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REPORT



AIDS Epidemic Model (AEM)

Impact Modeling & Analysis

*Modelling different HIV Investment Scenarios
in the Philippines from 2015 to 2030*

AIDS Epidemic Model Impact Modeling & Analysis Philippine Case Study Technical Report

2014

A project of the Department of Health



**In partnership with the Philippine National AIDS Council, the
National Economic Development Authority, and the Health Action Information Network**



**With support from the Global Fund to Fight AIDS, Tuberculosis, and Malaria; UNAIDS;
and the
East-West Center**



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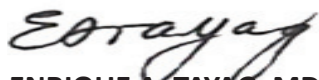
FOREWORD

The HIV epidemic in the Philippines has been increasing at an alarming rate and the nature of the epidemic has been changing. While the HIV prevalence in the country remains at less than one percent of the Filipino population, the Philippines is one of nine countries to have registered more than 25 percent increase in HIV incidence between 2001 and 2011. By the end of 2013, the country had an average of 14 new infections per day or one new case every two hours.

In partnership with the Global Fund to Fight AIDS, TB, and Malaria (GFATM); UNAIDS; and the East-West Center, the Department of Health led the development of the AIDS Epidemic Model (AEM) in the Philippines together with local partners. The AEM is a powerful tool that can help leaders understand the HIV epidemic and guide decision-makers in choosing the most effective and high impact HIV and AIDS program.

This report shows and explains the technical process and the results of the Philippine AEM and how it can be adapted by the National Health Sector Plan. In interpreting the results of the models, it is important to understand the data limitations encountered by the team and the necessary assumptions made for the modelling process. This is a living document which may be updated when new data and assumptions are available.

Now is a crucial time to act strategically in response to the Philippine HIV epidemic. At a point when international and local partners are willing to contribute to the country's HIV response, the AEM's utility is significant in maximizing the resources we have to achieve maximum impact.



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List of Acronyms and Abbreviations

AEM	AIDS Epidemic Model
ART	Anti-retroviral Therapy
BIHC	Bureau of International Health Cooperation
BSS	HIV/AIDS Behavioral Sentinel Surveillance
CMV	Cytomegalovirus
DOH	Department of Health
FSW	Female Sex Worker
FFSW	Freelance Female Sex Worker
GC	Gonococcal infection
GFATM	Global Fund for AIDS, TB, and Malaria
GMM	Greater Metro Manila
HAIn	Health Action Information Network
HSP	Health Sector Plan 2015-2017
HPV	Human papillomavirus
IHBSS	Integrated HIV Behavioral and Serologic Surveillance
IDU	Injecting Drug User, see also PWID
IEC	Information, Education, Communication
IPT	Isoniazid preventive therapy
ISW	Injecting Sex Worker
KP	Key population; used interchangeably with MARP
MARP	Most-at-Risk Population
MSM	Males who have Sex with Males
MM	Metro Manila
MOT	Modes of Transmission
MSW	Male Sex Worker
NCR	National Capital Region
NEC	National Epidemiology Center
NEDA	National Economic Development Authority
NDHS	National Demographic and Health Survey
NGI	Non-gonococcal infection
NHSPHS	National Health Sector Plan for HIV and STI
NSCB	National Statistical Coordination Board
NSO	National Statistics Office
OFW	Overseas Filipino Workers
OIs	Opportunistic infections
PCP	Pneumocystis Carinii Pneumonia
PE	Peer Education/Educator

PLHIV	People Living with HIV
PNAC	Philippine National AIDS Council
PWID	Person who Inject Drugs, used interchangeably with IDU
QC	Quezon City
RAV	Rapid Assessment of HIV Vulnerability
RH	Reproductive Health
ROTC	Rest of the country
RFSW	Registered Female Sex Worker
RP	Regular Partner
RPR	Rapid Plasma Reagin
SHC	Social Hygiene Clinic
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infections
TB	Tuberculosis
TFM	Transitional Funding Mechanism
TG	Transgender woman
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNGASS	United Nations General Assembly Special Session
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

Definitions

Baseline	A scenario that describes the current and future situation as a result of the current response and assuming that the percentage of program coverage remains the same
Baseline coverage	The estimated percentage of the population currently being covered by HIV interventions. The percentage tested for HIV in the past 12 months from the 2011 IHBSS was used to calculate the baseline coverage.
Combiner workbook	An AEM workbook that summarizes the six sub-national epidemic models to generate a national scenario.
Current infections	Total number of old and new infections among the adult population excluding deaths and movement of the population.
Female sex workers	<p>Refer to women who accept payment (cash or kind) in exchange for sex and work in either entertainment establishments or on the streets. They are further categorized into two groups:</p> <p>Group 1 – Freelance Female Sex Workers. Referred to as the higher risk group within the FSW group. Street-based or based in an entertainment establishment NOT registered at the local social hygiene clinic (SHC).</p> <p>Group 2 – SHC Registered Establishment-based Female Sex Worker. Referred to as the lower risk group within the FSW group because of routine monitoring of STI and HIV status by SHCs. Based in an entertainment establishment registered at the local SHC.</p>
Impact analysis	Comparison of the impact of different intervention program alternatives generated by AEM. The comparison may be in terms of resource needs, prevention and treatment costs, infections averted and lives saved, to name a few.
Model	Interchangeably used with the term “scenario,” which describes the possible outcome and/or impact of different interventions over time. This is usually presented in graph or table form. A model can be a baseline, intervention, or policy.
New infections	New HIV infections at any given year
No intervention scenario	Describes the HIV epidemic in a situation where no HIV intervention was implemented
Scenario	See definition for model
Sub-epidemic models	Interchangeably used with the phrase “sub-national models.” Given the diversity of the epidemic in the Philippines, these models present the different possible interventions and scenarios of a given set of site. See discussion in Chapter I.
Sub-national models	See definition for sub-epidemic models
Target coverage	Refers to the percentage of the population targeted to be reached by the planned response in a certain year (e.g. 2017)
Target population	Refers to the Most-at-Risk Population (MARP) for HIV namely Males having Sex with Males (MSM), Female Sex Workers (FSW), and Injecting Drug Users (IDU)
Treat all	An intervention strategy in which all PLHIV are considered eligible for treatment, regardless of CD4 count. The treatment coverage for the “treat all” scenario used in this case study is 90 percent of all PLHIV in the target year.
Unit cost	The cost of the prevention and treatment package for each population (MARP/ PLHIV)

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Executive Summary

Starting in 2011, the Global Fund to Fight AIDS, TB, and Malaria (GFATM) adopted the “investing for impact” strategy. Central to this strategy was the development of an investment package that yields the most impact for the lowest cost possible. To develop this, valid localized epidemic models were needed.

To meet the data needs for this funding strategy, the GFATM, together with UNAIDS and the World Health Organization (WHO), partnered with the East-West Center Research Program (EWC) for the Estimating HIV Program Impacts Using the AIDS Epidemic Model for Low-Level & Concentrated Epidemics (AEM-LLC) project. The project trained a group of researchers from six countries, including the Philippines, in using the AIDS Epidemic Model (AEM) suite of tools to generate epidemic models. The Philippine AEM Team is composed of representatives from the National Epidemiology Center of the Department of Health (NEC-DOH), Philippine National AIDS Council (PNAC), National AIDS/STD Prevention and Control Program (NASPCP), Health Action Information Network (an NGO PNAC Member), UNAIDS Country Office, and the National Economic and Development Authority (NEDA).

AEM method and process

A. Sites and key populations

- The 2012 Philippine Priority Areas for HIV Intervention (PAHI), Integrated HIV Behavioral and Serologic Surveillance (IHBSS), and the Philippine HIV and AIDS Registry were used as bases in selecting the sites.
- Six sub-national models were developed to reflect the diverse nature of the epidemic: Greater Metro Manila (GMM), Cebu Province, Pampanga Cities, Davao City, Category B, and Rest of the Country (ROTC). These were later merged to generate a national model.
- Key populations covered were registered and freelance female sex workers (FSW), males having sex with males (MSM), and injecting drug users (IDU).

B. Data generation

- Data from the IHBSS and Philippine HIV and AIDS Registry were used as inputs to AEM. Issues and concerns with data were settled either through triangulation or calibration using a set of formula.
- For the costing, the AEM team referred to the 5th AIDS Medium Term Plan (AMTP) and UNAIDS costing analysis. One concern that emerged was that the unit costs were too varied, depending on geographic location or program. Consultations with various stakeholders were then conducted to arrive at a consensus.

Key findings

A. Baseline scenario

The baseline scenario showed the current intervention programs and where the epidemic would lead if current level of intervention is maintained.

Figure 1e. Current HIV Infections, 2005-2030

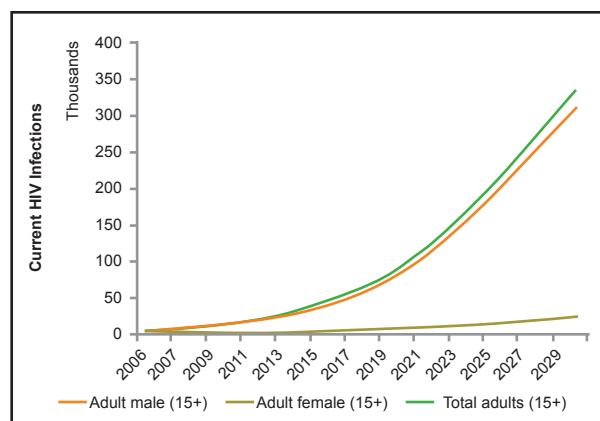
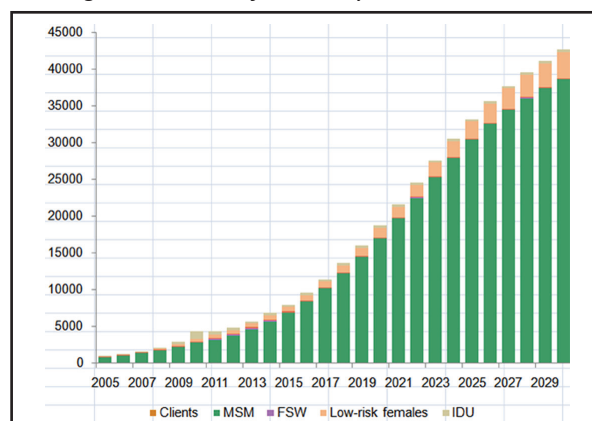


Figure 2e. New infections by MARP, 2005-2030



- If current coverage of intervention will be maintained, infections will continue to increase. By 2017, there will be around 57,236 PLHIV and by 2030, this will increase to 336,181. Refer to Figure 1e.
- As shown in Figure 2e, MSM will continue to be the most affected population. In 2017, there will be 10,273 new infections among MSM; about 90 percent of all new HIV infections. This proportion will continue to increase and reach 91 percent (38,643) of all new HIV infections by 2030.

B. Recommended actions and policy options

With the results of the baseline scenario, the AEM team proceeded with the development of various policy options that can be adapted by the country. To do this, the country needed to set baseline prevention coverage - the estimated percentage of the population currently being covered by HIV interventions. This was calculated from the 2011 IHBSS using the percentage of MARPs who had an HIV test in the past 12 months. Treatment coverage was calculated by the actual number of PLHIV on ART (Registry Database) divided by the estimated number of PLHIV in need of ART (AEM).

Once the unit costs, baseline coverage, and target coverage have been set for each MARP and model, the AEM team proceeded with running the scenarios.

Table 1e. Baseline Prevention and Treatment Coverage per Sub-Epidemic Model

Sub-Epidemic Model	FFSW	RFSW	IDU	MSM	ART - Male	ART - Female
Angeles	14%	11%	-	9%	28%	23%
Cat B	7%	49%	1%	8%	40%	31%
Cebu	10%	62%	18%	9%	15%	18%
Davao	12%	41%	-	15%	78%	61%
GMM	11%	28%	-	7%	69%	71%
ROTC	4%	10%	-	2%	40%	31%

In consultation with stakeholders, the team recommended three actions to address the HIV epidemic. For each recommended action, policy options were generated to identify the program that could deliver the highest impact for the least cost possible. The targets of all policy options presented here incrementally increase from the baseline (see Table 1e) until it reaches the target coverage of the National Health Sector Plan for HIV and STI (NHSPHS) in 2017.

In interpreting the results of the different policy options presented in this section, it is important to bear in mind that there are significant assumptions made as follows:

1. The package of interventions are highly effective, that is, a full coverage of 80 percent will lead to an increase in the condom use rate to 80 percent.

2. Infrastructure and human resources were not included in calculating unit costs because they are already in place in the health system.

Prioritize the intervention among Most At Risk Populations (MARPs)

This first set of policy options looked at the prioritization among MARP. Considering the limited resources of the country and the rapidly growing epidemic, there is a need to prioritize the resources while still achieving significant impact.

- a. Policy option 1: Prevention 80% (all Key Populations), ART 90% @ CD4 350
- b. Policy option 2: Prevention 80% (MSM and IDU), ART 90% @ CD4 350
- c. Policy option 3: Prevention 80% (MSM), ART 90% @ CD4 350
- d. Policy option 4: Prevention 80% (MSM) only
- e. Policy option 5: Prevention 80% (IDU) only
- f. Policy option 6: Sustain prevention, Treat All (ART only)

Figure 3e. Priority interventions among MARP & NEW infections, 2010-2030

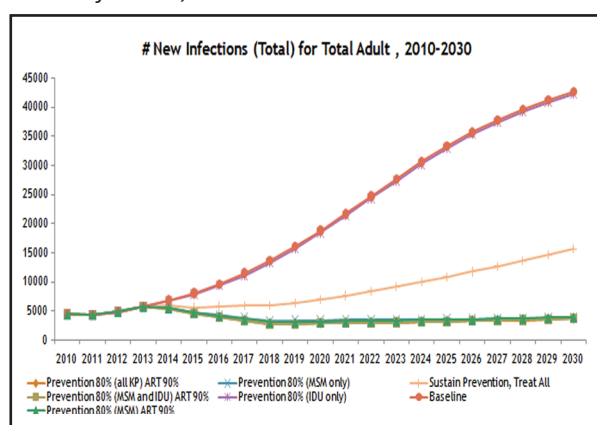
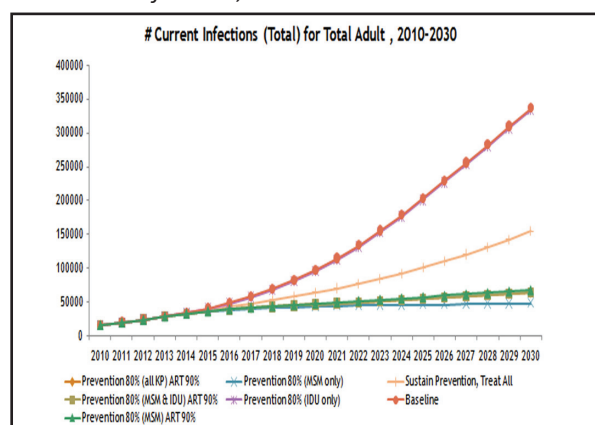


Figure 4e. Priority interventions among MARP & CURRENT infections, 2010-2030



- Policy option 1 (Prevention 80% [all KPs], ART 90%) and Policy option 2 (Prevention 80% [MSM and IDU], ART 90%) will have the most number of infections averted among the scenarios presented here. However, in the long run, Policy option 2 will produce almost the same averted infections per year as Policy option 1 with less cost requirement. By 2022, the cost of implementing Policy option 2 will be cheaper by USD 13 million per year compared to Policy option 1. Refer to Figures 3e and 4e.
- As seen in Figures 3e and 4e, Policy option 6 (Sustain Prevention, Treat All or ART only) will lead to a continuous increase of HIV infections. Focusing on treatment alone, while merely sustaining current prevention coverage, will not result in a decrease in new infections per year.
- The first set of policy options showed that if the country needs to prioritize interventions among MARP, **scaling up the prevention coverage of MSM and IDU** while sustaining the current coverage for FSWs would already lead to a significant decrease in the epidemic.

2. Strengthen treatment coverage program

Since the first set of policy options showed that focusing on prevention among MSM and IDU will already lead to a decrease in new infections, the next set of policy options aimed to look at the effect on the epidemic and the resources needed if the treatment parameters and coverage are adjusted.

- a. Policy option 1: Prevention 80% (MSM & IDU), ART 90% @ CD4 350
- b. Policy option 2: Prevention 80% (MSM & IDU), ART 90% @ CD4 500
- c. Policy option 3: Prevention 80% (MSM & IDU), Treat All
- d. Policy option 4: Sustain Prevention, ART 90% @ CD4 350
- e. Policy option 5: Sustain Prevention, ART 90% @ CD4 500
- f. Policy option 6: Sustain Prevention, Treat All (ART only)

Figure 5e. Strategic use of ART and total number of NEW HIV infections, 2010-2030

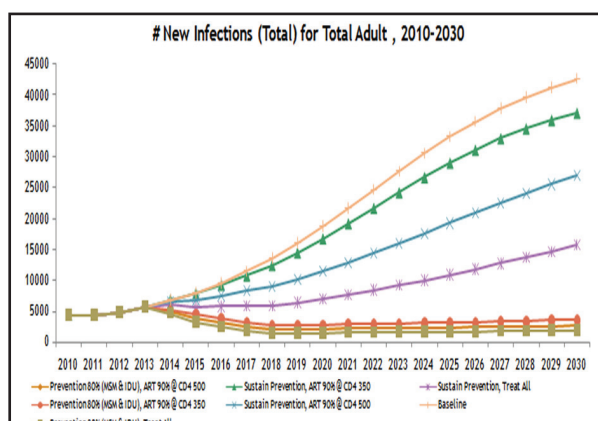
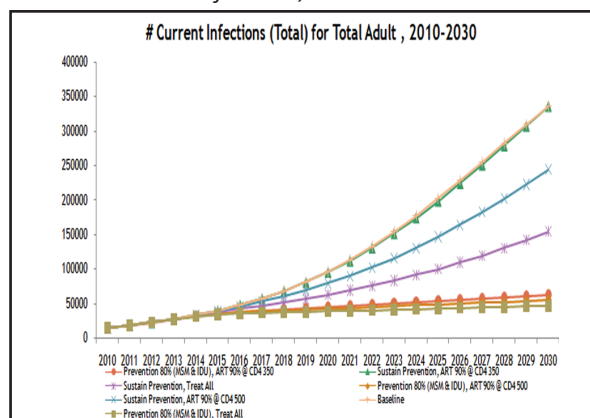


Figure 6e. Strategic use of ART and total number of CURRENT HIV infections, 2010-2030



- Policy option 3 (Prevention 80% [MSM & IDU], Treat All) will result in the highest number of infections averted. However, it is also the most expensive, requiring USD 85 million for 2022 and USD 97 million for 2030. Considering the limited resources of the country, Policy option 1 or Policy option 2 may be more feasible options. These policy options will avert a significant number of HIV infections while requiring less resources than the third option. Refer to Figures 5e and 6e.
- Furthermore, the results showed that focusing on scale up of treatment alone (Scenarios 4, 5, and 6) while sustaining prevention would not result to a decline of new infections (see Figures 5e and 6e).
- Overall, the key to significantly decreasing the number of new HIV infections is to **scale up the prevention coverage of MSM and IDU, sustain prevention coverage of FSW, and at the same time, scale up ART coverage among PLHIV.**

3. Scale-up prevention coverage among MSM and IDU and treatment coverage for PLHIV

While the first two policy options already cover the recommended actions, the country still has to consider its limitations in terms of resources, policies, and other factors that could affect the implementation of a policy option and consequently, its effects on the epidemic. Thus, a third set of policy options was developed to look at the specific prevention coverage and treatment coverage that is feasible for the country to target while still yielding significant outcomes.

- Policy option 1: Prevention 80%(MSM & IDU), ART 90% @ CD4 350
- Policy option 2: Prevention 60%(MSM & IDU), ART 90% @ CD4 350
- Policy option 3: Prevention 60% (MSM & IDU), Treat All

Figure 7e. MSM, IDU and ART focused interventions and total number of NEW HIV infections, 2010-2030

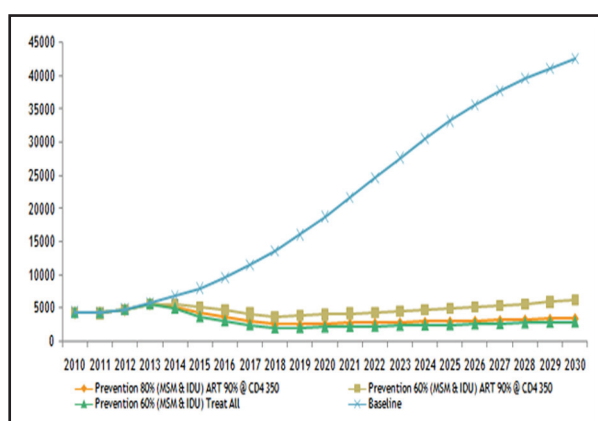


Figure 8e. MSM, IDU and ART focused interventions and total number of CURRENT HIV infections, 2010-2030

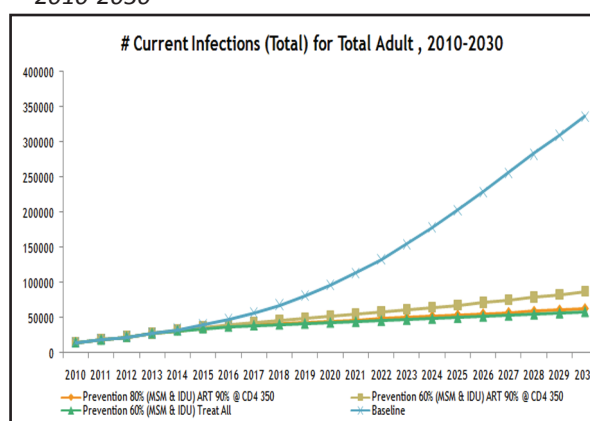


Table 2e. Annual infections averted and total resource needs (in thousands) - 2013, 2022, 2030

Scenario	2013		2022		2030	
	Infections Averted (Annually)	Resource Needs (USD)	Infections Averted (Annually)	Resource Needs (USD)	Infections Averted (Annually)	Resource Needs (USD)
Prevention 80% (MSM & IDU) ART 90% @ CD4 350	23	18,329	21,779	78,401	39,007	94,329
Prevention 60% (MSM & IDU) ART 90% @ CD4 350	18	15,873	20,181	65,999	36,256	85,386
Prevention 60% (MSM & IDU) Treat All	18	15,873	22,306	74,601	39,605	88,299

- Among the three options, Policy option 3 (Prevention 60% (MSM & IDU), Treat All) seems to be the best option as it will result in the highest number of infections averted at the lowest cost possible (see Figures 7e and 8e). Full implementation of Policy option 3 would avert 39,605 infections in 2030 and would cost USD 75 million in 2022 and USD 88 million in 2030. Refer to Table 2e.
- However, there are also other factors that should be considered if this scenario would be adopted. One major barrier would be the low testing coverage in the country (e.g. eight percent among MSM based on 2013 IHBSS results). If not all PLHIV (or at least 90 percent) could be identified through HIV testing, then the Treat All option could not be successfully implemented. Initially, the country needs to strengthen the prevention coverage before it aims to treat all PLHIV. Moreover, policy barriers and the readiness of the country to adopt a Treat All Policy also needs to be considered before this policy option could be fully implemented.
- Thus, Policy option 1 (Prevention 80% [MSM & IDU], ART 90% @ CD4 350) is recommended to be adopted by the country instead. This option will also avert a significant number of HIV infections - 21,779 in 2022 and 39,007 in 2030 with a corresponding cost requirement of USD 78 million in 2022 and USD 94 million in 2030 (Table 2e).

Conclusions and recommendations

The Philippine AIDS Epidemic Model (AEM) showed that the HIV epidemic in the country would continue to increase at a rapid rate if the country simply sustains its current prevention and treatment interventions and coverage. The majority of new HIV infections will come from the combination of four sub-epidemic models – Greater Metro Manila (GMM), Cebu Province, Pampanga Cities, and Davao City. Furthermore, around 90 percent of all new HIV infections will be coming from the MSM population by 2022. To address this problem, the AEM team developed several policy options that would guide program and policy decisions.

Considering the resource limitations of the country, there is a need to prioritize intervention among the MARPs. The AEM policy options were able to show that scaling up the prevention coverage on MSM and IDU while sustaining the current coverage for FSW would already lead to a significant decline in new infections per year.

Furthermore, it is clear from the modeling results that the ART only options will still lead to a continuous increase of new infections per year. The key to significantly decreasing the number of new HIV infections is to scale up the prevention coverage of MSM and IDU, sustain prevention coverage of FSW, and at the same time, scale up ART coverage among PLHIV.

The combination of Prevention 60% (MSM & IDU) and Treat All resulted in the highest number of averted infections and lower cost requirement in comparison to other options. However, there are other factors that were considered by the team in making a recommendation. With the currently low testing coverage in the country, few PLHIV are identified from the pool of all PLHIV in the country. Thus, it would not be feasible to treat all PLHIV unless they are encouraged to get tested and then enrolled to treatment. It is recommended that the country optimizes its prevention coverage which would lead to averted infections and simultaneously lead to the diagnosis of PLHIV and eventually, to their linkage to care.

Therefore, with the various policy options developed, **the AEM team recommends the country to adapt and implement these – Scale up Prevention Coverage to 80% of MSM and IDU, Sustain Prevention Coverage among FSW, and Scale up Treatment Coverage to 90% of PLHIV with CD4 of 350 and below.** In addition to averting thousands of HIV infections, these policies could contribute to systems strengthening.

DOH action

The AEM was used to guide the development of the Health Sector Plan (HSP) 2015-2017. Data generated by the AEM were used to inform the plan and to evaluate the impact of the national response. The Prevention 80% (MSM & IDU), ART 90% @ CD4 350 was adapted by the country, as recommended by the AEM. This option would require resources of around USD 40 million in 2015, USD 53 million in 2016, and USD 66 million in 2017. During various dialogues with stakeholders and partners, it was suggested that geographic prioritization should be applied considering the limitations of the country in terms of resources. Thus, the AEM team in coordination with NASPCP and partners, used the AEM tool to apply geographic prioritization and further trim down resource needs while still reversing the trend of the epidemic.

Table 3e shows the targets that were adopted by the Health Sector Plan. Baseline results of the AEM showed that majority of new HIV infections would come from Greater Metro Manila, Cebu Province, Pampanga Cities, and Davao City combined. Thus, highest prioritization was given to these models (Category A). They will fully implement the recommended targets of AEM. Category B was given the next level of prioritization due to its significant share of HIV infections, with scaled down targets while Category C and the rest of the country (ROTC) will be included in the HSP but would be given lesser priority in terms of HIV interventions.

The AEM team developed a policy option adopting these targets. Results showed that a significant number of HIV infections will be averted – a total of 17,718 infections will be averted within the HSP period of 2015 to 2017 with corresponding resource needs of USD 32 million in 2015, USD 43 million in 2016, and USD 53 million in 2017.

Category	KPs	Target
A	MSM	80%
	IDU	80%
	FFSW	60%
	RFSW	60%
	PLHIV on ART	90%
B	MSM	60%
	IDU	40%
	FFSW	60%
	RFSW	60%
	PLHIV on ART	90%
C and ROTC	MSM	40%
	IDU	40%
	FFSW	40%
	RFSW	40%
	PLHIV on ART	90%

Section 1

The AIDS Epidemic Model

This section is divided into three chapters. The first chapter introduces the AIDS Epidemic Model (AEM) - a modeling tool useful in identifying the program that can produce the highest impact for the least cost possible. It also covers the description and objectives of the AEM project, the process followed by the AEM team in selecting the sites and key populations to be included in the study, and the scope and limitations.

The second chapter provides an overview of the epidemic and the critical issues facing program managers and implementers. This chapter illustrates the need to identify critical interventions to halt the spread of HIV while taking into consideration the low resource available in the country.

