Evaluation of the Boosted- Integrated Active Case Management (B-IACM) in Cambodia

REVISED REPORT

HIV Innovate and Evaluate Project

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Summary

Background

Boosted Integrated Active Case Management (B-IACM) is a cornerstone of the Cambodia national HIV program to achieve its targets by 2020 of 90% of people living with HIV (PLHIV) knowing their HIV status, 90% of those diagnosed being on treatment, and 90% of PLHIV on treatment achieving viral suppression. B-IACM is a client-oriented approach designed to provide support to individuals receiving HIV services across the HIV service cascade, with the goal of decreasing losses to follow up along the HIV care cascade in Cambodia. B-IACM was initiated in 2015 in Siem Reap and Battambang provinces and was scaled up to 25 operational districts by mid-2017. The effectiveness of this strategy had not been examined systematically prior to this evaluation. This evaluation aimed to evaluate the effectiveness and cost-effectiveness of B-IACM in Siem Reap and Battambang provinces, the two locations with the longest implementation experience.

Objectives

The overall objective of this evaluation was to provide evidence on the performance of B-IACM toward improvement of its implementation. The specific objectives were:

1) To describe the implementation of B-IACM including activities, roles and responsibilities of involved persons, and processes;
2) To assess the effectiveness of the implementation of B-IACM;
3) To identify gaps/challenges of the implementation of B-IACM; and
4) To estimate the cost of the implementation, cost effectiveness (cost per case detected, cost per case enrolled on ART), of B-IACM.

Scope

The evaluation examined the process and effectiveness of B-IACM implemented in Siem Reap and Battambang provinces October 2015-June 2017. The outcomes and cost-effectiveness of B-IACM were compared with the pre- B-IACM time period, January 2014-September 2015.

Methods

A mixed methods qualitative/quantitative evaluation was performed. The qualitative component employed in-depth interviews with key informants and the Delphi method, using expert reflection to assess the B-IACM implementation activities, the process of implementation, and the factors affecting implementation. The quantitative component employed program datasets from B-IACM and the pre-B-IACM implementation period to measure outcomes and program effectiveness. Cost-effectiveness analysis was carried out utilizing cost allocation of key activities.

Findings

HIV Care Cascade

The numbers of individuals that had reactive HIV tests was dramatically higher during B-IACM (835) compared to the Pre-B-IACM time period (469), p=0.000. The number of ART clients newly enrolled also increased between the pre-B-IACM and B-IACM periods in both locations: from 226 to 359 in Siem Reap and from 86 to 209 in Battambang. These improvements were seen despite the decreased coordination structures decreased per-client funding levels.

There was no evidence of decreased losses to follow-up under BIACM. In Siem Reap, no statistically significant differences were observed in any of the outcome measures along the HIV care cascade, though in Battambang, there were statistically significant decreases in 1) the proportion of HIV+ clients enrolled into OI care between the Pre-B-IACM and B-IACM time periods, from 96% to 88%, respectively (p=0.006), and 2) the proportion of HIV+ clients enrolled into ART care, from 95% to 85% ($p < 0.01$).

The study found no statistically significant difference between Pre-B-IACM and B-IACM periods in average number of days to get a HIV confirmatory test from the date of receiving HIV reactive test, though there was a downward trend in the average number of days to enroll in OI/Pre-ART and ART services between Pre-B-IACM and B-IACM, with statistically significant differences seen in Siem Reap in

mean days to OI/pre ART enrollment (9 days vs 6 days P= 0.001) and in mean days to ART enrollment (101 days vs 31 days, p= 0.000) during Pre-B-IACM and B-IACM periods, respectively.

Qualitative

The B-IACM implementation structures, roles and responsibilities, and implementation activities were similar in both study locations, and followed closely the approach designed by NCHADS. Key informants among implementing staff related important issues, including: 1) data management had challenges (incomplete and complicated data systems), but databases and data use systems were clearly helpful; and 2) the importance of a coordinated team approach and for success. Staff also pointed to need for continued donor support, scale up/ strengthening of PNTT, and improving case identification.

Cost Analysis

In Siem Reap OD the total additional cost ($73,289) during the Pre-B-IACM period was nearly 2 times higher than the total cost during the B-IACM implementation period ($40,060).Conversely, in Battambang, the total cost was slightly higher in B-IACM period ($37,376) than during pre-B-IACM period ($30,787). The highest cost component was allocated for management and support activities in both locations during both time periods. It is noteworthy that expenditures were not decided at the implementation level in response to observed local conditions or need, but rather were dictated from higher levels.

Comparing the two time periods, B-IACM was a great deal more cost effective than the Pre-B-IACM approach. The cost per individual enrolled on ART under B-IACM was $112 in Siem Reap and $179 in Battambang, which were both much less than the pre-B-IACM costs per individual enrolled on ART: $324 in Siem Reap, and $358 in Battambang.

Conclusion

The implementation of B-IACM in Siem Reap and Battambang was associated with an increase in detection of new PLHIV, a decrease in the average number of days between HIV status confirmation and enrollment into ART, and an increase in number of individuals enrolled in ART, while proving a great deal more cost-effective than the pre-B-IACM approach. The implementation structures and activities of B-IACM were functioning along the lines of their design in both study locations. There remain concerns with regard to a lack of evidence of decreasing losses to follow-up under B-IACM, and reliance on support from development partners.

Acknowledgements

We would like to express our deep appreciation to Dr. Ly Penh Sun, Director of the National Center for HIV/AIDS Dermatology and STDs (NCHADS) for his leadership of this evaluative study. From NCHADS, Dr. Samrith Sovannarith, Chief of Technical Bureau, and his technical team, Dr. Kaoeun Chetra and Dr. Ngauv Bora, and Mr. Keo Vannak from AIDS Care Unit, provided invaluable inputs for the study formulation, coordination of fieldwork for data collection and validation workshop to triangulate data and feedbacks on the preliminary findings especially to ensure that the results are relevant to the national program.

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ART	Anti-Retroviral Therapy
B-CoC	Boosted Continuum of Care
B-CoPCT	Boosted Continuum of Prevention to Care and Treatment
BF4	Buddism for Development
B-IACM	Boosted Integrated Active Case Management
B-LR	Boosted Linked Response
CMA	Case Management Assistant
CMC	Case Management Coordinator
CMP	Case Management Provider
CMS	Case Management Supporter
CoE	Center of Excellence
CSV	Community Service Volunteers
CWPD	Cambodian Women for Peace and Development
EW	Entertainment Worker
GFATM	Global Fund for AIDS, TB and Malaria
GoC	Group of Champions
HIV	Human Immunodeficiency Virus
HTC	HIV Testing and Counselling
KP	Key Population
MHC	Men Health Cambodia
MHSS	Men's Health Social Service
MMM	Mondul Mith Chuoy Mith
MSM	Men who have Sex with Men
NCHADS	National Center for HIV/AIDS, Dermatology and STI's
NECHR	National Ethics Committee for Health Research
NGO	Non-Governmental Organization
OD	Operational District
OW	Outreach Worker
PASP	Provincial AIDS Secretariat Program Manager
PEPFAR	President's Emergency Plan for AIDS Relief
PHD	Provincial Health Department
PLHIV	Person/People Living with HIV
PMTCT	Prevention of Mother to Child Transmission
PNTT	Partner Notification, Tracing and HIV Testing
Pre-ART	Prior to Anti-Retroviral Therapy
PWID	People Who Inject Drugs
RMAA	Rapid Monitoring and Analysis for Action
SCC	Salvation Center Cambodia
SOP	Standard Operating Procedure
STI	Sexually Transmitted Infection
TB	Tuberculosis
TG	Transgender Woman
UIS	Unique Identifier System
UNAIDS	United Nations Agency for HIV/AIDS
URC	University Research Co., LLC
USAID	United States Agency for International Development
VCCT	Voluntary and Confidential Counselling and Testing

1. Introduction

1.1. Background

Cambodia's success in the fight against HIV/AIDS is demonstrated by the national prevalence of HIV among the general population aged 15-49 declining from an estimated 1.7 % in 1998 to 0.7 % in 2013 (NAA, 2015). This remarkable progress has occurred in the context of strong national leadership and effective program implementation. The HIV prevalence rates remain high, however, among the key populations at risk for HIV (KP), including entertainment workers (EW), men who have sex with men (MSM), transgender individuals (TG), and people who inject drugs (PWID).

As of the end of 2016, 70,498 people were estimated to be infected by HIV in Cambodia. Among them, 58,338 (83%) knew their HIV status and 56,754 (79%) of these were receiving antiretroviral therapy (NCHADS, 2016a). Led by the National Center for HIV/AIDS, Dermatology and STIs (NCHADS) Cambodia's HIV program is now focusing on achieving the UNAIDS 90-90-90 targets by 2020 where: 1) 90% of people living with HIV (PLHIV) know their HIV status, 2) 90% of those diagnosed are on antiretroviral treatment, and 3) 90% of PLHIV on treatment achieve viral suppression (NCHADS, 2016b; UNAIDS, 2014). Cambodia's future progress in reducing the number of new infections and providing ART is challenged by continued losses of individuals to follow-up at all stages of the HIV cascade. Eliminating these losses is critical to achieve the national program goal of eliminating new HIV infections by 2025 (NCHADS, 2016b).

In line with the WHO's recommendations to reduce losses to follow-up in the HIV cascade, the Cambodia HIV program implemented the Boosted Integrated Active Case Management (B-IACM) strategy that emphasizes a client-oriented approach where each client is followed individually by case managers through the HIV cascade. B-IACM relies on existing approaches including: 1) support and involvement of trained lay providers who are peers, expert patients/clients and, community outreach workers to identify and reach all new HIV cases and support the activities along the HIV cascade ensuring no client is lost, and 2) partner testing to increase rates of HIV testing (NCHADS, 2017; WHO, 2014).

1.2. B-IACM Program Description

1.2.1. **B-IACM Objectives and Strategies**

The objective of B-IACM is to leverage existing strategies and approaches for case detection, immediate ART enrolment and retention in HIV care to achieve the global 90-90-90 targets set for 2020 and to reach virtual elimination of new HIV infections in Cambodia by 2025 (NCHADS, 2017). B-IACM requires proactive monitoring and communication mechanisms to identify cases in need of specific follow-up at each stage of the HIV cascade. B-IACM underlies the main components of Cambodia's national HIV strategies (see figure 1):

1. Boosted Continuum of Prevention, Care and Treatment (B-CoPCT), which focuses on tracking key populations from outreach through the whole HIV cascade;
2. Boosted Linked Response (B-LR), which is the national strategy to better coordinate existing ANC and related services for pregnant women and their infants to eliminate mother-to-child transmission of HIV and syphilis (eMTCT);
3. Boosted Continuum of Care (B-CoC) which is the broad strategy for on-going services delivered to PLHIV, including policies for quality improvement and for Treatment as Prevention (TasP); and
4. Community-based prevention, care and support (CBPCS) which works in supporting PLHIV who are receiving ART.

B-IACM leverages these existing strategies and approaches for case detection, early and immediate ART initiation and retention in HIV care and treatment. The B-IACM objectives are to identify

all infections among KP and targeted GP from all possible entry points (community, health facilities, TB, STI and ANC clinics, etc.) and refer all identified cases to VCCT for confirmation, ensuring immediate ART initiation, retention in care and viral load monitoring, while ensuring no case is lost at any stage of the cascade (NCHADS, 2016b). Many ancillary approaches are used to achieve these objectives, including development of a linked database across the HIV cascade to help identify and follow up losses at each stage of the cascade, and strengthening collaboration between NGO and community networks in operational districts to conduct individual follow-up required at each stage.

In Cambodia, more than two thirds of all new HIV infections in 2014 were estimated to occur among sexual partner relationships, and of those half are from spousal relationships (majority from husband to wife). However, it is challenging to identify the source of these cases among the general population and the national program prioritized in tracing partners of PLHIV, identifying and provision of HIV prevention services for discordant couples and, targeted testing of general population (GP) as key approaches to reduce new infections in Cambodia (NCHADS, 2016b).

The national program has drafted a Community Action concept note incorporating the Community Based Prevention, Care and Support strategy which is implemented to engage with PLHIV and community networks to locate new cases among targeted GP. Targeted GP incudes pregnant women, discordant couples, and HIV/OI co-infected clients. They are reached through community based programs such as CBPCS, while KP are reached though the B-CoPCT strategy were NGO and CBOs provide HIV services for KP at the community and health facility level. B-IACM underlies these and similar national strategies (NCHADS, 2016a). See figure 1.

1.2.2. B-IACM Structures and Activities

Figure 1 depicts the overall system in which B-IACM operates, showing the various population channels engaged through location-specific interventions toward the ultimate goals of reducing new HIV infections and decreasing mortality from HIV. As illustrated, B-IACM underlies HIV services cascade and employs key national strategies and stakeholders.

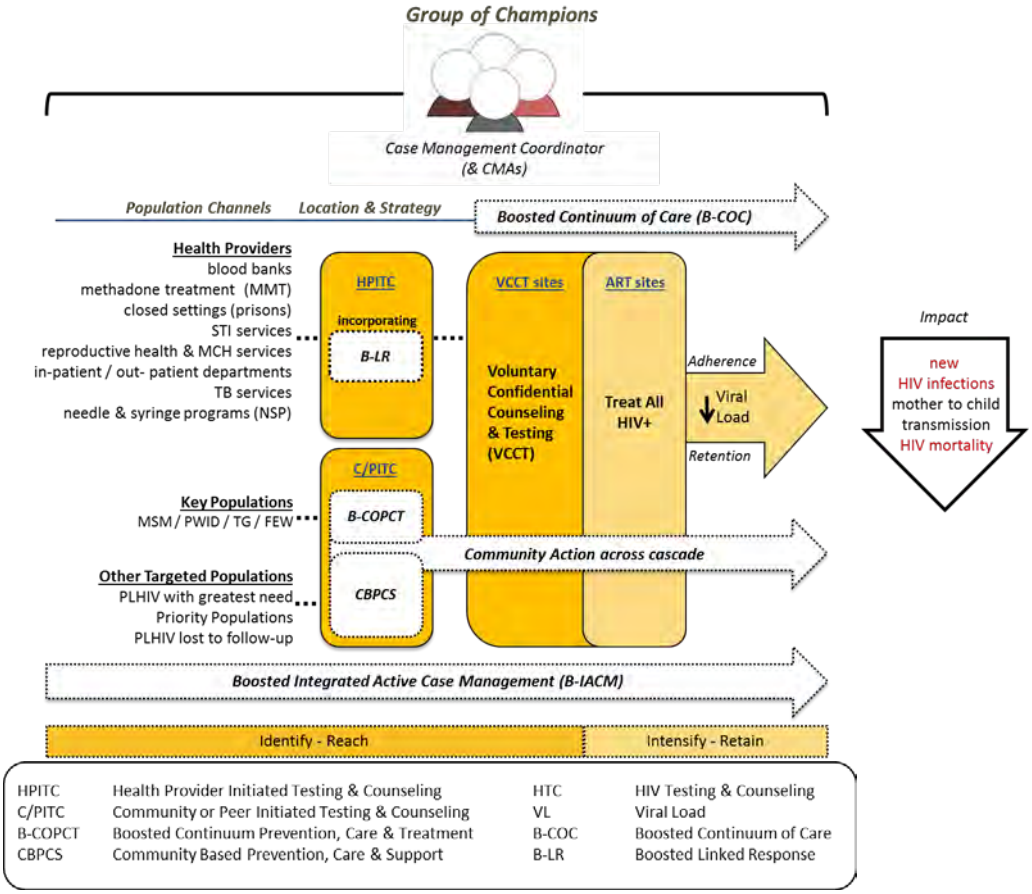


Figure 1 B-IACM Overview (NCHADS 2017)

B-IACM has been designed in three models of implementation and management, based on geography. First, in rural ODs, where the referral hospital and VCCT services are located within the OD. In this model all B-IACM activity is managed through the ODs, and simply reported to the Provincial Health Department (PHD) and NCHADS. Second, in urban OD, where the referral hospital and VCCT services are located at provincial level. Here B-IACM is managed by the Provincial AIDS Secretariat Program Manager (PASP) on behalf of the OD. The third, in Phnom Penh, requires a special system which will vary according to available resources (NCHADS, 2017).

