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# SUSTAINING THE HIV AND AIDS RESPONSE IN DOMINICA: INVESTMENT CASE BRIEF



October 2014

This publication was produced for review by the United States Agency for International Development. It was prepared by Karishmah Bhuanee, Elizabeth Conklin & Rachel Sanders for the Health Finance and Governance and Strengthening Health Outcomes through the Private Sector Projects.

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**DISCLAIMER**

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# ACRONYMS

<b>ART</b>	Antiretroviral Therapy
<b>CSW</b>	Commercial Sex Workers
<b>ECD</b>	Eastern Caribbean Dollars
<b>HFG</b>	Health Finance and Governance
<b>KfW</b>	German Development Bank
<b>MARPs</b>	Most-at-Risk Populations
<b>MSM</b>	Men who have Sex with Men
<b>NASA</b>	National AIDS Spending Assessment
<b>NGO</b>	Non-Governmental Organization
<b>NHA</b>	National Health Accounts
<b>OECS</b>	Organization of Eastern Caribbean States
<b>PAHO</b>	Pan American Health Organization
<b>PEPFAR</b>	President's Emergency Plan for AIDS Relief
<b>PLHIV</b>	People Living with HIV/AIDS
<b>PMTCT</b>	Prevention of Mother to Child Transmission
<b>PSI</b>	Population Services International
<b>SHOPS</b>	Strengthening Health Outcomes through the Private Sector
<b>STI</b>	Sexually Transmitted Infections
<b>UNAIDS</b>	Joint United Nations Program on HIV/AIDS
<b>UNGASS</b>	United Nations General Assembly Special Session
<b>USAID</b>	United States Agency for International Development





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# I. BACKGROUND

## I.1 HIV and AIDS Response in Dominica

Dominica is an upper-middle-income country in the eastern Caribbean with a population of approximately 72,293<sup>1</sup>. HIV prevalence is estimated at 0.75%. The epidemic is male-dominated, with 70% of those infected being male. While data indicates that the adults aged 25-49 are most affected by HIV and AIDS, incidence trends indicate a higher rate of infection among those over 50<sup>2</sup>. HIV prevalence has shown to be much higher among key populations such as men who have sex with men (MSMs) at 27%<sup>3</sup>. Further studies are required to produce evidence regarding trends in HIV prevalence among other vulnerable groups such as commercial sex workers (CSW), migrants, and indigenous populations. To date, the following populations have been assigned priority for the HIV/AIDS Response: MSMs and their partners, young people, CSWs, the indigenous population, and prisoners.

The National HIV and AIDS Response Program has continued to reinforce prevention efforts through the scaling-up of HIV counseling and rapid testing sites in additional districts and with non-governmental organization (NGO) partners. Prevention of mother-to-child transmission (PMTCT) efforts have included provider-initiated testing and been expanded to include PMTCT-plus to ensure care for mothers with HIV and AIDS. Challenges related to retaining those with HIV and AIDS in care and treatment, stigma and discrimination of target groups, and surveillance have been addressed in Dominica's upcoming National HIV and AIDS Strategic Plan 2015-2019. The Strategic Plan was developed during a series of participatory stakeholder workshops from June-September, 2014 and includes objectives related to prevention, treatment and care, policy and sustaining the HIV/AIDS response. Key populations were also reviewed, in which most-at-risk populations were determined to include: a) MSM, b)CSWs, c)youth, d)indigenous populations , e) prisoners, f) older population (50-70 years). In the case of some of these populations, such as MSM, there is clear evidence of higher prevalence whereas further investigation is required to determine level of risk and contribution to the epidemic of the other groups identified as high risk.