The last chapter highlights the importance of using existing information to generate models that can help in painting a better picture of the epidemic.

Chapter 1. About the AIDS Epidemic Model

The AIDS Epidemic Model (AEM) is a process model that projects epidemiological outcomes such as the number of new and current HIV infections in a given time period, mode of HIV transmission, and anti-retroviral therapy (ART) needs. The AEM is sensitive to behavioral and biological data inputs, allowing it to produce more realistic projections. It generates different scenarios with their corresponding infections averted and resource needs which can guide decision-makers in choosing the most cost effective and high impact HIV and AIDS program.

Project description

In 2011, The Global Fund to Fight AIDS, TB, and Malaria (GFATM) adopted the “investing for impact” strategy. Central to this strategy is the development of an investment package that yields the most impact for the lowest cost possible. To develop this, locally specific and valid epidemic models are needed.

The Global Fund, in partnership with UNAIDS and the World Health Organization (WHO), commissioned the East-West Center Research Program (EWC) to spearhead the project Estimating HIV Program Impacts Using the AIDS Epidemic Model for Low-Level & Concentrated Epidemics (AEM-LLC). Six partner countries, including the Philippines, were selected to apply the AEM set of tools which provides techniques for estimating and measuring the impact of past and future programs on the HIV epidemic.

The project sought to answer several key questions in each country or sub-national modeled:

- How would the HIV epidemic have progressed and how would it have been without interventions at all?
- How many lives were saved and infections averted from the overall AIDS response so far?
- What data are missing and what are the weaknesses in the data systems that affect the country’s or state’s/ province’s ability to improve program planning, impact evaluation, and budget allocation?
- Which program investments in the future will have the greatest impact, i.e., provide the greatest returns in terms of lives saved and infections averted?

Each country submitted a Country Case Study Paper that summarized the experience of the team in applying AEM in the local setting, discussed the use of the AEM to analyze past and future national and sub-national responses, and provided recommendations to AIDS National Programs, The Global Fund, and UNAIDS on how the process can help to:

- a. Inform national strategic planning or country dialogue processes;
- b. Assist in planning future activities for maximal impact, including the development of national action plans, Global Fund concept notes, reprogramming and renewals; and
- c. Contribute to greater resource mobilization.

Specifically, each country case study had the following objectives:

1. To identify current critical issues for improving responses in the country.
2. To describe the data going into the AEM model and the process of collecting it:
 - To explain the process by which data was gathered as inputs to the model, the challenges encountered in doing so, and the way those challenges were overcome.
 - To briefly summarize the key inputs and sources of data used.
 - To focus attention on specific data gaps and weaknesses in data systems in the country.
3. To present the overall results of the model, how the model was validated, and the in-country technical review process.
4. To discuss what the scenarios prepared with the model show about the impact of past and future responses to the epidemic.
5. To discuss how this process improved understanding of the epidemic and describe the ways in which it has been used to influence programs and policies.
6. To make recommendations in four specific areas:
 - How the process and tools for AEM impact analysis can be improved to make them more useful to countries.
 - How important in-country data gaps and data system deficiencies can be remedied.
 - How the impact of future responses in-country can be improved.
 - How The Global Fund and other donors can best make use of these tools to increase their own impact.

Developing the Philippine AIDS Epidemic Model

The development of the Philippine AEM commenced in December 2012. A team was created composed of representatives from the National Epidemiology Center of the Department of Health (NEC-DOH), Philippine National AIDS Council (PNAC), National AIDS/STD Prevention and Control Program (NASPCP), Health Action Information Network (an NGO PNAC Member), UNAIDS Country Office, and the National Economic and Development Authority (NEDA). The NEC spearheaded the process in collaboration with PNAC.

The team collected, generated, compared, examined, and built consensus on the data inputs for the AEM workbooks. Trainings were conducted in Thailand in December 2012 and in Hawai'i, USA in April 2013 to help the team understand the technical aspects of the AEM software, data needs, critical issues, assumptions, and validating results based on the context of the epidemic in the country.

The AEM experts from EWC provided the team with continuous online technical assistance. Dr. Wiwat Peerapatanapokin, one of the experts, visited the country (August 2013, October 2013, and May 2014) to assist the team in finalizing data inputs and in generating, interpreting, and validating the results.

Once the models were complete, the AEM team presented these to stakeholders for validation of results, including unit costs.

This report is envisioned to be a living document, subject to periodic updating. This would ensure that the projections would reflect current realities and data.

Selection of sites in developing sub-national models

Almost all of the country's 122 cities and 1514 municipalities have reported HIV cases. In 2012, the DOH issued the Philippine Priority Areas for HIV Intervention or PAHI¹ which identified the 70 priority cities and municipalities using data on HIV prevalence, number of reported HIV cases, most at risk population (MARP) population size estimates, and their risks and vulnerabilities. These areas were strategically divided into three categories – A, B, C – which were based on the immediacy and need for intervention. Category A, the highest priority for HIV intervention, is composed of 22 cities and municipalities. Category B follows with 18 sites and Category C with 30 sites. PAHI, IHBSS and the Philippine HIV and AIDS Registry, were the bases for the selection of sites for modeling.

Given the diversity of the epidemic in the country, six sub-national AIDS epidemic models were developed and combined to illustrate the Philippine national AIDS epidemic model. The following are the six sub-national models:

1. Greater Metro Manila – this sub-national model is composed of 16 cities and a municipality in Metro Manila and 11 adjacent cities and municipalities from nearby provinces of Rizal, Laguna, Cavite, and Bulacan. See Table 1 for the complete list.
2. Cebu Province – this includes Cebu, Lapu-lapu and Mandaue cities
3. Davao City - a highly urbanized city in Southern Philippines with high HIV prevalence among MSM
4. Category B – composed of nine PAHI Category B cities including Bacolod, Baguio, Batangas, Butuan, Cagayan de Oro, General Santos, Iloilo, Puerto Princesa, and Zamboanga
5. Pampanga Province - includes the cities of Angeles, Mabalacat, and San Fernando which have high prevalence among MSM and FSW
6. Rest of the Country or ROTC – this includes all other areas not included in the models above

Table 1. List of Cities and Municipalities for the Greater Metro Manila Sub-national Model	
NCR or MM	Adjacent cities and municipalities
1. Caloocan City	Rizal
2. Las Pinas City	1. Antipolo City
3. Makati City	2. Municipality of Cainta
4. Malabon City	3. Municipality of San Mateo
5. Mandaluyong City	4. Municipality of Taytay
6. Manila City	5. Municipality of Montalban
7. Marikina City	Laguna
8. Pateros (Municipality)	1. Municipality of San Pedro
9. Muntinlupa City	Cavite
10. Navotas City	1. Bacoor City
11. Paranaque City	Bulacan
12. Pasay City	1. Meycauayan City
13. Pasig City	2. San Jose Del Monte City
14. Quezon City	3. Municipality of Marilao
15. San Juan City	4. Municipality of Obando
16. Taguig City	
17. Valenzuela City	

Key populations

The Philippines is considered to have a low-level concentrated AIDS epidemic that affects key populations (KP) or MARP. The key populations identified in developing AEM were the following:

1. Female Sex Workers (FSW), categorized into two groups as follows:
 - High risk group or Group 1: Freelance FSW or street-based
 - Low risk group or Group 2: FSW in registered entertainment establishments
2. Males who have Sex with Males (MSM) who either had oral or anal sex
3. Injecting Drug Users (IDU)

Other key populations included are clients of FSW and migrant workers.

Scope and limitations

This paper will focus on the processes, key findings, program implications, and recommendations based on the results generated by the study.

Technical descriptions and tutorials on how to use the AEM software will not be discussed however; such information can be found in the 2014 AEM 4.02b manual “Assessing HIV Program Impacts with AIDS Epidemic Model (AEM) - A Tutorial Introduction to the AEM Suite of Tools And Workbooks” developed by the EWC Research Program in Hawai’i, USA.

Data limitation

It was observed that the AEM tool does not have age disaggregation to describe the projections and interventions for different age groups. The AEM collectively addresses issues on FFSW, RFSW, MSM, and IDU aged 15-49.

Transgenders were not included in the scenarios due to the lack of data on TG during the development of the baseline models.

Chapter 2. Current Issues in Responding to HIV

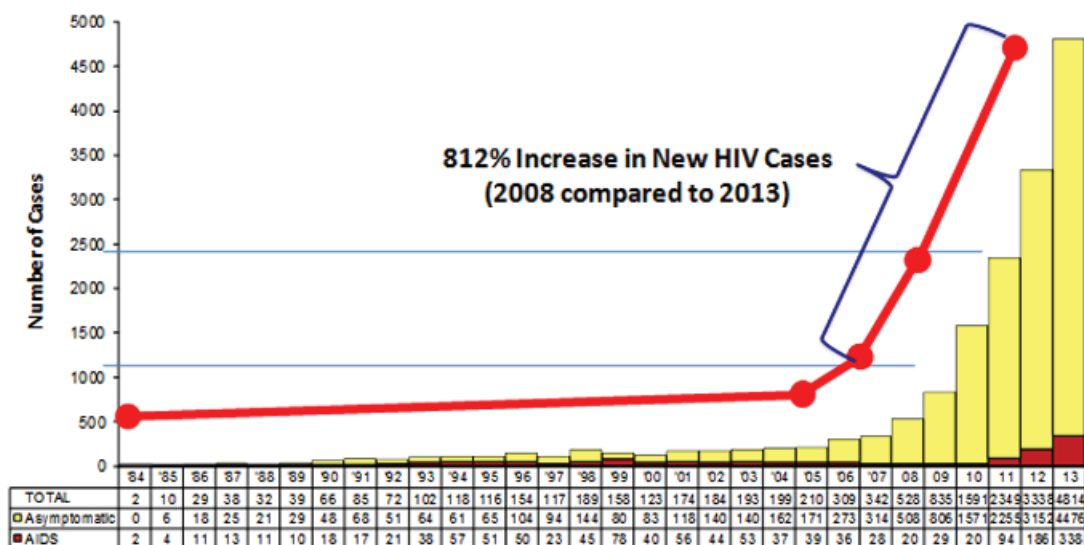
Overview of the epidemic

The HIV prevalence in the Philippines remains at less than one percent of the Filipino population. However, the 2012 United Nations Global Report noted that while the general trend of HIV epidemic in the world is declining, the Philippines is one of nine countries to have registered more than 25 percent increase in HIV incidence between 2001 and 2011.

The cumulative number of reported cases from 1984 to 2013 was 16,516.²

By the end of 2013, the country had an average of 14 new HIV infections per day or one new case every two hours. In comparison, the average daily number of new infection in 2007 was only one.³ Data from the 2013 Global AIDS Response Progress Report (GARPR) showed that there is a 812 percent increase in HIV cases from 2008 to 2013 as shown in Figure 1:

Figure 1: Increase in New HIV Cases for the period 2008 to 2013⁴



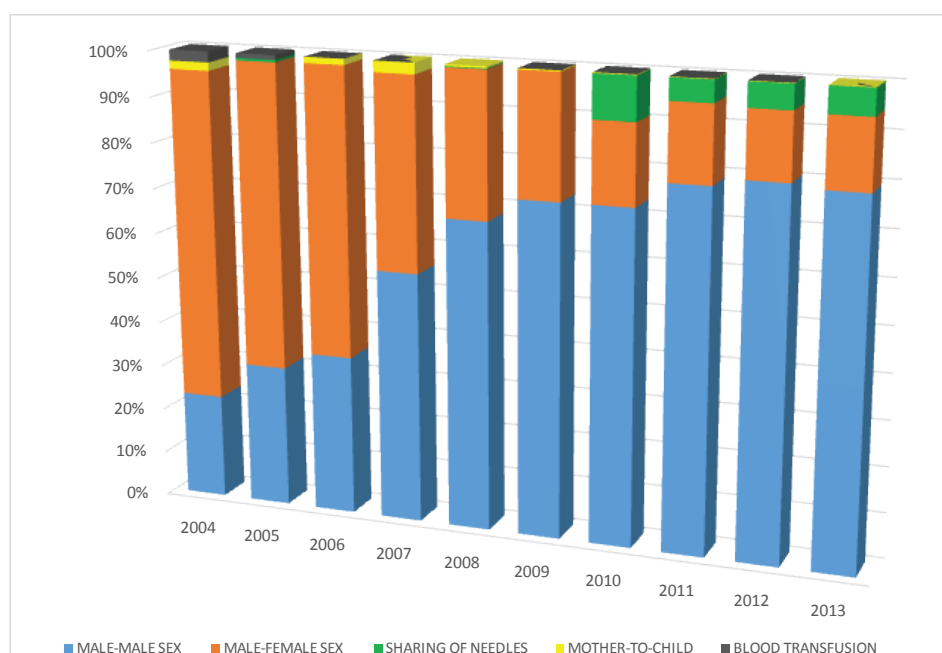
For the year 2013, most (95%) of the cases were males. Majority (59%) of the cases in 2013 belonged to the age group of 20-29 years old. Sexual contact was the main mode of transmission at 94 percent; of these, 83 percent were through male homosexual or bisexual contact and 18 percent were through heterosexual contact. Four percent of the reported new infections were through needle sharing among IDU.

The affected key populations are the MSM at 3.5 percent HIV prevalence, FFSW at 0.72 percent and RFSW at 0.07 percent. The HIV prevalence among IDU in Cebu City is at 52.30 percent among males and 30.39 percent among females in 2013. Since 1984, the overseas Filipino workers (OFW) have been included in the Philippine AIDS Registry. This sub-sector accounts for 16 percent of the reported cumulative cases.⁵

The modes of HIV transmission⁶ (Figure 2) are:

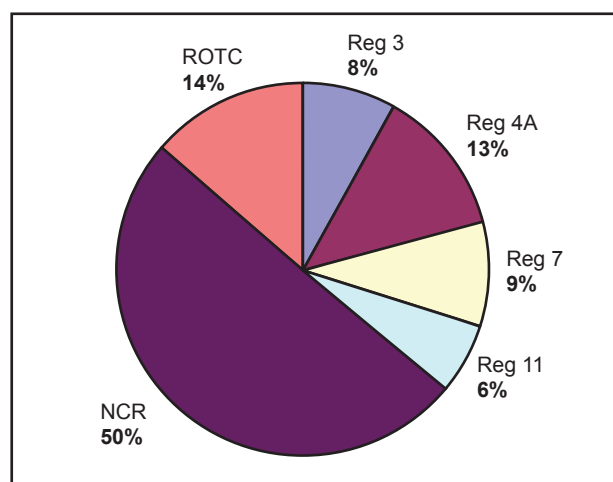
1. Unprotected heterosexual sex
2. Unprotected anal sex among males
3. Contamination with infected blood products through blood transfusion, sharing of injecting equipment, and accidental needle prick injuries
4. Mother to child through pregnancy, childbirth, breastfeeding

Figure 2: Mode of Transmission



In terms of geographic distribution, the National Capital Region accounted for half of all reported cases from 1984 to 2013.

Figure 3: Percentage of HIV cases by region, 1984-2013⁷



HIV response

The Fifth AIDS Medium Term Plan 2011-2016 (AMTP5) of the Philippine National AIDS Council (PNAC) urges all leaders and key stakeholders, including development partners, to work together in achieving the objectives set forth in the plan. The plan's objectives can be summed up as follows:

- halt the present rate of HIV infection by preventing the further spread of HIV and reducing the impact of the disease;
- broaden reach among the general population, especially those most-at-risk such as MSM and IDU by
 - scaling up the coverage and
 - improving the quality of programs for prevention, treatment, care, and support services through capacity building;
- promote a decentralized structure of implementation through local government units (LGU), Local AIDS Councils (LAC), and the Regional AIDS Action Teams (RAAT); and
- strengthening systems, partnerships, monitoring and evaluation, resource mobilization, and investment planning.⁸

Critical issues in responding to HIV today

The Philippines's 2011 Universal Access report identified a number of barriers to expand HIV programming, categorized under four broad areas:⁹

1. Inadequate financing for scaled up AIDS responses (including macro-economic constraints);
2. Weak human resource capacity, and health, social, and education systems;
3. Lack of affordable commodities and low-cost technologies; and
4. Human rights, stigma, discrimination, and gender inequality and marginalization of higher risk key populations.

The 2012 GARPR cited that at the end of the implementation of the Fourth AIDS Medium-Term Development Plan challenges remain to be the same - dwindling financial resources for HIV and AIDS, human resource and systems strengthening, low intervention coverage, and sustainability of programs.

Specifically, the following issues need to be urgently addressed:

Low resources. For over twenty years, the bulk of AIDS spending was from international resources, namely United States Agency for International Development (USAID); Australian Agency for International Development (AusAID); and The Global Fund among others. Beginning in 2011, funds from international development partners have increased. However, public and private funds show an unstable pattern; in 2013, funding from both sources went down. Overall spending remains low as shown in Table 2.

Table 2. Total AIDS Spending by Source, 2011-2013¹⁰

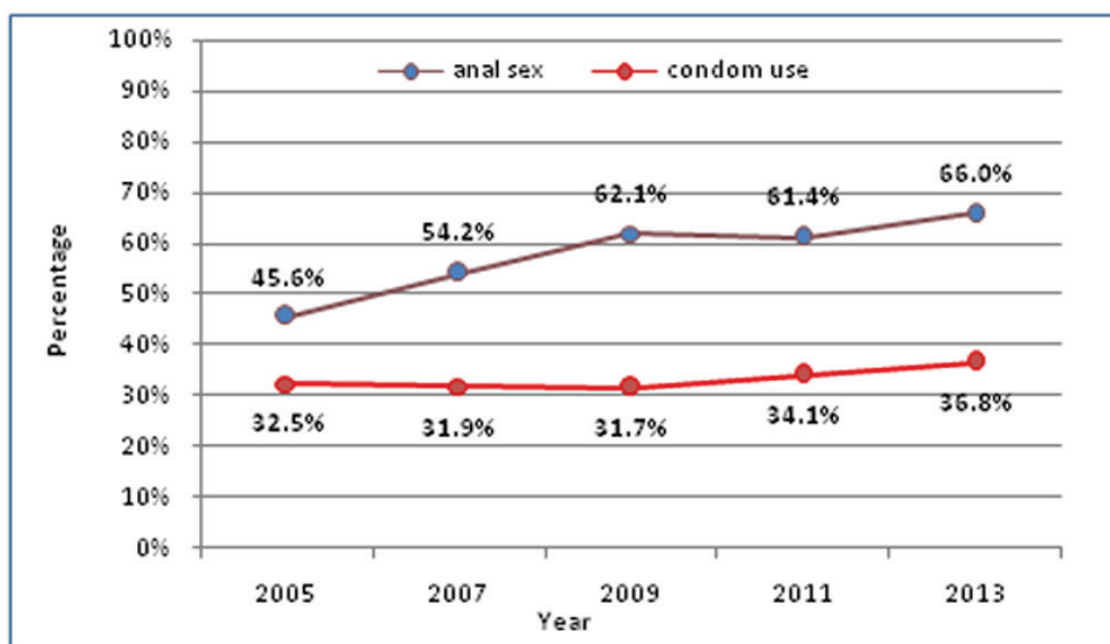
SOURCES		%	2011	%	2012	%	2013
Public	Php	27%	181,094,431.94	33%	196,550,437.70	48%	191,974,886.28
	USD		4,181,054.51		4,654,416.84		4,272,888.23
International	Php	40%	167,714,489.52	31%	209,655,900.91	51%	245,287,143.27
	USD		3,872,142.37		4,964,761.04		5,459,487.79
Private	Php	33%	198,912,069.70	36%	972,702.07	0%	756,131.47
	USD		4,592,422.84		23,034.09		16,829.62
TOTAL	Php		547,720,991.17		407,179,040.68		438,018,161.02
	USD		12,645,619.71		9,642,211.97		9,749,205.65
Excluding private	Php		348,808,921.46		406,206,338.61		437,262,029.55
	USD		8,053,196.87		9,619,177.87		9,732,376.03
Exchange rate			43.313		42.229		44.929

Low program coverage. Low resources result in low program coverage, as shown by the results of the 2011 IHBSS¹¹ on the percentage of respondents who had an HIV test and got the results: 16 percent among female sex workers, five percent among MSM, and four percent among male IDU.

Low impact. The reported knowledge in the 2008 National Demographic Health Survey (NDHS) on ways of preventing HIV and reject misconceptions about HIV transmission among respondents is 22 percent. The 2013 IHBSS results continue to show high-risk behavior among MSMs and IDUs and a continuous increase of HIV and STI prevalence.

- **High risk behavior.** Condom use among MARP continue to be low; female sex workers reported 64 percent condom use with their last male client, MSM reported 36 percent condom use with their male partners, and 14 percent of male IDU used condoms with their female partners.

Figure 4: Percentage of MSM having anal sex and percentage of condom use during their last anal sex, 2005-2013¹²



- **Increased HIV and STI.** Given the low percentage of condom use, it is unsurprising that HIV and STI infections among MARP have been increasing, particularly among MSM.

Figure 5: HIV prevalence of FFSW, RFSW and MSM in sentinel sites, 2005-2013¹³

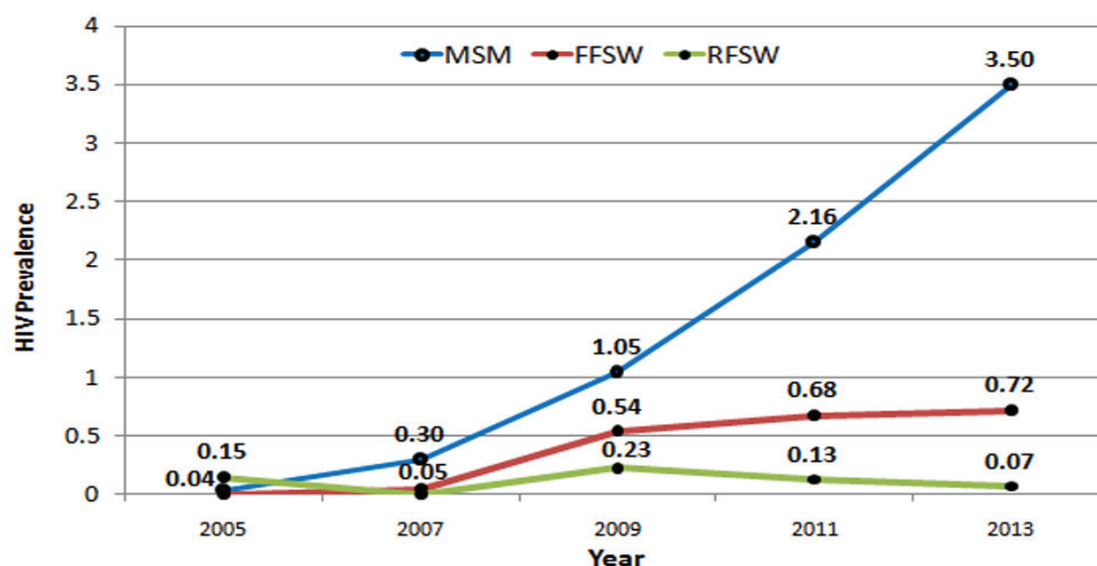
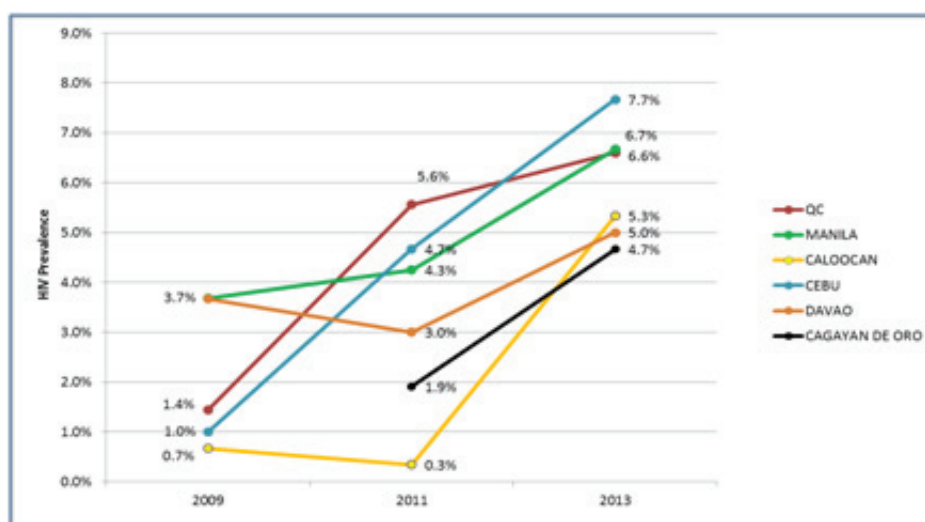


Figure 4 illustrates high risk behavior among MSM where condom use is low during their last anal sex. Figure 5, on the other hand, shows the rapid increase of HIV prevalence among MSM from less than one percent in 2007 to 3.5 percent in 2013. In comparison, prevalence rate for FSW during the same period was 0.72 percent for freelance and 0.07 percent for registered.

Figure 6: Cities with the highest HIV prevalence among MSM, 2009-2013¹⁴

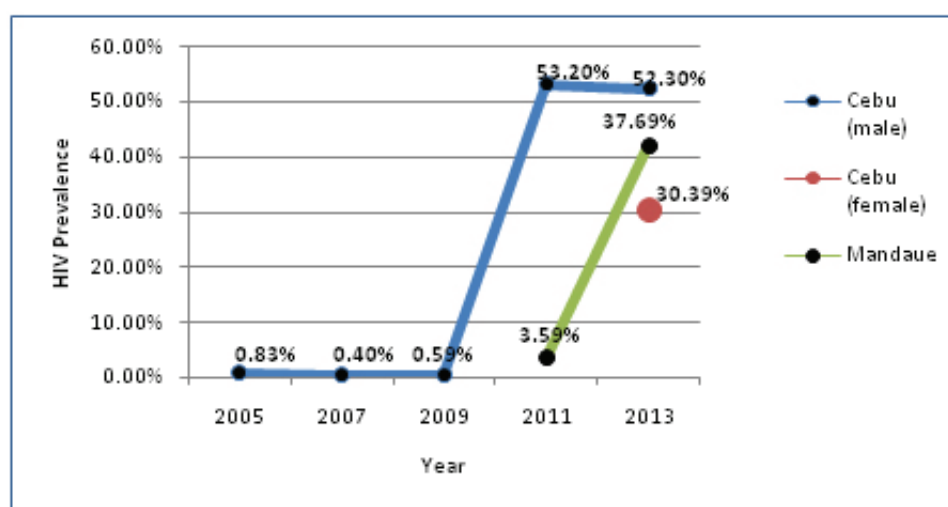


A closer look at the local level reveals that there are six cities with more than four percent HIV prevalence. Of these, Cebu City has the highest prevalence of 7.7 percent (Figure 6). Table 3 summarizes these figures.

Table 3: Cities with the highest HIV Prevalence among MSM, 2009-2013

Cities	2009	2011	2013
Quezon	1.4%	5.6%	6.6%
Manila	3.7%	4.3%	6.7%
Caloocan	0.7%	0.3%	5.3%
Cebu	1.0%	4.7%	7.7%
Davao	3.7%	3.0%	5.0%
Cagayan De Oro	n/a	1.9%	4.7%

Figure 7: HIV prevalence among IDU, 2005-2013



The HIV prevalence among male IDU in Cebu City spiked to 53.2 percent in 2010 and to 37.69 percent in Mandaue City in 2013. The HIV prevalence among female IDU in Cebu Province is also high at 30.39 percent in 2013.

Chapter 3. Building A Better Understanding of the Epidemic Using Existing Information

Developing an AIDS epidemic model requires a careful and evidence-based understanding on the context of the epidemic using reliable data since these are crucial in presenting a realistic picture of the country situation when applied in modeling. These data, both published and unpublished, include epidemiological, behavioral, and response data. They were gathered, generated from IHBSS, triangulated, and validated to ensure their integrity. Upon validation, these data were encoded to AEM workbooks.