Regardless of the location or model, the cascade of activities that underpin B-IACM is similar, as shown in figure 2. Client-focused services and individual follow-up at each cascade step where losses to follow-up commonly occur is emphasized. High losses to follow up occur at confirmation stages (step 2, 4 and 6) and the Case Management Coordinator (CMC) and Case Management Assistant (CMA) work with community and health facility staff to follow up cases at this steps. When a new case is identified, CMC and CMA are informed, upon which each case is followed individually until viral suppression along the B-IACM activities cascade. B-IACM staff are assigned specific roles and responsibilities at each steps of the B-IACM activities as described in section 1.2.3.

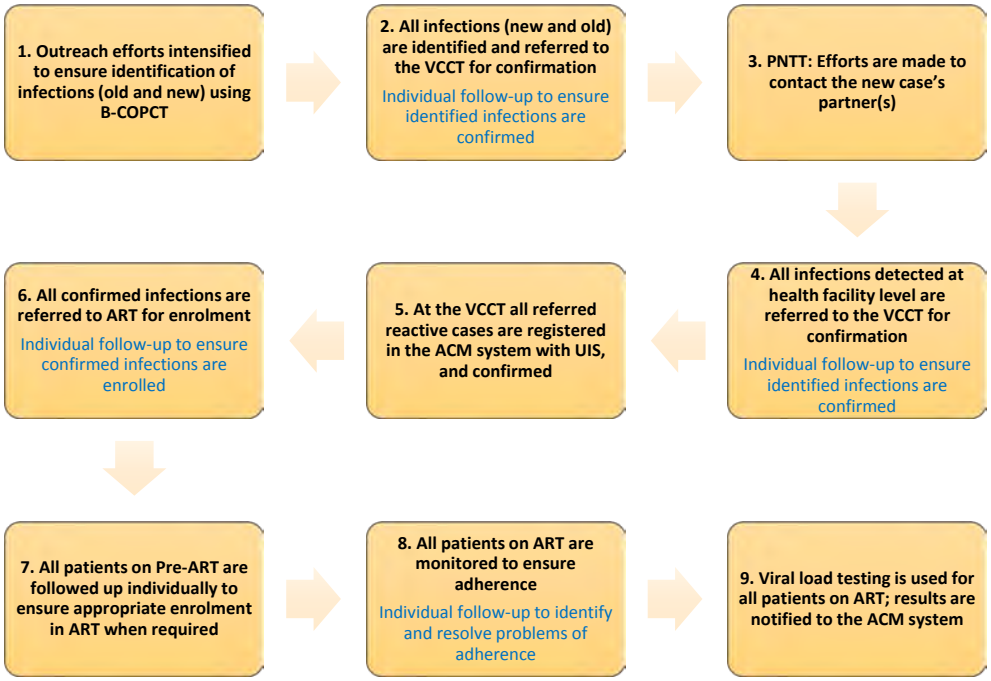


Figure 2 Cascade of B-IACM activities (NCHADS 2016)

1.2.3. B-IACM Staffing, Roles and Responsibilities

Table 1 describes the roles and responsibilities of key stakeholders under B-IACM. The Provincial AIDS Secretariat Program (PASP) Manager and the Group of Champions (GoC), provide leadership and oversight. The Case Management Coordinator (CMC) provides management and oversees the implementation of the B-IACM with support from the following key staff: Case Management Assistant (CMA), Case Management Coordinator (CMC), Case Management Provider (CMP), Case Management Supporter (CMS), NGO/CBO Outreach Worker, MMM Facilitator, Community Service Volunteers (CVS), NGO staff, and from PLHIV Network.

Table 1 B-IACM staffing, roles and responsibilities

Designation	Roles and Responsibilities
Provincial AIDS Secretariat Program (PASP) Manager	Responsible for overall functioning and oversight of B-IACM. In the Urban OD model, convenes the Group of Champions, directly supervises the CMC, and takes responsibility for B-IACM at provincial level. In the Rural OD model supervises the CMC and Group of Champions in each OD in the province. In Phnom Penh the PASP Manager coordinates the B-IACM work in the Phnom Penh ODs and is responsible for the RMAA
Group of Champions (GoC),	All activities in a geographic area are supervised by the GoC, which is a core group of immediately responsible people who manage and oversee B-IACM directly
Case Management Coordinator (CMC)	Primary responsibility is to manage the B-IACM, and ensure that all the key players are working together. The CMC is a senior member of the OD/PHD team.
Case Management Assistant (CMA)	Primarily responsible for collecting and entering the B-IACM data in the system, and preparing the charts, graphs and reports. Under the streamlined system an existing government staff in the OD will be designated to this function
Case Management Provider (CMP)	Play the key roles of identifying and referring cases within the public health service system. CMP are usually government staff working at different levels in the health care system; but they may also be NGO staff working in NGO health facilities and programmes
Case Management Supporter (CMS)	Responsible for following up new cases where there is delay in new cases reaching different points in the system (e.g. accepting testing, going for confirmatory testing at VCCT, referral to Pre-ART/ART clinic, adherence, home-based care support, etc.). CMS are government or NGO/CBO staff working within B-COPCT, B-COC, B-LR, CBPCS projects
NGO/CBO Outreach Worker, PLHIV Peer Facilitator, and Community Service Volunteers (CSV)	Function as CMP when they identify and refer new cases and as CMS, when they follow-up new cases (both in B-COPCT and in B-COC/LR and CBPCS).
NGO staff	Supervise and coordinate the work of the CMS with other CMP, and work with the CMC and CMA to ensure that follow-up for 'loss' (lost cases) takes place. They are key members of the Group of Champions.
PLHIV Network	Provide additional support in working closely with pre-ART/ART clinics and OD CMC and CMA, and support the supervision and coordination of CSVs
RMAA at Provincial and National levels	At provincial level the Group of Champions functions as the Rapid Monitoring and Analysis for Action (RMAA) group. At national level the RMAA group convened by NCHADS and monitors the B-IACM system.

Source: NCHADS B-IACM SOP March 2017

As shown in figure 3, the CMC and CMA play key roles in coordinating activities between community/health center where HIV screening takes place with VCCT and ART services ensuring no case is lost along the cascade. The CMC is a core member of the GoC that oversees the B-IACM activities to ensure all cases are identified, initiated on ARV and retained in care towards HIV viral suppression.

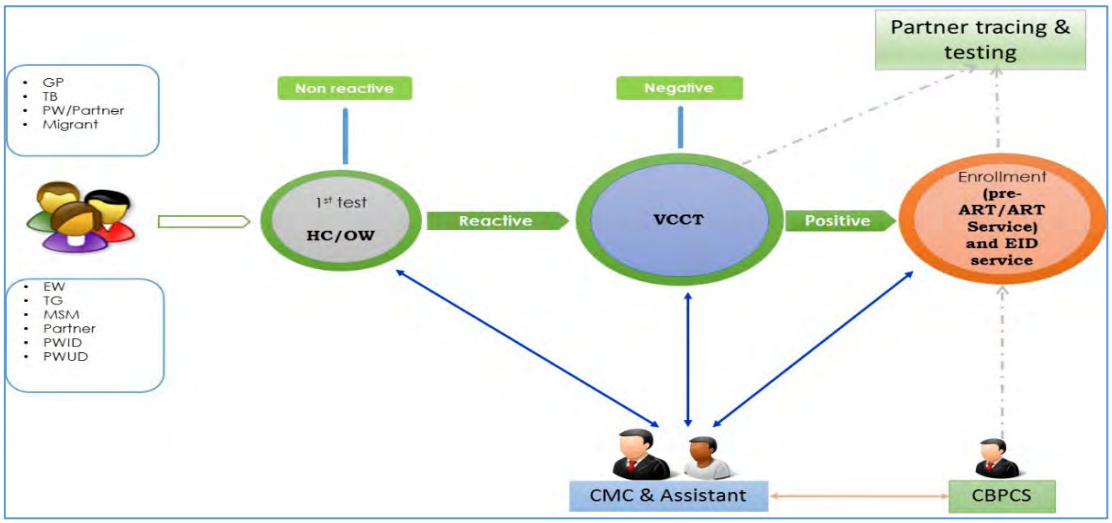


Figure 3 B-IACM Implementation Cascade. Source- NCHADS 2016.

Table 2 shows roles and responsivities of the various B-IACM staff for each step of the B-IACM implementation activities. At the community level, NGO staff who work in reaching KPs and outreach workers including Village Health Support Group (VHSG) and Community Support Volunteers (CSV) work as Case Management Support (CMS) to identify cases. NGO staff at the community level provide finger prick HIV testing for KP while targeted GP such as pregnant women are referred by OW to health centers for HIV testing. At VCCT, Case Manger Providers (CMP) along with CMS ensure that reactive HIV tests are confirmed and provide partner notification counselling services upon test confirmation. The ART team also plays a role of CMP ensures ART is initiated immediately based on the "Test and Treat" national policy to initiate ART. The CMC and CMA coordinate all activities ensuring each cases is enrolled and retained in care. The GoC review B-IACM data monthly to monitor B-IACM activities and to identify losses, discordant couples, and to assess partner notification coverage.

Table 2 Roles and responsibilities of B-IACM staff along the B-IACM implementation cascade

STEP	Activity	Who	Where
1	Outreach efforts are intensified to ensure identification of infections (old and new) in KP and targeted general populations (pregnant women, suspected HIV cases, serodiscordant couples, exposed infants, TB, STI, symptomatic cases, and other vulnerable populations such as prison population)	NGO staff and Outreach Workers as Case Management Supporter (CMS); CBPCS: NGO staff and Village Health Support Group/Community Support Volunteers (VHSG/CSV as CMS)	Community
2	Infections (old and new) among key and targeted general populations are identified and referred to the VCCT for confirmation; individual follow-up is used to ensure newly identified infections are confirmed	NGO staff & Outreach Workers as CMS; CBPCS: NGO staff & VHSG/CSV as CMS	Community VCCT
3	Efforts are made to contact the partner(s) of new cases through Partner Notification, Tracing and Testing (PNTT)	NGO staff & Outreach Workers as CMS; CBPCS: NGO staff & VHSG/CSV as CMS; VCCT staff	Community
4	All infections detected at health facility level (Health Center-HC, Family Health Clinics-FHC, hospital wards) are referred to the VCCT for confirmation; individual follow-up is used to ensure identified infections are confirmed	CMP & CMS	HC Referral Hospital FHC Community
5	At the VCCT all referred reactive cases are registered in the B-IACM system, and confirmed	CMP	VCCT
6	All confirmed infections are referred to ART services for enrolment (test and teat polity) individual follow-up is used to ensure enrolment of confirmed cases	CMP & CMS	VCCT ART Clinic NGO clinics
7	All patients enrolled in ART services are followed up individually to ensure appropriate initiation on ART according to the *Test and Treat* policy	CMP & CMS ART Team	ART Clinic Community
8	All patients on ART are monitored to ensure adherence; individual follow-up is used to identify and resolve problems of adherence	CMP & CMS ART team	ART Clinic Community
9	Viral load testing is used for all patients on ART; results are included in the B-IACM system	ART team, RH Laboratory Staff	ART Clinic NCHADS Lab
Cross-Cutting	National ART guidelines developed by NCHADS apply consistent with the *Test & Treat* policy Data for each stage of the cascade identified above are entered in the B-IACM database and regularly monitored	ART Team GOC (CMA, CMC, ART team etc.)	ART Clinic OD/PHD

Source: NCHADS B-IACM SOP – March 2017

1.3. B-IACM Implementation

B-IACM has been implemented since October 2015 in fourteen operational districts, and subsequently scaled up to 25 ODs by mid-2017 in Banteay Meanchey, Kampong Cham, Pailin, Odder Meanchey, Siem Reap, Battambang, Sihanouk and Phnom Penh provinces, with support from Centers for Disease Control and Prevention (US-CDC) and the United States Agency for International Development (USAID) HIV Flagship Project (Flagship). (NCHADS, 2017). B-IACM implementation requires effective collaborative efforts among the various B-IACM staff and implementing agencies along the nine B-IACM activities cascade as shown in figure 1. The implementation of B-IACM is operationalized through the *Identify Reach, Intensify and Retain* (IRIR) mechanism where B-IACM focuses on identifying and reaching all old and new infections (IR) and in intensifying efforts to ensure cases are brought into the HIV cascade to receive immediate ARV treatment (Test and Treat) while retaining (IR) all PLHIV on treatment to become virally suppressed.

Since the implementation of B-IACM in 2015, and its precursor IACM in late 2014, by the end of 2016 the B-IACM strategy found 4,157 new HIV cases and 293 cases among pregnant women (Vannak, 2016). Further study and analysis of the B-IACM strategy is warranted given the planned scale up of the strategy to all operational districts by late 2017 and this evaluation planned to provide evidence in this aspect.

2. Evaluation Rationale

B-IACM is the cornerstone strategy for the National HIV program under which all other HIV prevention and care approaches are operationalized, with the objective of reaching Cambodia's 90-90-90 goals by 2020. Since its implementation in 2015, the effectiveness of this key strategy has not be evaluated systematically. Information on the implementation of B-IACM is critical to understanding its performance and to guide its future elaboration under the national program.

3. Evaluation Questions

The following nine evaluation questions guided the objectives and methodology of the evaluation of B-IACM:

1. What were the B-IACM implementation activities at each site?
2. What were the roles and responsibilities of key persons involved in implementing B-IACM?
3. What were the processes of B-IACM implementation at each site?
4. How effective was the B-IACM's implementation, as measured by: 1) the proportion of individuals with reactive HIV test results that received confirmatory HIV tests, and 2) the proportion of individuals with positive confirmatory HIV test results that were enrolled into Pre-ART/ART?
5. What were the challenges faced in the implementation of B-IACM?
6. What is the understanding of the HIV cascade and how to use it to identify losses at each stage?
7. What were the experiences of PLHIV with B-IACM?
8. What suggestions might improve the implementation of B-IACM?
9. What were the costs of implementing B-IACM as measured by the cost per individual enrolled into ART and cost per new case detected across the two sites, compared to the pre-B-IACM program?

4. Evaluation Objectives

The overall objective of this evaluation is to provide evidence on the performance of B-IACM toward improvement of its implementation. The specific objectives were:

1. To describe the implementation of B-IACM including activities, roles and responsibilities of involved persons, and processes;
2. To assess the effectiveness of the implementation of B-IACM in terms of number of lost to testing confirmation (from reactive to confirmation) by comparing before and after B-IACM
3. To identify gaps/challenges of the implementation of B-IACM; and
4. To estimate the cost-effectiveness of the implementation of B-IACM.

5. Evaluation Scope

The evaluation examined the process and effectiveness of B-IACM implemented in two location, Siem Reap and Battambang provinces during October 2015-June 2017. The outcome and cost effectiveness of B-IACM was compared with the pre- B-IACM phase (February 2014 through September 2015).

6. Evaluation Design

A process evaluation design was employed to address the evaluation objectives above, designed to be formative and also to provide analysis and information on effectiveness. The effectiveness of BIACM was reflected by national program data across the service delivery cascade, compared to results of the HIV cascade performance before the introduction of BIACM. The formative component was to describe the processes of BIACM implementation and suggest improvements to program implementation.

