%	2.9%	0.0%	2.6%	1.2%	9.8%	4.1%	
Afraid of needle	9.8%	0.0%	1.8%	1.3%	11.8%	2.4%	5.3%	
Limited time off work	8.7%	39.1%	35.7%	25.0%	28.2%	19.5%	25.3%	
No transport	0.0%	5.8%	5.4%	0.0%	3.5%	0.0%	2.4%	
Other	30.4%	7.2%	8.9%	11.8%	18.8%	31.7%	18.1%	
Total	100%	100%	100%	100%	100%	100%	100%	
	92	*69*	*56*	*76*	*85*	*41*	*419*	

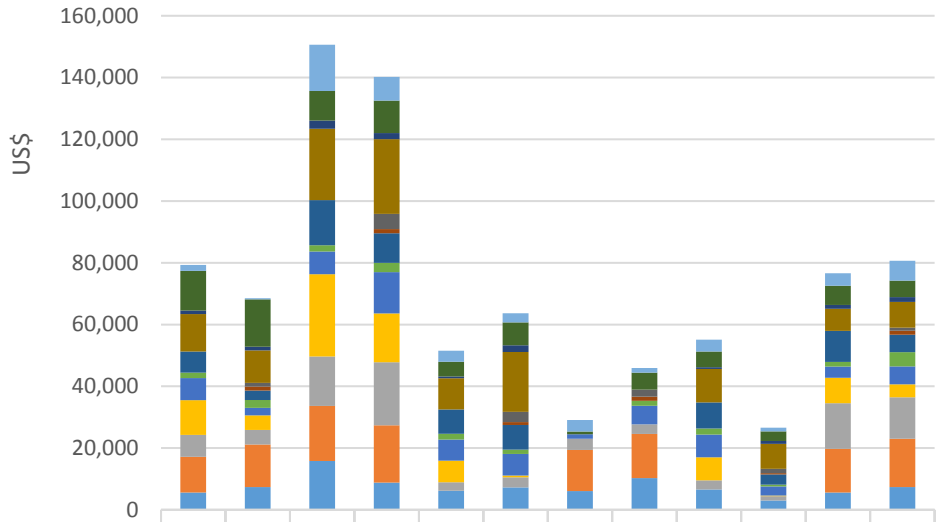
16.3. Staff Interviews

A total of 6 focus group discussions were conducted in Kampong Cham, Phnom Penh, and Siem Reap, with PDI+ implementing staff from PSOD, MHSS, Korsang, and MHC to glean insights on suggestions to improve implementation of PDI+. Key issues and suggestions include the following:

- Particularly after the initial period after which there was a decrease in recruitment, moving the base of operations to hotspots and work venues (e.g. KTV) from Clubs and Drop-in Centers can increase recruitment.
    - PDI+ mobile teams can facilitate this process, and team members should be flexible in their roles when basing HTC at hotspots.
    - Rented rooms or facilities near to the working venues or rooms in the working places of the target groups can also facilitate this process.
    - More intensive fieldwork utilized staff personal motorbikes, but they received no additional transportation support. Additional reimbursement should be made to account for additional expenses by staff.
- The incentive $2.5 for each recruit to get HIV testing may not be as attractive for those who lived further away from the facility, so consideration should be given to increasing the incentive based on distance.
- PDI+ teams had limited understanding of the system. For example, each recruit was given 5 recruitment coupons to recruit their peers, but in some cases if they had more than 5 peers to participate in the PDI+, the additional recruits were assigned to other recruiters who could not recruit the expected target number of 5 peers, though the coupon coding was still assigned to the original recruit. In examples across the PDI+ teams and KP subgroups, clients were verbally informed by PDI+ teams to find their peers to get HIV testing, but the coupons were kept by the PDI+ teams because they feared that the clients might lose them. More clear training of implementing staff was requested to ensure consistent and correct implementation of PDI+.
- Duplication is a concern for all PDI-type programs. Unique ID cards were not practical because many clients refused to use this card, with many stating that this card was to identify sex workers. Many clients also refused to disclose their true name and name of their parents. All PDI+ teams suggested that finger print devices should be used to address the issue of duplication.

16.4. Cost Allocation

As shown in figure 3, the total program costs for MSM in Phnom Penh were by far the highest, at more than $140,000 for both outreach HTC and PDI+, whereas all other total program costs fell below $81,000. The average total program cost was $73,711 for outreach HTC, and $70,927 for PDI+. Total program costs were similar in each location, except for among TG in Phnom Penh, where total outreach HTC costs were only 63% of the total PDI+ costs, and TG in Siem Reap, where total PDI+ costs were approximately one-third (35%) of the total outreach HTC cost.