This chapter highlights lessons learned in the process, problems encountered in the data, and data collection systems which resulted in deeper analyses of these findings. Recommendations were incorporated to improve the data collection systems.

Specifically, this chapter will discuss the following issues:

- A. Challenges in pulling the data together and assumptions made
- B. Biases and limitations of existing data sources
- C. Surprises emerging from the data
- D. New or unique approaches to analyzing or using the data

A. Challenges in pulling the data together and assumptions made

Numerical data required for AEM inputs were researched, generated, and carefully examined based on certain parameters. In the process, the team encountered issues and made some assumptions related to the data. The following table describes key issues and assumptions made.

Table 4: Challenges in data and assumptions

ISSUES	ASSUMPTIONS	BASIS
1. The HIV prevalence of MSM in GMM seems to be an underestimate.	<p>To address this issue, the following data were used for triangulation and it was seen that the current HIV prevalence was most likely underestimated.</p> <p>2011 IHBSS data on MSM (Metro Manila sample)</p> <ul style="list-style-type: none">Of the HIV+ MSM in 2011 – only 20 percent (20%) had ever had an HIV test (crude indicator of percentage reported in AIDS Registry)HIV Prevalence in Metro Manila was 1.9 percent which was calibrated from eight surveillance sites in Metro Manila. The HIV prevalence of QC was 5.6 percent and other seven sites had an average of 1.4 percent.Multiplying the 1.9 percent prevalence with the estimated MSM population in Metro Manila (120,000 MSM or 3% of adult males) yielded around 2,200 cases in 2011. <p>2012 Registry Data</p> <ul style="list-style-type: none">Actual cases reported in AIDS Registry was around 2,000 cases coming from Metro Manila – indicating under-reporting of 80 percent (and confirming ever had test of just 20%).If 2,200 is only 20 percent of actual cases = there should be 11,000 actual cases in Metro Manila by 2011	IHBSS, AIDS Registry, ART Data

ISSUES	ASSUMPTIONS	BASIS
1. The HIV prevalence of MSM in GMM seems to be an underestimate.	<p>ART</p> <ul style="list-style-type: none"> To further prove the under-estimation, data on ART was also reviewed. Of the 3,400 PLHIV on ART, 1,500 come from Metro Manila (or are enrolled in NCR treatment hubs). If 1,500 represent 20 percent coverage of PLHIV in need in Metro Manila = resulting estimated PLHIV also points to the estimated 11,000 actual cases in Metro Manila by 2011 above. <p>HIV prevalence and population among MSM in GMM were recalibrated using AEM to show a more realistic picture of the epidemic in the country. MSM population was increased to five percent while prevalence was maintained at 1.9 percent in 2011.</p>	IHBSS, AIDS Registry, ART Data
2. The Philippines does not have data for Indicator number 15 in heterosexual baseline input sheets (Clients of Female Sex Workers, Average duration buying sex (years))	<p>There is no direct question in IHBSS pertaining to the indicator. In addition, IHBSS among clients of sex workers is not regularly conducted and the most recent one was conducted in 2011 and in selected sites only. To approximate the value for this, a regional adviser was consulted in 2011 when Philippines developed its first AEM for Metro Manila and Cebu. The AEM documentation of Thailand in 2005 reflected five years as the average duration of buying sex. This value was adapted by the Philippines for the Cebu province, Davao, and Category B models.</p> <p>For the GMM model, this value was originally 12 years from the Occupational Cohorts of Men data runs. However, the indicators used seemed to be inconsistent so an alternative method was adapted. The median age of first sex of men which is 16 years old (2011 IHBSS IDU) was subtracted from the average age of marriage of men which is 24 years old (2008 NDHS). The assumption was made that after a man gets married, visits to FSW would diminish. Thus, eight years was used.</p>	2005 Thailand AEM documentation, 2011 IHBSS (IDU), 2008 National Demographic Health Survey (NDHS)
3. Difficulty in defining coverage and reach as the country does not have a standard definition of reach	The team has tried several combinations of services, including receiving of condoms, attending an HIV seminar, HIV testing, and other core services using the 2011 IHBSS data to arrive at the definition and value of coverage to be used for the AEM. However, calculating different combinations of these variables resulted to very low or very high coverage across models.	2011 IHBSS
4. Significant assumptions made	Package of interventions are highly effective; that is, a full coverage of 80 percent will lead to an 80 percent condom use rate.	Universal Access target
	Infrastructure and human resources are not included in the costing because these are already in place.	

B. Biases and limitations of existing data sources

Existing data were found to have biases such as geographic limitations, existence of urban-centric data, availability or non-availability of data, methodological issues, level of reporting, among others. The table below illustrates these findings and assumptions made.

Table 5: Biases and limitations of existing data sources

ISSUES	ASSUMPTIONS	BASIS
IDU data	<p>Using Cebu City's prevalence among IDU for Cebu province will overestimate the epidemic.</p> <p>Since the IDU epidemic in Cebu Province is concentrated in the cities of Cebu and Mandaue, applying the HIV prevalence from Cebu and Mandaue to the entire province may lead to an overestimation. Thus, calibration factor was applied to compute for the HIV prevalence in the entire Cebu province, using the available data from Cebu and Mandaue. The calibration factor was computed by dividing the combined 2011 prevalence in Cebu and Mandaue, by the combined 2011 prevalence in Cebu City.</p>	IHBSS
IDU data	<p>Calibration factor (base year - 2011): Cebu-Mandaue prevalence / Cebu prevalence = $(28.50/53.82) = 0.53$</p> <p>Calibrated prevalence (2011): Cebu prevalence x calibration factor = $53.82 \times 0.53 = 28.50$ percent</p> <p>The Philippines does not have data on IDU for Greater Metro Manila, Angeles and Davao.</p> <p>There are only three surveillance sites for IDU in the Philippines - Cebu, Zamboanga, and General Santos (GenSan) Cities. Cebu's data could be used as proxy data for any other city because of its high prevalence and it is the only city that had a central shooting gallery accessed by majority of the IDU.</p> <ul style="list-style-type: none"> • Zamboanga data will be used for Category B, GMM, Angeles and Davao models because of its data completeness compared to GenSan. In addition, by looking at IDU prevalence and rural-urban conditions, Zamboanga City is more comparable to all the models than GenSan. • To gauge the comparability of these sites with Metro Manila, the percentage of female sex workers who also inject drugs was used as the common criteria, as this data is available for Pasay and Quezon City. Zamboanga City was found to have a closer figure at two percent and was decided to be a better proxy for Metro Manila data. (AEM 2011 Report) 	<p>Review of literature, local AIDS Registry reports, and surveillance data</p>
	<p>Figure for IDU indicators related to females who inject drugs will be zero (0). The heterosexual surveillance data provide data for these indicators. HIV epidemic among FSW will shoot up if these indicators will be filled out. Compared to IDU surveillance data, FSW data disaggregates injecting FFSW and RFSW.</p>	2011 IHBSS (PWID)

ISSUES	ASSUMPTIONS	BASIS								
MSM	No data source for Male Sex Workers Dr. Wiwat Peerapatanapokin commented that the QC male establishment workers data used in AEM do not represent the MSW population due to the following reasons: <ul style="list-style-type: none">MSW data extracted from MSM IHBSS may not be “real” male sex workers and may only receive payment as neededFor male establishment workers, their primary work is either as a masseur or as a waiter. Sex work is only secondary to their main occupation. AEM defines MSW as those whose occupation is mainly sex work and receive cash in exchange for sex. All MSW data were set to 0, except for the average duration of sex work which was set to ten.									
	There is an increase in the MSM reporting to have female partners The 2011 IHBSS shows a high percentage (64%) of MSM reporting to have female partners. This significantly affects the HIV transmission to the general population in the models. However, in the dataset, some of the MSM interviewed also accepted payment (cash or kind) in exchange for sex. This may be one of the reasons why the bisexual behavior among MSM was high.	2011 IHBSS data								
	The 2007 surveillance data for MSM was not included The datasets for 2007 IHBSS were dropped from the sources of data due to non-availability of the coding guide. The codes in the questionnaire and in the data entry sheets did not match. Data inputs for 2007 were interpolated in AEM using the data from 2005 and from 2009.	2005 and 2009 IHBSS data								
FSW Data	Average duration of selling sex among FFSW and RFSW (Indicators 7 & 12, Heterosexual baseline sheets) There is no explicit data on the average duration of selling sex among FSW. With the existing data, AEM experts suggested a formula to obtain the average duration of selling sex. A separate excel file contains all the computations. The example of computation below represents the Davao RFSW who has an average of seven years of selling sex. <table><tr><td>No. of RFSW who started selling sex this year</td><td>42</td></tr><tr><td>total no. of RFSW</td><td>299</td></tr><tr><td>percentage of RFSW who started selling sex this year</td><td>0.1405</td></tr><tr><td>years RFSW sell sex (1/percentage)</td><td>7</td></tr></table>	No. of RFSW who started selling sex this year	42	total no. of RFSW	299	percentage of RFSW who started selling sex this year	0.1405	years RFSW sell sex (1/percentage)	7	2011 IHBSS data
No. of RFSW who started selling sex this year	42									
total no. of RFSW	299									
percentage of RFSW who started selling sex this year	0.1405									
years RFSW sell sex (1/percentage)	7									
STI prevalence is based on reported syphilis cases in the IHBSS	There is no available data for the general STI prevalence among the different key affected populations. The available data of syphilis prevalence from the IHBSS was utilized instead.	2011 IHBSS data								

C. Surprises emerging from the data

Table 6: Surprises emerging from the data

ISSUES	ASSUMPTIONS	BASIS
Unit costs	Unit cost was too varied across programs and different geographic locations. Specific examples are as follows: <ul style="list-style-type: none"> HIV test kit ranges from Php60.00 to Php250.00 (\$1.40 to \$5.80) One condom ranges from Php3.00 to Php13.60 (\$0.07 to \$0.31) Single syphilis test ranges from Php9.40 to Php70.00 (\$0.22 to \$1.63) Solution: Consultations on costing were done with stakeholders to arrive at a consensus.	5th AMTP Investment plan and UNAIDS costing analysis. A series of costing and validation exercises were done to arrive at a consensus.
Defining coverage and reach	Defining “coverage” at the national level was a challenge. Using data from IHBSS 2011 and combining different variables resulted to either a very low or a very high coverage across models which do not represent a realistic picture. In consultation with partners, the team agreed to use the variable “Percentage of MARPs who had an HIV test in the past 12 months” as the proxy indicator to define coverage and reach which resulted to a more realistic situation.	IHBSS 2011

D. New or unique approaches to analyzing or using the data

AEM requires data for trending from 1975 up to the present. Specifically, this refers to behavioral data. However, since the AIDS epidemic only emerged in early 1980s in the Philippines, some adjustments were made based on the available data and AEM parameters.

Table 7: New or unique approaches to analyzing or using data

ISSUES	ASSUMPTIONS	BASIS
There are limited available behavioral data during the early years of the epidemic.	The AEM team originally used the earliest available data from 1975 until the first year of data collection. However, this did not effectively reflect the trend of HIV epidemic over time. For some behavioral indicators (e.g. condom use), an assumption was made that from 1975 until 1994, there was only ten percent condom use among the different MARPs. This was based on data from the Thailand epidemic. Since interventions were introduced in 1994, the trend started increasing from 1995 onwards.	Review of related literature

Section 2

Data Inputs and Outputs of AEM

Chapter 4 describes the different key data needed to be inputted to AEM and their sources. In addition, key findings are presented in this chapter as illustrated by the scenarios.

Chapter 5 discusses the different scenarios under three strategic actions. Based on the results of the modeling, the team identified the high impact, low cost interventions policy actions.

Chapter 4. Key Inputs, Findings, and Validation

AEM workbooks require quantitative data related to HIV and AIDS and key affected populations and are entered to AEM's input pages then read by the calculating engine to generate graphs or scenarios on observed HIV epidemic trends, projections, and impacts.

These data that were gathered from various sources of information – both published and unpublished - reflect the country's AIDS response over time. In the absence of data for specific population, such as the transgenders, input pages were left blank and the population was not included in the discussion. On the other hand, in the absence of indicator specific data*, some decisions had to be made based on triangulation, re-runs, and review of literature. In some instances, default AEM data is used or other country data is used. The AEM Country Team took time and carefully observed these processes to ensure a realistic output.

These data are the basis of the AEM calculating engine to develop policy options. Because of the diversity of the epidemic in the Philippines, sub-national models were developed and AEM combines all these to generate a national epidemic model.

A. Essential data inputs to the model

The following data on most-at-risk-populations – FFSW, RFSW, MSM, PWID - were gathered, reviewed, examined and triangulated before encoding them to AEM Workbooks. Key data inputs or indicators include general male and female population 15 to 49 years old, MARP population size estimates, risk behaviors, HIV prevalence, ART coverage, coverage and data on additional infections for OFWs.

1. Data sources

a. Population

The main source of data on population is the national census conducted by the National Statistics Office (NSO) every ten years beginning in 1990. The latest survey was conducted in 2010 and official results were released through the NSO's website, disaggregated by age and sex. The age group 15 to 49 years old was entered to AEM. Given the 10-year period interval in conducting the census, the team used the 1990, 2000 and 2010 annual population growth rate¹⁵ at 2.44 percent, 2.06 percent and 1.67 percent, respectively in calculating annual population projections and reverse projections.

b. Behavioral data

There were indicators that required data for both MARPs and general population. For these data requirements, the main sources on MARPs were the Integrated HIV Behavioral & Serologic Surveillance (IHBSS) for the years 2005, 2007 (except for MSM), 2009, 2011, and 2013. Results of Behavioral Sentinel Surveillance (BSS) conducted prior to 2005 were not used because of the small sample population sizes. IHBSS is conducted by the DOH in key cities nationwide every two years since 2005 among FSW, MSM and PWID.

The source of the behavioral data on general population was the National Demographic & Health Survey (NDHS) conducted every five years by NSO, beginning in 1993.

c. HIV and STI prevalence

This set of data was generated from the IHBSS.

d. Anti-retroviral therapy (ART)

ART data are reported by all treatment hubs nationwide and are recorded in a database managed by NEC. Both 1st and 2nd line treatment cases were used as inputs for the AEM.

**AEM input pages has a set of indicators specific to key populations that require the input of realistic data that best reflect the country's AIDS situation.*

e. Unit costs

Various sources of information on the costs of services and commodities were examined and analyzed to determine the unit costs. Sources of information are the following:

- 5th AMTP Investment Plan by NEDA
- 2013 Global Fund Grant Work and Financial Plans of the DOH
- 2013 Philippine HIV Costing Study: Selected HIV Prevention and Treatment Services commissioned by UNAIDS

The last reference extensively analyzed the local data including type of services provided, provider time and rates, type of commodities, procurement processes and costs. The AEM Team collated these data, validated with AEM experts and stakeholders, and built consensus on the final figure.

Based on the final consensus on costs and on a series of consultations with the NASPCP-DOH and NEDA, the following unit costs and breakdown by MARP was endorsed and used for the AEM workbooks: (Table 8).

Table 8: Summary of unit costs

UNIT COST per year	in USD	in PHP (45)
RFSW	195	8,778
FFSW	129	5,819
MSM	130	5,834
PWID	183	8,248
ART	697	31,383

The unit costs include commodity cost, provider time cost, and support systems cost. The support systems cost is pegged at 12 percent of total cost. See Annex for details of unit costs.

B. Summary of key inputs

Behavioral data in quantitative form were key inputs to AEM. Qualitative studies were also reviewed to provide context to these numbers. The following tables summarize the key data inputs according to key population and sub-national models. The complete list of indicators by MARP can be found in Annex A.

Table 9: Key inputs for FFSW

Data input	GMM	Cebu Province	Category B	Davao	Pampanga
Population size (% of 15-49)	0.56%	0.53%	0.39%	0.47%	5%
% of FSW in group 1	33%	32%	38%	32%	1%
Duration	6	5.1	6	7	6
Clients per day	0.5	0.4	0.4	0.4	0.63
Days worked per week	7	7	7	7	7
Condom use with clients in 2005	49%	54%	50%	59%	67%
Condom use with clients in 2009	60%	54%	50%	65%	67%
Condom use with clients in 2011	60%	54%	50%	72%	67%
Percentage of HIV testing (last year)	11%	10%	7%	12%	14%
STI prevalence	1%	4%	2%	0.33%	3%
HIV prevalence	0.06%	0.00%	0.28%	0.00%	0.00%

Table 10: Key inputs for RFSW

Data input	GMM	Cebu Province	Category B	Davao	Pampanga
Population size (% of 15-49)	0.56%	0.53%	0.39%	0.47%	5%
% of FSW in group 1	6	6	6	7	4
Duration	0.3	0.2	0.33	0.25	0.238
Clients per day	7	7	7	7	7
Days worked per week	10%	10%	10%	77%	10%
Condom use with clients in 2005	71%	37%	69%	77%	74%
Condom use with clients in 2009	70%	59%	69%	80%	75%
Condom use with clients in 2011	70%	70%	69%	81%	75%
Percentage of HIV testing (last year)	28%	62%	49%	41%	11%
STI prevalence	0.40%	1%	1%	0.33%	1%
HIV prevalence	0.20%	0.28%	0.04%	0.00%	0.33%

Table 11: Key inputs for MSM

Data input		GMM	Cebu Province	Category B	Davao	Pampanga
Population size (% of 15-49)		5%	2%	3%	3%	3%
Duration		22	21	15	22	22
Engaged in anal sex*		62.20%	69.74%	80.15%	78.60%	81.13%
Anal sex contacts per week*		1.4	2	1	1	1
% with female partners*		14.90%	8.36%	17.46%	4.20%	12.96%
Condom use in anal sex 1975		10%	10%	23.81%	18.90%	10.00%
Condom use in anal sex 2005		28.02%	28%	23.81%	18.90%	15.38%
Condom use in anal sex 2009		28.02%	34%	28.07%	18.90%	47.76%
Condom use in anal sex 2011		35.27%	34%	30.20%	26.30%	63.95%
Percentage of HIV testing (last year)		7%	9%	8%	15%	9%
STI prevalence*		1.32%	2%	2%	0.33%	1%
HIV prevalence	2011	3%	1.67%	1.55%	3%	2%
	2013	4.7%	4.62%	2.34%	5%	2.3%

Table 12: Key inputs for IDU

Data input		GMM*	Cebu Province	Category B	Davao*	Pampanga*
Population size (% of 15-49)		0.04%	0.35%	0.03%	0.04%	0.04%
% in high risk network		58.24%	50%	49.65%	58.24%	58.24%
Duration		8.4	9	6	8.4	8.4
Share needles		62.48%	80%	62%	62.48%	62.48%
Percent injections shared		59%	43%	77%	59%	59%
Injections per day		1.50	3	0.3	1.50	1.50
Condom use with spouse		12.31%	15%	11%	12.31%	12.31%
STI prevalence						
HIV prevalence	2011	No data*	28.5%	0.15%	No data	No data
	2013	No data	43.8%		No data	No data

Table 13: Summary of baseline coverage on prevention and ART

Sub-Epidemic Model	FFSW	RFSW	IDU	MSM	ART - Male	ART – Female
Angeles	14%	11%	-	9%	28%	23%
Cat B	7%	49%	1%	8%	40%	31%
Cebu	10%	62%	18%	9%	15%	18%
Davao	12%	41%	-	15%	78%	61%
GMM	11%	28%	-	7%	69%	71%
ROTC	4%	10%	-	2%	40%	31%

To reiterate, the AEM defines coverage as the percentage of MARP who got tested for HIV in the past 12 months based on the results of the 2011 IHBSS.

* Data on IDU for these models were adapted from CatB

C. Key findings - what the models show and their implications for the response

The discussion in this chapter emphasizes the importance of data in evaluating the national response and to assess and compare impacts of different program alternatives. These data were used as inputs to AEM to generate graphs that showed the current AIDS scenario in the country and their implications on the course of the epidemic. These graphs, which are being shown here, are referred to in this section as baseline scenarios. Based on the current intervention programs, they answer the questions “where are we now” and “where are we heading to.”

The following baseline scenarios illustrate significant findings from 2005 HIV intervention programs and their impact on the HIV epidemic by 2030 if programs will not scale up.

Figure 8: Total CURRENT HIV infections, 2005-2030

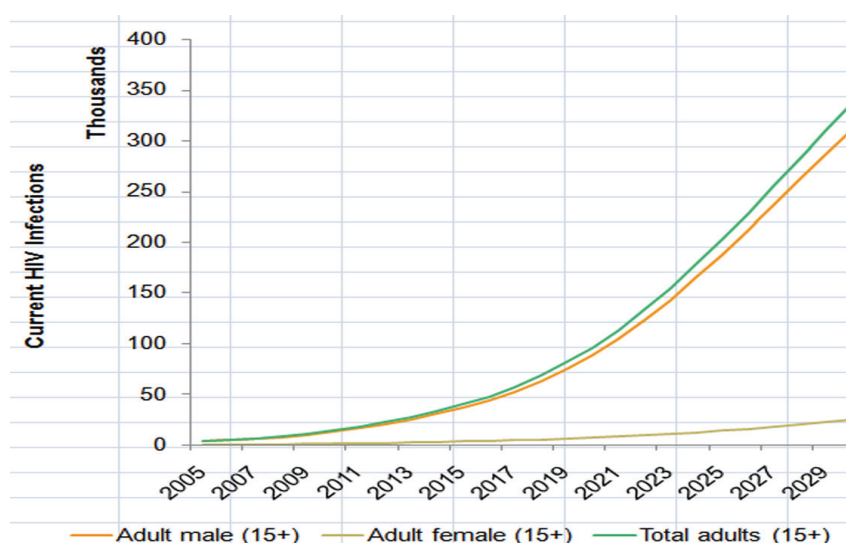


Figure 8 shows the total current HIV infections or the HIV prevalence by sex from 2005 to 2030. Majority of PLHIV in this figure is adult male.

Figure 9: Total NEW HIV infections, 2005-2030

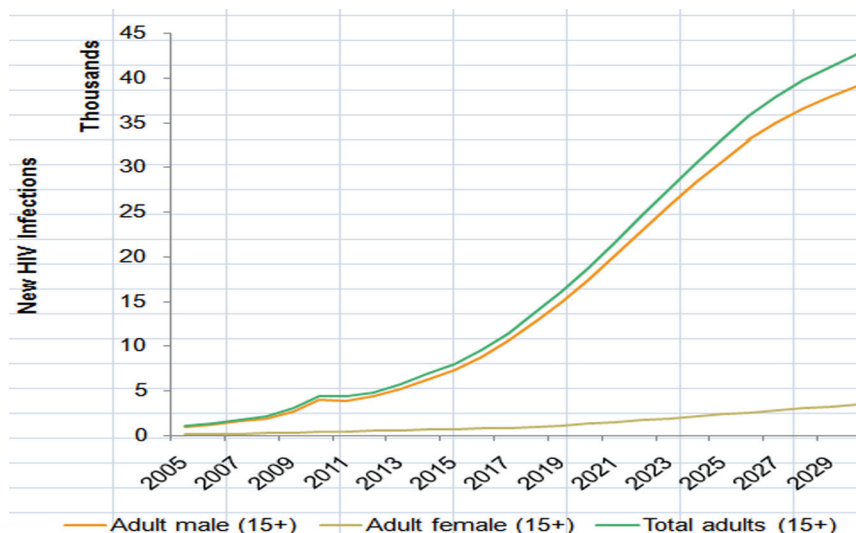
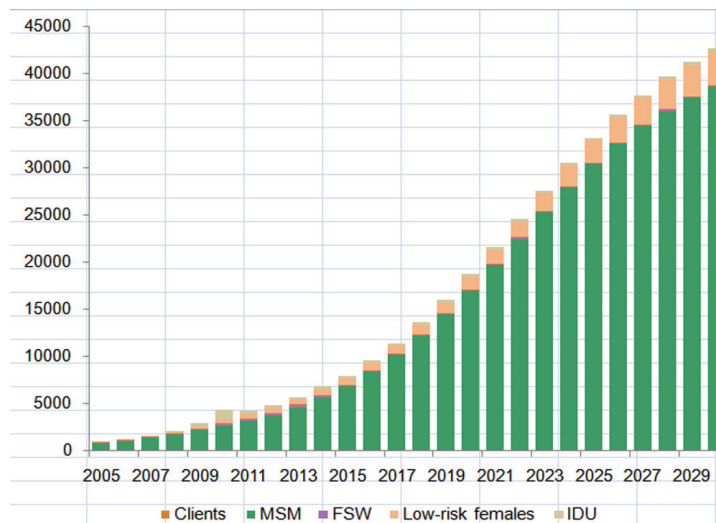


Figure 9 shows that new HIV infections has the same pattern as the current infections, which is also increasing at a rapid pace with MSM as the majority key affected population. In both scenarios, HIV prevalence and incidence are low among female population.

Figure 10: Mode of HIV transmission, 2005-2030



The mode of transmission of HIV infection is mainly through MSM. HIV is also transmitted by MSM and male IDU to their female partners. This explains the high number of low-risk females infected with HIV.

Figure 11: Total Number of PLHIV needing ART, 2005-2030

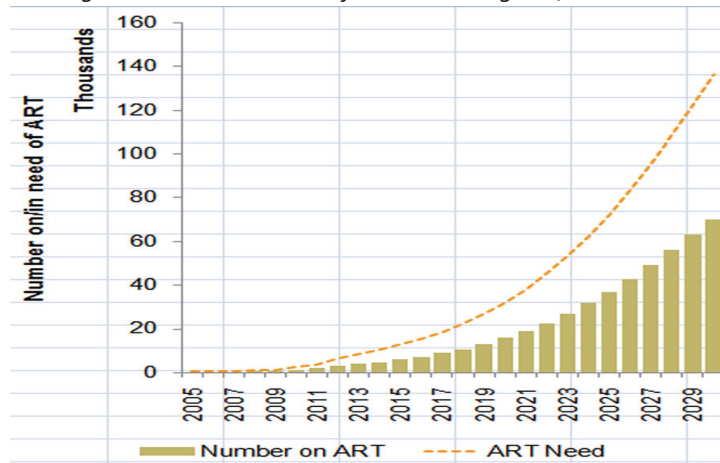
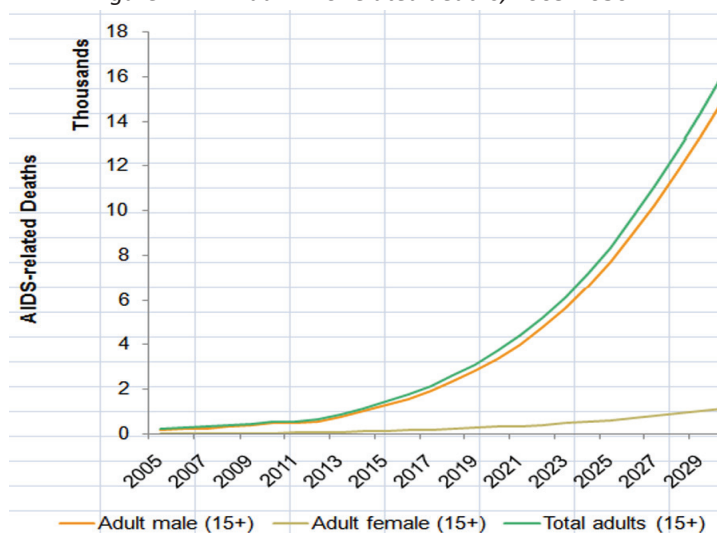


Figure 11 shows that the number of PLHIV who are on ART is much lower than the total number of PLHIV who are in need of ART. The gap will continuously increase if this will not be addressed and will result to an increase in AIDS-related deaths shown in Figure 12.