Cost allocation was employed in order to estimate cost per individual enrolled into Pre-ART/ART during BIACM implementation compared to the period before the introduction of BIACM at the two sites. This study design was retrospective in nature, leveraging data from past financial expenditures.

7. Method of Evaluation

Qualitative methods – in-depth interviews using key informants and the Delphi method using expert reflection were employed in order that implementation activities, the process of implementation, and factors affecting the implementation could be systematically identified and suggested for improvement. Data gathering was triangulated to ensure reliability of the responses to the questions. This was undertaken through inquiries with implementers, stakeholders, and experts at the national level. The validation workshop with all concerned stakeholders including technical staff from Flagship, OD Siem Reap, OD Battambang, and NCHADS were organized to gain their feedbacks on the qualitative findings.

In addition to the data from the interviews, program datasets from the BIACM phase and a pre-B-IACM phase was used for the analysis in order that the effectiveness of the implementation could be measured. Program data was provided by NCHADS. From 2014 to late 2015, pre-B-IACM or IACM period, program data were recorded in Excel. From late 2015, for the period of B-IACM implementation, a stand-alone database system was developed by NCHADS to record the program data. Data officers at the sub-national level entered data into this database, and sent the backup files to NCHADS to perform data synchronization at the national level. The pre-B-IACM and B-IACM program datasets provided by NCHADS were merged into a single file in Excel spreadsheet for statistical analysis. This program dataset was transferred to a statistical application, STATA 14, in order that statistical analysis could be performed.

Relevant documents including the SOPs guiding the BIACM implementation was reviewed in order to get an overview of the implementation as a whole, and specifically to identify the existing information concerning implementation arrangements and corresponding strategies. Reports and other relevant documents were sources of data to guide this process evaluation. Validation of some activities was undertaken during the interactions with the program implementers, stakeholders, and PLHIV.

Determination of costs was carried out to allocate costs to certain key activities. Program cost data was provided by Flagship, NCHADS, US-CDC, and the two ODs above. The estimated costs did not include the costs of public facilities and government staff. Only additional costs to the government operations were included.

8. Participants

This evaluation was committed to implementer ownership. Thus, inclusive involvement of direct implementers at the national and sub-national levels and stakeholders in the community was necessary to ensure that suggested improvements were emerged and guided the practice as a result of inclusive interviews with: Case Management Coordinators (CMC), Case Management Assistants (CMA),Case Management Providers (CMP), Case Management Supporters (CMS),VCCT counsellors, Pre-ART/ART managers, PASP Managers, NGO staff members, PPN+ coordinators and 15 PLHIV clients that have gone through BIACM.

A purposive sampling technique was used to choose these stakeholders to participate in this process evaluation. Fifty five participants (27 PLHIV and 28 providers) were interviewed and the number was decided in the process of data collection when reached saturation. The interview process was finished when the principal investigator determined that sufficient data have been obtained and triangulated, particularly when no new themes emerge. This method of sampling was applied to both data collection from stakeholders and PLHIV.

9. Data Collection

Data collection was conducted in OD Siem Reap and OD Battambang where BIACM was implemented. Data collection was carried out by a national evaluation consultant with extensive experience in qualitative evaluation and knowledge of the study topic and coordinated by a director of research in collaboration with technical team from NCHADS. Written notes and voice recorder were used to record interviews.
Qualitative data was generated by responses to open-ended interview questions and free-flowing conversation between principal investigator and key informants. This data was organized to allow for systematic approach of data analysis.

Data was checked by the principal investigator in the beginning in order to ensure sufficient quality for analysis, including comprehensiveness and accuracy. The interviews were transcribed. The principal investigator summarized and analyzed the data.

An identification code system for informants was created to keep track the source of the information between the sites and across participants, Battambang and Siem Reap ODs, to enable the sorting of content based on themes and categories.

10. Data Analysis

Data derived from the above mentioned methods were grouped according to themes, particularly in terms of the key questions that were posed. Trends and patterns pointing to the suggested improvements to the program were culled.

An inductive approach was applied for the analysis of qualitative data. Based on this approach, the textual data from qualitative inquiries was condensed into a brief summary format, framework of the underlying process of the program implementation was developed and suggested improvements to the implementation of BIACM from PLHIV, implementers and stakeholders was summarized using a systematic process of qualitative data analysis.

The program dataset was analyzed using the statistical analysis program, STATA 14.
Resources used during the implementation of BIACM were estimated by reviewing administrative and financial records. Standard cost allocation was used to determine cost per individual enrolled into ART.

Table 3 Framework for data analysis

	Evaluation Question	Analysis Plan
1.	What were the BIACM implementation activities at each site?	• Description of activities of BIACM implemented in Battambang and Siem Reap.
2.	What were the roles and responsibilities of key persons involved in implementing BIACM?	• Description of the roles and responsibilities of concerned persons involved in implementing BIACM. Challenges and opportunities were identified.
3.	What were the processes of BIACM implementation at each site?	• Description of the processes of BIACM implementation in Battambang and Siem Reap. Challenges and opportunities were identified.
4.	How effective was the BIACM's implementation, as measured by: 1) the proportion of individuals with reactive HIV test results that received confirmatory HIV tests, and 2) the proportion of individuals with positive confirmatory HIV test results that were enrolled into Pre-ART/ART?	• Comparisons of the BIACM phase and the phase before BIACM regarding the proportion of individuals with reactive HIV test results that received confirmatory HIV tests and proportion of individuals with positive confirmatory HIV test results that were enrolled into Pre-ART/ART.
5.	What were the challenges faced in the implementation of BIACM?	• Identification of challenges faced in the implementation of BIACM.
6.	What was the understanding of the HIV cascade and how to use it to identify losses at each stage?	• Description of the understanding of the HIV cascade among direct implementers. • Description of the use of HIV cascade for the identification of losses at each stage.
7.	What were the experiences of PLHIV with BIACM?	• Description of experiences of PLHIV with BIACM.
8.	What suggestions might improve the implementation of BIACM?	• Description of the suggestions for improvement of the implementation of BIACM.
9.	What were the costs of implementing BIACM as measured by the cost per individual enrolled into Pre-ART/ART across the two sites, compared to the pre-BIACM program?	• Resources used by Flagship project during the implementation of BIACM in Siem Reap and Battambang from October 2015 through May 2017, and before the BIACM implemented, February 2014 through September 2015 were estimated by reviewing administrative and financial records. • The costs per individual enrolled into Pre-ART/ART were compared between the two periods and sites.

11. Stakeholder Engagement

To ensure that the evaluation provided valid and useful evidence for the national program, a broad range of stakeholders participated-- from the development of the concept note, evaluation protocol, data collection, through qualitative data validation. Consultative meetings were organized with stakeholders, including technical staff from Flagship, USAID, a technical team from NCHADS and the NCHADS Director, to provide comment on the B-IACM evaluation concept note. Based on these inputs, the concept note was finalized.

The NCHADS technical team played important roles to not only coordinate with key persons in different locations to ensure that data collection had been implemented as planned, but also in providing supervision of data collection to ensure validity and reliability. NCHADS' technical team provided program data from the implementing locations.

On 15 August 2017, 48 participants from government staff, NGOs staff, NCHADS' technical team and Director, KHANA, and FHI 360, participated in a consultative meeting to provide input and to validate the qualitative findings of this evaluation.

12. 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.
- Dr. Orm Chhorvoin, MD, MPH, Ph.D., Evaluation Consultant, SAID HIV Innovate and Evaluate Project, University Research Co. LLC.
- Ms. 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. Orm Socheata, B.A. & M.A. (Psychology), Research Project Officer, 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.

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.

13. 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 27 June 2017 prior to starting of the study.

The evaluation team safeguarded these protections for participants:

- Participation was completely voluntary;
- Subjects were free to withdraw at any time;
- Confidentiality was guaranteed on all documents and tools used;
- No names was used in written documentation of the study; and

All study-related information have been kept in a confidential manner.

14. Limitations

Our study was limited to the implementation of BIACM at OD Siem Reap and OD Battambang, and therefore broad generalizations to other ODs should be made with caution. The cost allocation of BIACM implementation did not include the costs of government staff salary, facilities, and operational costs of the government institution, but was restricted to the data available from partners supporting BIACM.

15. Results

15.1. Results from Program Data Analysis

Characteristics of reactive clients during Pre-B-IACM and B-IACM time periods

Overall, of the 1,304 reactive clients, 826 were from Siem Reap and 476 were from Battambang, inclusive of the Pre-B-IACM and B-IACM time periods. The subgroup breakdown were similar between Siem Reap and Battambang with the exception that a larger proportions of clients were partners of PLHIV in Siem Reap (14%) than in Battambang (5%), and there were proportionally more TG clients in Siem Reap (4%) than in Battambang (2%), and proportionally more TB clients in Siem Reap (5%) than in Battambang (3%). See table 4. The proportion of reactive clients that were KP in the B-IACM period (21%) was larger than in the pre- B-IACM (10%) period.

Comparing Pre-B-IACM and B-IACM time periods, the proportional representation of client subgroups were similar in Battambang, but in Siem Reap each subgroup had larger proportions under B-IACM than Pre-BIACM, with a commensurate decrease in general population. This difference was statistically significant, p=0.000.

Table 4 Characteristics of HIV clients during Pre-B-IACM and B-IACM time periods

OD	Implementation Period	Type of Client							Total	N	Chi-Square Test
		EW	MSM	TG	Pregnant Women	HIV Partner	TB	General Population			
Battambang OD	Pre-B-IACM	5.7%	3.4%	1.1%	13.1%	5.1%	4.0%	67.4%	100%	*175*	7.089, df=6, p=0.313
	B-IACM	7.9%	8.3%	2.0%	10.2%	4.3%	5.3%	62.0%	100%	*303*	
	Overall	7.1%	6.5%	1.7%	11.3%	4.6%	4.8%	64.0%	100%	*478*	
Siem Reap OD	Pre-B-IACM	5.8%	2.4%	1.7%	13.6%	11.2%	2.4%	62.9%	100%	*294*	37.534, df=6, p=0.000
	B-IACM	7.5%	10.7%	4.5%	8.6%	16.2%	3.6%	48.9%	100%	*532*	
	Overall	6.9%	7.7%	3.5%	10.4%	14.4%	3.1%	53.9%	100%	*826*	
Overall	Pre-B-IACM	5.8%	2.8%	1.5%	13.4%	9.0%	3.0%	64.6%	100%	*469*	41.433, df=6, p=0.000
	B-IACM	7.7%	9.8%	3.6%	9.2%	11.9%	4.2%	53.7%	100%	*835*	
	Overall	7.0%	7.3%	2.8%	10.7%	10.8%	3.8%	57.6%	100%	*1304*	

Table 5 shows the numbers of individuals that screened positive for HIV (reactive) in the community (KP), health centers, RH/VCCT, and other locations in the Pre-B-IACM and B-IACM time periods. Overall, the numbers of reactive individuals increased dramatically during B-IACM (835) compared to the Pre-B-IACM time period (469), p=0.000. The numbers of reactive individuals increased dramatically both in Battambang (from 175 to 3010) and in Siem Reap (from 294 to 532), and these differences were also statistically significant (p=0.000 in both cases).

Table 5 HIV screening

OD	Implementation Period	Place of HIV Test				Total	Chi-Square Test
		Community (KP)	Health Center	RH/ VCCT (Walk-In)	Other		
Battambang OD	Pre-B-IACM	16	83	76	0	*175*	30.733, df=3, p=0.000
	B-IACM	33	77	176	17	*303*	
	Overall	49	160	252	17	*478*	
Siem Reap OD	Pre-B-IACM	65	75	151	3	*294*	27.524, df=3, p=0.000
	B-IACM	150	86	255	41	*532*	
	Overall	215	161	406	44	*826*	
Overall	Pre-B-IACM	81	158	227	3	*469*	53.838, df=3, p=0.000
	B-IACM	183	163	431	58	*835*	
	Overall	264	321	658	61	*1304*	

Figure 4 compares the Pre-B-IACM and B-IACM time periods, respectively, for Battambang, with regard to: HIV confirmatory testing, enrollment for OI, and ART enrollment. In Battambang, no statistically significant difference was observed in the ratio of reactive HIV tests and confirmatory HIV tests. Statistically significant decreases were seen in 1) the ratio of HIV+ clients enrolled into OI care between the Pre-B-IACM and B-IACM time periods, from 96% to 88%, respectively (p=0.006), and 2) the ratio of HIV+ clients enrolled into ART care, from 95% to 85% (p=0.007).

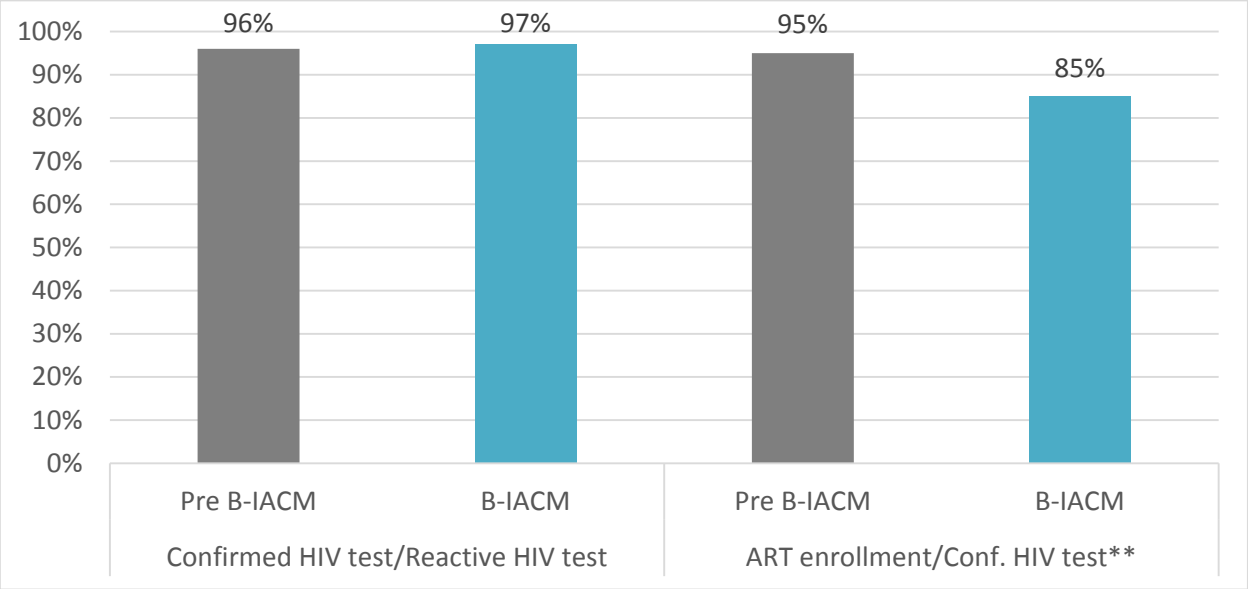


Figure 4 HIV service cascade, Battambang OD: Pre-B-IACM vs B-IACM
**p<.01

Figure 5 compares the Pre-B-IACM and B-IACM time periods, respectively, for Siem Reap, with regard to: HIV confirmatory testing, enrollment for OI, and ART enrollment. In Siem Reap, no statistically significant differences were observed in the proportion of reactive HIV tests and confirmatory HIV tests, in the proportion of HIV+ clients enrolled into OI care, or in the proportion of HIV+ clients enrolled into ART care.