With support from USAID, Abt Associates' Health Finance and Governance (HFG) and Strengthening Health Outcomes through the Private Sector (SHOPS) projects used the Goals model in Spectrum to estimate the cost, impact, and cost-effectiveness of achieving the goals of the Dominica's National Strategic HIV/AIDS Plan (2015-2019). The present document describes the methods and assumptions used in that analysis, model results, and important considerations for the Dominica's National HIV/AIDS Response Program moving forward. This "investment case" brief seeks to help Dominica prioritize resource allocations, identify potential funding gaps, and analyze the impact of different trade-offs in

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<sup>1</sup> Census, Dominica, 2011.

<sup>2</sup> UNGASS, Dominica Global AIDS Report, 2014.

<sup>3</sup> UNAIDS, Behavioral and Seroprevalence Study among MSMs, Dominica, 2010.



terms of HIV infections. This has served as a key input for their National HIV/AIDS Strategic Plan(2014-2019). It will also aid in the presentation of needs for upcoming funding opportunities, such as the Regional Global Fund Concept Note, set to be submitted in 2015.

## I.2 Rationale

Dominica is one of six Organization of Eastern Caribbean States (OECS) countries applying for funding through the Global Fund's New Funding Model, and it is contributing to a regional Concept Note to be submitted in 2015. In January 2014, UNAIDS and the President's Emergency Plan for AIDS Relief (PEPFAR) held a meeting in Saint Lucia on the topic of "Strategic HIV Investment and Sustainable Financing" for nine small-island countries in the eastern Caribbean. During that meeting, the two sponsoring agencies encouraged each participating country to prepare an HIV investment case – a report that would identify opportunities to "improve country-level prioritization, technical efficiency and decision making for the allocation of HIV program resources" (UNAIDS 2014).

A key component of UNAIDS' investment framework is a quantitative analysis of trends in the HIV epidemic, the impact of various prevention and treatment efforts to date, as well as a projection of possible future programming scenarios and their implications for the epidemic and program costs. With assistance from USAID-funded Health Finance and Governance and Strengthening Health Outcomes through the Private Sector (SHOPS) Projects, this analysis was conducted using the Goals and Resource Needs models. These tools are part of the Spectrum/OneHealth modeling system and estimate the impact and costs of future prevention and treatment interventions.

Beyond the development of an investment case and Concept Note for new external funding, this quantitative modelling produces strategic information aimed to assist policymakers in Dominica in other ways. First, it will encourage the prioritization of limited resources for HIV and AIDS to those interventions that are most likely to produce impact on the epidemic. It can also be used to spur investments in programs that are both equitable and efficient, including leveraging private sector partners to participate actively in the HIV and AIDS response. Second, these analyses will assist the Ministry of Health and other key stakeholders to make a strong case for additional funding. It can be used as a tool to explain why HIV and AIDS funding is crucial – both by explaining the harmful impact that reduced funding will have on the epidemic and the gains that can be achieved if greater funding is received.

## 2. METHODS AND MODELS

In this section, we describe the projection model developed to estimate trends in the HIV epidemic, the projected impact of HIV and AIDS programs on the epidemic in terms of expected new infections, AIDS deaths, and the number of people receiving anti-retroviral therapy (ART) under different scenarios, and the potential costs of these future program options.

### 2.1 Methodology and data

#### 2.1.1 Methodology

This analysis uses the Goals model<sup>4</sup>, a module implemented in the Spectrum modeling system that estimates the impact of future prevention and treatment interventions. The Goals model partitions the adult population aged 15-49 by age and sex and into six risk groups: not sexually active, low-risk heterosexual (stable monogamous couples), medium-risk heterosexual (people engaging in casual sex with multiple partners per year), high-risk heterosexual (female sex workers and their male clients), men who have sex with men, and injecting drug users. The Goals model implements a dynamical compartment model to project transmission forward in time and to model the costs and impact of interventions that reduce transmission.