Figure 12: Annual AIDS related deaths, 2005-2030



Summary of key messages

1. At baseline scenario, AEM results showed that the Philippines will continue to display an exponential growth of the HIV epidemic in the Philippines, reaching 336,181 (3% prevalence) current HIV infections by the year 2030. This validated the UNAIDS 2012 Global Report which includes the Philippines as one of nine countries with an increasing HIV epidemic.
2. HIV prevalence among FSW showed a plateauing trend which may indicate stabilization in this population. This may be the result of the previous prevention focus among FSW.
3. HIV epidemic among IDU is concentrated in some cities of Cebu province, as well as in General Santos City and Zamboanga. AEM results showed that the new HIV infections among IDU peaked in the year 2010. In succeeding years, the number of new infections will decline due to the saturation of this population. This means that either all IDU have already become HIV positive or have since died.
4. The AEM result showed that MSM would account for ninety percent (90%) of new HIV infections by 2022. This figure was validated by the Philippine HIV and AIDS Registry.
5. AEM data showed that infections will occur among female partners of MSM and IDU. These low-risk females can also potentially transmit the infection to their newborns.
6. Consistent condom use among MSM was just 23 percent while testing coverage was also low at eight percent. However, scaling up the coverage of peer education can help reach the 80 percent target for both consistent condom use and testing. Data from the 2013 IHBSS showed that MSM who were reached by the current prevention programs were five times more likely to come for testing if they were reached by peer education and two times more likely to use condom if they were reached by the current prevention program.¹⁷
7. Current data from NASA showed that the proportion of expenditures or investments for MSM and IDU was very low. Of the total expenditure, only five percent was allotted for the two sub-populations.

The overall impact of the current HIV intervention program is highlighted in Table 14.

Table 14: Overall impact of HIV epidemic

Sub-Epidemic Model	2009	2013	2022
PLHIV	10,954	27,721	133,134
New HIV Infections	2,984	5,730	24,649
Annual AIDS-related deaths	443	848	5,177
PLHIV in need for ART with less than 350 CD4 counts	911	8,180	44,982
Money Spent on ART (90% coverage among those who are need)	\$571,470	\$5,131,314	\$28,217,209

D. Model validation

The scenarios and unit costs were validated in several consultations with stakeholders. Participants were from the government and non-government agencies, faith-based organizations, local response teams, and the Country Coordinating Mechanism (CCM).

The DOH Technical Working Group met several times to vet the unit costs in February, March, and May 2014. In May 2014, the DOH organized a multi-sectoral review of the health sector strategic plan where AEM outputs were also validated. In May 13-14, 2014 and in partnership with CCM, NEC organized a two-day workshop for the CCM members to update them on the progress of the AEM, to increase the members' understanding on the AEM process, to further validate the results, and to solicit comments on the types of scenarios that would help and guide HIV planning, programming, and budget allocation.

Some issues raised by the participants were the following:

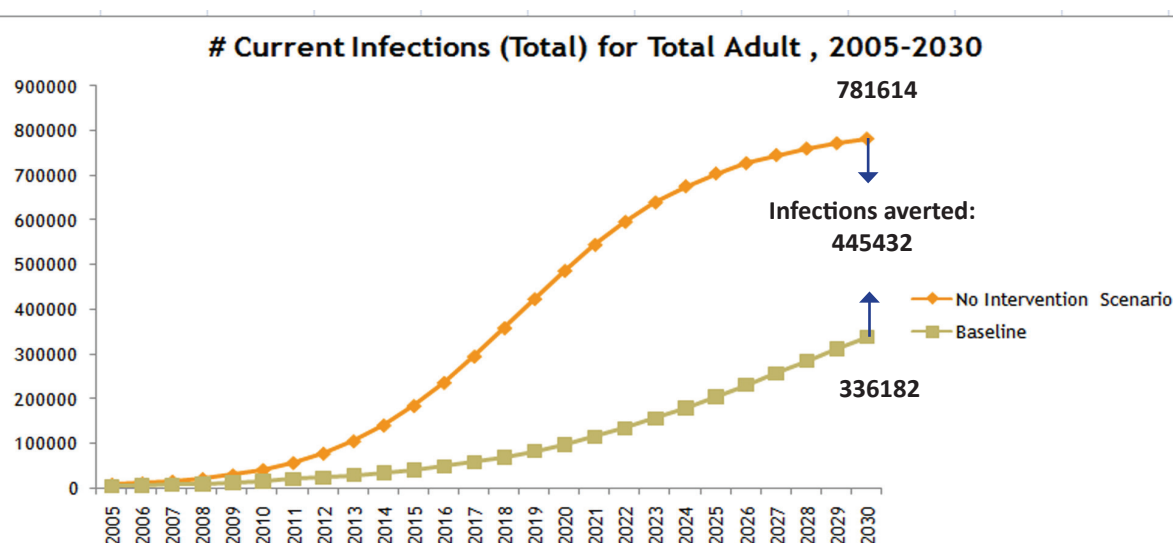
Key Issues Raised	How AEM model/s was/were adapted to address the issues?
The Cebu-Mandaue-Lapu-lapu clustering is not applicable to Cebu City because of the uniqueness of the HIV epidemic in the city such as the presence of shooting galleries, HIV prevalence, among others. In localizing AEM, it should also reflect the uniqueness of individual city or municipalities based on the pattern and trend of their epidemic.	Either a tri-city model or Cebu City model only will be considered in the future AEM exercise.
How can AEM target social protection program?	This issue is not covered by AEM.
With limited resources, how do we prioritize the investment? The HSP is presenting a comprehensive package. It was suggested that a minimum package consists of peer education, HIV counseling and testing, and provision of ART.	The NASPCP, in partnership with PNAC, conducted a workshop with the MSM and TG community in Pampanga to discuss and develop "Quality Minimum Package of Services in the Continuum of Care of HIV Prevention, Treatment, Care and Support of MSM and TG" (June 16-19, 2014)
Can we select sites?	Selection of sites to prioritize interventions was done and was validated against AEM's sub-national models. See discussion in Chapter VI.
Can we adjust unit costs?	A number of cost adjustment measures were considered. For example, ROTC has a huge population base but the HIV prevalence is low compared to the high-burden cities. The AEM will be using the adjusted unit costs for interventions. See discussions on Unit Costs.
Who is the target population for intervention?	Based on the discussion – priority target of interventions are MSM, TG, and IDU in Cebu City and Mandaue City
How do you ensure quality of services?	AEM does not capture or measure quality of services. It captures quantitative behavioral data and STI and HIV prevalence. The MSM Plan 2012-2016 and the updated Health Sector Plan lay down the strategies that will ensure the delivery of quality services.

E. Has the response to date made a difference?

The first case of HIV infection in the Philippines was reported in 1984 and the mode of transmission was mainly heterosexual. The government's immediate multi-sectoral response included the establishment of NASPCP, and the development of national strategic plans at the national level and strengthening SHC and establishing LAC at the local level. The NGO's strong collective efforts on advocacy and community involvement paved the way in strengthening prevention programs, in establishing people's organizations, in advocating for policy development and in re-focusing the response from heterosexual to males having sex with males. The global AIDS community commended the Philippines for being one of the first countries to pass a comprehensive AIDS law in 1998. A number of development partners extended their support to the Philippines to address AIDS issues.

Figure 13 shows that 595,225 adults would have been infected with HIV if there were no interventions. It is worth noting that a total of 462,091 infections were averted by the current intervention programs.

Figure 13: No intervention scenario and the total number of CURRENT HIV infections, 2005-2030



Chapter 5. The Future of the Epidemic

A. How can we respond better?

This chapter will discuss the recommended policy actions to halt and reverse the AIDS epidemic in the Philippines with high impact, low cost interventions. Using AEM, key policy scenarios were developed in collaboration with national and local stakeholders to explore ways of improving the Philippine AIDS response. Policy options using a combination of strategies, illustrate the impact of the intervention over two presidential terms – 2010 to 2016 and 2017 to 2022 , and extending until 2030 to show the long-term effects of the scenarios. These scenarios will serve as guides to program planning and resource mobilization.

AEM developed three recommended actions:

1. Prioritize the intervention among MARPs
2. Strengthen treatment coverage
3. Scale-up prevention coverage among MSM and IDU and treatment coverage for PLHIV

In consultation with stakeholders, the team recommended three actions to address the HIV epidemic. For each recommendation, policy options were generated to identify the program that could deliver the most impact for the least cost possible. The targets of all policy options presented here incrementally increase from the baseline (see Table 13) until it reaches the target coverage by the year 2017.

The recommended actions were based on the package of interventions which were developed based on the AMTP5, the MSM National Strategic Plan 2012-2016, and inputs from stakeholders through consultations. All policy options in this section will have the same set of package of interventions. Adjustments were made based on target coverage, target populations, and ART coverage and eligibility criteria.

In interpreting the results of the different policy options presented in this section, it is important to bear in mind that there are significant assumptions made as follows:

1. The package of interventions are highly effective, that is, a full coverage of 80 percent will lead to an increase in the condom use rate to 80 percent.
2. Infrastructure and human resources were not included in calculating unit costs because they are already in place in the health system.

Table 15: Package of interventions

Category	Prevention Package	ART Package	Difference in ROTC
Basic Program	<ul style="list-style-type: none"> • VCT • Condom provision • Lubricant provision • STI diagnosis and treatment • Community Outreach and peer education • Contraceptive pills (for RFSW) • Abscess and wound care (for IDU) • Hepatitis screening (for IDU) 	<ul style="list-style-type: none"> • ARV medications • Monitoring • CD4 cell count • Viral load test • X-ray • Routine lab test • ARV adherence counseling • OIs (PCP, CMV) • Hepatitis C treatment, IPT Vaccines (Flu, Pneumococcal, Hepatitis B, HPV) 	Same package, except for the following: <ul style="list-style-type: none"> • PE on voluntary basis focusing mostly on education • Symptomatic visits to facilities for STI since not all of ROTC have SHCs • VCT as referrals
Support Systems (12% of total cost)	Capital outlay Capacity building Program management Monitoring and evaluation Research Mass media, social media Policy and law environment Advocacy activities		

B. Recommended Action 1: Prioritize HIV interventions among MARPs

The HIV epidemic in the Philippines is concentrated among FFSW, RFSW, MSM, and PWID. MSM has the highest reported cases in the AIDS Registry since 2007. Based on the IHBSS, HIV prevalence among FSW shows a plateauing trend which may indicate stabilization. HIV prevalence among PWIDs is high in Cebu and Mandaue cities. Due to the diverse nature of the HIV epidemic among the three MARPs, the AEM team developed several policy scenarios for Recommended Action 1 using a combination of strategies to illustrate the impact of the interventions over time.

The policy options for Recommended Action 1 aim to guide the prioritization of intervention among MARP and answer the question “if the country has limited resources, how should we prioritize to achieve maximum impact at a low cost?”

For all the policy options with ART 90 percent coverage, the CD4 eligibility is @ 350 cells/mm³.

Policy Option 1: Prevention 80 percent (all KPs), ART 90 percent

The target of this option is that 80 percent of all KPs - FFSW, RFSW, MSM, and PWID - will receive the HIV prevention package and that 90 percent of all PLHIV in need of ART will receive the HIV treatment package.

Policy Option 2: Prevention 80 percent (MSM and PWID), ART 90 percent

The target of this option is that 80 percent of MSM and PWID will receive the HIV prevention package. Baseline coverage (see Table 13) of interventions for FSWs will be sustained. 90 percent of all PLHIV will receive the HIV treatment package.

Policy Option 3: Prevention 80 percent (MSM), ART 90 percent

The target of this option is that 80 percent of MSM will receive the HIV prevention package and that 90 percent of all PLHIV in need of ART will receive the HIV treatment package. Baseline coverage of interventions for IDU and FSW will be sustained as indicated in Table 13.

Policy Option 4: Prevention 80 percent (MSM) only

The target of this option is that 80 percent of MSM will receive the HIV prevention package. Baseline coverage of interventions for FSW and IDU will be sustained and there will be no additional enrollment to ART.

Policy Option 5: Prevention 80 percent (IDU) only

The target of this option is that 80 percent of IDU will receive the HIV prevention package. Baseline coverage of interventions for MSM and FSW will be sustained. There will be no additional enrollment to ART.

Policy Option 6: Sustain prevention, Treat All

This scenario shows what the effect will be if the current coverage of the HIV prevention coverage will be maintained for all MARP. Only the ART coverage will be increased to treat all, meaning that 90 percent of all PLHIV, regardless of the CD4 count, will receive the HIV treatment package.

Figure 14: Priority interventions among MARPs & total number of NEW HIV infections 2010-2030

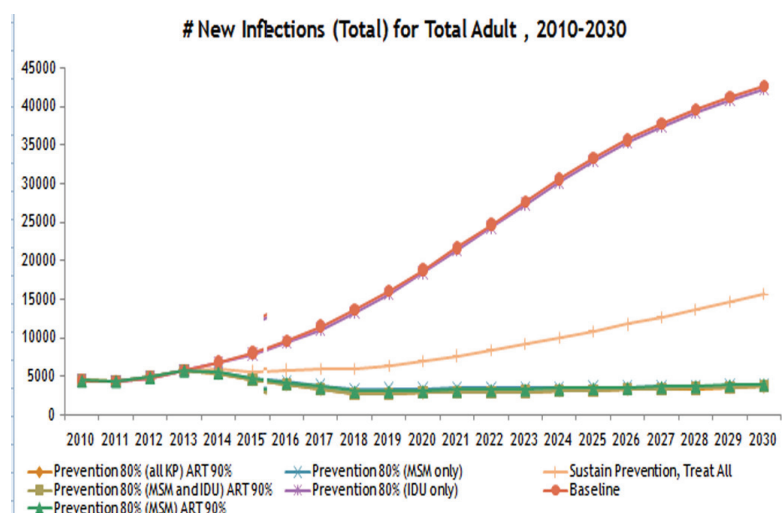
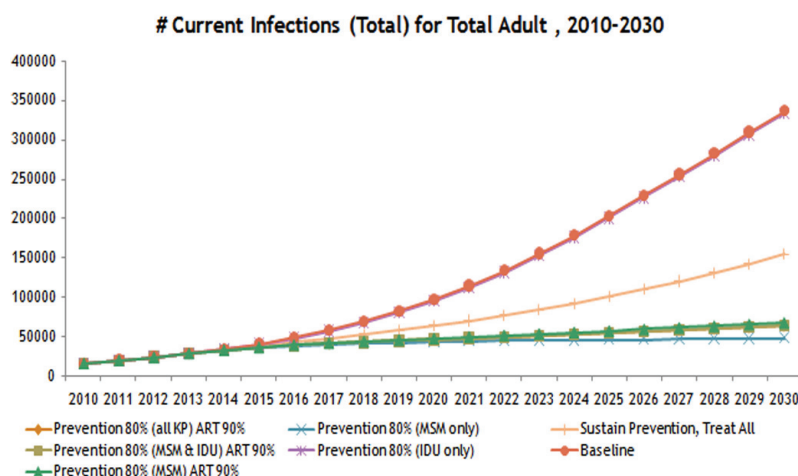


Figure 15: Priority interventions among MARPs & total number of CURRENT HIV infections 2010-2030



Recommended Action 1 Analysis

The following are the key messages of Recommended Action 1 as shown by Figures 14 and 15:

1. Policy Option 1 (Prevention 80 percent [all KP - FFSW, RFSW, MSM, and IDU], ART 90 percent) and Policy Option 2 (Prevention 80 percent [MSM and PWID] ART 90 percent) will have almost the same number of infections averted. However, there is a significant difference in resource needs because over time, Policy Option 1 will cost around USD 13 million more than Policy Option 2 in the year 2022. Among the five policy options, Policy Option 2 will have the highest impact at low intervention cost. Focusing on both MSM and IDU will not only prevent KP infections but also prevent infection of female partners of MSM and IDU.
2. Policy Option 3 (Prevention 80 percent [MSM only], ART 90 Percent) shows that new infections will be less than in Policy Option 4 where there is no treatment scale up. Current infections will increase because of possible zero AIDS-related death due to the provision of ART.
3. Policy Option 4 (Prevention 80 percent [MSM only]) shows that if the focus is on 80 percent prevention but no new ART enrollment, the current infection will be lower than that with treatment scale up as shown in Policy Option 3. If ART will not be scaled up, current infection will be lower because more PLHIV will die since they are not on ART. Policy Option 4 also yields a lower current infection rate compared to Policy Option 5 because homosexual transmissions are the main drivers of the epidemic.
4. Policy Option 5 (Prevention 80 percent [IDU] only) shows that focusing on IDU alone will not halt or reverse the epidemic; new and current infections will continuously increase.
5. Policy Option 6 (Sustain prevention, treat all [ART only scenario]) will lead to a continuous increase of HIV infections. Focusing on treatment alone, while merely sustaining current prevention coverage, will not have a good impact on the epidemic.

Table 16 summarizes the comparison of the five policy options (excluding policy option 6).

Table 16: Priority interventions among MARP, annual infections averted, and total resource needs in thousands – 2013, 2022, 2030

Policy Option	2013		2022		2030	
	Annual Infections Averted	Resource Needs (USD)	Annual Infections Averted	Resource Needs (USD)	Annual Infections Averted	Resource Needs (USD)
Prevention 80% (all KP) ART 90%	23	19,506	21,796	85,264	39,031	101,996
Prevention 80% (MSM & PWID) ART 90%	23	18,329	21,779	78,401	39,008	94,329
Prevention 80% (MSM) ART 90%	18	18,088	21,462	78,108	38,659	94,958
Prevention 80% (MSM) only	18	18,088	21,150	66,834	38,749	75,003
Prevention 80% (PWID) only	1	9,356	351	24,055	390	58,335

C. Recommended Action 2. Strengthen treatment coverage

Providing Antiretroviral Treatment (ART) for positive prevention is one of the newer strategies said to prevent onward HIV transmission by decreasing the infectivity rate of people living with HIV (International HIV/AIDS Alliance, 2003). At present, the reduction rates are set by default in AEM at 0.92 for heterosexual, 0.55 for anal and 0.5 for needle sharing, but these are currently being reviewed (AEM Suite Manual).

To look at possible positive prevention interventions in the country, the AEM team also generated policy options called Strategic Use of ART which shows the effect of modifications in prevention and treatment. The CD4 eligibility criteria was adjusted and the effect of each treatment option with and without prevention scale up was also investigated. Currently, the eligibility criteria of the country for PLHIV who will be enrolled in ART is at 350 cells/mm³ CD4 count.

The “treat all” policy option means that all PLHIVs, regardless of CD4 count, are eligible for treatment. The coverage with ART in the “treat all” policy option is 90 percent at the target year. It should be noted that Treat All options are pegged at 90 percent coverage because of the assumptions that 1. not all PLHIVs would seek treatment and 2. not all PLHIVs got their results and are thus unaware of their status.

The strategic use of ART has six comparative policy options:

Policy Option 1: Prevention 80 percent (MSM & IDU), ART 90 percent @ CD4 350

The target of this scenario is that 80 percent of all MSM and IDU will receive the HIV prevention package and 90 percent of all PLHIV with a CD4 count of 350 cells/mm³ and below will receive the HIV treatment package.

Policy Option 2: Prevention 80 percent (MSM & IDU), ART 90 percent @ CD4 500

The target of this scenario is that 80 percent of all MSM and IDU will receive the HIV prevention package and 90 percent of all PLHIV with a CD4 count of 500 cells/mm³ and below will receive the HIV treatment package.

Policy Option 3: Prevention 80 percent (MSM & IDU), Treat All

The target of this scenario is that 80 percent of all MSM and IDU will receive the HIV prevention package and 90 percent of all PLHIV, regardless of CD4 count, will receive the HIV treatment package.

Policy Option 4: Sustain Prevention, ART 90 percent @ CD4 350

This scenario shows what the effect will be if the baseline coverage of the HIV prevention coverage will be maintained for all MARPs. This means that no scale-up of preventive interventions will be done. There will be a scale-up of ART coverage - 90 percent of all PLHIV with a CD4 count of 350 cells/mm³ and below will receive the HIV treatment package.

Policy Option 5: Sustain Prevention, ART 90 percent @ 500

In this scenario, no scale up of preventive interventions will be done. There will be a scale up of ART coverage; 90 percent of all PLHIV with a CD4 count of 500 cells/mm³ and below will receive the HIV treatment package.

Policy Option 6: Sustain prevention, Treat All

In this scenario, no scale up of preventive interventions will be done. There will be a scale up of ART coverage; 90 percent of all PLHIV, regardless of CD4 count will receive the HIV treatment package.

Figure 16: Strategic use of ART and total number of NEW HIV infections, 2010-2030

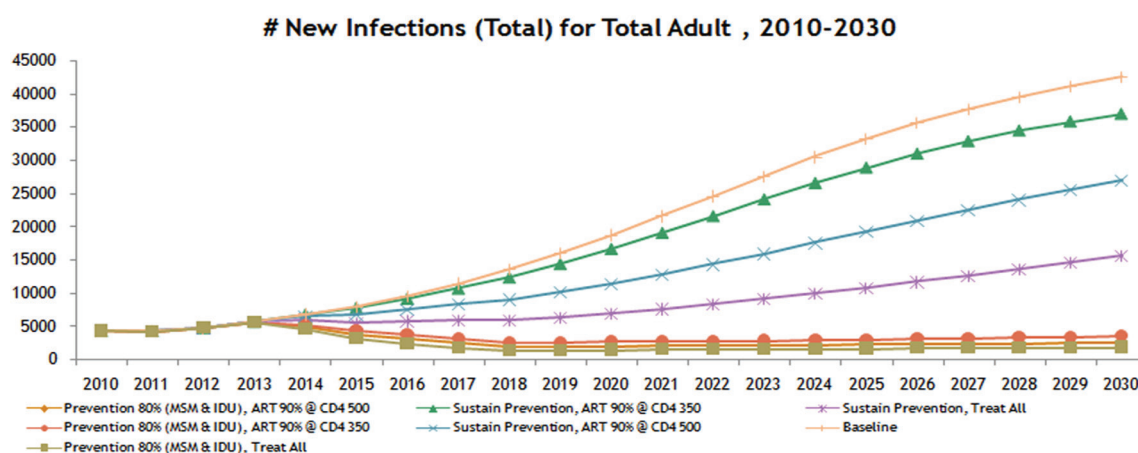
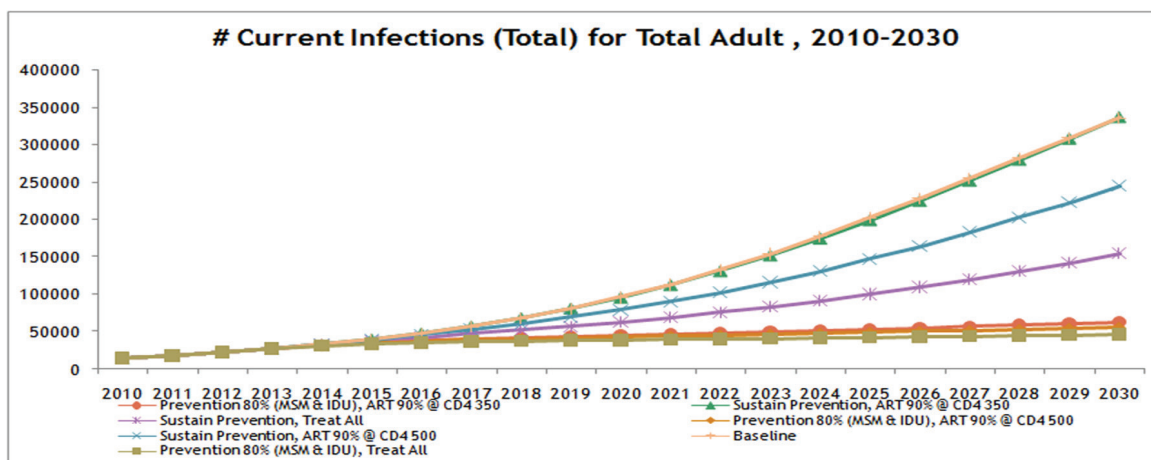


Figure 17: Strategic use of ART and total number of CURRENT HIV infections, 2010-2030



Recommended Action 2 Analysis

1. Overall, the results show that focusing on scale-up of treatment alone while sustaining prevention would not result to maximum impact. The key to significantly decreasing the number of new HIV infections is to scale up the prevention coverage of MSM and IDU and scale up ART coverage. Though the impact of investing in prevention cannot be immediately seen, in the long run, it will have a greater impact than investing in treatment.
2. Policy Option 3 (Prevention 80 percent [MSM & IDU], Treat All) will result in the highest number of infections averted. However, this maximum increase in both prevention and treatment coverage will also require the highest resource needs among the six options.
3. Considering the country's limited resources, another good option would be Policy Option 2 (Prevention 80 percent [MSM & IDU], ART 90% @ CD4 500). The country would be able to avert around 22,000 infections in 2022. This intervention option would cost USD 83 million if this would be fully implemented in 2022.

Table 17 summarizes the comparison of the six policy options.

Table 17: Strategic use of ART, annual infections averted, total number of PLHIV on ART, and total resource needs in thousands - 2013, 2022, 2030

Policy Options	2013			2022			2030		
	Annual Infections Averted	Total Number on ART	Resource Needs (USD)	Annual Infections Averted	Total Number on ART	Resource Needs (USD)	Annual Infections Averted	Total Number on ART	Resource Needs (USD)
Prevention 80% (MSM & IDU), ART 90% @ CD4 350	2,859	4,051	18,329	21,778	25,848	78,401	39,716	37,945	94,329
Prevention 80% (MSM & IDU), ART 90% @ CD4 500	3,535	4,051	18,329	22,454	32,627	83,125	40,392	42,197	97,293
Prevention 80% (MSM & IDU), Treat All	4,131	4,051	18,329	23,050	36,082	85,534	40,988	41,959	97,126
Sustain Prevention, ART 90% @ CD4 350	0	3,902	9,219	3,012	46,395	39,932	5,558	145,323	109,831
Sustain Prevention, ART 90% @ CD4 500	0	3,902	9,219	10,277	64,548	52,584	15,620	161,372	121,017
Sustain Prevention, Treat All	0	3,902	9,219	16,258	68,844	55,578	26,942	139,690	105,905

D. Recommended Action 3. Scale up MSM & IDU prevention coverage and treatment coverage for PLHIV

The previous policy options show that focusing on prevention or treatment alone will not be sufficient to control the HIV epidemic in the Philippines. Before choosing the best policies for the country, decision-makers would have to consider a number of things, including the availability of resource needs.

This last set of policy options adjusts the target coverage of prevention among MSM & IDU and the CD4 eligibility criteria for PLHIV. It aims to recommend a policy option with the right blend of prevention and treatment coverage that would result to high impacts while maintaining a realistic cost for the country.

Policy Option 1: Prevention 80 percent (MSM & IDU), ART 90 percent @ 350 CD4

The target of this scenario is that 80 percent of MSM and 80 percent of IDU will receive the HIV prevention package and that 90 percent of all PLHIV in need of ART will receive the HIV treatment package. Baseline coverage of interventions for FSWs will be sustained.

Policy Option 2: Prevention 60 percent (MSM & IDU), ART 90 percent @ 350 CD4

The target of this scenario is that 60 percent of MSM and 60 percent of IDU will receive the HIV prevention package and that 90 percent of all PLHIV in need of ART will receive the HIV treatment package. Baseline coverage of interventions for FSWs will be sustained.

Policy Option 3: Prevention 60 percent (MSM & IDU), Treat All

The target of this scenario is that 60 percent of MSM and 60 percent of IDU will receive the HIV prevention package and that 90 percent of all PLHIV regardless of CD4 count will receive the HIV treatment package. Baseline coverage of interventions for FSWs will be sustained.