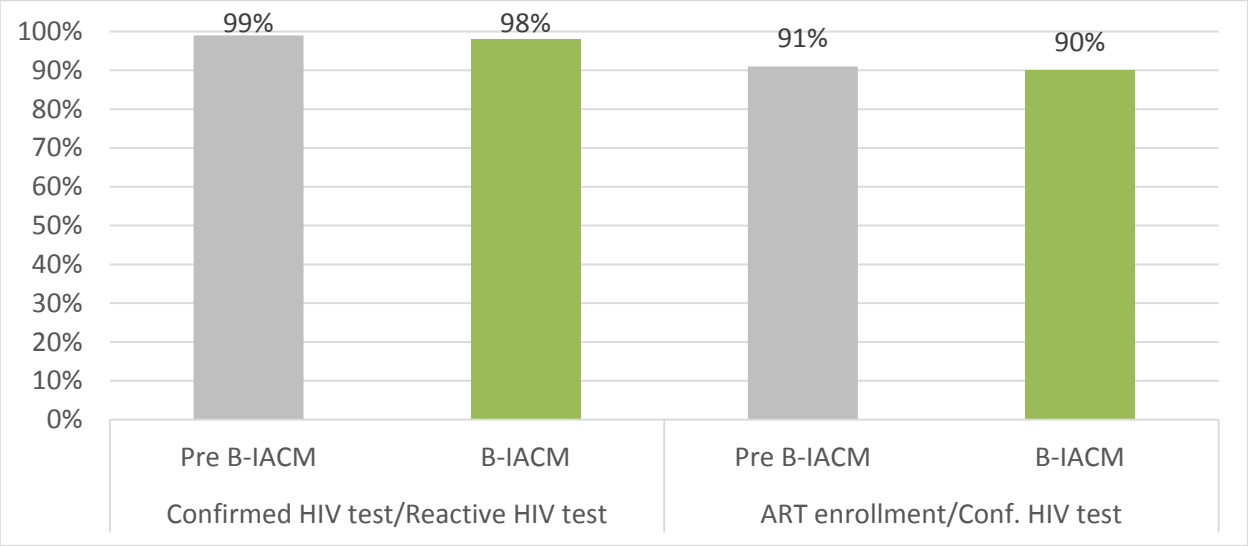
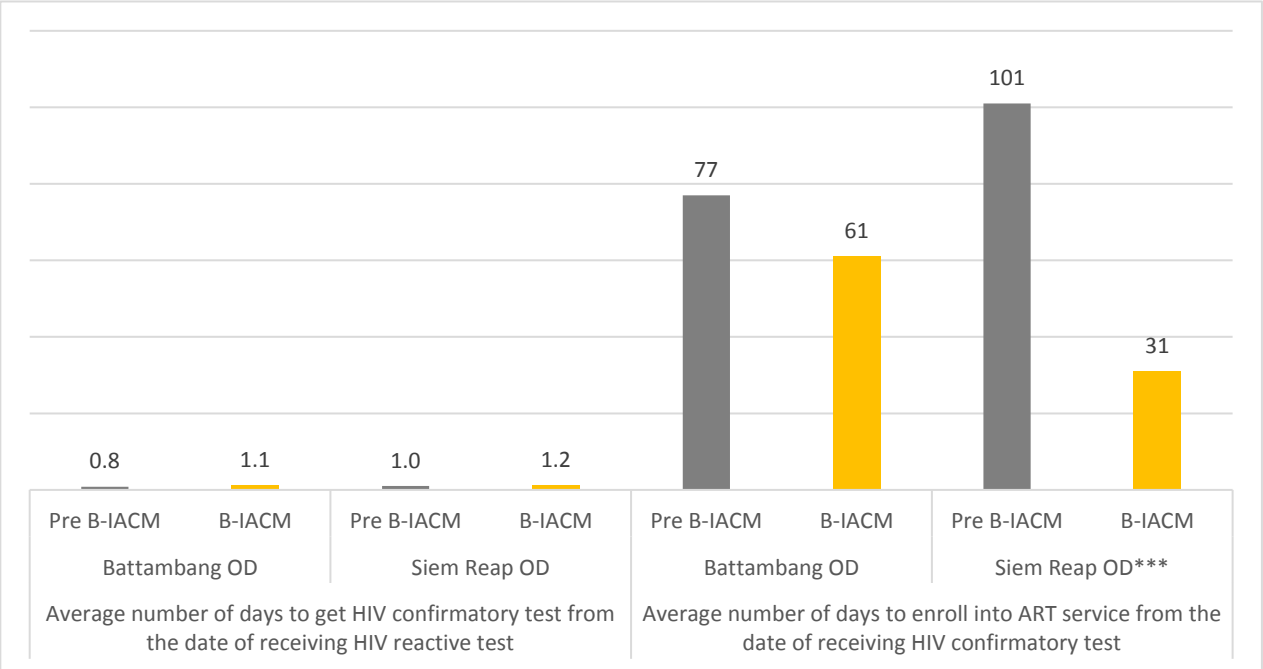


Figure 5 HIV service cascade, Siem Reap OD: Pre-B-IACM vs B-IACM

Figure 6 compares the Pre-B-IACM and B-IACM time periods for Battambang and Siem Reap with regard to the average number of days to get a HIV confirmatory test from the date of receiving HIV reactive test and the average number of days to enroll into OI/Pre-ART service from the date of receiving HIV confirmatory test. Detailed data can be found in annex tables 13 and 14. None of the minor differences were statistically significant in Battambang or Siem Reap between time periods.

With regard to latency to enroll into OI/Pre-ART service from the date of receiving a HIV confirmatory test, while there was a downward trend in the average number of days to receive a HIV confirmatory test in Battambang (6.9 to 3.5 days) and Siem Reap (8.6 to 5.6 days), though only for Siem Reap was the difference statistically significant (p=0.001).



*F*igure 6 Average number of days to get a HIV confirmatory test from the date of receiving HIV reactive test and the average number of days to enroll into ART service from the date of receiving HIV confirmatory test

****p<.001*

15.2. Qualitative Findings

The qualitative B-IACM study gathered information through in-depth interviews of key informants whose roles and responsibilities are listed in Annex 1 and PLHIV who were currently using VCCT and OI/ART services. The analysis found insights in B-IACM activities along the HIV cascade and identified roles and responsibilities of key B-IACM personnel from the two study sites in Siem Reap and Battambang as described below.

15.2.1. **B-IACM Implementation Process**

15.2.1.1. B-IACM Implementation structure in Siem Reap and Battambang ODs

The B-IACM implementation structures in Siem Reap and Battambang ODs were similar: PASP and CMC at PHD level were closely involved in the implementation of B-IACM and supervision of VCCT and OI/clinics, while CMCs located at the ODs provided coordination of B-IACM activities within their respective ODs and had no supervising role in VCCT and OI/ART clinics located in provincial hospital. See annex section 18.2 for details on the implementation structures at the two locations.

There were two CMAs in Battambang – one was a government staff member and another one was a US-CDC contracted staff – and both were located in the PHD, while there was only one CMA located in Siem Reap OD. The CMAs in the two ODs performed similar B-IACM activities of primarily facilitating activities so that reactive cases are not lost along the B-IACM cascade. Both ODs received significant support from NGOs and donors (US-CDC for Battambang and AHF for Siem Reap) to run VCCT and OI/ART clinic and to implement B-IACM activities. For example, Siem Reap also had PLHIV workers supporting the process at the ART clinic and in the community, and NGOs assigned staff to follow up HIV+ KPs in Siem Reap and Battambang

While the OI/ART clinic operated for the full day in Siem Reap OD, it was open only in the mornings in Battambang OD. The OI/ART clinic in Siem Reap OD provided services to adult PLHIV only, while CLHIV were referred to Angkor Hospital for Children. Conversely, the OI/ART clinic in Battambang provided OI/ART services to adult PLHIV and CLHIV were served at the pediatric ward of the Battambang Provincial Hospital.

15.2.2. B-IACM Implementation Activities

B-IACM implementation activities can be broken down into 8 steps, as listed below. See annex section 18.3 for details on the implementation activities at the two locations.

- Step 1: Identify all PLHIV who are still unaware of their status or lost to follow-up
- Step 2: Trace and propose HTC to all partner(s) of newly detected HIV cascade
- Step 3: Refer all reactive HIV finger prick cases to VCCT for confirmation
- Step 4: Enroll all confirmed HIV infections at ART clinics
- Step 5: Actively follow-up all newly enrolled patients in ART clinics for early ART initiation
- Step 6: Follow-up all patients on ART ensuring that ARV adherence is carefully monitored; identify and resolve problems of adherence.
- Step 7: Implement and monitor routine viral load (VL) testing
- Step 8: Monitor the HIV cascade outcomes

In both Siem Reap and Battambang ODs, each of these activity areas were performed, with great similarity between locations. GoC members were responsible for the implementation of B-IACM and the members of GoC performed similar tasks in both ODs: As a member of GoC, PASPs and CMCs were responsible for coordinating and ensured that the activities of B-IACM were implemented appropriately by addressing problems, making decisions and giving directions based on information or report from GoC regular meetings. The CMAs played key roles in the implementation of B-IACM activities through the role

of active coordination and facilitation between different levels of HIV service cascade. The CMAs worked closely with the CMCs, CMPs and CMS, spent a considerable amount of time in VCCT and OI/ART clinics, coordinated with NGOs, hospital wards and health centers to facilitate referrals of reactive cases and, coordinated with all B-IACM key players to find cases lost cases and missed appointments.

The only notable difference in the approaches was that in Battambang OD, PNTT was not fully implemented yet, though OWs and counsellors at VCCT took the initiative to counsel PLHIV to bring partners for HTC. The details of B-IACM activities at each stage of the B-IACM HIV service cascade in the Siem Reap and Battambang operational districts can be found in annex section 18.5.

15.2.2.1. Challenges in Data Quality and Use

There were several data recording steps of B-IACM in both Siem Reap and Battambang ODs. Reactive cases were recorded by health centers, NGO and CMA when the CMA was notified before the cases were referred to VCCT. At VCCT, cases including confirmed HIV cases were also recorded in a VCCT book. When the cases reached OI/ART, the cases were also recorded by ART counsellor in OI/ART book. On a daily basis, CMA transferred the recorded data into Excel spreadsheet database used by previous IACM program. On a weekly basis, CMA backed up the database (Excel Spreadsheet), reported to GoC meeting before the Excel spreadsheet was zipped and emailed to NCHADS. The PASP and CMC at PHD level in Siem Reap OD mentioned that this required considerable amount of time to complete.

The PASP and CMC at the PHD level in Siem Reap indicated that the database and dashboard designed by NCHADS were not ideal for PNTT, as there was only one cell to partner's information, not allowing for multiple partners. As a result, if an HIV confirmed case has a husband or child or multiple partners with HIV being confirmed positive, only one person (either husband or child) could be entered in the database. In addition, each OD had its own B-IACM Excel spreadsheet template and this caused difficulty for the CMC at PHD level to combine B-IACM data from all ODs to produce a provincial B-IACM database. The CMC at PHD level received weekly data via email and these were combined to monitor B-IACM at the provincial level. Data entry and weekly reporting of data to NCHADS was time consuming since the Excel sheet provided by NCHADS has to be filled and backed up before emailing to NCHADS weekly, requiring duplicate data entry and considerable amount of staff time.

The B-IACM cascade did not appear to be well understood by many providers across the spectrum of staff cadres in both study locations. While staff members tended to understand the roles they play in their assigned positions, their understanding of their contribution to the "big picture" of the B-IACM cascade was limited. In practice, however, it was not clear that a poor understanding of the larger view of B-IACM was deleterious to staff functioning.

15.2.3. PLHIV B-IACM Experiences

PLHIV reported both positive and negative experiences at OI/ART in the two ODs. Many PLHIV reported that they were satisfied with services. Reasons for their satisfaction included welcoming and greeting gestures, counselling, confidentiality, OI treatment before ART, and access to viral load monitoring. Some PLHIV reported that they could tolerate the long waiting time at registration and in OI/ART clinics because they understood that there were many PLHIV who were using the services. The PLHIV interviewed expressed that financial support for travelling to OI/ART clinics was needed for them to continue on ART.

Some PLHIV expressed their dissatisfaction with services they received. The most common complaint was a long waiting times. The Interviewed PLHIV reported that ART staff at times used negative words when PLHIV were late or missed ART appointments.

In Siem Reap OD, some PLHIV complained about staff absence during working hours at VCCT and the complicated numbering system in waiting area. They illustrated as an example that, they arrived in OI/ART earlier but those clients who arrived after them received service before them even when the service number sequence obtained at registration indicated otherwise. In addition, PLHIV voiced that the waiting time to pick up their ARV was long because of two reasons: 1) since the hospital pharmacy in Siem Reap OD catered to all hospital patients there was a long queue, and 2) the pharmacy was closed by 11:30 am and re-opens 2:00pm, prolonging the waiting time to collect ARVs.

In Battambang OD, PLHIV reported that since the OI/ART clinic operated only half day, it posed a challenge for them to receive ART. All reactive cases identified by the time close to 11 am or in the afternoon were not likely to refer to VCCT for confirmed HIV test and registration for OI/ART services until the next morning or next week if the case was detected on Friday morning. This was a challenge to refer those, for instance EW, who worked late at night.

15.2.4. Suggestions to Improve B-IACM

The following suggestions were made by key informants (Case Management Coordinator (CMC), Case Management Assistant (CMA), Case Management Providers (CMP), Case Management Supporters (CMS), VCCT counsellor, Pre-ART/ART manager, PASP Manager, NGO staff members, PPN+ coordinator) through in-depth interviews:

- Donors should continue to support the activities of B-IACM and without the financial support from NGOs, the sustainability of B-IACM could be affected. They suggested that, support such as transportation costs for some PLHIV and phone card allowance for health center staff to call the CMA when a reactive case is identified were good practices and should be continued.
- Financial support for monthly and quarterly GoC meetings should continue since it provided a platform to monitor and improve the B-IACM activities.
- Continued financial support for PLHIV volunteers from NGOs working in the community and in OI/ART clinics was extremely important to intensify case detection as PLHIV volunteers were active implementers of B-IACM in communities to facilitate case identification, referral and follow up and provided administrative support in OI/ART clinics to assist new and old cases.
- In Siem Reap OD, it was also suggested that the PNTT program should be scaled up because PNTT can contribute to the identification of more unknown PLHIV. Staff key informants expressed a need for PNTT formal guidelines and SOP for field implementers to carry out PNTT activities. It was also suggested to improve the current B-IACM database and dashboard for PNTT to include more cells to capture multiple partners of PLHIV since currently, the B-IACM dashboard template provides only one cell to record partner information.

- A staff member of an NGO at Battambang province suggested to allocate some budget to commune council to support the case identification in community. It was also communicated that there should be a committee to work with entertainment establishments as it was difficult to reach out to EW in some establishments due to lack of cooperation from the owner. He suggested that since the department of tourism give the license to these establishment, the ministry should be a committee member to enforce cooperation of the entertainment establishment.
- B-IACM database should be a web-based database to reduce the amount of time to fill in the data spreadsheet at all level of B-IACM activities.

15.2.5. **Helpful Practices**

The key informants gave feedback as summarized below.