	Outreach HTC	PDI+	Outreach HTC	PD+	Outreach HTC	PDI+	Outreach HTC	PDI+	Outreach HTC	PDI+	Outreach HTC	PDI+
	EW - Kampong Cham		MSM - Phnom Penh		MSM - Siem Reap		TG - Phnom Penh		TG - Siem Reap		PWID - Phnom Penh	
IP field office - referral	1,931	388	15,008	7,644	3,582	2,952	3,720	1,466	3,832	1,234	4,014	6,404
IP field office - Club/DIC	12,869	15,320	9,580	10,525	4,740	7,425	886	5,520	5,071	3,104	6,229	5,331
IP field office - administration	1,151	1,205	2,620	1,992	551	2,143	0	0	589	896	1,216	1,583
IP field office - program management/support	12,108	10,531	23,113	24,197	10,129	19,414	0	0	10,838	8,115	7,190	8,330
PDI+ incentive		1,155		4,918		3,308		2,283		1,403		975
PDI+ materials (coupons & tablets)	0	1,321	0	1,327	0	940	0	1,334	0	393	0	1,321
IP field office - outreach/PDI+	6,853	3,070	14,658	9,585	7,877	7,985	0	0	8,428	3,338	10,032	5,648
IP Monitoring and Evaluation	1,761	2,549	2,022	3,023	1,865	1,384	0	1,616	1,996	579	1,512	4,580
Meeting (including DSA)	7,161	2,412	7,325	13,382	6,851	6,982	1,451	5,999	7,331	2,919	3,631	5,835
IP capacity development	11,208	4,738	26,679	15,777	7,008	576	0	0	7,498	241	8,253	4,207
IP central office - administration	7,125	4,709	16,002	20,430	2,747	3,293	3,623	3,135	2,940	1,377	14,743	13,404
IP central office - program management	11,576	13,770	17,798	18,569	0	0	13,299	14,286	0	0	14,183	15,656
TA	5,588	7,374	15,840	8,823	6,163	7,244	6,090	10,272	6,594	3,028	5,588	7,374

Figure 3 Cost allocation – in US$

As shown in figure 4, the largest average proportional cost categories for PDI+ were IP field office - program management/support (17%), IP central office - program management (14%), TA (12%), and IP field office - Club/DIC (12%). The largest average proportional cost categories for outreach HTC were IP central office - program management (15%), IP field office - program management/support (13%), TA (12%), and IP capacity development (12%). The average incentives to clients and recruiters accounted for $2,340, or about 4% of the average cost at PDI+ sites.