Figure 18: MSM, IDU and ART focused interventions and total number of NEW HIV infections, 2010-2030

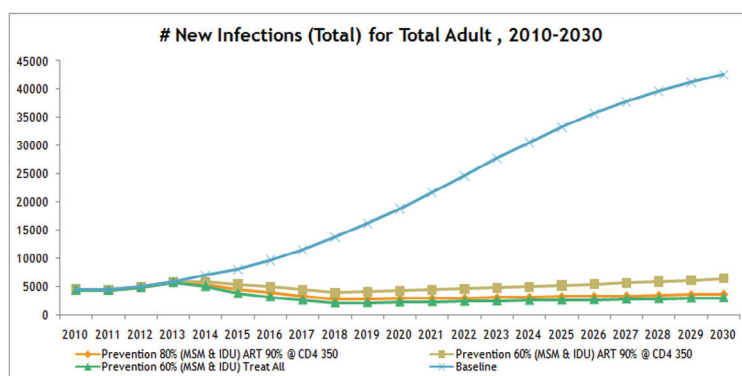
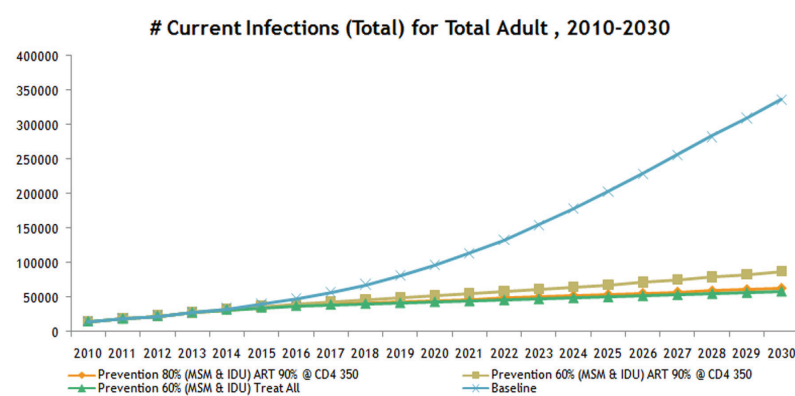


Figure 19: MSM, IDU and ART focused interventions and total number of CURRENT HIV infections, 2010-2030



Recommended Action 3 Analysis

1. Among the options, Policy Option 3 (Prevention 60% [MSM & IDU], Treat All) seemed to be the best option as it will result in the highest number of infections averted at the lowest cost possible. Full implementation of Policy Option 3 would avert 39,605 infections in 2030 and would cost USD 75 million in 2022 and USD 88 million in 2030.
2. However, there are also other factors that should be considered if this option would be adopted. One major barrier would be the low testing coverage in the country (e.g. 8% among MSM based on 2013 IHBSS results). If not all PLHIV (or at least 90%) could be identified through HIV testing, then the Treat All scenario could not be successfully implemented. Initially, the country needs to strengthen the prevention coverage before it aims to treat all PLHIV. Moreover, policy barriers and the readiness of the country to adopt a Treat All Policy also needs to be considered before this option could be fully implemented.
3. Thus, Policy Option 1 (Prevention 80% [MSM & IDU], ART 90% @ CD4 350) should be adopted by the country instead. It will also avert a significant number of HIV infections - 21,779 in 2022 and 39,007 in 2030 with corresponding cost requirement of USD 78 million in 2022 and USD 94 million in 2030.

Presented in Table 18 is the summary of annual infections averted and corresponding resource needs of the three Policy Options.

Table 18: MSM, IDU & ART focused interventions, infections averted, and resource needs (in thousands) –
2013, 2022, 2030

Policy Options	2013		2022		2030	
	Annual Infections Averted	Resource Needs (USD)	Annual Infections Averted	Resource Needs (USD)	Annual Infections Averted	Resource Needs (USD)
Prevention 80% (MSM & IDU) ART 90%	23	18,329	21,779	78,401	39,007	94,329
Prevention 60% (MSM & IDU) ART 90%	18	15,873	20,181	65,999	36,256	85,386
Prevention 60% (MSM & IDU) Treat All	18	15,873	22,306	74,601	39,605	88,299

Conclusions and recommendations from the AEM scenarios

The Philippine AIDS Epidemic Model (AEM) showed that the HIV epidemic in the country would continue to increase at a rapid rate if the country simply sustains its current prevention and treatment interventions and coverage. Majority of new HIV infections would be coming from the combination of four sub-epidemic models – Greater Metro Manila (GMM), Cebu Province, Pampanga Cities, and Davao City. Furthermore, around 90 percent of all new HIV infections will be coming from the MSM population by 2022. To address this problem, the AEM team developed several scenarios that would guide program and policy decisions.

Considering the resource limitations of the country, there is a need to prioritize intervention among the MARPs, the AEM scenarios were able to show that scaling up the prevention coverage on MSM and IDU while sustaining the current coverage for FSW would already lead to a significant decrease in the epidemic.

Furthermore, it is clear from the modeling results that the ART only scenarios would not result to maximum impact and would lead to a continuous increase of the epidemic. The key to significantly decreasing the number of new HIV infections is to scale up the prevention coverage of MSM and IDU, sustain prevention coverage of FSW, and at the same time, scale up ART coverage among PLHIV.

The combination of Prevention 60 percent (MSM & IDU) and Treat All showed the highest averted infections and lower cost requirement in comparison to other scenarios. However, there are other factors that were considered by the team in making a recommendation. With the currently low testing coverage in the country, few PLHIV are identified from the pool of all PLHIV in the country. Thus, it would not be feasible to treat all PLHIV unless they are encouraged to get tested and then enrolled to treatment. It is recommended that the country optimizes its prevention coverage which would lead to averted infections and simultaneously lead to the diagnosis of PLHIV and eventually, to their linkage to care.

Therefore, with the various policy options developed, the AEM team recommends the country to adapt and implement these – **Scale up Prevention Coverage to 80 percent of MSM and IDU, Sustain Prevention Coverage among FSW, and Scale-up Treatment Coverage to 90 percent of PLHIV with CD4 of 350 and below.** In addition to averting thousands of HIV infections, these policies could contribute to systems strengthening.

Section 3

The AEM and the Philippine National Health Sector Plan for HIV and STI 2015-2017

This section provides an overview of the Philippine National Health Sector Plan for HIV and STI 2015-2017 and how the AEM was extensively used to guide the development of the plan.

Chapter 6. National Health Sector Plan for HIV and STI (NHSPHS) 2015-2017

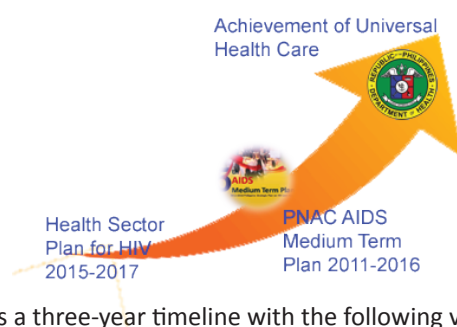
A. Introduction

The National AIDS/STD Prevention and Control Program (NASPCP) of the Department of Health (DOH) led the development of the National Health Sector Plan for HIV and STI (NHSPHS) 2015-2017 which aims to strategically focus the country's investments on high impact and low cost interventions. The Health Sector Plan or HSP 2015-2017 was developed in collaboration with key populations, the PLHIV community, and development partners. It was built on international normative guidance, national health sector strategies, and in coordination across the three diseases (AIDS, TB and malaria).

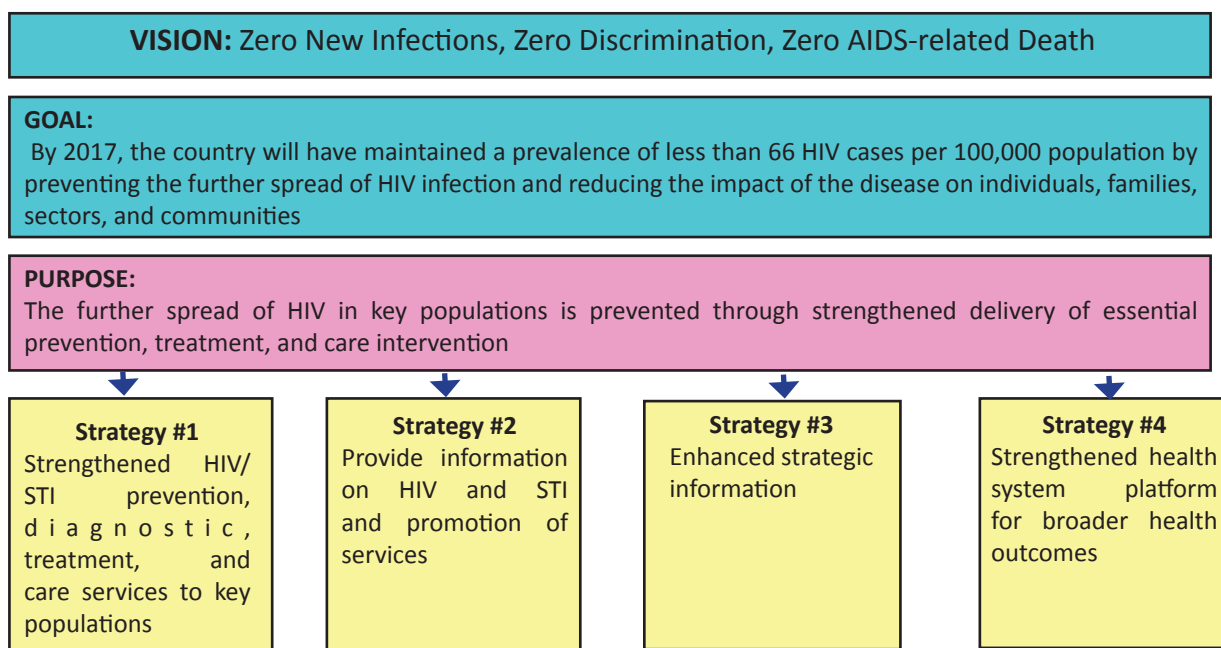
The AEM served as a guide in the process of developing the HSP. It helped inform the plan, evaluate the national response, assess, and compare impacts of the different interventions. It also informed the HSP in preparing the concept note for the Global Fund.

B. The Health Sector Plan Framework of Response

The HSP is anchored on the DOH's Universal Health Care program and PNAC's Fifth AIDS Medium Term Plan 2011-2016.¹⁸



The strategic framework has a three-year timeline with the following vision, goal, purpose and strategies:¹⁹



C. Priority sites for intervention

Building on the PAHI 2012 and the most recent results of the Philippine HIV and AIDS Registry and the IHBSS 2013, the HSP re-clustered the categories of priority sites for intervention as shown in Table 19. The table shows the original clustering; the colored texts indicate the movement of sites as a result of the re-clustering. Sites in red fonts have been moved to Category A which has more than two percent of HIV prevalence, while sites in blue fonts have been moved to Category B which reported less than two percent of HIV prevalence.

Table 19: PAHI 2012²⁰

Category A (22)	Category B (18)	Category C (30)
Parañaque City • Muntinlupa City Taguig City • Pasay City • Makati City • Mandaluyong City • Marikina City • Quezon City • Caloocan City • Navotas City • Las Piñas City • Manila City • Pasig City • San Juan City • Malabon City • Valenzuela City • Pateros • Angeles City • Davao City • Cebu City • Mandaue City • Danao City	Olongapo City • Antipolo City, Rizal • Bacoor, Cavite • Dasmariñas City, Cavite • Batangas City, Batangas • Cainta, Rizal • Imus, Cavite • Lipa City, Batangas • Puerto Princesa City, Palawan • Iloilo City • Bacolod City, Negros Occidental • Lapu-Lapu City, Cebu • Talisay, Cebu • Zamboanga City • Cagayan de Oro City • General Santos City • Baguio City • Butuan City	Dagupan City, Pangasinan • San Fernando, La Union • Tuguegarao City, Cagayan • Tarlac City • San Fernando, Pampanga • Mabalacat, Pampanga • Marilao, Bulacan • Malolos, Bulacan • San Jose del Monte, Bulacan • Meycauyan, Bulacan • Sta. Maria, Bulacan • San Pedro, Laguna • Sta. Rosa, Laguna • San Pablo, Laguna • Calamba, Laguna • Cavite City, Cavite • Lucena City • San Mateo, Rizal • Taytay, Rizal • Puerto Galera, Mindoro Oriental • Legazpi City, Albay • Naga City, Camarines Sur • Malay, Aklan • Toledo, Cebu • Tagbilaran City, Bohol • Tacloban City • Iligan City • Tagum, Davao del Norte • Panabo, Davao del Norte • Cotabato City

Table 20. HSP priority sites for intervention, 2015-2017

Category A (26)	Category B (19)	Category C (25)
1. Paranaque City 2. Muntinlupa City 3. Taguig City 4. Pasay City 5. Makati City 6. Mandaluyong City 7. Marikina City 8. Quezon City 9. Caloocan City 10. Navotas City 11. Las Pinas City 12. Manila City 13. Pasig City 14. San Juan City 15. Malabon City 16. Valenzuela City 17. Pateros 18. Angeles City 19. Davao City 20. Cebu City 21. Mandaue City 22. Bacoor City, Cavite 23. Puerto Princesa City, Palawan 24. Zamboanga City 25. Cagayan De Oro City 26. Baguio City	1. Danao City 2. Antipolo City 3. Olongapo City 4. Dasmariñas City, Cavite 5. Batangas City, Batangas 6. Cainta, Rizal 7. Imus, Cavite 8. Lipa City, Batangas 9. Iloilo City 10. Bacolod City, Negros Occ. 11. Lapu-lapu City, Cebu 12. Talisay, Cebu 13. General Santos City 14. Butuan City 15. San Fernando, Pampanga 16. Mabalacat, Pampanga 17. San Jose del Monte, Bulacan 18. Meycauyan, Bulacan 19. Sta.Rosa, Laguna	1. Dagupan City, Pangasinan 2. San Fernando, La Union 3. Tuguegarao City, Cagayan 4. Tarlac City 5. Marilao, Bulacan 6. Malolos, Bulacan 7. Sta. Maria Bulacan 8. San Pedro, Laguna 9. San Pablo, Laguna 10. Calamba, Laguna 11. Cavite City, Cavite 12. Lucena City, Quezon 13. San Mateo, Rizal 14. Taytay, Rizal 15. Puerto Galera, Mindoro Or. 16. Legazpi City, Albay 17. Naga City, Camarines Sur 18. Malay, Aklan 19. Toledo, Cebu 20. Tagbilaran City, Bohol 21. Tacloban City 22. Iligan City 23. Tagum, Davao del Norte 24. Panabo, Davao del Norte 25. Cotabato City

Table 20 defines the geographic focus of the HSP 2015-2017.

As discussed in Chapter I, the AEM developed six sub-national models:

1. Greater Metro Manila (GMM)
2. Cebu Province
3. Davao City
4. Category B cities
5. Pampanga Province
6. Rest of the Country

In a dialogue with NASPCP, the priority sites or geographic focus for intervention of HSP in Table 19 were validated and matched with AEM sub-national models to determine the appropriate programmatic and policy response. The agreements as to which model to adapt are the following:

1. GMM, Cebu Province, Pampanga Cities, and Davao City models were adapted in HSP Category A.
2. Category B model was adapted in HSP Category B.
3. ROTC model was adapted in HSP Category C.

D. Key populations

The target key populations (KP) of HSP are the following:

1. MSM
2. FFSW
3. RFSW
4. PWID

The HSP will also target the TG women population, male clients of FSW, and the young people in general. However, strategic information for these populations needs to be strengthened to increase the understanding of their risks and vulnerabilities.

The HSP identified 12 Priority Agenda for HIV 2015-2017 ²¹:

1. Revamp/formalize Peer Education Program (full-time, skills, tools, competencies)
2. Revise service package for KP and PLHIV
 - a. Reproductive Health (RH), frequency of HIV Counseling and Testing (HCT), Sexually Transmitted Infections (STI) screening program, vaccinations, management of co-infections
3. Expand availability and coverage of HIV Counseling and/or Testing (HCT) services:
 - a. Network of non-profit clinics
 - b. Community-led, SHC-linked HIV testing
 - c. Hospital-based
 - d. Antenatal clinics
 - e. Deaf-mute-blind and prisons
4. Decentralize HIV Care and Management (more satellite treatment hubs-primary care services)
5. Shorten HIV Diagnostic Algorithm
6. Expand ARV eligibility (eg. Treat all for TB, pregnant women, and those with regular partners)
7. Information systems: Drug Resistance, Universal ID Code (UIC) to track access to services, micro-mapping
8. Localize grant management to leverage community action
9. Support Capital Outlay – CD4 and vehicle for efficient referrals
10. Innovate communication strategies and activities for the young people
11. National Condom Strategy
12. Address barriers to Harm Reduction

The intervention package described in Table 14 will be applied by the HSP 2015-2017 with adjusted unit costs. In addition, the target coverage for each MARPs in each category is shown in Table 21.

E. Targets of Health Sector Plan 2015-2017

The HSP 2015-2017 will adapt the AEM recommended scenario of Prevention 80% (MSM & IDU), ART 90% @ CD4 350. Upon various meetings with partners and stakeholders, there were suggestions that certain adjustments need to be made to lower the resource needs while maintaining the high impact that the scenario would yield.

Geographic focus

Based on AEM, Table 22 further illustrates the geographic focus of the HSP categorized in Table 20. It shows that the bulk of the new infections will come from Categories A and B. While the combined population of Category C and ROTC is high (72%), the majority (74%) of the infections will come from Categories A and B.

Table 21 : Distribution of estimated key populations and new PLHIV, 2014

2014 Data	Philippines	Category A and B	Category C and ROTC
Total population size	65,824,674	18,427,342 (28%)	47,415,332 (72%)
Total key population size	778,647	365,854 (47%)	412,818 (53%)
Total new infections	6,852	5,057 (74%)	1,795 (26%)

MARPs prioritization

Based on the baseline scenario, majority of new infections will come from MSM and IDU. But prioritizing and scaling up prevention coverage among MSM and IDU will produce high impact results in terms of reducing new HIV infections. Prevention coverage among FSWs must be scaled up to 60 percent.

The HSP sets targets for 2017 but these were adjusted and prioritized based on the available resources. Table 22 shows the summary of geographic focus or priority sites by category, priority MARP, and target coverage for each MARP and site.

Table 22. HIV intervention target coverage by category and by MARP by 2017

Site category	MARPs	Target
Category A	MSM	80%
	IDU	80%
	FFSW	60%
	RFSW	60%
	PLHIV on ART	90%
Category B	MSM	60%
	IDU	40%
	FFSW	60%
	RFSW	60%
	PLHIV on ART	90%
Category C	MSM	40%
	IDU	40%
	FFSW	40%
	RFSW	40%
	PLHIV on ART	90%

The set of intervention package defined in Table 14 will be adapted in achieving the targets set in the above table. The treatment package will cover 90 percent of all PLHIV with CD4 count of 350 cells/mm³ and below.

The target coverage among MARPs in percentage and numbers are presented in Table 23 . These were the results of the generated HSP scenario. In order to avert the projected number of HIV infections if the HSP scenario is implemented, these targets need to be met annually.

For Category A, the target percentages were approximated by averaging the target percentages of GMM, Cebu City, Pampanga, and Davao City.

Table 23: Annual target coverage by category, 2015-2017

	Category A			Category B			Category C		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
FFSW	41%	50%	60%	39%	49%	60%	26%	33%	40%
	4,346	5,500	6,691	643	833	1,030	3,291	4,163	5,064
RFSW	50%	55%	60%	56%	58%	60%	28%	34%	40%
	15,711	18,265	20,900	1,502	1,591	1,681	7,691	8,892	10,131
IDU	55%	68%	80%	24%	32%	40%			
	2,313	2,878	3,458	391	525	664			
MSM	52%	66%	80%	39%	50%	60%	25%	32%	40%
	144,042	187,980	233,373	13,447	17,328	21,341	113,420	148,662	185,083
ART	90%	90%	90%	90%	90%	90%	90%	90%	90%
	5,859	8,486	9,912	393	625	757	3136	4548	5350

Table 24 show the target number of MARPs and PLHIVs that should be reached by prevention and treatment interventions from 2015 to 2017.

Table 24. Annual target number of MARPs and PLHIVs in the Philippines, 2015-2017

Population	2015	2016	2017
FFSW	8,279	10,496	12,786
RFSW	24,904	28,748	32,712
IDU	2,704	3,403	4,122
MSM	270,909	353,970	439,797
ART	9,389	13,659	16,019

F. Unit costs

There are two unit costs used in this report - unadjusted and adjusted.

Unadjusted unit cost is the unit cost per MARP applied by the AEM Case Study, while adjusted unit cost is the unit per MARP applied by the Health Sector Plan 2015-2017 and in preparation for a proposal for the New Funding Model.

The package of interventions are the same and adjustments in the HSP 2015-2017 were made to lower the costs based on the following assumptions and parameters:

1. Adjusted number of sex acts per MARP
2. Provider time cost will be shouldered by the government
3. Non-provision of contraceptive pills for FSWs
4. The cost of TB treatment for PLHIVs will be shouldered by the AIDS Program
5. Vaccines for flu, pneumonia, HPV, Hepatitis A and B, are included in the treatment package of HSP
6. Non-basic program for the unadjusted cost was set at 12 percent and 20 percent for the adjusted cost to cover capacity building, program management, monitoring and evaluation, research, mass media, policy and law environment and advocacy activities.

Unit costs used in AEM resulted to a high resource needs model where 50 percent of the allotted cost goes to condoms and lubricants. Given the trend in Philippine AIDS spending and the limited resources, the AEM Team, in consultation with NASPCP, validated the unit costs and identified strategies on how to adjust the costs. Following are the assumptions to come up with adjusted unit costs to be applied to the HSP:

1. The unit costs were re-computed based on the number of sex acts for the three MARPs – MSM, FFSW, and RFSW

Table 25. Computation of Sex Acts – MSM, FFSW, & RFSW (Source: 2011 IHBSS Fact Sheet)

MSM	
2	One time partner in a month
2	More than one partner in a month
4	Number of sex acts per partner
Computation: $(2 + 2) \times 4 = 16$	
16	Sex acts in a month or 4 in a week
FFSW	
1	Permanent partner
6	Sex acts in a month
8	Non-returning clients
1	Sex act in a month
3	Returning clients
4	Sex acts in a month
Computation: $(1 \times 6) + (8 \times 1) + (3 \times 4) = 36$	
36	Sex acts in a month or 9 sex in a week
RFSW	
1	Permanent partner
7	Sex acts in a month
7	Paying partner in a month
3	Sex acts per partner
Computation: $(1 \times 7) + (7 \times 3) = 28$	
28	Sex acts in a month

2. Provider time and infrastructure costs are embedded in the health system
The unit costs were adjusted by removing the provider time because human resources and capacity building are embedded in the annual health plan and in place.
3. Removal of contraceptive pill for FSWs
Provision of contraceptive pills was removed because it should already be integrated under the Family Health program of the DOH.
4. TB drugs
The government will allot funds for the procurement of TB drugs for the 30 percent of PLHIVs who are in need of TB treatment
5. Non-basic program
An additional 12 percent was added to cover non-basic program services.

Table 26 summarizes the adjusted unit costs:

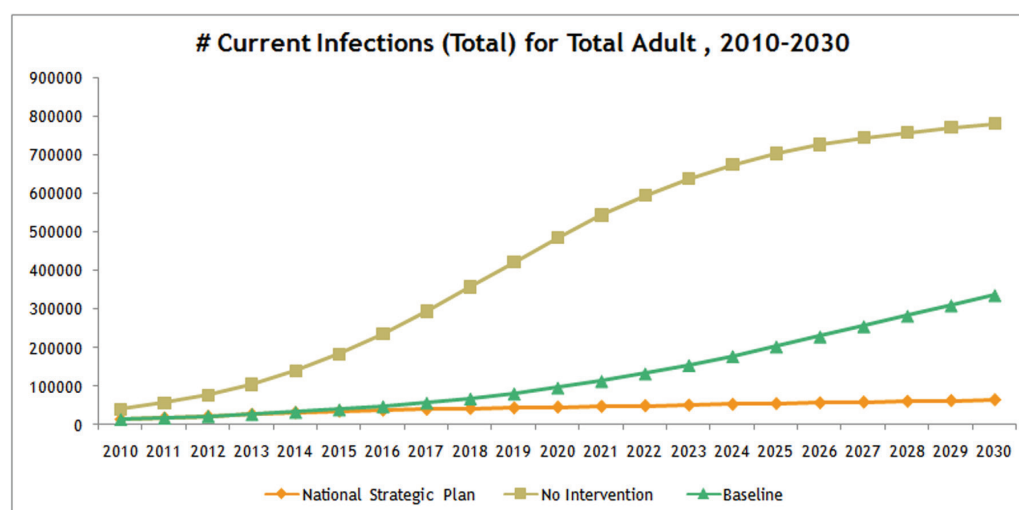
Table 26. Summary of HSP Adjusted Unit Costs

UNIT COST per year	in USD	in PHP (45)
RFSW	174	7,823
FFSW	110	4,939
MSM	84	3,802
PWID	193	8,693
ART	811	36,499

G. Impact Analysis of Health Sector Plan 2015-2017

Figure 20 shows that the implementation of the HSP 2015-2017, which scales up targets and coverage, will result to a decrease in the number of current infections among adults from 2010 to 2022. However, if we continue the current intervention program where targets and coverage are very low, the total number of current infections will continuously rise by 2030.

Figure 20 : Total number of current infections for total adults, 2010-2030



Scaling up interventions will reduce the total number of new infections among adults from 2010 to 2030 .
(Figure 21).

Figure 21 : Total number of new infections for total adults, 2010-2030

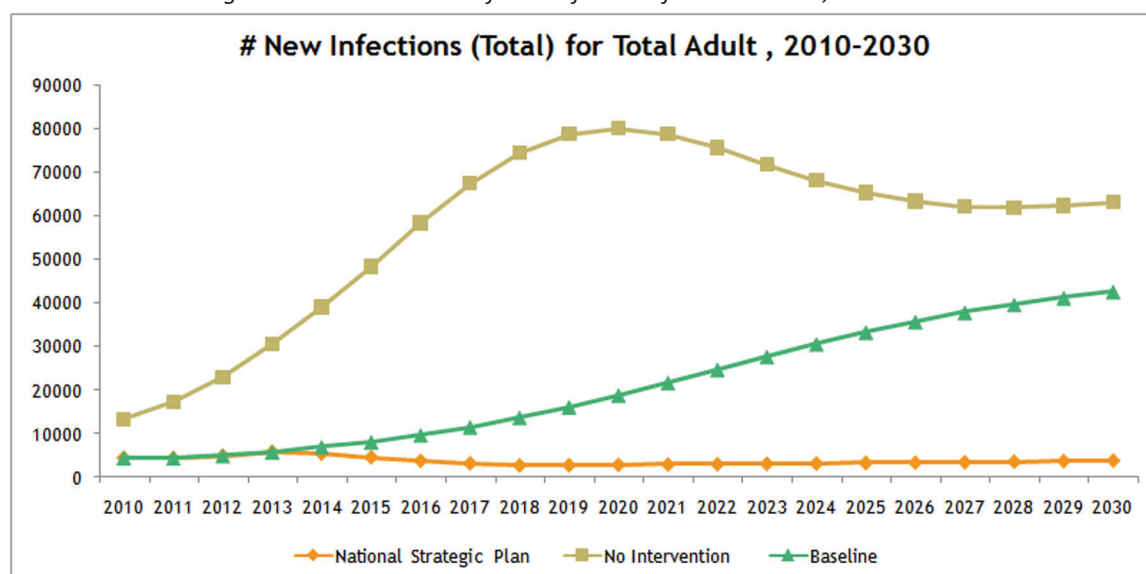


Table 27: Total number of HIV infections averted and resource needs in thousands- 2013, 2022, 2030

Scenario	2013		2022		2030	
	Infections Averted	Resource Needs (USD)	Infections Averted	Resource Needs (USD)	Infections Averted	Resource Needs (USD)
Health Sector Plan 2015-2017	22	14,550	21,688	64,523	38,832	79,968
No Intervention	-24,905	12,363	-50,960	88,946	-20,515	150,609

Table 27 above shows the infections averted and corresponding resource needs for the HSP 2015 to 2017 and the No Interventions scenario. The No Intervention Scenario showed what could have happened if no interventions were applied since 1995. The negative infections averted means there would be 24,905 more infections in 2013 than what we have at status quo if there were no interventions since 1995. It showed that infections would have continued to increase to around 40,000 infections by 2014. Therefore, the current & past interventions of the program already had significant effects.