- B-IACM improved the case detection rate and retained PLHIV in HIV care cascade because B-IACM had a strong coordination between all partners involved.
- The weekly meeting was an effective mechanism to follow up reactive cases at each level of the HIV service cascade. Informants mentioned that the weekly meeting allowed for rapid action to follow up lost cases and helped address B-IACM implementation issues such as stock out of HIV test kits. It was reported that monitoring of B-IACM activities and follow-up of lost cases were participatory, allowing all partners to voice their challenges and concerns. These participatory meetings kept all partners informed about the progress or challenges of B-IACM.
- The financial support from NGOs to contract CMA staff and PLHIV at ART Clinics to support volunteers allowed B-IACM activities to be implemented effectively. For example, key informants indicated that the contracted CMA could commit full time to implement B-IACM and that the VCCT and OI/ARV clinic could benefit from contracted PLHIV volunteers through this financial support.
- Continue to supply phone card for communication. PASP, CMA, CMA and CMP highlighted that the supply of a $5 phone card per month by an NGO in Siem Reap OD for communication to each health center was an effective strategy to improve case detection as this communication led to rapid action and follow-up. Informants feared that without phone card support, communication between health centers and CMA or OD's CMC was problematic resulting in slower response and lost cases prior to donors' support of phone card.
- Informants at Siem Reap OD felt that PNTT contributed to identification of new cases and should be strengthened.
- Continuous monitoring of B-IACM data and dashboard allowed the fast flow of data from B-IACM implementation ODs to NCHADS that resulted in timely and fast action to address implementation issues.

15.3. Cost Allocation

Table 6 and figure 8 show the breakdown of total additional cost by category for the pre-B-IACM reference period (January 2014 -September 2015) and for the B-IACM implementation period (October 2015-June 2017). The total additional cost ($73,289) during the Pre-B-IACM period was nearly 2 times higher than the total additional cost during the B-IACM implementation period ($40,060) in Siem Reap OD. Conversely, in Battambang, the total additional cost was slightly higher in B-IACM period ($37,376) when compared to the total cost during pre-B-IACM period ($30,787). Management and support (including salary, benefits and insurance for staff) was the largest cost category for both pre-B-IACM and B-IACM periods in Siem Reap and Battambang.

Table 6 Cost allocation – in US$

	Feb 14- Sep 15	**Oct 15- May 17**	**April 14- Sep 15**	**Oct 15- Mar 17**
	OD Siem Reap		**OD Battambang**	
	Pre-B-IACM	B-IACM	Pre-B-IACM	B-IACM
Management and Support	28,065	11,960	22,377	25,409
Transportation	5,305	3,067	-	-
Meeting	3,375	5,280	3,480	3,872
Capacity development	1,326	544	406	532
Monitoring & supervision	2,320	2,175	750	3,634
Supplies, communication & consumables	3,598	4,962	3,325	3,930
Referral (transportation for PLHIV & PW)	150	161	-	-
Lab & OPD fee for Pre ART	7,172	2,506	-	-
Overhead costs (including operations)	21,978	9,406	450	-
Total costs	**73,289**	**40,061**	**30,787**	**37,376**

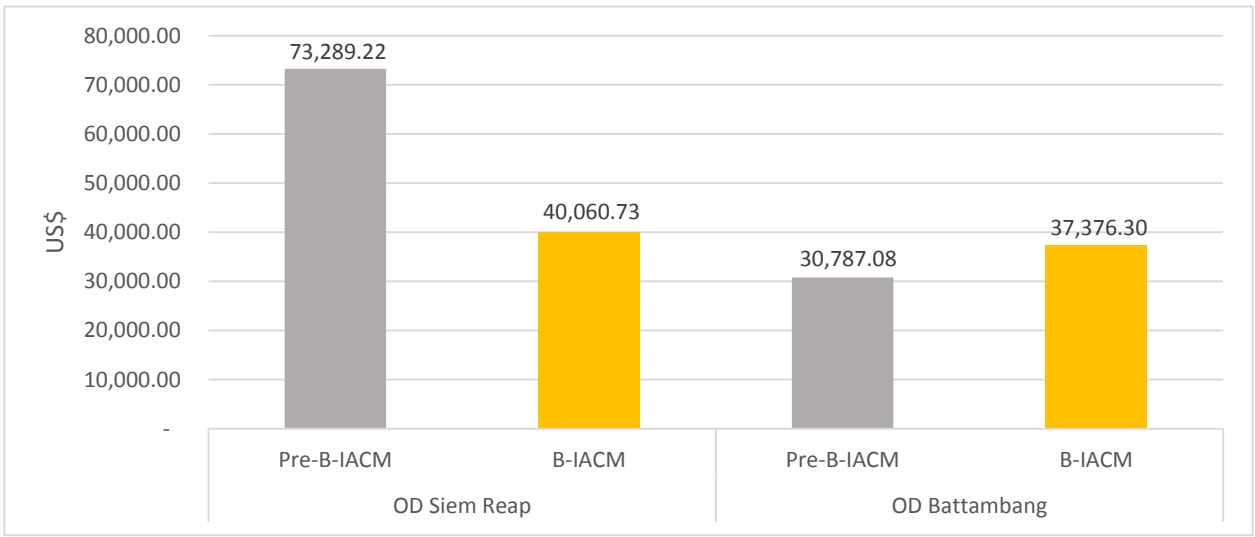


Figure 7 Total program cost

Figure 8 shows that Siem Reap had a larger proportion of costs on overhead and laboratory, while Battambang spent a higher proportion on management and support.

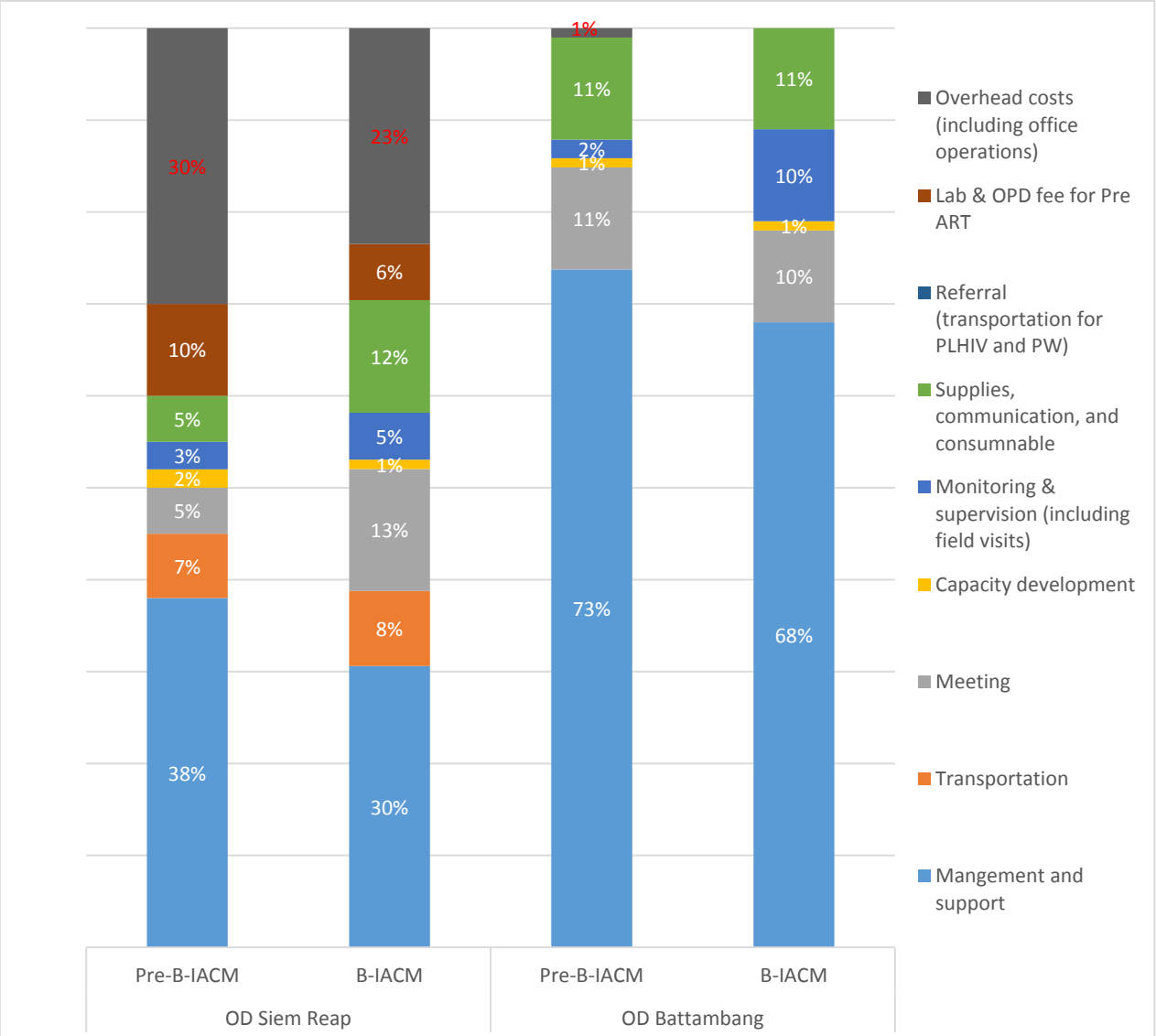


Figure 8 Cost allocation – in %

Figure 9 shows the numbers of individuals enrolled on ART and the cost per individual enrolled on ART for the pre-B-IACM reference period and for the B-IACM implementation period in Siem Reap and Battambang. The number of ART clients newly enrolled increased between the pre-B-IACM and B-IACM periods in both locations, most notably in Battambang, where it more than doubled from 86 to 209. The cost per individual enrolled on ART was much lower under B-IACM than under pre-B-IACM in both locations, $112 compared to $324 in Siem Reap, and $175 compared to $358 in Battambang.

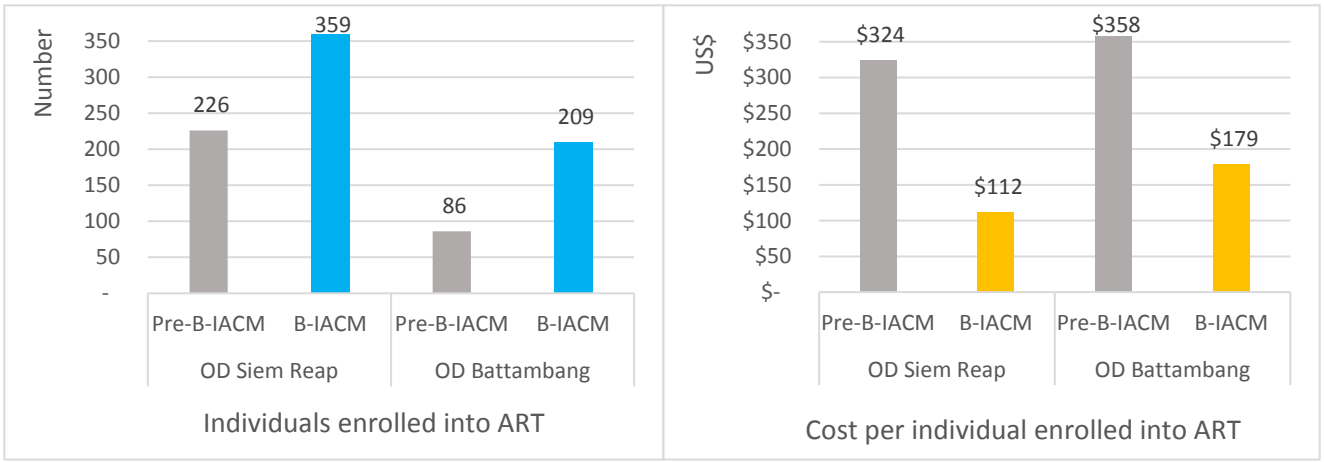


Figure 9 ART enrollment and cost per individual enrolled on ART

(Note: the number of individuals enrolled into ART here were adjusted to be consistent with financial periods. OD Siem Reap: Pre-B-IACM from February 2014 to September 2015 and B-IACM from October 2015 to May 2017, and OD Battambang: Pre-B-IACM from April 2014 to September 2015 and B-IACM from October 2015 to March 2017.)

16. Discussion

This evaluation analyzed B-IACM data on 1,304 clients: 826 from Siem Reap and 476 from Battambang. B-IACM proved superior to the Pre-B-IACM approach in at least three key respects. First, the number of individuals reactive for HIV increased dramatically during B-IACM (835) compared to the Pre-B-IACM time period (469), p=0.000. Second, the average number of days to enroll into OI/Pre-ART service from the date of receiving HIV confirmatory test decreased in Battambang (6.9 to 3.5 days) and Siem Reap (8.6 to 5.6 days), though only for Siem Reap was the difference statistically significant (p=0.001). Third, the number of individuals enrolled into OI/Pre ART and ART also increased during B-IACM in both Siem Reap (226 to 359) and Battambang (86 to 209). In sum, these results point to notable improvements seen under B-IACM, compared to the previous approach. The pre-BIACM used an Excel spreadsheet database, while BIACM used a purpose-built database, and changes were made to strengthen the data system under B-IACM. As such, it is possible that there were differences in data quality between the two time periods that contributed to the differences seen by this analysis.

There was no evidence of decreased losses to follow-up along the HIV care cascade under B-IACM, compared to Pre-B-IACM. Indeed, in Battambang there was a statistically significant decrease in the proportion of individuals that were confirmed HIV positive that were enrolled on ART (from 95% to 85%, $p < 0.01$). None of the other Pre-B-IACM/B-IACM retention comparisons yielded statistically significant differences. Despite the absence of notable increases in retention, the overall OI and ART enrollment during B-IACM (88%) remained higher than the national average of 79% (NCHADS, 2016a). Thus, while no increases in retention were seen under B-IACM, performance on retention continued at a relatively high level. This, despite the decreased coordination structures— moving from 3 bodies (Active Case Management group, and sub-TWGS on B-COPCT and B-COC) to only one (GOC) — as well as significantly decreased per-client funding levels, as discussed below.

The B-IACM implementation structures, roles and responsibilities, and implementation activities were similar in both study locations, and followed closely the approach designed by NCHADS, even though many lacked a full understanding of the "big picture" of B-IACM. Key informants among implementing staff related important issues, including: 1) data management had challenges (incomplete and complicated data systems), but databases and data use systems were clearly helpful; and 2) the importance of a coordinated team approach for success.

The two ODs received a great deal of support from donors to carry out many important B-IACM activities. The direct financial support to contract CMAs to commit full time for B-IACM was important to ensure the day-to-day implementation of B-IACM activities. The current operation of the OI/ART clinic in Siem Reap OD was reliant on contracted staff from AHF and from Flagship-supported SCC PLHIV workers. There was one permanent physician working OI/ART clinic in Battambang OD and PLHIV volunteers supported by US-CDC. Direct transportation support from NGOs encouraged PLHIV to use VCCT and OI/ART services, thereby encouraging ART adherence. Financial support to monthly and quarterly GoC meeting was also critically important to ensure all activities were conducted appropriately. Without this financial support, the sustainability of B-IACM was questioned by key informants.

The total additional support cost ($73,289) during the Pre-B-IACM period was much higher than during the B-IACM implementation period ($40,060) in Siem Reap, while in Battambang, the total additional support cost was slightly higher in B-IACM period ($37,376) when compared to the pre-B-IACM period ($30,787). The highest cost component was allocated for management and support in both locations during both time periods. It should be noted that the costs described were exclusive of costs borne by the government (most clinicians' salaries, HIV tests, ARVs, infrastructure, payment for results, etc.). Therefore, while these costs do not encompass the full scope of HIV program activities, they captured the costs of the additional support for BIACM. Furthermore, the models in Siem Reap and Battambang were different in scope. For example, in Battambang there was no funding for referrals, laboratory fees, or transportation, while these costs were covered by Flagship.

Comparing the two time periods, B-IACM was a great deal more cost-effective than the Pre-B-IACM approach. The additional cost per individual enrolled on ART under B-IACM was $112 in Siem Reap and $179 in Battambang, which were both much less than the pre-B-IACM additional costs per individual enrolled on ART: $324 in Siem Reap and $358 in Battambang. As described earlier, expenditures for local coordination and financial support decreased under B-IACM compared to Pre-B-IACM. It is noteworthy that expenditures were not decided at the implementation level in response to observed local conditions or need, but rather were dictated from higher levels, such that the resources provided were the resources utilized. That said, the B-IACM approach emerged as the more efficient use of resources.