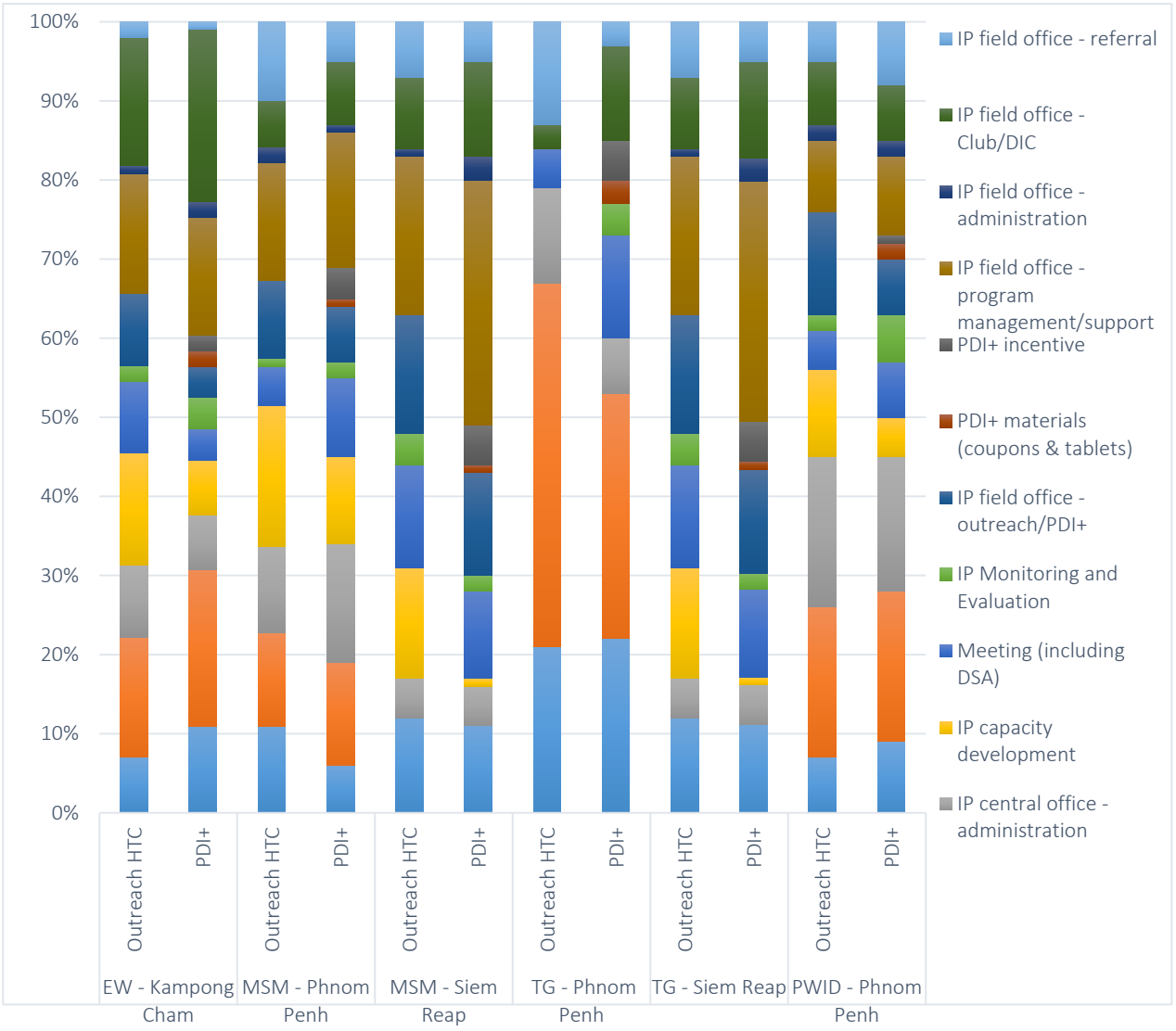


Figure 4 Cost allocation – in %

Slightly more total HIV tests occurred under outreach HTC than under PDI+ (3,474 vs 3,193), but more total HIV cases were identified under PDI+ than under outreach HTC (72 vs 29). The average cost per HIV test under outreach HTC was $144 (range $73-$330), and under PDI+ was $168 (range $88-$365). The highest costs per HIV test were among PWID Phnom Penh. The average cost per HIV case detected under outreach HTC was $19,982 (range $6,439-$29,068), and under PDI+ was $7,912 (range $2,048-$17,135). See table 14 and figure 5.

Table 14 Unit costs

KP	Program Type	Total cost ($)	HIV tests	Cost per HIV test ($)	HIV cases detected	Cost per HIV case detected ($)
EW - Kampong Cham	Outreach HTC	79,331	670	118	3	26,444
	PDI+	68,541	262	262	4	17,135
MSM - Phnom Penh	Outreach HTC	150,644	1,167	129	10	15,064
	PD+	140,192	1,115	126	21	6,676
MSM - Siem Reap	Outreach HTC	51,514	486	106	8	6,439
	PDI+	63,649	756	84	12	5,304
TG - Phnom Penh	Outreach HTC	29,069	399	73	1	29,069
	PDI+	45,910	523	88	16	2,869
TG - Siem Reap	Outreach HTC	55,117	520	106	2	27,559
	PDI+	26,625	316	84	13	2,048
PWID - Phnom Penh	Outreach HTC	76,590	232	330	5	15,318
	PDI+	80,647	221	365	6	13,441
Total	Outreach HTC	442,265	3,474	862	29	119,893
	PDI+	425,564	3,193	1,008	72	47,474
Average	Outreach HTC	73,711	579	144	5	19,982
	PDI+	70,927	532	168	12	7,912