The Health Sector Plan scenario showed that there will be a total of 17,718 infections averted from 2015 to 2017 if this scenario will be implemented. It will amount to resource needs of USD 32 million in 2015, USD 43 million in 2016, and USD 53 million in 2017.

Furthermore, it shows the longer-term effects if the HSP Scenario is implemented. Despite the adjustments made in terms of target setting, the impact of the HSP scenario remained significant.

H. DOH action

The AEM was used to guide the development of the Health Sector Plan (HSP) 2015-2017. Data generated by the AEM were used to inform the plan and to evaluate the impact of the national response. The Prevention 80% (MSM & IDU), ART 90% @ CD4 350 was adapted by the country, as recommended by the AIDS Epidemic Model. This scenario would require resources of around \$40 million in 2015, USD 53 million in 2016, and USD 66 million in 2017. During various dialogues with stakeholders and partners, it was suggested that geographic prioritization should be applied considering the limitations of the country in terms of resources. Thus, the AEM team in coordination with NASPCP and partners, used the AEM tool to apply geographic prioritization and further trim down resource needs while still reversing the trend of the epidemic.

Baseline results of the AEM showed that majority of new HIV infections would come from Greater Metro Manila, Cebu Province, Pampanga Cities, and Davao City combined. Thus, highest prioritization was given to these models (Category A). They will fully implement the recommended targets of AEM. Category B was given the next level of prioritization due to its significant share of HIV infections, with scaled down targets while Category C and the rest of the country (ROTC) will be included in the HSP but would be given the least priority in terms of HIV interventions.

The AEM team developed a policy scenario adopting these targets. Results showed that a significant number of HIV infections will be averted – a total of 17,718 infections will be averted within the HSP period of 2015 to 2017 with corresponding resource needs of USD 32 million in 2015, USD 43 million in 2016, and USD 53 million in 2017.

Section 4

Lessons learned & recommendations

The learnings discussed in this section pertain to the challenges encountered by the team in applying the AEM tools to generate scenarios and models.

The recommendations made by the team focus on two areas:

1. further improvement of the AEM
2. programmatic concerns

A. Advantages and disadvantages of the AEM process

Advantages

1. By using AEM, the team have gained an in-depth understanding of the national HIV epidemic through its unique features such as scenario building, impact analysis, intervention, worksheets, etc. These data can be used for strategic and investment planning purposes by the government and other organizations. Moreover, it will allow stakeholders to assess, prioritize, and allocate resources based on the different generated scenarios.
2. AEM includes specific and considerable number of indicators per sub-population allowing the country to have a more realistic projection and model.
3. Since AEM is a process model, it allows the country to consider behavioral and biologic data that are changing over a period of time secondary to prevention and treatment interventions. This will help the country analyze the epidemiological impact of the said prevention and treatment efforts.
4. Compared to other projection and modeling software, AEM assumes that Asian countries follows a certain trend of epidemic; thus, this model can give us a more evidence-based, more specific, and clearer picture of HIV and AIDS epidemic in Asian countries, like the Philippines.
5. AEM interface is more user-friendly than other software by allowing the user to adjust accordingly the start years of each epidemic, transmission probabilities and cofactors, and immediately seeing all the changes in one window.
6. The AEM has served as an excellent jump off point to broaden the discussion on the country's HIV and AIDS response. It allowed the country to assess and evaluate critical issues in the response, assist in planning future activities for maximum impact, and contribute to a greater resource mobilization. The AEM also served as a tool to examine gaps and weaknesses in the national data collection system and how to address them.

Disadvantages

1. Some indicators in AEM are not collected by the Philippines and this creates data gaps. The application of assumptions in this case, depending on the level of expertise, may or may not reflect a “real” epidemic.
2. Technical problems caused some delays in the process.
3. AEM software does not work effectively and efficiently when the data in the baseline do not follow a smooth trend. This could lead to manipulation of data to some extent which could alter the actual data gathered.
4. A final standardized and clear guideline regarding data inputs, interpolation, and extrapolation would be useful. The absence of it in the first part slowed down the process as the team took multiple approaches in the process.

B. Recommendations

AEM

Improving the AEM tools and process. A more detailed manual or help file for AEM may be useful for country teams; this can include examples, tips for adjusting data inputs, linking different input sections or worksheets, frequently asked questions, and tips in adjusting data. A thorough discussion on proxy data, substitution of data, and assumptions would be helpful.

AEM as an advocacy tool. The capacity of the AEM to give projections of outcomes, scenarios, and costs makes it a potentially powerful tool for advocacy to policymakers and other stakeholders. While the development and use for advocacy of the AEM is a relatively new undertaking in the Philippines, the team anticipates its usefulness in gaining political commitment and increasing the participation of stakeholders in a decisive and comprehensive response to the Philippine HIV and AIDS epidemic.

Program concerns

Filling the gaps and improving the quality of data systems in-country. The following are key areas for improvement in terms of data availability and quality:

- **MARP population sizes:** More studies must be conducted and possibly other methods of estimation be explored to arrive at more accurate estimates of MARP population sizes, especially for MSM and IDU.
- **Studies on the effectiveness of interventions:** The current dearth of effectiveness studies must be corrected, as these are of paramount importance in guiding the selection, improvement, and scaling up of interventions at the national and local levels.
- **Cost:** a better understanding of the sources and mechanisms producing variations in the cost of interventions can guide strategies for more cost-effective interventions and implementation.
- **Coordination:** Strengthening of collaboration and coordination among different agencies and institutions holding relevant data to the AEM, such as national or special surveys, will provide a more comprehensive array of information that may fill in data gaps.

Increasing the impact of future national/provincial responses. The country response must focus on populations that are driving the epidemic, as evidenced by current data systems and the AEM projections:

- **MSM Interventions:** The response should give greater focus on interventions that effectively increase condom use among MSM, in addition to strategies for increasing testing. There should be strategies to bridge the gap from testing to knowing the results and assessment for ART eligibility, and consequently increase the rate of enrollment to ART.
- **IDU Interventions:** Similarly, interventions to increase condom use and ART enrollment are important. In addition, needle and syringe programs should be strongly considered, and legal and political impediments to such programs need to be addressed.

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Annex

ANNEX A: List of AEM Indicators by MARP

Heterosexual	
1.	Percent of females aged 15-49 who sell sex
2.	Percent of female sex workers in group 1
3.	Movement from group 1 to group 2 each year
4.	Number of clients per day - female sex worker group 1
5.	Days worked per week - female sex workers group 1
6.	Percent condom use with clients - FSW group 1
7.	Average duration selling sex in group 1 (years)
8.	STI prevalence among female sex worker group 1
9.	Number of clients per day - female sex worker group 2
10.	Days worked per week - female sex workers group 2
11.	Percent condom use with clients - FSW group 2
12.	Average duration selling sex in group 2 (years)
13.	STI prevalence among female sex worker group 2
14.	Percent of males aged 15-49 who visited FSW in the last year
15.	Average duration buying sex (years)
16.	Percent of adult males who are circumcised
17.	Percent of males engaging in casual sex in the last year
18.	Percent of females engaging in casual sex in the last year
19.	Percent condom use in casual sex
20.	Average number of sex contacts in the last year (male)
21.	Number of sexual contacts with spouse or RP (per week)
22.	Percent condom use with spouses or regular partners
23.	STI prevalence in adult population

Injecting Drug Users	
1.	Percent of males age 15-49 who inject drugs
2.	Percent of male IDUs in high-risk networks
3.	IDU mortality (crude mortality per year in %)
4.	Percent of male IDUs who share needles
5.	Percent of all injections shared (among those who share)
6.	Number of injections per day
7.	Average duration of injecting behavior (in years)
8.	Sharing to non-sharing movement per year
9.	Percent of male IDUs visiting female sex workers
10.	Percent condom use with female sex worker group 1
11.	Percent condom use with female sex worker group 2
12.	Percent condom use with spouse or regular partner
13.	Number of contacts with regular partners (per week)
14.	Percent of females age 15-49 who inject drugs
15.	Percent of female IDUs in high-risk networks
16.	Percent of female IDUs who share needles
17.	Percent of all injections shared (among those who share)
18.	Number of injections per day
19.	Average duration of injection (in years)
20.	Sharing to non-sharing movement per year
21.	Percent whose regular partners also inject drugs
22.	Percent condom use with spouse or regular partner
23.	Number of contacts with regular partners (per week)
24.	Percent of female sex workers in group 1 who inject drugs
25.	Percent of injecting FSW in group 1 in high-risk networks
26.	Percent of injecting FSW in group 1 who share injections
27.	Percent of all injections shared (among those who share)
28.	Number of injections per day for injecting FSW in group 1
29.	Average duration of injecting for FSW in group 1
30.	Percent condom use with clients - Injecting FSW in group 1
31.	Percent of female sex workers in group 2 who inject drugs
32.	Percent of injecting FSW in group 2 in high-risk networks
33.	Percent of injecting FSW in group 2 who share injections
34.	Percent of all injections shared (among those who share)
35.	Number of injections per day for injecting FSW in group 2
36.	Average duration of injecting for FSW in group 2
37.	Percent condom use with clients - Injecting FSW in group 2

Males having Sex with Males	
1.	Percent of males aged 15-49 engaging in same-sex behavior
2.	Percent of MSM in risk group 1
3.	Shift from MSM group 1 to group 2
4.	Percent engaging in anal sex in the last year - MSM1
5.	Number of anal sex contacts last week (among those having anal sex) - MSM1
6.	Average duration of same-sex behavior (years) - MSM1
7.	Percent of MSM1 with female partners
8.	Percent condom use in anal sex with MSM1
9.	STI prevalence among MSM1
10.	Percent engaging in anal sex in the last year - MSM2
11.	Number of anal sex contacts last week (among those having anal sex) - MSM2
12.	Average duration of same-sex behavior (years) - MSM2
13.	Percent of MSM2 with female partners
14.	Percent condom use in anal sex with MSM2
15.	STI prevalence among MSM2
16.	Percent of MSM1 visiting male sex workers
17.	Percent of MSM2 visiting male sex workers
18.	Ratio of frequency of visiting MSW (group 2 / group 1)
19.	Percent of MSM1 visiting female sex workers
20.	Percent of MSM2 visiting female sex workers
21.	Percent condom use in anal sex with male sex workers
22.	Percent condom use with Female sex worker group 1 (FSW1)
23.	Percent condom use with female sex worker group 2 (FSW2)
24.	Percent of males aged 15-49 who sell sex
25.	Average duration selling sex (in years)
26.	Shift from MSM1 to MSW
27.	Shift from MSM2 to MSW
28.	Percent of MSW reporting anal sex with clients in the last year
29.	Number of anal sex contacts last week (for MSW with anal sex)
30.	STI prevalence among male sex workers
31.	Percent MSW visiting female sex workers in the last year
32.	Percent MSW with female regular partners in the last year

ANNEX B: Key Inputs - Population by sub-national models

Year	Greater Metro Manila - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	1,542,100	1,230,893	51,094	459,843	91	83	0.7982
1976	1,643,406	1,311,755	54,450	490,052	91	83	0.7982
1977	1,744,712	1,392,616	57,807	520,260	91	83	0.7982
1978	1,846,018	1,473,478	61,163	550,469	91	83	0.7982
1979	1,947,324	1,554,340	64,520	580,678	91	83	0.7982
1980	2,048,630	1,635,202	67,876	610,887	91	83	0.7982
1981	2,149,936	1,716,063	71,233	641,095	91	83	0.7982
1982	2,251,242	1,796,925	74,589	671,304	91	83	0.7982
1983	2,352,548	1,877,787	77,946	701,513	91	83	0.7982
1984	2,453,854	1,958,649	81,302	731,722	91	83	0.7982
1985	2,555,160	2,039,510	84,659	761,930	91	83	0.7982
1986	2,656,466	2,120,372	88,015	792,139	91	83	0.7982
1987	2,757,772	2,201,234	91,372	822,348	91	83	0.7982
1988	2,859,078	2,282,096	94,729	852,557	91	83	0.7982
1989	2,960,385	2,362,958	98,085	882,765	91	83	0.7982
1990	3,064,283	2,445,888	101,527	913,747	91	83	0.7982
1991	3,165,044	2,526,316	104,866	943,793	91	83	0.7982
1992	3,265,806	2,606,743	108,204	973,840	91	83	0.7982
1993	3,366,568	2,687,170	111,543	1,003,886	91	83	0.7982
1994	3,467,330	2,767,597	114,881	1,033,933	91	83	0.7982
1995	3,568,091	2,848,025	118,220	1,063,979	91	83	0.7982
1996	3,668,853	2,928,452	121,558	1,094,025	91	83	0.7982
1997	3,769,615	3,008,879	124,897	1,124,072	91	83	0.7982
1998	3,870,377	3,089,307	128,235	1,154,118	91	83	0.7982
1999	3,971,138	3,169,734	131,574	1,184,165	91	83	0.7982
2000	4,071,900	3,250,161	134,912	1,214,211	91	83	0.7982
2001	4,173,750	3,331,457	138,287	1,244,582	91	83	0.7982
2002	4,275,601	3,412,754	141,661	1,274,953	91	83	0.7982
2003	4,377,451	3,494,050	145,036	1,305,324	91	83	0.7982
2004	4,479,302	3,575,346	148,411	1,335,695	91	83	0.7982
2005	4,581,152	3,656,642	151,785	1,366,066	91	83	0.7982
2006	4,683,002	3,737,939	155,160	1,396,437	91	83	0.7982
2007	4,784,853	3,819,235	158,534	1,426,809	91	83	0.7982
2008	4,886,703	3,900,531	161,909	1,457,180	91	83	0.7982
2009	4,988,554	3,981,827	165,283	1,487,551	90	82	0.7982
2010	5,090,404	4,063,124	168,658	1,517,922	90	82	0.7982
2011	5,189,118	4,141,916	171,929	1,547,357	89	81	0.7982
2012	5,290,424	4,222,778	175,285	1,577,566	88	81	0.7982
2013	5,391,730	4,303,640	178,642	1,607,775	88	81	0.7982

Year	Greater Metro Manila - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2014	5,493,036	4,384,502	181,998	1,637,984	88	81	0.7982
2015	5,594,342	4,465,364	185,355	1,668,192	88	81	0.7982
2016	5,695,648	4,546,225	188,711	1,698,401	88	82	0.7982
2017	5,796,954	4,627,087	192,068	1,728,610	88	82	0.7982
2018	5,898,260	4,707,949	195,424	1,758,819	88	82	0.7982
2019	5,999,566	4,788,811	198,781	1,789,027	88	82	0.7982
2020	6,100,873	4,869,672	202,137	1,819,236	88	82	0.7982
2021	6,202,179	4,950,534	205,494	1,849,445	88	81	0.7982
2022	6,303,485	5,031,396	208,850	1,879,654	88	81	0.7982
2023	6,404,791	5,112,258	212,207	1,909,862	88	81	0.7982
2024	6,506,097	5,193,119	215,563	1,940,071	88	81	0.7982
2025	6,607,403	5,273,981	218,920	1,970,280	88	81	0.7982
2026	6,708,709	5,354,843	222,277	2,000,489	88	81	0.7982
2027	6,810,015	5,435,705	225,633	2,030,697	88	81	0.7982
2028	6,911,321	5,516,567	228,990	2,060,906	88	81	0.7982
2029	7,012,627	5,597,428	232,346	2,091,115	88	81	0.7982
2030	7,113,933	5,678,290	235,703	2,121,323	87	81	0.7982
2031	7,215,239	5,759,152	239,059	2,151,532	88	81	0.7982
2032	7,316,545	5,840,014	242,416	2,181,741	88	81	0.7982
2033	7,417,851	5,920,875	245,772	2,211,950	88	81	0.7982
2034	7,519,157	6,001,737	249,129	2,242,158	88	80	0.7982
2035	7,620,464	6,082,599	252,485	2,272,367	88	80	0.7982
2036	7,721,770	6,163,461	255,842	2,302,576	88	80	0.7982
2037	7,823,076	6,244,322	259,198	2,332,785	87	80	0.7982
2038	7,924,382	6,325,184	262,555	2,362,993	87	80	0.7982
2039	8,025,688	6,406,046	265,911	2,393,202	87	80	0.7982
2040	8,126,994	6,486,908	269,268	2,423,411	87	80	0.7982
2041	8,228,300	6,567,770	272,624	2,453,620	87	80	0.7982
2042	8,329,606	6,648,631	275,981	2,483,828	87	80	0.7982
2043	8,430,912	6,729,493	279,337	2,514,037	87	80	0.7982
2044	8,532,218	6,810,355	282,694	2,544,246	87	80	0.7982
2045	8,633,524	6,891,217	286,050	2,574,454	87	79	0.7982
2046	8,734,830	6,972,078	289,407	2,604,663	87	80	0.7982
2047	8,836,136	7,052,940	292,764	2,634,872	87	80	0.7982
2048	8,937,442	7,133,802	296,120	2,665,081	87	80	0.7982
2049	9,038,748	7,214,664	299,477	2,695,289	87	80	0.7982
2050	9,140,054	7,295,525	302,833	2,725,498	87	80	0.7982

Year	Greater Metro Manila - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	1,551,389	1,203,023	51,094	450,553	89	83	0.7754
1976	1,653,306	1,282,054	54,450	480,152	89	83	0.7754
1977	1,755,222	1,361,085	57,807	509,750	89	83	0.7754
1978	1,857,138	1,440,116	61,163	539,349	89	83	0.7754
1979	1,959,055	1,519,147	64,520	568,947	89	83	0.7754
1980	2,060,971	1,598,178	67,876	598,545	89	83	0.7754
1981	2,162,887	1,677,209	71,233	628,144	89	83	0.7754
1982	2,264,804	1,756,240	74,589	657,742	89	83	0.7754
1983	2,366,720	1,835,271	77,946	687,341	89	83	0.7754
1984	2,468,636	1,914,302	81,302	716,939	89	83	0.7754
1985	2,570,553	1,993,333	84,659	746,538	89	83	0.7754
1986	2,672,469	2,072,364	88,015	776,136	89	83	0.7754
1987	2,774,385	2,151,395	91,372	805,735	89	83	0.7754
1988	2,876,302	2,230,426	94,729	835,333	89	83	0.7754
1989	2,978,218	2,309,457	98,085	864,932	89	83	0.7754
1990	3,082,742	2,390,510	101,527	895,287	89	83	0.7754
1991	3,184,111	2,469,116	104,866	924,727	89	83	0.7754
1992	3,285,480	2,547,722	108,204	954,166	89	83	0.7754
1993	3,386,848	2,626,329	111,543	983,606	89	83	0.7754
1994	3,488,217	2,704,935	114,881	1,013,045	89	83	0.7754
1995	3,589,586	2,783,541	118,220	1,042,485	89	83	0.7754
1996	3,690,955	2,862,147	121,558	1,071,924	89	83	0.7754
1997	3,792,323	2,940,754	124,897	1,101,363	89	83	0.7754
1998	3,893,692	3,019,360	128,235	1,130,803	89	83	0.7754
1999	3,995,061	3,097,966	131,574	1,160,242	89	83	0.7754
2000	4,096,430	3,176,573	134,912	1,189,682	89	83	0.7754
2001	4,198,893	3,256,028	138,287	1,219,439	89	83	0.7754
2002	4,301,357	3,335,484	141,661	1,249,197	89	83	0.7754
2003	4,403,821	3,414,939	145,036	1,278,954	89	83	0.7754
2004	4,506,285	3,494,395	148,411	1,308,712	89	83	0.7754
2005	4,608,749	3,573,850	151,785	1,338,469	89	83	0.7754
2006	4,711,213	3,653,306	155,160	1,368,227	89	83	0.7754
2007	4,813,677	3,732,762	158,534	1,397,984	89	83	0.7754
2008	4,916,141	3,812,217	161,909	1,427,742	89	83	0.7754
2009	5,018,605	3,891,673	165,283	1,457,499	89	82	0.7754
2010	5,121,069	3,971,128	168,658	1,487,257	88	82	0.7754
2011	5,220,378	4,048,137	171,929	1,516,098	89	82	0.7754
2012	5,322,294	4,127,168	175,285	1,545,696	88	82	0.7754
2013	5,424,210	4,206,199	178,642	1,575,295	88	82	0.7754
2014	5,526,127	4,285,230	181,998	1,604,893	88	81	0.7754

Year	Greater Metro Manila - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2015	5,628,043	4,364,261	185,355	1,634,492	89	82	0.7754
2016	5,729,959	4,443,292	188,711	1,664,090	88	81	0.7754
2017	5,831,876	4,522,323	192,068	1,693,688	88	81	0.7754
2018	5,933,792	4,601,354	195,424	1,723,287	88	81	0.7754
2019	6,035,708	4,680,385	198,781	1,752,885	88	81	0.7754
2020	6,137,625	4,759,416	202,137	1,782,484	89	81	0.7754
2021	6,239,541	4,838,447	205,494	1,812,082	88	81	0.7754
2022	6,341,457	4,917,478	208,850	1,841,681	88	81	0.7754
2023	6,443,374	4,996,508	212,207	1,871,279	88	81	0.7754
2024	6,545,290	5,075,539	215,563	1,900,878	88	81	0.7754
2025	6,647,207	5,154,570	218,920	1,930,476	88	80	0.7754
2026	6,749,123	5,233,601	222,277	1,960,075	88	80	0.7754
2027	6,851,039	5,312,632	225,633	1,989,673	88	80	0.7754
2028	6,952,956	5,391,663	228,990	2,019,272	88	80	0.7754
2029	7,054,872	5,470,694	232,346	2,048,870	87	80	0.7754
2030	7,156,788	5,549,725	235,703	2,078,468	87	80	0.7754
2031	7,258,705	5,628,756	239,059	2,108,067	88	80	0.7754
2032	7,360,621	5,707,787	242,416	2,137,665	88	80	0.7754
2033	7,462,537	5,786,818	245,772	2,167,264	88	80	0.7754
2034	7,564,454	5,865,849	249,129	2,196,862	87	80	0.7754
2035	7,666,370	5,944,880	252,485	2,226,461	88	80	0.7754
2036	7,768,286	6,023,911	255,842	2,256,059	87	80	0.7754
2037	7,870,203	6,102,942	259,198	2,285,658	87	80	0.7754
2038	7,972,119	6,181,972	262,555	2,315,256	87	80	0.7754
2039	8,074,035	6,261,003	265,911	2,344,855	87	80	0.7754
2040	8,175,952	6,340,034	269,268	2,374,453	87	79	0.7754
2041	8,277,868	6,419,065	272,624	2,404,051	87	79	0.7754
2042	8,379,784	6,498,096	275,981	2,433,650	87	79	0.7754
2043	8,481,701	6,577,127	279,337	2,463,248	87	79	0.7754
2044	8,583,617	6,656,158	282,694	2,492,847	87	79	0.7754
2045	8,685,533	6,735,189	286,050	2,522,445	87	79	0.7754
2046	8,787,450	6,814,220	289,407	2,552,044	87	79	0.7754
2047	8,889,366	6,893,251	292,764	2,581,642	87	79	0.7754
2048	8,991,282	6,972,282	296,120	2,611,241	87	79	0.7754
2049	9,093,199	7,051,313	299,477	2,640,839	87	80	0.7754
2050	9,195,115	7,130,344	302,833	2,670,438	88	80	0.7754

Year	Cebu Province - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	491,935	392,659	16,299	146,692	91	83	0.7982
1976	517,181	412,810	17,136	154,220	91	83	0.7982
1977	542,426	432,961	17,972	161,748	91	83	0.7982
1978	567,671	453,111	18,808	169,275	91	83	0.7982
1979	592,917	473,262	19,645	176,803	91	83	0.7982
1980	618,162	493,412	20,481	184,331	91	83	0.7982
1981	643,407	513,563	21,318	191,859	91	83	0.7982
1982	668,653	533,714	22,154	199,387	91	83	0.7982
1983	693,898	553,864	22,991	206,915	91	83	0.7982
1984	719,143	574,015	23,827	214,443	91	83	0.7982
1985	744,389	594,166	24,663	221,971	91	83	0.7982
1986	769,634	614,316	25,500	229,499	91	83	0.7982
1987	794,879	634,467	26,336	237,027	91	83	0.7982
1988	820,125	654,618	27,173	244,555	91	83	0.7982
1989	845,370	674,768	28,009	252,083	91	83	0.7982
1990	878,644	701,327	29,112	262,005	91	83	0.7982
1991	902,203	720,132	29,892	269,030	91	83	0.7982
1992	925,762	738,937	30,673	276,056	91	83	0.7982
1993	949,322	757,742	31,453	283,081	91	83	0.7982
1994	972,881	776,547	32,234	290,106	91	83	0.7982
1995	996,441	795,352	33,015	297,131	91	83	0.7982
1996	1,020,000	814,157	33,795	304,157	91	83	0.7982
1997	1,043,559	832,962	34,576	311,182	91	83	0.7982
1998	1,067,119	851,766	35,356	318,207	91	83	0.7982
1999	1,090,678	870,571	36,137	325,232	91	83	0.7982
2000	1,114,237	889,376	36,918	332,258	91	83	0.7982
2001	1,141,169	910,873	37,810	340,288	91	83	0.7982
2002	1,168,100	932,369	38,702	348,319	91	83	0.7982
2003	1,195,031	953,865	39,594	356,350	91	83	0.7982
2004	1,221,963	975,362	40,487	364,380	91	83	0.7982
2005	1,248,894	996,858	41,379	372,411	91	83	0.7982
2006	1,275,825	1,018,354	42,271	380,442	91	83	0.7982
2007	1,302,756	1,039,851	43,164	388,473	91	83	0.7982
2008	1,329,688	1,061,347	44,056	396,503	91	83	0.7982
2009	1,356,619	1,082,843	44,948	404,534	90	82	0.7982
2010	1,383,550	1,104,340	45,841	412,565	90	82	0.7982
2011	1,400,767	1,118,082	46,411	417,699	89	81	0.7982
2012	1,426,013	1,138,233	47,247	425,227	88	81	0.7982
2013	1,451,258	1,158,384	48,084	432,755	88	81	0.7982
2014	1,476,503	1,178,534	48,920	440,283	88	81	0.7982
2015	1,501,749	1,198,685	49,757	447,811	88	81	0.7982