17. Conclusion

In conclusion, the implementation of B-IACM in Siem Reap and Battambang was associated with an increase in detection of PLHIV, a decrease in the average number of days between HIV status confirmation and enrollment into ART, and an increase in number of individuals enrolled in ART, while proving a great deal more cost-effective than the pre-B-IACM approach. The implementation structures and activities of B-IACM were functioning along the lines of their design in both study locations. There remain concerns with regard to a lack of evidence of decreasing losses to follow-up under B-IACM, and reliance on support from development partners.

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19. Annexes

19.1. B-IACM

Table 1 shows that comparing Pre-B-IACM and B-IACM time periods in the proportion of HIV confirmatory tests in Battambang, no statistically significant difference was observed (99% vs 98%, p=0.601). Similarly in Siem Reap, there was no statistically significant difference in the proportion of HIV confirmatory tests (96% in Pre-B-IACM time vs 97% in B-IACM time period, p=.153).

Table 1 Percentage of individuals with reactive HIV test results that received and did not receive HIV confirmatory tests for B-IACM and before B-IACM implementation periods

OD Name	Implementation Period	Confirmatory Test		Total	N	Fisher's Exact Test
		Received confirmatory test	Did not receive confirmatory test			
Battambang OD						
	Before B-IACM	96.0%	4.0%	100%	*175*	
	B-IACM	97.0%	3.0%	100%	*303*	.601
	Total	96.7%	3.3%	100%	*478*	
Siem Reap OD						
	Before B-IACM	99.3%	.7%	100%	*294*	
	B-IACM	97.9%	2.1%	100%	*532*	.153
	Total	98.4%	1.6%	100%	*826*	
Overall						
	Before B-IACM	98.1%	1.9%	100%	*469*	
	B-IACM	97.6%	2.4%	100%	*835*	.697
	Total	97.8%	2.2%	100%	*1304*	

Table 2 shows that comparing the Pre-B-IACM and B-IACM time periods in Siem Reap, no statistically significant difference was noted in the number of HIV+ clients enrolled into ART care (91% vs 90%, respectively, p=0.589). In Battambang, however, a decrease in HIV+ clients enrolled into ART care was seen, from 95% to 85%. This difference was statistically significant, p=0.007.

Table 2 Percentage of ART enrollment for B-IACM and before B-IACM implementation periods

OD Name	Implementation Period	ART Enrollment		Total	N	Fisher's Exact Test
		Not Enrolled	Enrolled			
Battambang OD						
	Before B-IACM	5.3%	94.7%	100%	*131*	
	B-IACM	14.8%	85.2%	100%	*230*	.007
	Total	11.4%	88.6%	100%	*361*	
Siem Reap OD						
	Before B-IACM	8.9%	91.1%	100%	*247*	
	B-IACM	10.4%	89.6%	100%	*402*	.589
	Total	9.9%	90.1%	100%	*649*	
Overall						
	Before B-IACM	7.7%	92.3%	100%	*378*	
	B-IACM	12.0%	88.0%	100%	*632*	.033
	Total	10.4%	89.6%	100%	*1010*	

Table 3 compares the average number of days to receive HIV confirmatory test between Pre-B-IACM and B-IACM time periods. There were no statistically significance differences in the average number of days to receive confirmatory test in Battambang (0.8 vs 1.1 respectively, p=0.539) and in Siem Reap (1.0 vs 1.2 in pre-B-IACM and B-IACM time periods respectively, p=0.539).

Table 3 Average number of days to get HIV confirmatory test from the date of receiving HIV reactive test

OD Name	Implementation period	Mean	Std. Err.	Std. Dev.	95% Conf. Interval		N	Wilcoxon rank-sum (Mann-Whitney) test
Battambang OD	Pre B-IACM	0.839	0.203	2.629	0.439	1.240	168	
	B-IACM	1.061	0.324	5.560	0.423	1.699	294	0.539
	Overall	0.981	0.219	4.708	0.550	1.411	462	
	Difference	-0.222	0.456		-1.117	0.674		
	Statistical test	*Diff<0, p= 0.3132; diff!=0, p= 0.6265 ; diff>0, p=0.6868*						
Siem Reap OD	Pre B-IACM	1.021	0.216	3.696	0.595	1.446	292	
	B-IACM	1.209	0.266	6.068	0.687	1.731	521	0.539
	Combined	1.141	0.187	5.337	0.774	1.509	813	
	Difference	-0.189	0.390		-0.955	0.577		
	Statistical test	*Diff<0, p= 0.3145; diff!=0, p=0.6290 ; diff>0, p= 0.6855*						

Table 4 shows that comparing the Pre-B-IACM and B-IACM time periods in Battambang, no statistically significant difference was seen in average number of days to enroll into ART services from the date of receiving HIV confirmatory test (77 vs 61 days respectively, p=0.316). However, in Siem Reap, there was a decrease in the average number of days to enroll into ART services when comparing pre-B-IACM and B-IACM implementation time periods (101 vs 31 days respectively, p=0.000).

Table 4 Average number of days to enroll into ART service from the date of receiving HIV confirmatory test

OD name	Implementation period	Mean	Std. Err.	Std. Dev.	95% Conf. Interval		N	Wilcoxon rank-sum (Mann-Whitney) test
Battambang OD	Pre B-IACM	76.516	12.411	138.198	51.950	101.082	124	
	B-IACM	61.214	5.178	72.493	51.002	71.426	196	0.316
	Overall	67.144	5.764	103.113	55.803	78.484	320	
	Difference	15.302	11.819		-7.952	38.556		
	Statistical test	*Diff<0, p= 0.9018; diff!=0, p=0.1964 ; diff>0, p=0.0982*						
Siem Reap OD	Pre B-IACM	100.911	14.042	210.628	73.240	128.582	225	
	B-IACM	30.674	3.826	72.491	23.150	38.198	359	0.000
	Overall	57.735	6.059	146.434	45.834	69.636	584	
	Difference	70.237	12.117		46.439	94.035		
	Statistical test	*Diff<0, p= 1.0000 ; diff!=0, p=0.0000 ; diff>0, p= 0.0000*						

19.2. B-IACM Implementation Structure

19.2.1. **Siem Reap OD**

Figure 1 illustrates the B-IACM implementation structure in Siem Reap. At PHD level, the PASP and CMC provided overall management of B-IACM in the province. The CMC located at the PHD performed data analysis, engaged in RMAA and participated in the GoC weekly, monthly and quarterly meeting.
At the OD level the CMC coordinated B-IACM activities in the OD ensuring that HIV test kits were available in all health centers, and reactive cases were followed up through the CMA. The CMA at the OD level was a Flagship contracted staff who coordinated with health centers and NGOs to ensure that identified reactive cases were referred to VCCT and OI/ART services and lost cases were followed up.

At the service delivery level, NGOs and health centers were engaged in identification of new cases in the community and notified the CMA for referral to VCCT and OI/ART services. At VCCT and OI /ART clinics, reactive cases received further counselling, HIV confirmation tests, and registered for OI/ART. The VCCT and OI/ART clinics were located in the same building, operated full day, and provided services to adult PLHIV. Child PLHIV were referred to Angkor Hospital for Children (AHC). Also at the service delivery level, health centers and hospital wards (TB, maternity, infectious diseases, etc.) performed provider initiated HIV Testing and Counseling (PIHTC) finger prick testing and notified the CMA/CMC of reactive cases for HIV confirmation test and enrollment into OI/ART services. At this level, NGOs engaged in case detection, referral and PNTT.

The NGO, AHF, provided fifteen staff members, including physicians, at VCCT and OI/ART clinics in Siem Reap OD. Another NGO, SCC, provided staff at VCCT to facilitate registration of reactive cases, to ensure ART enrolment for confirmed cases, and provided financial support for transportation to poor PLHIV who came to use VCCT and IO/ART services. In addition, SCC engaged in community HIV education for the general population, provided home care services, facilitated referrals for HIV finger prick testing at health centers, and followed reactive cases from health centers to VCCT. CRS operated in Ankor Chum OD but all reactive cases were referred to VCCT and OI/ART clinic in provincial referral hospital because there were no VCCT and OI/ART services in Angkor Chum hospital. Same as SCC, CRS provided CBPCS services, referral of reactive cases and follow-up of lost cases. CWPD and AHF NGOs in Siem Reap were involved in case detection among EW, while MHC targeted MSM and TG by providing HIV finger prick testing in the community.

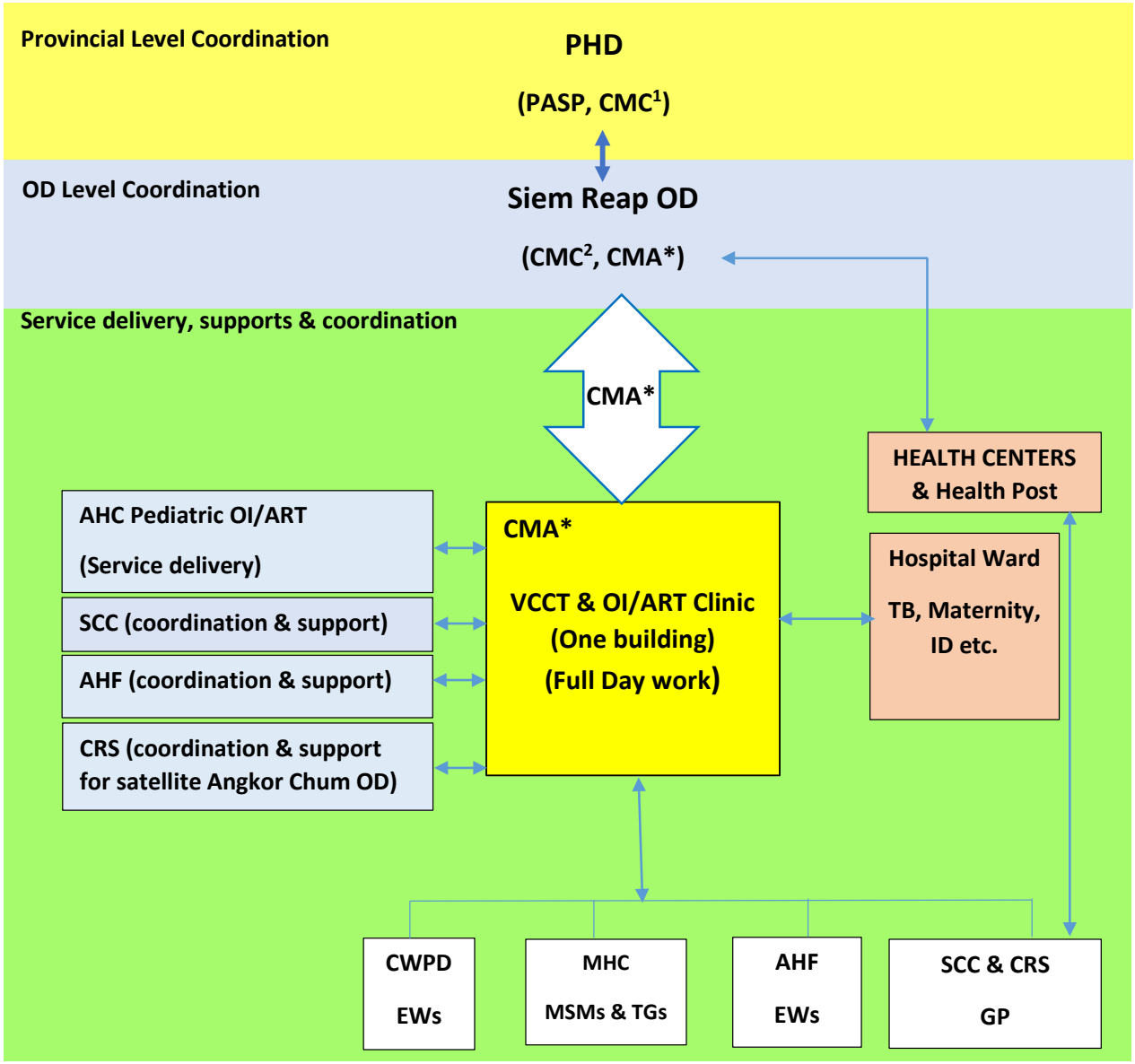

Figure 1 *B-IACM implementation Structure in Siem Reap OD*

**There was one CMA located at Siem Reap OD who coordinated B-IACM activities in the OD, VCCT and OI/ART clinic located in Siem Reap Provincial hospital.*

[1]CMC was located at PHD level to coordinate and monitor B-IACM in the Siem Reap province. The CMC managed B-IACM database and performed data analysis for B-IACM regular meetings.

[2]CMC was located at Siem Reap OD and coordinated B-IACM activities in the OD.

19.2.2. **Battambang OD**

Figure 2 shows the implementation structure of B-IACM in Battambang OD. At the PHD level, the PASP and CMC oversaw B-IACM implementation in the province. As a member of the core GoC, the CMC participated in regular GoC meetings. The PASP chaired the monthly and quarterly meetings while CMC chaired weekly meeting. There were two CMAs located at PHD and one of them was contracted by US-CDC while the other was a government staff member. Based in the PHD, the US-CDC contracted CMA played a role in coordination of B-IACM activities between the OD, service delivery and communities.

At the OD level, the CMC managed B-IACM implementation in health centers in the coverage area of the Battambang OD and worked in collaboration with the CMAs on referrals of reactive cases reported from the health centers to VCCT and OI/ARV services.
At the service delivery level, VCCT and OI/ART clinics received support from NGOs and US-CDC. Buddhism for Development (BFD) is one NGO that placed three staff working at VCCT and OI/ART clinics to ensure that all reactive cases from health centers were assisted to receive services, and to ensure that new reactive cases who visited these clinics received finical support for transportation cost. US-CDC supported PLHIV volunteers provides administrative support (registration patients, preparing patient's files, etc.) in the OI/ART clinic.

At the community level, BFD provided CBPCS services, while MHSS and CWPD provided services such as HIV education and finger prick testing to KP. When a new case was identified, health centers and NGOs notified the US-CDC contracted CMA who performed coordination functions to ensure the reactive cases were linked to VCCT and registered for OI/ART services. B-IACM in Battambang OD also covered activities in Sangke OD.