Figure 5 Unit Costs

17. Discussion

This evaluation analyzed program data on 6,667 KP from Phnom Penh (TG, MSM and PWID), Siem Reap (TG and MSM), and Kampong Cham (EW), and interviewed 31 implementing staff and 666 KP from these locations. A key finding was that the HIV positive yield was a great deal higher among PDI+ clients than outreach HTC clients (2.3% compared to 1.2%, respectively, p=0.006). The 2.3% HIV positive yield found in the PDI+ approach was more than three times the average HIV positive yield found in KHANA supported sites (0.7%) among KP previously (KHANA, 2016). The higher PDI+ HIV positivity yield found, compared with traditional outreach approaches, is consistent with studies from elsewhere (Abramovitz, 2009; Johnston, 2006; Kimbrough, 2009). Examining the KP subgroups, however, revealed disparate findings. Among EW, MSM and PWID there were no statistically significant differences in HIV positive yields between outreach-based HTC and PDI+. Among TG, however, there was a statistically significant higher HIV positive yield between outreach-based HTC and PDI+ (0.3% vs 3.1%, respectively, in Phnom Penh, p=0.004 and 0.9% vs 4.1% respectively, in Siem Reap, p=0.031). It is possible that with larger sample sizes that would be available after longer implementation of PDI+ the differences in yield would become statistically significant for EW, MSM and PWID.

The PDI+ testing locations across KP groups was also varied, but only 49.5% were received PDI+ HTC at a club or DIC, as initially intended. Among EW 43% of PDI+ clients received HTC at a club or DIC, and 36% had PDI+ HTC at a karaoke establishment. In Phnom Penh, 99% of MSM PDI+ clients received HTC at a club or DIC, while in Siem Reap, only 27% of MSM PDI+ clients received HTC at a club or DIC, while most MSM PDI+ clients in Siem Reap received HTC at a hotspot (69%). 42% of PWID PDI+ clients received HTC at a club or DIC while 51% of PWID PDI+ clients received HTC at a hotspot. The majority of TG in Siem Reap received PDI+ HTC at a club or DIC (57%), though this was true of only 30% of TG tested under PDI+ in Phnom Penh. The finding that some locations larger proportions of clients received PDI+ outside the originally designated club or DIC (e.g. in Siem Reap for MSM, and in Phnom Penh for TG and PWID) may indicate the limitations of PDI+ in accessing these clients in those geographic areas, necessitating outreach by implementers. According to interviewed staff, this modification to the initial PDI+ design was utilized in response to the diminishing numbers of clients that came to DICs and Clubs.

Overall, the evaluation was unable to compare the proportions of new clients for HTC between outreach-based HTC and PDI+, because of limitations in the outreach dataset. Overall, 49.5% of KP were new including: majorities of TG in Phnom Penh (76%) and TG in Siem Reap (81%), and PWID in Phnom Penh (70%) were new clients. Conversely, minorities of MSM in Phnom Penh (35%), MSM in Siem Reap (41%) and EW (30) were new.

KP that received HTC through PDI+ were overall overwhelmingly satisfied (91%), and most KP found the PDI+ process to be reliable (92%), uncomplicated (67%), and quick (55%). Most KP that got coupons to recruit peers thought the process of recruiting peers was well explained (87%), the criteria for peer recruitment were clear (84%), and most were satisfied to serve as a recruiter (90%). The $2.50 incentive was rarely cited as the main reason to come for HTC (only 3%), and only 7% of those that served as a recruiter cited this incentive as their main motivation for recruiting peers. The exception was PWID, however, 15% of whom said the incentive was their main reason for undergoing PDI+, and 20% of whom said the incentive was their main reason for recruiting peers to PDI+.

Two-thirds of KP participating in PDI+ (63%) reported that the NGO staff asked them to recruit their peers using the coupon, and only one quarter (26%) of those that were asked to recruit peers said they received a coupon to do so. Indeed, about half of PDI+ clients (49%) received a coupon from NGO staff prior to testing, instead of from peers, and only 4% of clients reported coming to HTC with a coupon in hand, as PDI+ was designed.

Despite the significant deficiencies noted in implementation, PDI+ was clearly more efficient in identifying PLHIV, as noted above. Because of this, while the average cost per HIV test under outreach HTC was somewhat lower ($144) than under PDI+ ($168), the average cost per HIV case detected under PDI+ was significantly lower than under outreach HTC ($7,912 vs $19,982, respectively). PDI+ incentives to clients accounted for a very small proportion (4%) of costs, on average. The cost per HIV test seen in this evaluation were higher than what has been reported in the literature in low- and middle-income countries (range $3–$43) but the cost per HIV case detected was similar to findings from other low- and middle-income countries (range $16 to $15,308) (WHO 2015).

18. Conclusion

Though outreach HTC had a lower unit cost per HIV test, PDI+ was more a great deal cost-effective than outreach HTC in identifying PLHIV among KP, largely because PDI+ had a higher HIV+ yield, resulting in an average cost per HIV case detected under PDI+ of $7,912, which was nearly three times lower than for outreach HTC, $19,982. This finding came despite the fact that there were shortcomings with regard to how PDI+ was implemented.

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