Year	Cebu Province - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2016	1,526,994	1,218,835	50,593	455,339	88	82	0.7982
2017	1,552,239	1,238,986	51,430	462,867	88	82	0.7982
2018	1,577,485	1,259,137	52,266	470,394	88	82	0.7982
2019	1,602,730	1,279,287	53,102	477,922	88	82	0.7982
2020	1,627,975	1,299,438	53,939	485,450	88	82	0.7982
2021	1,653,221	1,319,589	54,775	492,978	88	81	0.7982
2022	1,678,466	1,339,739	55,612	500,506	88	81	0.7982
2023	1,703,711	1,359,890	56,448	508,034	88	81	0.7982
2024	1,728,957	1,380,041	57,285	515,562	88	81	0.7982
2025	1,754,202	1,400,191	58,121	523,090	88	81	0.7982
2026	1,779,447	1,420,342	58,958	530,618	88	81	0.7982
2027	1,804,693	1,440,493	59,794	538,146	88	81	0.7982
2028	1,829,938	1,460,643	60,630	545,674	88	81	0.7982
2029	1,855,183	1,480,794	61,467	553,202	88	81	0.7982
2030	1,880,429	1,500,944	62,303	560,730	87	81	0.7982
2031	1,905,674	1,521,095	63,140	568,258	88	81	0.7982
2032	1,930,919	1,541,246	63,976	575,786	88	81	0.7982
2033	1,956,165	1,561,396	64,813	583,314	88	81	0.7982
2034	1,981,410	1,581,547	65,649	590,842	88	80	0.7982
2035	2,006,655	1,601,698	66,486	598,370	88	80	0.7982
2036	2,031,901	1,621,848	67,322	605,898	88	80	0.7982
2037	2,057,146	1,641,999	68,158	613,426	87	80	0.7982
2038	2,082,391	1,662,150	68,995	620,954	87	80	0.7982
2039	2,107,636	1,682,300	69,831	628,482	87	80	0.7982
2040	2,132,882	1,702,451	70,668	636,010	87	80	0.7982
2041	2,158,127	1,722,601	71,504	643,538	87	80	0.7982
2042	2,183,372	1,742,752	72,341	651,066	87	80	0.7982
2043	2,208,618	1,762,903	73,177	658,594	87	80	0.7982
2044	2,233,863	1,783,053	74,014	666,122	87	80	0.7982
2045	2,259,108	1,803,204	74,850	673,650	87	79	0.7982
2046	2,284,354	1,823,355	75,686	681,178	87	80	0.7982
2047	2,309,599	1,843,505	76,523	688,706	87	80	0.7982
2048	2,334,844	1,863,656	77,359	696,234	87	80	0.7982
2049	2,360,090	1,883,807	78,196	703,762	87	80	0.7982
2050	2,385,335	1,903,957	79,032	711,290	87	80	0.7982

Year	Cebu Province - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	494,899	383,769	16,299	143,728	89	83	0.7754
1976	520,296	403,463	17,136	151,104	89	83	0.7754
1977	545,694	423,158	17,972	158,480	89	83	0.7754
1978	571,091	442,852	18,808	165,856	89	83	0.7754
1979	596,488	462,546	19,645	173,232	89	83	0.7754
1980	621,886	482,241	20,481	180,608	89	83	0.7754
1981	647,283	501,935	21,318	187,983	89	83	0.7754
1982	672,681	521,630	22,154	195,359	89	83	0.7754
1983	698,078	541,324	22,991	202,735	89	83	0.7754
1984	723,476	561,018	23,827	210,111	89	83	0.7754
1985	748,873	580,713	24,663	217,487	89	83	0.7754
1986	774,270	600,407	25,500	224,863	89	83	0.7754
1987	799,668	620,102	26,336	232,239	89	83	0.7754
1988	825,065	639,796	27,173	239,615	89	83	0.7754
1989	850,463	659,490	28,009	246,991	89	83	0.7754
1990	883,937	685,448	29,112	256,712	89	83	0.7754
1991	907,638	703,827	29,892	263,595	89	83	0.7754
1992	931,339	722,206	30,673	270,479	89	83	0.7754
1993	955,041	740,585	31,453	277,362	89	83	0.7754
1994	978,742	758,965	32,234	284,245	89	83	0.7754
1995	1,002,443	777,344	33,015	291,129	89	83	0.7754
1996	1,026,145	795,723	33,795	298,012	89	83	0.7754
1997	1,049,846	814,102	34,576	304,895	89	83	0.7754
1998	1,073,547	832,481	35,356	311,779	89	83	0.7754
1999	1,097,248	850,860	36,137	318,662	89	83	0.7754
2000	1,120,950	869,239	36,918	325,545	89	83	0.7754
2001	1,148,043	890,249	37,810	333,414	89	83	0.7754
2002	1,175,137	911,259	38,702	341,282	89	83	0.7754
2003	1,202,230	932,268	39,594	349,151	89	83	0.7754
2004	1,229,324	953,278	40,487	357,019	89	83	0.7754
2005	1,256,417	974,288	41,379	364,888	89	83	0.7754
2006	1,283,511	995,297	42,271	372,756	89	83	0.7754
2007	1,310,604	1,016,307	43,164	380,625	89	83	0.7754
2008	1,337,698	1,037,317	44,056	388,493	89	83	0.7754
2009	1,364,791	1,058,326	44,948	396,362	89	82	0.7754
2010	1,391,885	1,079,336	45,841	404,230	88	82	0.7754
2011	1,409,206	1,092,767	46,411	409,260	89	82	0.7754
2012	1,434,603	1,112,462	47,247	416,636	88	82	0.7754
2013	1,460,000	1,132,156	48,084	424,012	88	82	0.7754
2014	1,485,398	1,151,850	48,920	431,388	88	81	0.7754
2015	1,510,795	1,171,545	49,757	438,764	89	82	0.7754

Year	Cebu Province - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2016	1,536,193	1,191,239	50,593	446,140	88	81	0.7754
2017	1,561,590	1,210,934	51,430	453,516	88	81	0.7754
2018	1,586,987	1,230,628	52,266	460,892	88	81	0.7754
2019	1,612,385	1,250,322	53,102	468,267	88	81	0.7754
2020	1,637,782	1,270,017	53,939	475,643	89	81	0.7754
2021	1,663,180	1,289,711	54,775	483,019	88	81	0.7754
2022	1,688,577	1,309,406	55,612	490,395	88	81	0.7754
2023	1,713,975	1,329,100	56,448	497,771	88	81	0.7754
2024	1,739,372	1,348,794	57,285	505,147	88	81	0.7754
2025	1,764,769	1,368,489	58,121	512,523	88	80	0.7754
2026	1,790,167	1,388,183	58,958	519,899	88	80	0.7754
2027	1,815,564	1,407,878	59,794	527,275	88	80	0.7754
2028	1,840,962	1,427,572	60,630	534,651	88	80	0.7754
2029	1,866,359	1,447,266	61,467	542,026	87	80	0.7754
2030	1,891,756	1,466,961	62,303	549,402	87	80	0.7754
2031	1,917,154	1,486,655	63,140	556,778	88	80	0.7754
2032	1,942,551	1,506,350	63,976	564,154	88	80	0.7754
2033	1,967,949	1,526,044	64,813	571,530	88	80	0.7754
2034	1,993,346	1,545,738	65,649	578,906	87	80	0.7754
2035	2,018,743	1,565,433	66,486	586,282	88	80	0.7754
2036	2,044,141	1,585,127	67,322	593,658	87	80	0.7754
2037	2,069,538	1,604,822	68,158	601,034	87	80	0.7754
2038	2,094,936	1,624,516	68,995	608,409	87	80	0.7754
2039	2,120,333	1,644,210	69,831	615,785	87	80	0.7754
2040	2,145,731	1,663,905	70,668	623,161	87	79	0.7754
2041	2,171,128	1,683,599	71,504	630,537	87	79	0.7754
2042	2,196,525	1,703,294	72,341	637,913	87	79	0.7754
2043	2,221,923	1,722,988	73,177	645,289	87	79	0.7754
2044	2,247,320	1,742,682	74,014	652,665	87	79	0.7754
2045	2,272,718	1,762,377	74,850	660,041	87	79	0.7754
2046	2,298,115	1,782,071	75,686	667,417	87	79	0.7754
2047	2,323,512	1,801,766	76,523	674,793	87	79	0.7754
2048	2,348,910	1,821,460	77,359	682,168	87	79	0.7754
2049	2,374,307	1,841,154	78,196	689,544	87	80	0.7754
2050	2,399,705	1,860,849	79,032	696,920	88	80	0.7754

Year	Category B Cities - Male (Bacolod, Baguio, batangas, Butuan, Cagayan de Oro, General Santos, Iloilo, Puerto Princesa, and Zamboanga)						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	375,921	300,058	12,455	112,097	91	83	0.7982
1976	402,337	321,142	13,330	119,974	91	83	0.7982
1977	428,752	342,227	14,206	127,851	91	83	0.7982
1978	455,168	363,312	15,081	135,728	91	83	0.7982
1979	481,584	384,397	15,956	143,605	91	83	0.7982
1980	507,999	405,481	16,831	151,482	91	83	0.7982
1981	534,415	426,566	17,707	159,359	91	83	0.7982
1982	560,830	447,651	18,582	167,235	91	83	0.7982
1983	587,246	468,735	19,457	175,112	91	83	0.7982
1984	613,661	489,820	20,332	182,989	91	83	0.7982
1985	640,077	510,905	21,207	190,866	91	83	0.7982
1986	666,492	531,989	22,083	198,743	91	83	0.7982
1987	692,908	553,074	22,958	206,620	91	83	0.7982
1988	719,323	574,159	23,833	214,497	91	83	0.7982
1989	745,739	595,243	24,708	222,374	91	83	0.7982
1990	775,364	618,890	25,690	231,208	91	83	0.7982
1991	801,106	639,437	26,543	238,884	91	83	0.7982
1992	826,847	659,984	27,396	246,560	91	83	0.7982
1993	852,589	680,530	28,248	254,236	91	83	0.7982
1994	878,330	701,077	29,101	261,912	91	83	0.7982
1995	904,072	721,623	29,954	269,588	91	83	0.7982
1996	929,813	742,170	30,807	277,263	91	83	0.7982
1997	955,554	762,717	31,660	284,939	91	83	0.7982
1998	981,296	783,263	32,513	292,615	91	83	0.7982
1999	1,007,037	803,810	33,366	300,291	91	83	0.7982
2000	1,032,779	824,356	34,219	307,967	91	83	0.7982
2001	1,059,868	845,979	35,116	316,045	91	83	0.7982
2002	1,086,958	867,602	36,014	324,123	91	83	0.7982
2003	1,114,048	889,225	36,911	332,201	91	83	0.7982
2004	1,141,137	910,847	37,809	340,279	91	83	0.7982
2005	1,168,227	932,470	38,706	348,357	91	83	0.7982
2006	1,195,316	954,093	39,604	356,435	91	83	0.7982
2007	1,222,406	975,716	40,501	364,513	91	83	0.7982
2008	1,249,496	997,338	41,399	372,591	91	83	0.7982
2009	1,276,585	1,018,961	42,297	380,669	90	82	0.7982
2010	1,303,675	1,040,584	43,194	388,746	90	82	0.7982
2011	1,326,881	1,059,106	43,963	395,666	89	81	0.7982
2012	1,353,296	1,080,191	44,838	403,543	88	81	0.7982
2013	1,379,712	1,101,276	45,713	411,420	88	81	0.7982
2014	1,406,127	1,122,360	46,589	419,297	88	81	0.7982

Year	Category B Cities - Male (Bacolod, Baguio, batangas, Butuan, Cagayan de Oro, General Santos, Iloilo, Puerto Princesa, and Zamboanga)						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2015	1,432,543	1,143,445	47,464	427,174	88	81	0.7982
2016	1,458,958	1,164,530	48,339	435,051	88	82	0.7982
2017	1,485,374	1,185,615	49,214	442,928	88	82	0.7982
2018	1,511,789	1,206,699	50,089	450,805	88	82	0.7982
2019	1,538,205	1,227,784	50,965	458,682	88	82	0.7982
2020	1,564,620	1,248,869	51,840	466,558	88	82	0.7982
2021	1,591,036	1,269,953	52,715	474,435	88	81	0.7982
2022	1,617,451	1,291,038	53,590	482,312	88	81	0.7982
2023	1,643,867	1,312,123	54,465	490,189	88	81	0.7982
2024	1,670,282	1,333,207	55,341	498,066	88	81	0.7982
2025	1,696,698	1,354,292	56,216	505,943	88	81	0.7982
2026	1,723,113	1,375,377	57,091	513,820	88	81	0.7982
2027	1,749,529	1,396,461	57,966	521,697	88	81	0.7982
2028	1,775,945	1,417,546	58,842	529,574	88	81	0.7982
2029	1,802,360	1,438,631	59,717	537,451	88	81	0.7982
2030	1,828,776	1,459,715	60,592	545,328	87	81	0.7982
2031	1,855,191	1,480,800	61,467	553,205	88	81	0.7982
2032	1,881,607	1,501,885	62,342	561,081	88	81	0.7982
2033	1,908,022	1,522,970	63,218	568,958	88	81	0.7982
2034	1,934,438	1,544,054	64,093	576,835	88	80	0.7982
2035	1,960,853	1,565,139	64,968	584,712	88	80	0.7982
2036	1,987,269	1,586,224	65,843	592,589	88	80	0.7982
2037	2,013,684	1,607,308	66,718	600,466	87	80	0.7982
2038	2,040,100	1,628,393	67,594	608,343	87	80	0.7982
2039	2,066,515	1,649,478	68,469	616,220	87	80	0.7982
2040	2,092,931	1,670,562	69,344	624,097	87	80	0.7982
2041	2,119,346	1,691,647	70,219	631,974	87	80	0.7982
2042	2,145,762	1,712,732	71,095	639,851	87	80	0.7982
2043	2,172,177	1,733,816	71,970	647,728	87	80	0.7982
2044	2,198,593	1,754,901	72,845	655,605	87	80	0.7982
2045	2,225,009	1,775,986	73,720	663,481	87	79	0.7982
2046	2,251,424	1,797,070	74,595	671,358	87	80	0.7982
2047	2,277,840	1,818,155	75,471	679,235	87	80	0.7982
2048	2,304,255	1,839,240	76,346	687,112	87	80	0.7982
2049	2,330,671	1,860,324	77,221	694,989	87	80	0.7982
2050	2,357,086	1,881,409	78,096	702,866	87	80	0.7982

Year	Category B Cities - Female (Bacolod, Baguio, batangas, Butuan, Cagayan de Oro, General Santos, Iloilo, Puerto Princesa, and Zamboanga)						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	378,186	293,264	12,455	109,832	89	83	0.7754
1976	404,761	313,871	13,330	117,550	89	83	0.7754
1977	431,335	334,479	14,206	125,268	89	83	0.7754
1978	457,910	355,086	15,081	132,986	89	83	0.7754
1979	484,485	375,693	15,956	140,704	89	83	0.7754
1980	511,059	396,300	16,831	148,421	89	83	0.7754
1981	537,634	416,908	17,707	156,139	89	83	0.7754
1982	564,209	437,515	18,582	163,857	89	83	0.7754
1983	590,783	458,122	19,457	171,575	89	83	0.7754
1984	617,358	478,730	20,332	179,293	89	83	0.7754
1985	643,933	499,337	21,207	187,010	89	83	0.7754
1986	670,507	519,944	22,083	194,728	89	83	0.7754
1987	697,082	540,552	22,958	202,446	89	83	0.7754
1988	723,657	561,159	23,833	210,164	89	83	0.7754
1989	750,231	581,766	24,708	217,882	89	83	0.7754
1990	780,035	604,878	25,690	226,537	89	83	0.7754
1991	805,932	624,959	26,543	234,058	89	83	0.7754
1992	831,828	645,040	27,396	241,579	89	83	0.7754
1993	857,725	665,122	28,248	249,100	89	83	0.7754
1994	883,621	685,203	29,101	256,621	89	83	0.7754
1995	909,518	705,285	29,954	264,141	89	83	0.7754
1996	935,414	725,366	30,807	271,662	89	83	0.7754
1997	961,311	745,448	31,660	279,183	89	83	0.7754
1998	987,207	765,529	32,513	286,704	89	83	0.7754
1999	1,013,104	785,610	33,366	294,225	89	83	0.7754
2000	1,039,000	805,692	34,219	301,746	89	83	0.7754
2001	1,066,253	826,825	35,116	309,660	89	83	0.7754
2002	1,093,506	847,958	36,014	317,575	89	83	0.7754
2003	1,120,759	869,091	36,911	325,490	89	83	0.7754
2004	1,148,012	890,224	37,809	333,405	89	83	0.7754
2005	1,175,264	911,358	38,706	341,319	89	83	0.7754
2006	1,202,517	932,491	39,604	349,234	89	83	0.7754
2007	1,229,770	953,624	40,501	357,149	89	83	0.7754
2008	1,257,023	974,757	41,399	365,064	89	83	0.7754
2009	1,284,276	995,890	42,297	372,978	89	82	0.7754
2010	1,311,528	1,017,024	43,194	380,893	88	82	0.7754
2011	1,334,874	1,035,127	43,963	387,673	89	82	0.7754
2012	1,361,448	1,055,734	44,838	395,391	88	82	0.7754
2013	1,388,023	1,076,341	45,713	403,109	88	82	0.7754
2014	1,414,598	1,096,949	46,589	410,826	88	81	0.7754

Year	Category B Cities - Female (Bacolod, Baguio, batangas, Butuan, Cagayan de Oro, General Santos, Iloilo, Puerto Princesa, and Zamboanga)						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2015	1,441,172	1,117,556	47,464	418,544	89	82	0.7754
2016	1,467,747	1,138,163	48,339	426,262	88	81	0.7754
2017	1,494,322	1,158,770	49,214	433,980	88	81	0.7754
2018	1,520,896	1,179,378	50,089	441,697	88	81	0.7754
2019	1,547,471	1,199,985	50,965	449,415	88	81	0.7754
2020	1,574,046	1,220,592	51,840	457,133	89	81	0.7754
2021	1,600,620	1,241,200	52,715	464,851	88	81	0.7754
2022	1,627,195	1,261,807	53,590	472,569	88	81	0.7754
2023	1,653,770	1,282,414	54,465	480,286	88	81	0.7754
2024	1,680,344	1,303,022	55,341	488,004	88	81	0.7754
2025	1,706,919	1,323,629	56,216	495,722	88	80	0.7754
2026	1,733,494	1,344,236	57,091	503,440	88	80	0.7754
2027	1,760,068	1,364,843	57,966	511,158	88	80	0.7754
2028	1,786,643	1,385,451	58,842	518,875	88	80	0.7754
2029	1,813,218	1,406,058	59,717	526,593	87	80	0.7754
2030	1,839,792	1,426,665	60,592	534,311	87	80	0.7754
2031	1,866,367	1,447,273	61,467	542,029	88	80	0.7754
2032	1,892,942	1,467,880	62,342	549,747	88	80	0.7754
2033	1,919,516	1,488,487	63,218	557,464	88	80	0.7754
2034	1,946,091	1,509,094	64,093	565,182	87	80	0.7754
2035	1,972,666	1,529,702	64,968	572,900	88	80	0.7754
2036	1,999,240	1,550,309	65,843	580,618	87	80	0.7754
2037	2,025,815	1,570,916	66,718	588,335	87	80	0.7754
2038	2,052,390	1,591,524	67,594	596,053	87	80	0.7754
2039	2,078,964	1,612,131	68,469	603,771	87	80	0.7754
2040	2,105,539	1,632,738	69,344	611,489	87	79	0.7754
2041	2,132,114	1,653,346	70,219	619,207	87	79	0.7754
2042	2,158,688	1,673,953	71,095	626,924	87	79	0.7754
2043	2,185,263	1,694,560	71,970	634,642	87	79	0.7754
2044	2,211,838	1,715,167	72,845	642,360	87	79	0.7754
2045	2,238,412	1,735,775	73,720	650,078	87	79	0.7754
2046	2,264,987	1,756,382	74,595	657,796	87	79	0.7754
2047	2,291,562	1,776,989	75,471	665,513	87	79	0.7754
2048	2,318,136	1,797,597	76,346	673,231	87	79	0.7754
2049	2,344,711	1,818,204	77,221	680,949	87	80	0.7754
2050	2,371,286	1,838,811	78,096	688,667	88	80	0.7754

Year	Davao City - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	132,548	105,799	4,392	39,525	91	83	0.7982
1976	142,498	113,741	4,721	42,492	91	83	0.7982
1977	152,447	121,682	5,051	45,459	91	83	0.7982
1978	162,396	129,623	5,381	48,425	91	83	0.7982
1979	172,345	137,565	5,710	51,392	91	83	0.7982
1980	182,294	145,506	6,040	54,359	91	83	0.7982
1981	192,244	153,447	6,370	57,326	91	83	0.7982
1982	202,193	161,389	6,699	60,292	91	83	0.7982
1983	212,142	169,330	7,029	63,259	91	83	0.7982
1984	222,091	177,271	7,358	66,226	91	83	0.7982
1985	232,040	185,213	7,688	69,193	91	83	0.7982
1986	241,989	193,154	8,018	72,160	91	83	0.7982
1987	251,939	201,096	8,347	75,126	91	83	0.7982
1988	261,888	209,037	8,677	78,093	91	83	0.7982
1989	271,837	216,978	9,007	81,060	91	83	0.7982
1990	282,182	225,236	9,349	84,145	91	83	0.7982
1991	292,048	233,111	9,676	87,087	91	83	0.7982
1992	301,914	240,986	10,003	90,029	91	83	0.7982
1993	311,780	248,861	10,330	92,971	91	83	0.7982
1994	321,646	256,736	10,657	95,913	91	83	0.7982
1995	331,512	264,611	10,984	98,855	91	83	0.7982
1996	341,378	272,486	11,311	101,797	91	83	0.7982
1997	351,244	280,361	11,638	104,739	91	83	0.7982
1998	361,110	288,236	11,965	107,681	91	83	0.7982
1999	370,977	296,111	12,291	110,623	91	83	0.7982
2000	380,843	303,986	12,618	113,564	91	83	0.7982
2001	390,875	311,994	12,951	116,556	91	83	0.7982
2002	400,907	320,001	13,283	119,548	91	83	0.7982
2003	410,940	328,009	13,615	122,539	91	83	0.7982
2004	420,972	336,017	13,948	125,531	91	83	0.7982
2005	431,004	344,025	14,280	128,522	91	83	0.7982
2006	441,037	352,032	14,613	131,514	91	83	0.7982
2007	451,069	360,040	14,945	134,506	91	83	0.7982
2008	461,102	368,048	15,277	137,497	91	83	0.7982
2009	471,134	376,056	15,610	140,489	90	82	0.7982
2010	481,166	384,063	15,942	143,480	90	82	0.7982
2011	490,719	391,689	16,259	146,329	89	81	0.7982
2012	500,669	399,630	16,588	149,296	88	81	0.7982
2013	510,618	407,571	16,918	152,263	88	81	0.7982
2014	520,567	415,513	17,248	155,229	88	81	0.7982
2015	530,516	423,454	17,577	158,196	88	81	0.7982

Year	Davao City - Males						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2016	540,465	431,396	17,907	161,163	88	82	0.7982
2017	550,415	439,337	18,237	164,130	88	82	0.7982
2018	560,364	447,278	18,566	167,096	88	82	0.7982
2019	570,313	455,220	18,896	170,063	88	82	0.7982
2020	580,262	463,161	19,226	173,030	88	82	0.7982
2021	590,211	471,102	19,555	175,997	88	81	0.7982
2022	600,160	479,044	19,885	178,964	88	81	0.7982
2023	610,110	486,985	20,214	181,930	88	81	0.7982
2024	620,059	494,927	20,544	184,897	88	81	0.7982
2025	630,008	502,868	20,874	187,864	88	81	0.7982
2026	639,957	510,809	21,203	190,831	88	81	0.7982
2027	649,906	518,751	21,533	193,797	88	81	0.7982
2028	659,856	526,692	21,863	196,764	88	81	0.7982
2029	669,805	534,633	22,192	199,731	88	81	0.7982
2030	679,754	542,575	22,522	202,698	87	81	0.7982
2031	689,703	550,516	22,852	205,665	88	81	0.7982
2032	699,652	558,458	23,181	208,631	88	81	0.7982
2033	709,602	566,399	23,511	211,598	88	81	0.7982
2034	719,551	574,340	23,841	214,565	88	80	0.7982
2035	729,500	582,282	24,170	217,532	88	80	0.7982
2036	739,449	590,223	24,500	220,498	88	80	0.7982
2037	749,398	598,164	24,829	223,465	87	80	0.7982
2038	759,348	606,106	25,159	226,432	87	80	0.7982
2039	769,297	614,047	25,489	229,399	87	80	0.7982
2040	779,246	621,988	25,818	232,366	87	80	0.7982
2041	789,195	629,930	26,148	235,332	87	80	0.7982
2042	799,144	637,871	26,478	238,299	87	80	0.7982
2043	809,094	645,813	26,807	241,266	87	80	0.7982
2044	819,043	653,754	27,137	244,233	87	80	0.7982
2045	828,992	661,695	27,467	247,199	87	79	0.7982
2046	838,941	669,637	27,796	250,166	87	80	0.7982
2047	848,890	677,578	28,126	253,133	87	80	0.7982
2048	858,840	685,519	28,456	256,100	87	80	0.7982
2049	868,789	693,461	28,785	259,067	87	80	0.7982
2050	878,738	701,402	29,115	262,033	87	80	0.7982

Year	Davao City - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	133,347	103,404	4,392	38,726	89	83	0.7754
1976	143,356	111,165	4,721	41,633	89	83	0.7754
1977	153,365	118,927	5,051	44,540	89	83	0.7754
1978	163,374	126,689	5,381	47,447	89	83	0.7754
1979	173,383	134,450	5,710	50,354	89	83	0.7754
1980	183,392	142,211	6,040	53,261	89	83	0.7754
1981	193,402	149,973	6,370	56,168	89	83	0.7754
1982	203,411	157,735	6,699	59,074	89	83	0.7754
1983	213,420	165,496	7,029	61,981	89	83	0.7754
1984	223,429	173,258	7,358	64,888	89	83	0.7754
1985	233,438	181,020	7,688	67,795	89	83	0.7754
1986	243,447	188,781	8,018	70,702	89	83	0.7754
1987	253,457	196,543	8,347	73,609	89	83	0.7754
1988	263,466	204,304	8,677	76,515	89	83	0.7754
1989	273,475	212,066	9,007	79,422	89	83	0.7754
1990	283,882	220,136	9,349	82,445	89	83	0.7754
1991	293,808	227,833	9,676	85,327	89	83	0.7754
1992	303,733	235,530	10,003	88,210	89	83	0.7754
1993	313,659	243,226	10,330	91,092	89	83	0.7754
1994	323,584	250,923	10,657	93,975	89	83	0.7754
1995	333,510	258,620	10,984	96,858	89	83	0.7754
1996	343,435	266,316	11,311	99,740	89	83	0.7754
1997	353,360	274,013	11,638	102,623	89	83	0.7754
1998	363,286	281,710	11,965	105,505	89	83	0.7754
1999	373,211	289,406	12,291	108,388	89	83	0.7754
2000	383,137	297,103	12,618	111,270	89	83	0.7754
2001	393,230	304,930	12,951	114,201	89	83	0.7754
2002	403,322	312,756	13,283	117,133	89	83	0.7754
2003	413,415	320,582	13,615	120,064	89	83	0.7754
2004	423,508	328,409	13,948	122,995	89	83	0.7754
2005	433,601	336,235	14,280	125,926	89	83	0.7754
2006	443,694	344,062	14,613	128,857	89	83	0.7754
2007	453,786	351,888	14,945	131,788	89	83	0.7754
2008	463,879	359,715	15,277	134,719	89	83	0.7754
2009	473,972	367,541	15,610	137,651	89	82	0.7754
2010	484,065	375,368	15,942	140,582	88	82	0.7754
2011	493,675	382,820	16,259	143,373	89	82	0.7754
2012	503,685	390,582	16,588	146,280	88	82	0.7754
2013	513,694	398,343	16,918	149,187	88	82	0.7754
2014	523,703	406,105	17,248	152,093	88	81	0.7754