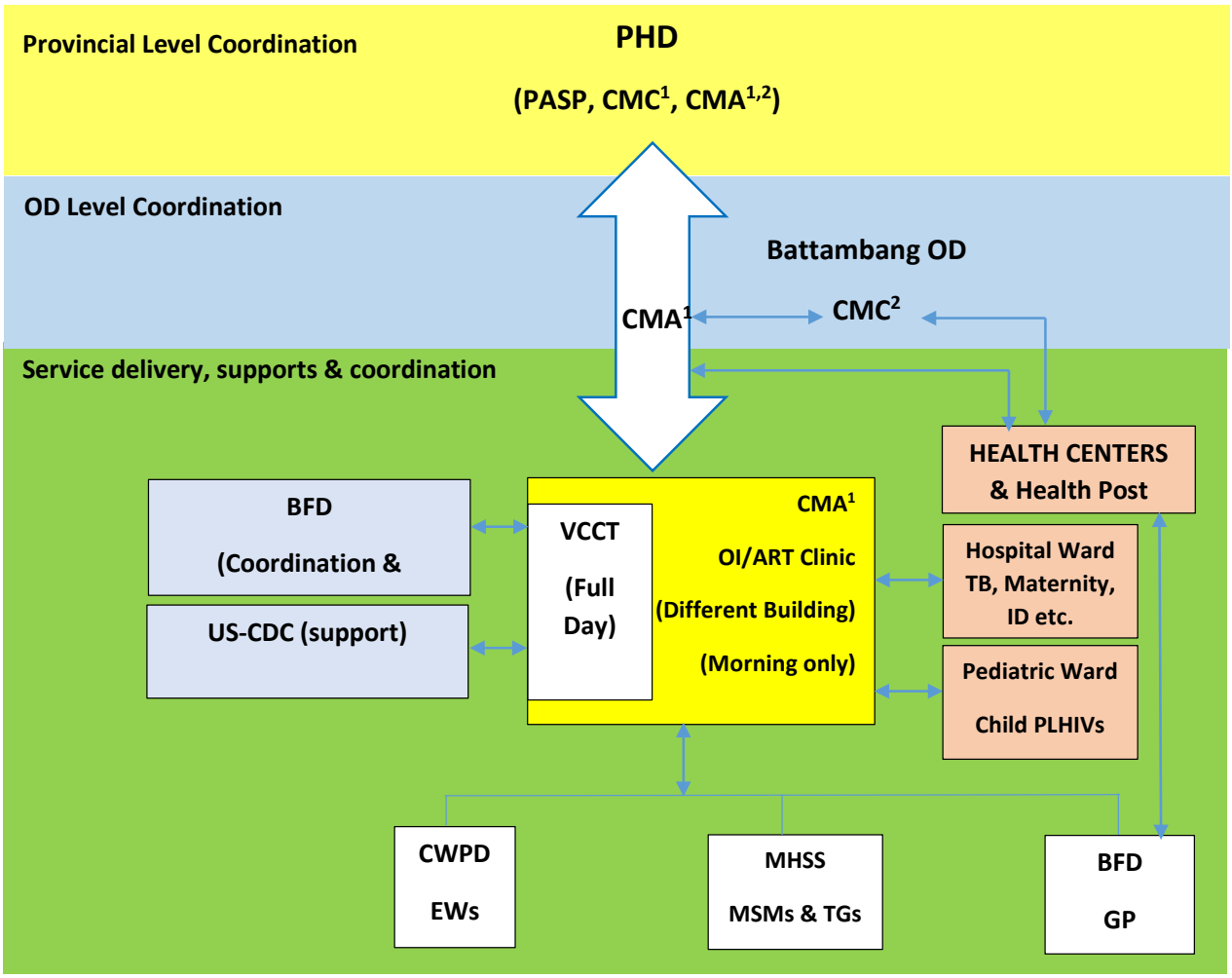

Figure 2 *B-IACM implementation Structure in Battambang OD*

[1]CMA is contracted by US-CDC to perform B-IACM coordination activities in Battambang OD. The CMA is based in PHD.
[2]CMA is a government staff located in Battambang PHD.
[1]CMC is located at PHD level to coordinate and monitor B-IACM in the Battambang province. The CMC manages B-IACM database performs data analysis for B-IACM regular meetings.
[2]CMC is located at Battambang OD and coordinates B-IACM activities in the OD.

At VCCT and OI/ART clinics in both Siem Reap and Battambang ODs, there were VCCT counsellors, ART counsellors, physicians, nurses and supporting staff including PLHIV volunteers and contracted staff. VCCT and OI/ART clinics in Siem Reap OD were located in the same building and provided services all day to adult PLHIV (>14 years) while child PLHIV (<14 years) were referred to Angkor Hospital for Children for VCCT and OI/ART services.

In Battambang OD, VCCT and OI/ART clinics were located in separate buildings within the provincial hospital compound and provided services to both adult and children PLHIV. Adult PLHIV were registered at VCCT and OI/ART clinics and children living with HIV (CLHIV) were registered at Pediatric Ward (for both VCCT and ART). Both adult PLHIV and CLHIV collected ARV drugs at the OI/ART clinic. The OI/ART clinic was open only in the morning while the VCCT clinic provided services full day.

19.3. B-IACM Activities Steps

Step 1: Identify all PLHIV who are still unaware of their status or lost to follow-up

The in-depth interviews performed at Siem Reap and Battambang OD showed that, at step one of the B-IACM activities cascade where case detection and identification of new cases occurred, the full B-COPCT service package (finger prick HIV testing, outreach and hot spot HIV testing, community education etc.) was reported to have been implemented for key populations via the NGOs working with their respective KP groups. Targeted general population members were reported to have been reached through community action framework that included outreach activities by VHSG and NGOs that provided CBPCS services to find HIV cases among pregnant women, TB and STI patients at health facilities (PITC at health centers, family health clinics, hospital wards) and in the communities.

In Siem Reap OD, all health centers including satellite health posts, provincial hospital wards (TB, maternity, ID) and RHAC clinic provided finger prick HIV testing. There were five NGOs (see figure 1) involved in identification of PLHIV. SCC provided CBPCS services to the general population, and referrals to health centers for HTC. CRS based in Angkor Chum OD provided CBPCS services and referrals of reactive cases to VCCT and OI/ART clinic in Siem Reap provincial hospital. CWPD and AHF worked closely with EWs and provided health education that included prevention of STI/HIV infection and pregnancy, family planning, counselling and HIV finger prick testing. Finger prick testing was reportedly provided twice (or every six months) yearly to EWs. Similarly, MHC targeted MSM and TG, providing health education, counselling and HIV finger prick testing.

In Battambang OD, all health centers including satellite health post and the maternity ward of the provincial hospital reportedly provided counselling and finger prick HIV testing (PIHTC). There were three NGOs involved in the implementation of B-IACM activities. BFD provided home-based care services and community HIV education, prevention and referrals to health centers for reactive testing. As seen with CWPD in Siem Reap OD, CWPD in Battambang OD worked closely with EWs in entertainment establishments to provide HIV education, HIV counselling and finger prick testing. MHSS targeted MSM and TG, providing HIV education, condom distribution, VCCT and HIV finger prick testing. MSM and TG gathered weekly at hairdressing salons or outreach workers' houses, where HIV education, VCCT and HIV finger prick testing took place.

Key informants (PASP, CMC, CMA, CMP and NGO staff) reported that activities to address cases lost to follow up were carried out in the two ODs. When a loss to follow-up happened, action was taken by calling back the case or informing the health center/health post or NGO staff who worked in the area where the lost case were detected. Similarly for EWs, MSM or TG, NGO staff contacted lost cases via phone or by visiting their homes or work locations. In addition, any lost registered cases were discussed during the weekly GoC meeting.

Figure 3 illustrates how a reactive case was referred from community to VCCT for confirmed test and potential loss at both Siem Reap and Battambang ODs.

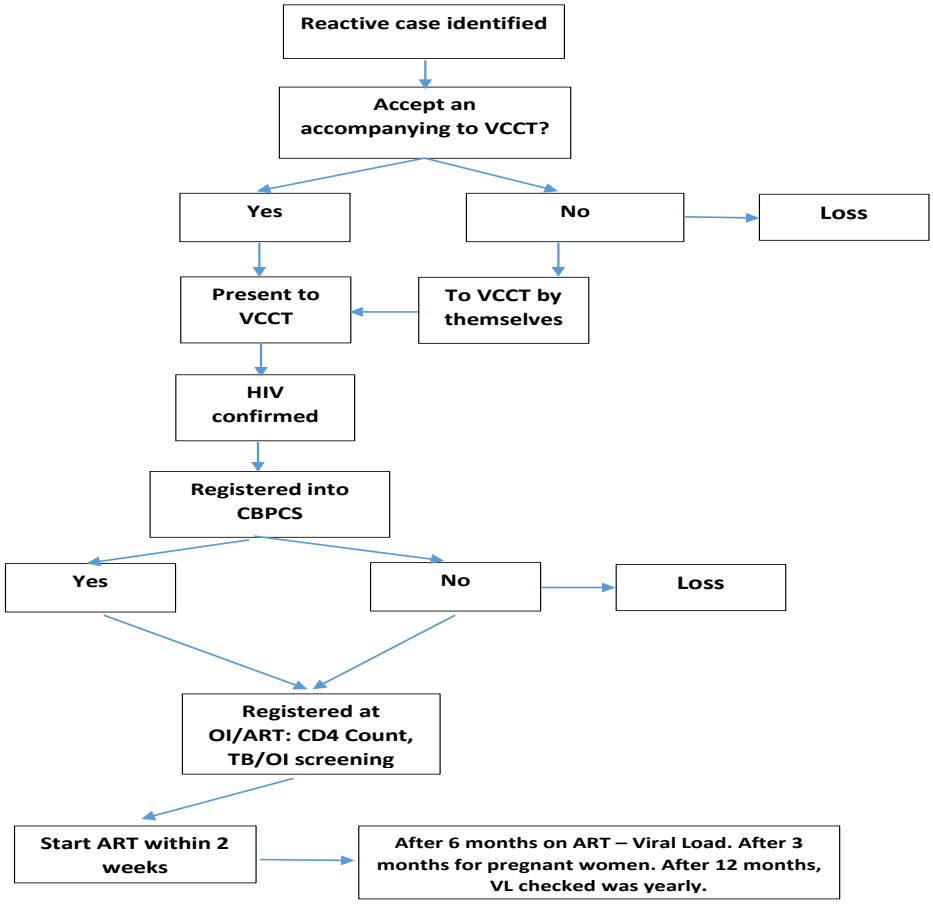

Figure 3 Flow of referrals of reactive cases in Siem Reap and Battambang ODs

Step 2: Trace and propose HTC to all partner(s) of newly detected HIV cascade

Efforts were made to encourage new cases to bring their partners and exposed children to VCCT, especially in Siem Reap OD. In Siem Reap OD, Partner Notification, Tracing and HIV Testing (PNTT) activities have been implemented, though there exist no formal guidelines or SOP for PNTT. When a reactive case was confirmed HIV positive at VCCT, counsellors at VCCT counselled the PLHIV to bring partner(s) and children for HTC. In the community, NGO staff and their OWs provided counselling to their target groups to bring partner(s) and children for HTC. PNTT excel database was used to record counselling and testing of partners. The form provided by NCHADS had a limitation, as it only allowed for entry of information on one partner information. This posed a challenges when an index client had more than one partner.

In Battambang OD, PNTT was not fully implemented yet. OWs and counsellors at VCCT took the initiative to counsel PLHIV to bring partners for HTC. PLHIV were counselled to bring partner(s) for HTC and recorded in PNTT Form A2.

Step 3: Referral of all reactive HIV finger prick cases to VCCT for confirmation

The interviews from both ODs revealed that the CMA played a key role in linking reactive cases to VCCT for confirmation of HIV testing at both Siem Reap and Battambang OD. When a reactive case was detected by outreach activities of NGOs working with KPs or by a health center/health post or a hospital ward, information was sent to CMA who coordinated referrals of the case to VCCT for HIV conformation test and for registration into the system for OI/ART services if confirmed HIV positive. See figure 13.

In Siem Reap OD, the CMA coordinated with health centers/health post, NGOs (SCC, CWPD, MHC, AHF and CRS) for referrals of reactive cases. If the reactive cases agreed to be escorted to VCCT, NGO staff or OW who worked closely with health centers (occasionally health center staff) escorted the cases to VCCT. Similarly, MHC, CWPD and AHF staff members escorted reactive cases from their HIV finger prick testing to VCCT if the cases agreed to be escorted. When the reactive cases disagreed to have an escort, referral arrangement was done by taking the phone numbers of the cases, asking the time and date they planned to visit the VCCT on their own and NGO staff and CMA arranged to meet them at VCCT if the cases agreed to have somebody meeting them at VCCT. All reactive cases of finger prick testing received transport allowance from NGO, except RHAC as SCC covered transport allowance for all reactive cases from RHAC.
In Battambang OD, CMA contracted by US-CDC coordinated all referrals to VCCT for HIV confirmation test. There were three NGOs working to boost identification of new PLHIV in Battambang OD. BFD targeted general population and provided referrals of reactive cases from health centers to VCCT for HIV confirmed test; CWPD targeted EWs while MHSS targeted MSMs and TGs referred reactive cases from community to VCCT for confirmed test. The process of escorting HIV reactive cases in Battambang was the same as in Siem Reap. These three NGOs provided travelling support for all reactive cases for confirmed HIV test at VCCT in Battambang provincial hospital.

Step 4: Enroll all confirmed HIV infections at ART clinics

Based on in-depth interviews conducted at Siem Reap and Battambang ODs, the findings on linkage to care activities of B-IACM indicated that at ART clinics, NGOs and contracted staff were present to help enroll HIV confirmed cases for OI/ART services. When reactive cases were confirmed at VCCT, the cases were sent to see NGO staff standing by in VCCT and OI/ART clinics for registration into their CBPCS program before the cases were sent to OI/ART clinic for registration for CD4 test, OI screening and ART treatment. For a new case, ART initiation would start within two weeks, except for pregnant women who were initiated immediately on ART.

At the ART clinic in Siem Reap OD, SCC and CRS was responsible for PLHIV registration for their CBPCS program while AHF staff at OI/ART clinic assisted in the enrollment into OI/ART services. A government staff registered HIV confirmed test for OI/ART services using NCHADS database system.
In Battambang, BFD staff stood by at VCCT clinic for registration into the CBPCS program. As ART clinic in Battambang provided services to both children and adult PLHIV, all adult PLHIV were registered at the ART clinic, while all children living with HIV (CLHIV) were registered at pediatric wards and the two groups collected ARV at IO/ART clinic. At Battambang, two database persons contracted by US-CDC were responsible for enrolling the confirmed cases for OI/ART services. In addition, US-CDC provided financial incentive to seven other PLHIV volunteers to work in OI/ART clinics to help prepare patients' files, filling forms and taking blood of PLHIV for viral load test.

Step 5: Actively follow-up all newly enrolled patients in ART clinics for early ART initiation

Interviews of key informants (PASP, CMC, CMA, CMP and NGO staff) from Siem Reap and Battambang ODs indicated that all newly enrolled PLHIV were followed up to ensure that they received OI/ART services. CMA in both Siem Reap and Battambang ODs checked and collected data on all newly enrolled PLHIV at OI/ART clinics and shared these data during the GoC weekly meeting before sending to NCHADS. The weekly data presented included the number of reactive cases, the number of HIV confirmed at VCCT, the number of PLHIV registered for OI/ART services, the number of PLHIV receiving OI/ART services,

number of PLHIV with viral load test, and the number of PLHIV who are lost. The lost cases would be followed by NGOs.

Step 6: Follow-up all patients on ART ensuring that ARV adherence is carefully monitored; identify and resolve problems of adherence.

In both Siem Reap and Battambang ODs, NGOs played an important role in helping PLHIV on ARV adherence. NGOs provided transportation allowance to PLHIV who were in great need for support to collect ARV at ART clinic. In Siem Reap OD, SCC and CRS provided this support and so did BFD in Battambang OD. At OI/ART clinic, ART counsellors in both ODs provided counselling to PLHIV focusing on collect ARV drugs on time, benefits of treatment, reliable test results, acceptance of HIV status and living with HIV. The ART counsellors notified the CMA of cases that had missed an appointment, and the CMA shared all missed cases with GoC members during weekly and monthly meetings. All missed appointments were followed up by NGO staff. Viral loads of individual patients were closely monitored by doctor and ART counsellors. If a patient had a high viral load, ART counselors provided adherence counselling in order to improve ART adherence. Doctor increased number of appointment, reduce the amount of ARV dispensed from two month to one month and the PLHIV was recorded in a book to boost counselling to improve ART adherence.

Step 7: Implement and monitor routine viral load (VL) testing

At both Battambang and Siem Reap ODs, viral load testing was performed first time at the initiation of ART and 6 months afterward for newly ART enrolled patients, and yearly for stable patients. In Siem Reap OD, all viral load tests were performed at the laboratory of the provincial hospital. If any PLHIV had a high viral load, they were recorded in VL book and were sent to the ART counsellor who would provide further adherence counselling.