The Goals model calculates new HIV infections by sex and risk group as a function of behaviors and epidemiological factors such as prevalence among partners and stage of infection. The risk of transmission is determined by behaviors (number of partners, contacts per partners, condom use) and biomedical factors (ART use, male circumcision, prevalence of other sexually transmitted infections). Interventions can change any of these factors and, thus, affect the future course of the epidemic. The Goals model uses an impact matrix that summarizes the international literature on the average impact of each intervention type on these behaviors and biomedical factors to influence overall transmission in the modeled population.<sup>5</sup>

The Goals model is linked to the AIM module in Spectrum, which calculates the effects on children (aged 0-14) and individuals 50 and older. The AIM module also includes the effects of PMTCT programs on pediatric infections.

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<sup>4</sup> Futures Institute. Goals manual: a model for estimating the effects of interventions and resource allocation on HIV infections and deaths, August 2011. [www.FuturesInstitute.org](http://www.FuturesInstitute.org). [Accessed October 23, 2014].

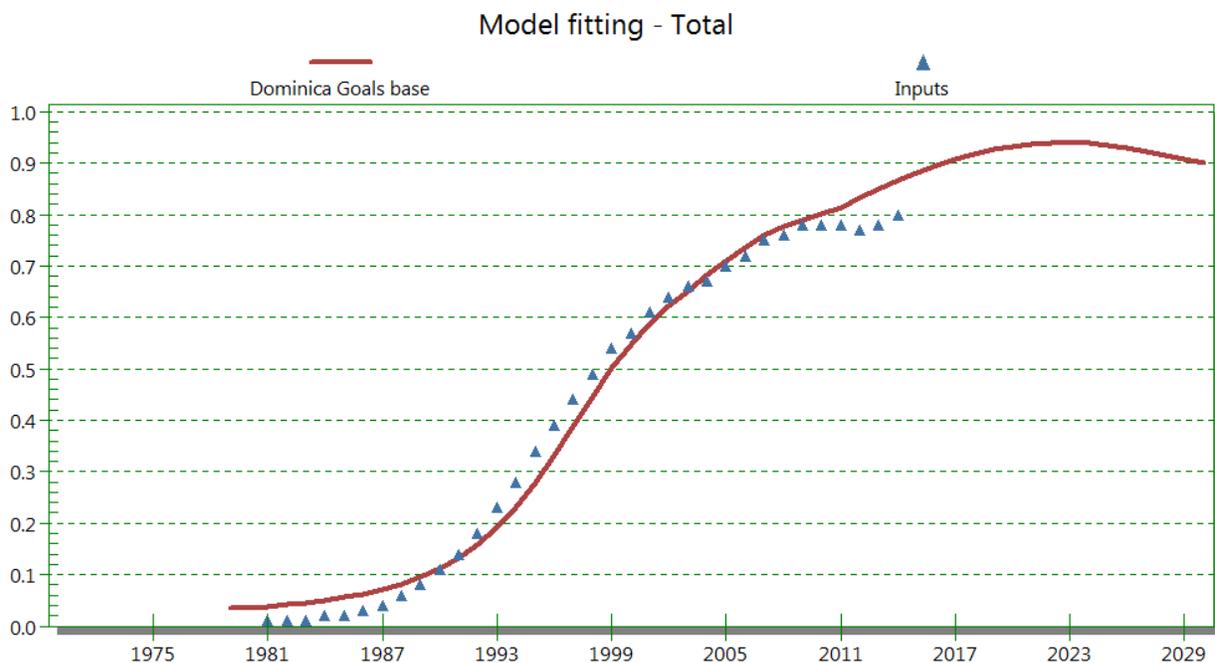
<sup>5</sup> Bollinger LA, How can we calculate the “E” in “CEA” *AIDS* 2008, 22(suppl 1): S51-S57.