Year	Davao City - Females						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2015	533,712	413,867	17,577	155,000	89	82	0.7754
2016	543,721	421,628	17,907	157,907	88	81	0.7754
2017	553,730	429,390	18,237	160,814	88	81	0.7754
2018	563,739	437,151	18,566	163,721	88	81	0.7754
2019	573,749	444,913	18,896	166,628	88	81	0.7754
2020	583,758	452,674	19,226	169,534	89	81	0.7754
2021	593,767	460,436	19,555	172,441	88	81	0.7754
2022	603,776	468,197	19,885	175,348	88	81	0.7754
2023	613,785	475,959	20,214	178,255	88	81	0.7754
2024	623,794	483,721	20,544	181,162	88	81	0.7754
2025	633,803	491,482	20,874	184,069	88	80	0.7754
2026	643,812	499,244	21,203	186,975	88	80	0.7754
2027	653,822	507,005	21,533	189,882	88	80	0.7754
2028	663,831	514,767	21,863	192,789	88	80	0.7754
2029	673,840	522,528	22,192	195,696	87	80	0.7754
2030	683,849	530,290	22,522	198,603	87	80	0.7754
2031	693,858	538,052	22,852	201,510	88	80	0.7754
2032	703,867	545,813	23,181	204,417	88	80	0.7754
2033	713,876	553,575	23,511	207,323	88	80	0.7754
2034	723,885	561,336	23,841	210,230	87	80	0.7754
2035	733,895	569,098	24,170	213,137	88	80	0.7754
2036	743,904	576,859	24,500	216,044	87	80	0.7754
2037	753,913	584,621	24,829	218,951	87	80	0.7754
2038	763,922	592,383	25,159	221,858	87	80	0.7754
2039	773,931	600,144	25,489	224,764	87	80	0.7754
2040	783,940	607,906	25,818	227,671	87	79	0.7754
2041	793,949	615,667	26,148	230,578	87	79	0.7754
2042	803,958	623,429	26,478	233,485	87	79	0.7754
2043	813,968	631,190	26,807	236,392	87	79	0.7754
2044	823,977	638,952	27,137	239,299	87	79	0.7754
2045	833,986	646,714	27,467	242,205	87	79	0.7754
2046	843,995	654,475	27,796	245,112	87	79	0.7754
2047	854,004	662,237	28,126	248,019	87	79	0.7754
2048	864,013	669,998	28,456	250,926	87	79	0.7754
2049	874,022	677,760	28,785	253,833	87	80	0.7754
2050	884,032	685,521	29,115	256,740	88	80	0.7754

Year	Pampanga Province - Males (Angeles, Mabalacat, San Fernando)						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	82,499	65,850	2,733	24,601	91	83	0.7982
1976	88,010	70,249	2,916	26,244	91	83	0.7982
1977	93,520	74,647	3,099	27,887	91	83	0.7982
1978	99,030	79,045	3,281	29,530	91	83	0.7982
1979	104,541	83,444	3,464	31,173	91	83	0.7982
1980	110,051	87,842	3,646	32,816	91	83	0.7982
1981	115,561	92,240	3,829	34,460	91	83	0.7982
1982	121,072	96,639	4,011	36,103	91	83	0.7982
1983	126,582	101,037	4,194	37,746	91	83	0.7982
1984	132,093	105,435	4,377	39,389	91	83	0.7982
1985	137,603	109,834	4,559	41,032	91	83	0.7982
1986	143,113	114,232	4,742	42,675	91	83	0.7982
1987	148,624	118,630	4,924	44,318	91	83	0.7982
1988	154,134	123,029	5,107	45,962	91	83	0.7982
1989	159,644	127,427	5,289	47,605	91	83	0.7982
1990	168,238	134,286	5,574	50,167	91	83	0.7982
1991	173,079	138,151	5,735	51,611	91	83	0.7982
1992	177,920	142,015	5,895	53,055	91	83	0.7982
1993	182,762	145,879	6,055	54,498	91	83	0.7982
1994	187,603	149,743	6,216	55,942	91	83	0.7982
1995	190,380	151,960	6,308	56,770	91	83	0.7982
1996	195,921	156,382	6,491	58,422	91	83	0.7982
1997	201,461	160,805	6,675	60,074	91	83	0.7982
1998	207,001	165,227	6,858	61,726	91	83	0.7982
1999	212,542	169,649	7,042	63,378	91	83	0.7982
2000	218,082	174,071	7,226	65,030	91	83	0.7982
2001	224,261	179,004	7,430	66,873	91	83	0.7982
2002	230,441	183,936	7,635	68,716	91	83	0.7982
2003	236,621	188,869	7,840	70,559	91	83	0.7982
2004	242,800	193,801	8,045	72,401	91	83	0.7982
2005	248,980	198,734	8,249	74,244	91	83	0.7982
2006	255,159	203,666	8,454	76,087	91	83	0.7982
2007	261,339	208,599	8,659	77,929	91	83	0.7982
2008	265,809	212,167	8,807	79,262	91	83	0.7982
2009	270,279	215,734	8,955	80,595	90	82	0.7982
2010	274,749	219,302	9,103	81,928	90	82	0.7982
2011	280,872	224,190	9,306	83,754	89	81	0.7982
2012	286,383	228,589	9,489	85,397	88	81	0.7982
2013	291,893	232,987	9,671	87,040	88	81	0.7982
2014	297,403	237,385	9,854	88,684	88	81	0.7982

Year	Pampanga Province - Males (Angeles, Mabalacat, San Fernando)						
	Males 15+	Males 15-49	Males 15 y/o	Males 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2015	302,914	241,784	10,036	90,327	88	81	0.7982
2016	308,424	246,182	10,219	91,970	88	82	0.7982
2017	313,934	250,580	10,401	93,613	88	82	0.7982
2018	319,445	254,979	10,584	95,256	88	82	0.7982
2019	324,955	259,377	10,767	96,899	88	82	0.7982
2020	330,466	263,775	10,949	98,542	88	82	0.7982
2021	335,976	268,174	11,132	100,186	88	81	0.7982
2022	341,486	272,572	11,314	101,829	88	81	0.7982
2023	346,997	276,970	11,497	103,472	88	81	0.7982
2024	352,507	281,369	11,679	105,115	88	81	0.7982
2025	358,017	285,767	11,862	106,758	88	81	0.7982
2026	363,528	290,165	12,045	108,401	88	81	0.7982
2027	369,038	294,564	12,227	110,044	88	81	0.7982
2028	374,548	298,962	12,410	111,688	88	81	0.7982
2029	380,059	303,360	12,592	113,331	88	81	0.7982
2030	385,569	307,759	12,775	114,974	87	81	0.7982
2031	391,080	312,157	12,957	116,617	88	81	0.7982
2032	396,590	316,555	13,140	118,260	88	81	0.7982
2033	402,100	320,954	13,323	119,903	88	81	0.7982
2034	407,611	325,352	13,505	121,547	88	80	0.7982
2035	413,121	329,750	13,688	123,190	88	80	0.7982
2036	418,631	334,149	13,870	124,833	88	80	0.7982
2037	424,142	338,547	14,053	126,476	87	80	0.7982
2038	429,652	342,945	14,235	128,119	87	80	0.7982
2039	435,162	347,344	14,418	129,762	87	80	0.7982
2040	440,673	351,742	14,601	131,405	87	80	0.7982
2041	446,183	356,140	14,783	133,049	87	80	0.7982
2042	451,694	360,539	14,966	134,692	87	80	0.7982
2043	457,204	364,937	15,148	136,335	87	80	0.7982
2044	462,714	369,335	15,331	137,978	87	80	0.7982
2045	468,225	373,734	15,513	139,621	87	79	0.7982
2046	473,735	378,132	15,696	141,264	87	80	0.7982
2047	479,245	382,530	15,879	142,907	87	80	0.7982
2048	484,756	386,929	16,061	144,551	87	80	0.7982
2049	490,266	391,327	16,244	146,194	87	80	0.7982
2050	495,776	395,725	16,426	147,837	87	80	0.7982

Year	Pampanga Province - Females (Angeles, Mabalacat, San Fernando)						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
1975	82,996	64,359	2,733	24,104	89	83	0.7754
1976	88,540	68,658	2,916	25,714	89	83	0.7754
1977	94,083	72,957	3,099	27,324	89	83	0.7754
1978	99,627	77,256	3,281	28,934	89	83	0.7754
1979	105,170	81,554	3,464	30,544	89	83	0.7754
1980	110,714	85,853	3,646	32,153	89	83	0.7754
1981	116,258	90,152	3,829	33,763	89	83	0.7754
1982	121,801	94,451	4,011	35,373	89	83	0.7754
1983	127,345	98,749	4,194	36,983	89	83	0.7754
1984	132,888	103,048	4,377	38,593	89	83	0.7754
1985	138,432	107,347	4,559	40,203	89	83	0.7754
1986	143,975	111,646	4,742	41,813	89	83	0.7754
1987	149,519	115,944	4,924	43,423	89	83	0.7754
1988	155,062	120,243	5,107	45,033	89	83	0.7754
1989	160,606	124,542	5,289	46,643	89	83	0.7754
1990	169,252	131,246	5,574	49,154	89	83	0.7754
1991	174,122	135,023	5,735	50,568	89	83	0.7754
1992	178,992	138,799	5,895	51,983	89	83	0.7754
1993	183,863	142,576	6,055	53,397	89	83	0.7754
1994	188,733	146,353	6,216	54,812	89	83	0.7754
1995	191,527	148,520	6,308	55,623	89	83	0.7754
1996	197,101	152,842	6,491	57,242	89	83	0.7754
1997	202,675	157,164	6,675	58,861	89	83	0.7754
1998	208,248	161,486	6,858	60,479	89	83	0.7754
1999	213,822	165,808	7,042	62,098	89	83	0.7754
2000	219,396	170,130	7,226	63,717	89	83	0.7754
2001	225,612	174,951	7,430	65,522	89	83	0.7754
2002	231,829	179,772	7,635	67,328	89	83	0.7754
2003	238,046	184,593	7,840	69,133	89	83	0.7754
2004	244,263	189,413	8,045	70,939	89	83	0.7754
2005	250,480	194,234	8,249	72,744	89	83	0.7754
2006	256,696	199,055	8,454	74,550	89	83	0.7754
2007	262,913	203,876	8,659	76,355	89	83	0.7754
2008	267,410	207,363	8,807	77,661	89	83	0.7754
2009	271,907	210,850	8,955	78,967	89	82	0.7754
2010	276,404	214,337	9,103	80,273	88	82	0.7754
2011	282,564	219,114	9,306	82,062	89	82	0.7754
2012	288,108	223,413	9,489	83,672	88	82	0.7754
2013	293,651	227,712	9,671	85,282	88	82	0.7754

Year	Pampanga Province - Females (Angeles, Mabalacat, San Fernando)						
	Females 15+	Females 15-49	Females 15 y/o	Females 15-24	Migration 15+	Migration 15-24	Ratio of 15-49 to 15+ population
2014	299,195	232,010	9,854	86,892	88	81	0.7754
2015	304,739	236,309	10,036	88,502	89	82	0.7754
2016	310,282	240,608	10,219	90,112	88	81	0.7754
2017	315,826	244,907	10,401	91,722	88	81	0.7754
2018	321,369	249,205	10,584	93,332	88	81	0.7754
2019	326,913	253,504	10,767	94,942	88	81	0.7754
2020	332,456	257,803	10,949	96,552	89	81	0.7754
2021	338,000	262,102	11,132	98,162	88	81	0.7754
2022	343,543	266,400	11,314	99,772	88	81	0.7754
2023	349,087	270,699	11,497	101,382	88	81	0.7754
2024	354,631	274,998	11,679	102,992	88	81	0.7754
2025	360,174	279,297	11,862	104,601	88	80	0.7754
2026	365,718	283,595	12,045	106,211	88	80	0.7754
2027	371,261	287,894	12,227	107,821	88	80	0.7754
2028	376,805	292,193	12,410	109,431	88	80	0.7754
2029	382,348	296,492	12,592	111,041	87	80	0.7754
2030	387,892	300,790	12,775	112,651	87	80	0.7754
2031	393,435	305,089	12,957	114,261	88	80	0.7754
2032	398,979	309,388	13,140	115,871	88	80	0.7754
2033	404,523	313,687	13,323	117,481	88	80	0.7754
2034	410,066	317,985	13,505	119,091	87	80	0.7754
2035	415,610	322,284	13,688	120,701	88	80	0.7754
2036	421,153	326,583	13,870	122,311	87	80	0.7754
2037	426,697	330,882	14,053	123,921	87	80	0.7754
2038	432,240	335,180	14,235	125,531	87	80	0.7754
2039	437,784	339,479	14,418	127,141	87	80	0.7754
2040	443,327	343,778	14,601	128,751	87	79	0.7754
2041	448,871	348,077	14,783	130,361	87	79	0.7754
2042	454,415	352,375	14,966	131,971	87	79	0.7754
2043	459,958	356,674	15,148	133,581	87	79	0.7754
2044	465,502	360,973	15,331	135,191	87	79	0.7754
2045	471,045	365,272	15,513	136,801	87	79	0.7754
2046	476,589	369,570	15,696	138,411	87	79	0.7754
2047	482,132	373,869	15,879	140,020	87	79	0.7754
2048	487,676	378,168	16,061	141,630	87	79	0.7754
2049	493,219	382,467	16,244	143,240	87	80	0.7754
2050	498,763	386,765	16,426	144,850	88	80	0.7754

ANNEX C.1: Unit costs applied by the AEM Case Study (Unadjusted)

REGISTERED FEMALE SEX WORKERS (RFSW)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
1. Voluntary counseling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
2. Reproductive Health Services							
Pills	12	18	210			310	310
VIA (Acetic Acid Wash)	1	100	100				
3. Condom provision						1,536	1,536
Cost of condom		3	1,296				
Number of condoms distributed per visit	18						
Frequency of visits per year	24			10	240		
4. Lubricant provision						2,160	2,160
Cost of lubricant		5	2,160				
Number of lubricants distributed per visit	18						
Frequency of visits per year	24						
5. STI Diagnosis							
Cost per Gram Stain	24	30	840				
Cost per RPR test	2	60					
Provider Time - STI Services	24			106	2,550	3,390	3,390
6. STI treatment							
Cost of treatment of GC	2	170	57				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				57	57
7. Community Outreach and Peer Education							
Annual PE allowance			60				
Annual Supervising PE allowance							
Number of outreach per year							
FSW reached per PE per year							
PE supervised per SIO							
IEC material	12	5					60
Unit cost per year per RFSW							PHP 7,837
1 US\$ to Php is 45.00							USD 174
Non-Basic Program							
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)			12%				PHP 940.49
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 8,778 USD 195

FREELANCE FEMALE SEX WORKERS (FFSW)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
1. Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
2. Mobile VCT							
Per Diem	2			150	100	100	100
Cost of Transportation	2			150			
3. Condom provision						1,416	1,416
Cost of condom		3	1,296				
Number of condoms distributed per visit	36						
Frequency of visits per year	12			10	120		
4. Lubricant provision						2,160	2,160
Cost of lubricant		5	2,160				
Number of lubricants distributed per visit	36						
Frequency of visits per year	12						
5. STI Diagnosis							
Cost per Gram Stain	2	30	180				
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	213	393	393
6. STI treatment							
Cost of treatment of GC	2	170	60				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				60	60
7. Community Outreach and Peer Education							
Annual allowance PE		72,000	743.67	160			
Annual allowance PE Supervisor		216,000		40.00			
Number of outreach per year	12						
FSW reached per PE per year	450						
PE supervised per PE Supervisor	12						
IEC material	1	5		5		744	744
Transportation Cost for Referrals	2	1,000		1.11			
Accidental Insurance for PE	1	400		0.89			
Capital Outlay - Motorcycle	1	10,000		11.11			
Unit cost per year per FFSW							PHP 5,196
1 US\$ to Php is 45.00							USD 115
Non-Basic Program							
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)			12%				PHP 623.49
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 5,819 USD 129

MALES HAVING SEX WITH MALES (MSM)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
1. Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
2. Mobile VCT							
Per Diem	2			150	100	100	100
Cost of Transportation	2			150			
3. Condom provision						1,416	1,416
Cost of condom		3					
Number of condoms distributed per visit	36		1,296				
Frequency of visits per year	12			10	120		
4. Lubricant provision						2,160	2,160
Cost of lubricant		5					
Number of lubricants distributed per visit	36		2,160				
Frequency of visits per year	12						
5. STI Diagnosis							
Cost per Gram Stain	2	30	180				
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	212		392
6. STI treatment							
Cost of treatment of GC	2	170	58				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				58	58
7. Community Outreach and Peer Education							
Annual allowance PE		72,000					
Annually allowance SIO		216,000					
Number of outreach per year	12		743.67				
MSM reached per PE per year	450						
PE supervised per SIO	12						
IEC material	1	5				744	744
Transportation Cost for Referrals	2	1,000					
Accidental Insurance for PE	1	400					
Capital Outlay - Motorcycle	1	10,000					
Care and Support	c/o ART	c/o ART	c/o ART				
Unit cost per year per MSM 1 US\$ to Php is 45.00							PHP 5,194 USD 115
Non-Basic Program							
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)			12%				PHP 623.24
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							PHP 5,817
							USD 129
Capital Outlay (refurbishment, facility-enhancement of SHC in Cat A and B sites)			12,000,000.00				PHP 17
Number of MSM in entire Phils (2014)			685,416				
TOTAL							PHP 5,834 USD 129

PERSON WHO INJECT DRUGS (PWID)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
1. Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
						408	408
2. Condom provision							
Cost of condom		3	288				
Number of condoms distributed per visit	8						
Frequency of visits per year	12			10	120		
3. Abscess and Wound Care							
Abscess and wound care	1	200	200			200	200
4. STI Diagnosis							
Cost per Gram Stain	2	30	180			392	392
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	212		
5. STI treatment							
Cost of treatment of GC	2	170	13				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				13	13
6. Hepatitis							
Hep C Screening	1	350	350			88,431	431
Hep C Treatment	1	88,000	88,000				
Hepatitis B vaccination	3	27	81				
7. Community Outreach and Peer Education							
Annual allowance PE		72,000	500.10	353			
Annually allowance SIO		216,000		105.88			
Number of outreach per year	1						
PWID reached per PE per year	204						
PE supervised per SIO	10						
IEC material	1	5		5		500	500
Transportation Cost for Referrals	2	1,000		2.45			
Accidental Insurance for PE	1	400		1.96			
Capital Outlay - Motorcycle	1	10,000		24.51			
Needles and Syringe Distribution Program							
Needles and Syringe Distribution	52	7	5,096			5,096	5,096
Number of Needles per visit	14						
Unit cost per year per PWID							PHP 7,364
1 US\$ to Php is 45.00							USD 163
Non-Basic Program			12%				PHP 884
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)							
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 8,248 USD 183

Treatment Unit Cost – Unadjusted

Summary of ART Package		
Basic Program Services		28,021
Non-Basic Program Services	12%	3,362
Total Unit Cost per year	in PHP	31,383
	in USD	697

ART Medications - Assumptions based on the Consultation with NASPCP				
	Cost of regimen per month (PHP)	Cost of regimen per year (PHP)	Assumptions 2013	ART Cost (PHP)
1st Line Art	750	9,000	97%	8,730.00
2nd Line Art	1,500	18,000	3%	540.00
TOTAL	2,250	27,000	100%	9,270

Breakdown of the Treatment Unit Cost

Basic Program Services	Cost
ART Medications (97% First Line, 3% Second Line)	9,270
1st Line Art (P750/month or 9,000/year)	8,730
2nd Line Art (P1,500/month or 18,000/year)	540
Monitoring ART	12,999
CD4 cell count (twice a year)	4,000
Viral load test (one a year)	6,000
X-ray (twice a year)	300
Routine lab test (twice a year)	2,000
ARV Adherence Counselling (3 sessions before initiation of ART; every quarter thereafter)	699
OI Treatment & Prevention	5,752
Cotrimoxazole (P734 for 1 treatment regimen x 15% PLHIV)	110
Valgancyclovir (P151,200 for 1 treatment regimen x 1% PLHIV)	1,512
Fluconazole (P3,595 for 1 treatment regimen x 2% PLHIV)	72
Clarithromycin (P2,592 for 1 treatment regimen x 1% PLHIV)	26
Hepatitis C Treatment (P100,000 for 1 treatment regimen x 4% PLHIV)	3,960
Isoniazid (P180 for 1 treatment regimen x 40% PLHIV)	72
TOTAL	28,021

ANNEX C.2: Unit costs applied by the Health Sector Plan 2015-2017 (Adjusted)

Registered Female Sex Workers (RFSW)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
Reproductive Health Services							
VIA (Acetic Acid Wash)	1	100	100				
Condom provision						1,008	1,008
Cost of condom		3	1,008				
Number of condoms distributed per visit	14						
Frequency of visits per year	24						
Lubricant provision						1,680	1,680
Cost of lubricant		5	1,680				
Number of lubricants distributed per visit	14						
Frequency of visits per year	24						
STI Diagnosis							
Cost per Gram Stain	24	30	840				
Cost per RPR test	2	60					
Provider Time - STI Services	24			106	2,550	3,390	3,390
STI treatment							
Cost of treatment of GC	2	170	57				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				57	57
Community Outreach and Peer Education							
Annual PE allowance			60				
Annual Supervising PE allowance							
Number of outreach per year							
FSW reached per PE per year							
PE supervised per SIO							
IEC material	12	5					60
Needles and Syringe Distribution	n/a	n/a	n/a				
Care and Support	n/a	n/a	n/a				
Unit cost per year per RFSW							PHP 6,519
1 US\$ to Php is 45.00							USD 144
Non-Basic Program			20%				PHP 1,303.89
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)							
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 7,823
							USD 174

Freelance Female Sex Workers (FFSW)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
Mobile VCT							
Per Diem	2			150	100	100	100
Cost of Transportation	2			150			
Condom provision						936	936
Cost of condom		3	936				
Number of condoms distributed per visit	26						
Frequency of visits per year	12						
Lubricant provision						1,560	1,560
Cost of lubricant		5	1,560				
Number of lubricants distributed per visit	26						
Frequency of visits per year	12						
STI Diagnosis							
Cost per Gram Stain	2	30	180				
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	213	393	393
STI treatment							
Cost of treatment of GC	2	170	60				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				60	60
Community Outreach and Peer Education							
Annual allowance PE		72,000	743.67	160			
Annual allowance PE Supervisor		216,000		40.00			
Number of outreach per year	12						
FSW reached per PE per year	450						
PE supervised per PE Supervisor	12						
IEC material	1	5		5		744	744
Transportation Cost for Referrals	2	1,000		1.11			
Accidental Insurance for PE	1	400		0.89			
Capital Outlay - Motorcycle	1	10,000		11.11			
Needles and Syringe Distribution	n/a	n/a	n/a				
Care and Support	n/a	n/a	n/a				
Unit cost per year per FFSW							PHP 4,116
1 US\$ to Php is 45.00							USD 91.46
Non-Basic Program			20%				PHP 823.16
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)							
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 4,939 USD 110

Freelance Female Sex Workers (FFSW)	Frequency per year	COMMODITY COST		PROVIDER TIME COST		TOTAL per Category	USED for AEM
INTERVENTION CATEGORIES		COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP		
Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
Mobile VCT							
Per Diem	2			150	100	100	100
Cost of Transportation	2			150			
Condom provision						936	936
Cost of condom		3	936				
Number of condoms distributed per visit	26						
Frequency of visits per year	12						
Lubricant provision						1,560	1,560
Cost of lubricant		5	1,560				
Number of lubricants distributed per visit	26						
Frequency of visits per year	12						
STI Diagnosis							
Cost per Gram Stain	2	30	180				
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	213	393	393
STI treatment							
Cost of treatment of GC	2	170	60				
Cost of treatment of NGU	2	300					
Cost of treatment of SY	1	80				60	60
Community Outreach and Peer Education							
Annual allowance PE		72,000	743.67	160			
Annual allowane PE Supervisor		216,000		40.00			
Number of outreach per year	12						
FSW reached per PE per year	450						
PE supervised per PE Supervisor	12						
IEC material	1	5		5		744	744
Transportation Cost for Referrals	2	1,000		1.11			
Accidental Insurance for PE	1	400		0.89			
Capital Outlay - Motorcycle	1	10,000		11.11			
Needles and Syringe Distribution	n/a	n/a	n/a				
Care and Support	n/a	n/a	n/a				
Unit cost per year per FFSW 1 US\$ to Php is 45.00							PHP 4,116 USD 91.46
Non-Basic Program			20%				PHP 823.16
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)							
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 4,939 USD 110

PERSON WHO INJECT DRUGS (PWID)		COMMODITY COST		PROVIDER TIME COST			
INTERVENTION CATEGORIES	Frequency per year	COST in PHP	Unit cost per client per category in PHP	COST in PHP	Unit cost per client per category in PHP	TOTAL per Category	USED for AEM
Voluntary counselling and testing							
Cost of HIV test kit	2	70	150				
IEC material	2	5					
With Pre and Post-Test Counseling and Blood Testing by Med Tech							
Negative Result	2			87	174	324	324
Positive Result	2			189	378	528	
Condom provision						288	288
Cost of condom		3	288				
Number of condoms distributed per visit	8						
Frequency of visits per year	12						
Abscess and Wound Care							
Abscess and wound care	1	200	200			200	200
STI Diagnosis							
Cost per Gram Stain	2	30	180			392	392
Cost per RPR test	2	60					
Provider Time - STI Services	2			106	212		
STI treatment							
Cost of treatment of GC	2	170	13				
Cost of treatment of NGI	2	300					
Cost of treatment of SY	1	80				13	13
Hepatitis							
Hep C Screening	1	350	350			88,431	431
Hep C Treatment	1	88,000	88,000				
Hepatitis B vaccination	3	27	81				
Community Outreach and Peer Education							
Annual allowance PE		72,000	500.10				
Annually allowance SIO		216,000					
Number of outreach per year	1						
PWID reached per PE per year	204						
PE supervised per SIO	10						
IEC material	1	5				500	500
Transportation Cost for Referrals	2	1,000					
Accidental Insurance for PE	1	400					
Capital Outlay - Motorcycle	1	10,000					
Needles and Syringe Distribution Program							
Needles and Syringe Distribution	52	7	5,096			5,096	5,096
Number of Needles per visit	14						
			6,777	150.61	174		
Unit cost per year per PWID 1 US\$ to Php is 45.00							PHP 7,244 USD 161
Non-Basic Program			20%				PHP 1,448.90
Program Enabler (inc Capacity Bldg, Program Mgt, M&E, Research)							
Social Enabler (inc Mass media, Social media, Policy & Law Environment, Advocacy activities)							
TOTAL							PHP 8,693 USD 193

Treatment Unit Cost – Adjusted

Summary of ART Package		
Basic Program Services		30,416
Non-Basic Program Services	20%	6,083
Total Unit Cost per year	in PHP	36,499
	in USD	811

ART Medications - Assumptions based on the Consultation with NASPCP				
	Cost of regimen per month (PHP)	Cost of regimen per year (PHP)	Assumptions 2013	ART Cost (PHP)
1st Line Art	675	8,100	97%	7,857
2nd Line Art	1,500	18,000	3%	540
TOTAL	2,175	26,100	100%	8,397

Breakdown of the Treatment Unit Cost

Basic Program Services	Cost
ART Medications (97% First Line, 3% Second Line)	8,397
1st Line Art (P675/month or 8,100/year)	7,857
2nd Line Art (P1,500/month or 18,000/year)	540
Monitoring ART	12,999
CD4 cell count	4,000
Viral load test	6,000
X-ray	300
Routine lab test	2,000
ARV Adherence Counselling	699
OI Treatment & Prevention	9,020
TB Treatment	1,080
Cotrimoxazole (P734 for 1 tx regimen x 15% PLHIV)	110
Valgancyclovir (P151,200 for 1 tx regimen x 1% PLHIV)	1,512
Fluconazole (P3,595 for 1 tx regimen x 2% PLHIV)	72
Clarithromycin (P2,592 for 1 tx regimen x 1% PLHIV)	26
Hepatitis C Treatment (P100,000 for 1 tx regimen x 4% PLHIV)	3,960
Isoniazid (P180 for 1 tx regimen x 40% PLHIV)	72
Flu Vaccine (P170 x 90% PHIV)	153
Pneumococcal Vaccine (P363 x 80% PLHIV / 5 years)	58
HPV Vaccine (P1,500 x 3 doses x 90% PLHIV/3 years)	1,350
Hep A Vaccine (P1,000 x 2 doses x 90% PHIV / 3 years)	600
Hep B Vaccine (P27 x 3 doses x 90% PLHIV / 3 years)	27
TOTAL	30,416