In Battambang OD, viral load tests were conducted in Phnom Penh at the NCHADS laboratory. Staff in the ART clinic took blood samples from PLHIV and sent them to the Battambang Provincial Hospital laboratory that would then send these samples to Phnom Penh for viral load test. All the transport costs of sending samples for viral load testing were covered by US-CDC in Battambang OD.

Step 8: Monitor the HIV cascade outcomes

The implementation of B-IACM in the two ODs were closely monitored through weekly, monthly, quarterly and yearly meetings of GoC members and other key staff who work on HIV/AIDS. All the meetings, except weekly meetings, were supported (per diem, refreshment and travel cost) by Flagship in Siem Reap OD and by US-CDC in Battambang OD. Meeting minutes were taken in each monthly and quarterly meeting and action items documented in the previous meeting were discussed. The B-IACM dashboard was updated weekly from each OD and sent to NCHADS by entering the data into the B-IACM database. The weekly and monthly meetings were held at OD level for Siem Reap OD and chaired by CMC/PASP or OD director while in Battambang OD these meetings were chaired by PASP or CMC. The objective of these meetings at both ODs was to monitor the B-IACM by examining weekly and monthly data and to address any concerns. During these meetings, data on newly identified reactive and confirmed cases, services use including OI/ART, ART adherence, and VL results were presented by the CMA (CMC) and NGO members and discussed.

19.4. Group of Champions

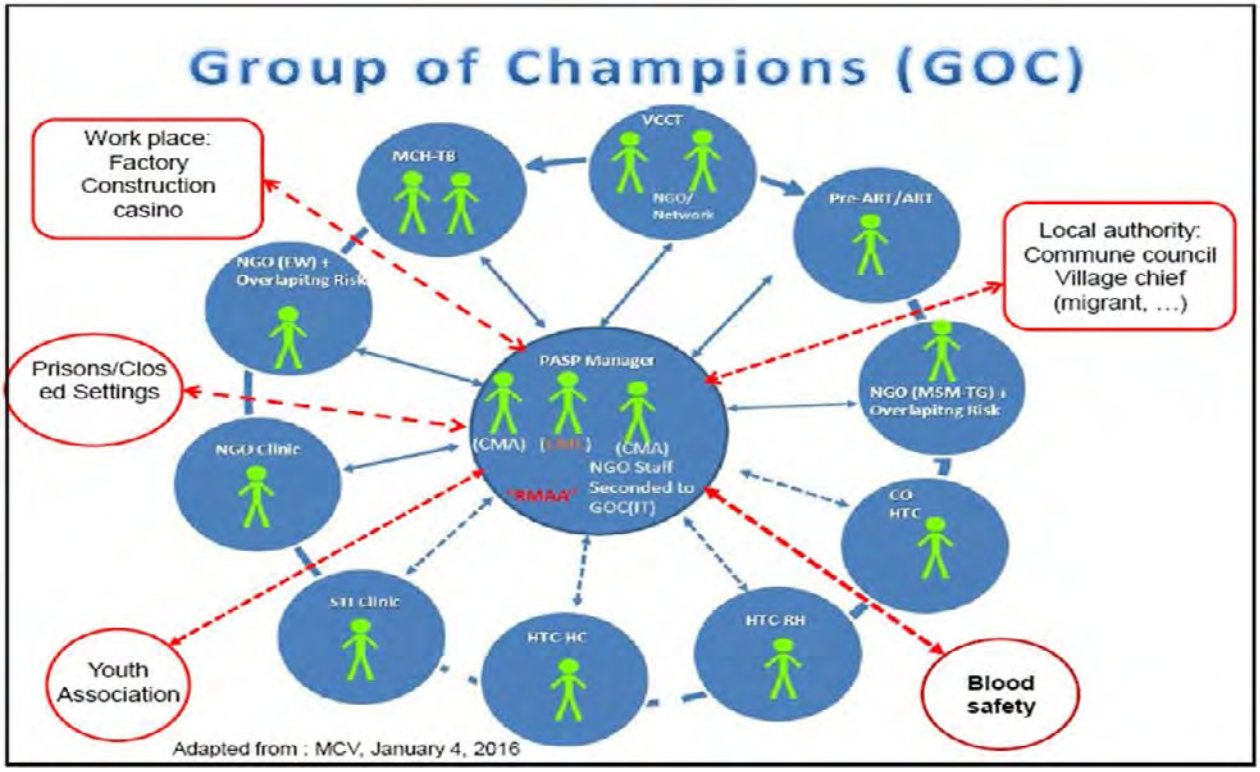

Figure 4 Group of Champions

19.5. Roles and Responsibilities of B-IACM Staff

19.5.1. **PASP Activities**

The PASPs provided oversight of B-IACM implementation in their respective provinces, convened the GoC monthly and quarterly meetings, mobilise resources, provided technical assistance and supervised B-IACM activities in the provinces including the two OD. PASP engaged in similar activities in both Siem Reap and Battambang ODs. (See Table 5).

Table 5 Activities performed by PASP in Siem Reap and Battambang OD

ACTIVITIES	NCHADS	SIEM REAP	BATTAMBANG
Responsible for overall functioning and oversight of B-IACM.	X	X	X
In the urban OD model, convenes the group of champions, directly supervises the CMC, and takes responsibility for B-IACM at provincial level.	X	X	X
Convene monthly and quarterly meeting with GoC members to monitor the implementation of B-IACM activities in the province.	X	X	X
Orient B-IACM activities to all ODs.	X	X	X
Form GoC teams within ODs.	X	X	X
Mobilize resources to implement B-IACM.	X	X	X
Technical support to all B-IACM sites through supervision.	X	X	X

19.5.2. **CMC Activities**

The primary responsibilities of the CMCs in both Siem Reap and Battambang OD was to manage and coordinate the B-IACM activities and to ensure that the B-IACM key players were working well together.

The CMCs at PHD level in Siem Reap performed additional activities such as facilitating data collection from all ODs, and data analysis, and played a key role in rapid monitoring analysis for action (RMAA) for all ODs including Siem Reap OD when compared to the CMCs located at Battambang. It was noteworthy that the CMCs at OD level in the two ODs coordinated B-IACM in their respective ODs, but had no authority over the VCCT and OI/ART clinic in the provincial hospital. They were also responsible for managing rapid HIV test kits in their OD to ensure that each health center had adequate supply for HIV testing.

The CMC who were seated at PHD in Siem Reap and Battambang provinces were involved closely in the B-IACM activities in the two ODs as they had authority over the provincial hospitals where VCCT and OI/ART clinic were located. The CMCs located at the OD level coordinated B-IACM with the OD and ensured availability of HIV test kits. (See Table 6).

Table 6 Activities performed by CMC in Siem Reap and Battambang OD

Activities	NCHADS	Siem Reap	Battambang
Manage the B-IACM, and ensure that all the key players are working together.	X	X	X
The CMC of PHD manage and analyse B-IACM data for action.		X	
The CMC of OD coordinate and support B-IACM activities.	X	X	X
Facilitate data analysis and give feedback to GoC team and OI/ART clinic.		X	

Coordinate to ensure HIV testing reagents available for all health centers.	X	X

19.5.3. **CMA Activities**

CMA was the primary person contacted when a reactive case was found. CMAs were responsible to ensure that the reactive cases were referred to VCCT for HIV confirmation tests, and those who were confirmed positive were linked to OI/ART services, by facilitating these activities between the referring facilities and the HIV service providers. The CMA was instrumental for B-IACM implementation by making sure that reactive cases were followed through the HIV cascade up to viral suppression through their role of facilitation at different steps of the B-IACM activities.

In Siem Reap OD there was one CMA contracted by Flagship, based at the OD office, while there were two CMAs in Battambang OD located at the PHD office. Of the two CMAs at Battambang OD, one CMA was contracted by US-CDC and another CMA was a government staff member. The contracted Battambang CMA was an active implementer of B-IACM and was responsible for entering B-IACM data into the NCHADS database for weekly reporting. In both Siem Reap and Battambang ODs, the CMAs performed similar activities in primarily coordinating referrals between the community and VCCT/ART clinics, in follow up of newly identified cases along the B-IACM activities cascades. (See Table 7).

{Direct quotation} *My routine task is to follow up patients identified at HC and community and facilitate them to VCCT in Battambang. If HIV test is confirmed, I facilitate them to get ART services that include CD4 test, TB screening and to see whether they have received ARV within two weeks according to the guideline (test and treat immediately). I also follow up missed cases. So every Friday I get a list of missed cases from ART clinic and the ART codes and give them to home-based care team. I also follow up pregnant women until they deliver their babies and get their baby tested. Non-government CMA – Battambang.*

Table 7 Activities performed by CMA in Siem Reap and Battambang ODs

Activities	NCHADS	Siem Reap	Battambang
Collecting and entering the B-IACM data in the system.	X	X	X
Prepare charts, graphs and reports	X	X	X
Act as a contact person between upper level (CMC) and lower level (CMS, CMP) of B-IACM cascade	X	X	X
Coordinate the referral of reactive case from CMS to VCCT at OI/ART clinic	X	X	X
Coordinate with CMS/NGOs to follow up the missed or lost cases.	X	X	X
Attend weekly coordinating meeting with CMC, NGOs, VCCT	X	X	X
Attend monthly and quarterly coordinating meeting with PASP, CMC, NGOs, VCCT, ART	X	X	X
Provide Rapid Monitoring and Analysis for Action (RMAA) activities		X	X
Coordinate and collaborate with all stakeholders (HTC, VCCT, NGOs, OI/ART service, PMTC etc.) within the coverage area to ensure that the reactive cases from HTC get through all the required services in the HIV cascade in a timely manner.	X	X	X
Ensure that all the data collected and entered the B-IACM database system are on time, completed and accurate.	X	X	X
Ensure that all the individual data are kept secured and all the information should not be disclosed without the authorization from their supervisor.	X	X	X
Assist CMC on data utilization and interpretation.	X	X	X
Regularly report the progress and challenges related to B-IACM data to the CMC and seek advice and support.	X	X	X
Support the CMC to prepare for GOC Core Group and full meetings to discuss/manage B-IACM procedures in the OD.	X	X	X
Present and interpret data during GOC meetings to ensure that all members of the GOC understand the situation, purpose and action(s) for B-IACM.	X	X	X
Identification and notification of cases requiring active follow up.	X	X	X
Mobilization of those who should be involved in active follow up for each individual case.	X	X	X
Coordination of active follow up of individual cases.	X	X	X
Recording and reporting on the process and outcomes of the active follow up.	X	X	X
Creation and updating the list for active follow up.	X	X	X
Assist in distribution of HIV test kits to health centers			

CMP Activities

According to NCHADS, CMPs play the role of identifying and referring cases to HIV services. CMPs are government staff working at different levels in the health care system; they may also be NGO staff working in NGO health facilities and programs.

There were several types of CMPs. A CMP was anyone who was involved in providing direct services to PLHIV at all levels of the HIV cascade. At the community level, CMPs were health center staff who provided VCCT to patients and NGO staff and outreach workers who provided VCCT finger prick testing and referring reactive cases to VCCT and OI/ART services. At VCCT and OI/ART clinic, CMPs were VCCT counselors, ART counsellors, nurses and physicians who provided care and treatment. CMPs in Siem Reap and Battambang OD provided similar activities. (See Table 8).

Table 8 Activities performed by CMP in Siem Reap and Battambang OD

Activities	NCHADS	Siem Reap	Battambang
Identifying and referring cases within the public health service system.	X	X	X
Provide VCCT finger prick HIV test in the community.		X	X
Provide VCCT for confirmed HIV testing and OI/ART services.		X	X
Provide ART counselling and viral load testing.		X	X
Fill in form A demographic data of partner (name, gender, age, address and phone number)		X	
Providing counselling to PLHIV to collect ARV drugs on time, benefits of treatment, reliable test results, acceptance of HIV status and living with HIV.		X	X
Provide counselling to bring partner(s) for HIV test			
Provide counselling on family planning, ARV adherence, collecting ARV on time, storing ARV appropriately at home etc.			

19.5.4. CMS Activities

According to NCHADS, CMS are responsible for following up new cases where there is delay in new cases reaching different points in the B-IACM Cascade. CMSs are, for example, NGO case managers or CBPCS teams supporting active case management at different stages of the B-IACM cascade.

The interviews of key informants (PASP, CMC, CMA, CMP, NGO staff) also found that CMS provided supporting services to facilitate the functioning of B-IACM implementation. They were NGO staff and government staff such as health center staff who sometimes escorted reactive cases to VCCT for HIV confirmation test. The CMS assisted the work of the CMA in following up on delayed linkages at each step of the B-IACM cascade. The CMS provided support, guiding PLHIV to service rooms and preparing patient files at OI/ART clinics before the PLHIV were seen by counsellors and physicians. The CMS in Siem Reap and Battambang OD carried out similar activities. (See Table 9).

Table 9 Activities performed by CMS in Siem Reap and Battambang OD

Activities	NCHADS	Siem Reap	Battambang
Following up new cases where there is delay in new cases reaching different points in the system (e.g. accepting testing, going for confirmatory testing at VCCT, referral to Pre-ART/ART clinic, adherence, home-based care support, etc.).	X	X	X
Provide health education to target group such as general population and counselling to and testing of EWs, MSMs and TGs.	X	X	X
Accompany reactive case to VCCT for HIV confirmation test.	X	X	X
PLHIV volunteers provide administrative support such as guiding PLHIV and making patient files at VCCT and OI/ART clinics.		X	X

19.5.5. NGO Staff Activities

The activities of NGO staff at Siem Reap and Battambang ODs in B-IACM implementation were the same. The NGO staff worked very closely with CMAs, CMCs, VCCT counsellors and OI/ART counsellors. NGOs provided outreach activities such as HIV education, CBPCS services, identified and referred reactive cases and followed up lost cases in collaboration with the CMCs, CMAs and health center staff. The NGO staff in both ODs were members of the GoC. (See Table 10).

Table 10 Activities performed by NGO staff in Siem Reap and Battambang OD

Activities	NCHADS	Siem Reap	Battambang
Supervise and coordinate the work of the CMS with other CMP, takes place.	X	X	X
work with the CMC and CMA to ensure that follow-up for 'loss' (lost cases)	X	X	X
Participate in regular meeting – weekly, monthly and quarterly.	X	X	X
Act as outreach workers to educate target group and conduct VCCT (finger prick test)	X	X	X
Provide home-based care services			
Provided cash to PLHIV for travelling cost t to VCCT and OI/ART clinic.			

Group of Champions (GoC) Activities

GoC were composed of core members from PHD, OD and NGOs. In both OD, PASP, CMC, CMA, CMP, CMS, NGOs and ART counselors were directly engaged in the implementation of B-IACM in each OD while the GoC at PHD level are composed of key representatives from the OD level GoC such as the OD director and CMC.

GoC performed similar activities in both Siem Reap and Battambang. GoC coordinated and supervised all B-IACM activities at both OD and PHD levels. GoC members were involved in organizing regular meeting (weekly, monthly and quarterly meetings) as outlined by NCHADS to address the implementation issues of B-IACM. (See Table 11). The weekly meetings were chaired by the CMC based at PHD level and the monthly and quarterly meetings were chaired by the PASP.

Table 11 Activities performed by GoC in Siem Reap and Battambang OD

Activities	NCHADS	Siem Reap	Battambang
Supervised, manage and oversee B-IACM directly in a geographic area.	X	X	X
Organize regular meeting (weekly, monthly, quarterly and annually) to discuss among members to solve B-IACM implementation problem such as loss to follow-up.	X	X	X