## 2.1.2 Data and assumptions

The model parameters and sources used are provided in Annex A. Data on the epidemiology of HIV and AIDS in Dominica, including historical surveillance of HIV prevalence and the number of individuals receiving PMTCT and ART, were taken from the UNAIDS national estimates. Validated international studies were used to set values of epidemiological parameters such as the per-act probability of transmission and variation in risk of transmission by stage of infection, type of sex act, prevalence of other sexually transmitted infections (STI), and use of condoms. The model was further parameterized using a combination of country-specific published data sources whenever available. When country-specific estimates were unavailable, estimates from published Caribbean regional sources or expert opinion derived from interviews with clinicians and program staff familiar with the local epidemic was used.

The model was first fit to the historical pattern of HIV prevalence in Dominica in order to reproduce the historical epidemic dynamics. Figure 1 displays the closeness of fit between observed prevalence and the model-generated prevalence. The quality of this fit provides assurance that the model will accurately predict future dynamics, subject to projected changes in program coverage. The triangles are prevalence data from the Goals model and align well with existing surveillance data, suggesting that the Goals model developed to predict each scenario is strong.

**Figure 4. Goals Model Fit to Historical Prevalence Trend**



Current coverage estimates used in the modeling are based on service statistics. The full list of behavioral and unit cost data and sources are provided in Annex I.

The sources used and assumptions behind cost estimations for each intervention are detailed in Table I.

**Table 4. Key Unit Cost Assumptions (US \$)**

<b>Intervention</b>	<b>Unit Cost</b>	<b>Source</b>
Testing and counseling	\$30 per person	Routh, Subrata, Josef Tayag. September 2012. Costing of Primary Health Care and HIV/AIDS Services in Antigua and Barbuda: A Preliminary Report. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc.
ART (first line)	\$174.38 per patient per year	OECS purchase price for TDF/3TC/EFV
ART (second line)	\$518.78 per patient per year	OECS purchase price for TDF/FTC/LPV/ritonavir
PMTCT	\$607 per mother-baby pair	Average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support
Condoms	\$0.29 per condom	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
Prevention for MSM	\$242 per person per year	McLean R., V. Menon, A. Scott, T. Couture, S. Alkenbrack . 2013. The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados. Washington, DC: Caribbean HIV/AIDS Alliance and Futures Group, Health Policy Project
Prevention for sex workers and clients	\$242 per person per year	McLean R., V. Menon, A. Scott, T. Couture, S. Alkenbrack . 2013. The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados. Washington, DC: Caribbean HIV/AIDS Alliance and Futures Group, Health Policy Project
STI Treatment	\$65 per case	Global average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014

Costs of program support have been included as a percentage of the direct costs. This includes enabling environment (0.3%), administration (5.5%), research (0.3%), monitoring and evaluation (1%), communications (.2%), program level human resources (.9%) and training (1%) based on NASA regional

averages. Total program support costs are estimated at 9.2%, which is consistent with recent NHA findings in Dominica that found 9% of health spending was on administration and overhead<sup>6</sup>.

## 2.2 Scenarios

In consultation with the Dominica National AIDS Response Program, three model scenarios were developed to model costs and potential impact. Each reflects a possible set of changes in program coverage, corresponding to an increase or decrease in resource expenditure. The scenarios are projected from a baseline year of 2013, the last full year for which any data are available. They begin to diverge in 2015, the first year in which program changes will begin. All three scenarios estimate changes in program coverage to be achieved by the year 2020. The following scenarios are presented in depth in Table 4, which outline key indicators of the epidemic and coverage estimates from behavioral and treatment interventions. These figures are used in the Goals model to derive key outputs, such as the number of new HIV cases and AIDS deaths per annum.

### 2.2.1 Maintenance

The Maintenance scenario reflects funding for prevention programs such as community mobilization, condom provision, and outreach to MARPs to remain constant at current levels. The CD4 count threshold for ART eligibility also remains constant at 350 cells/ $\mu$ L and ART coverage remains constant at present levels.

### 2.2.2 Strategic Plan Scale-up

In this scenario, the coverage targets corresponding to key components of the HIV/AIDS Response Program reflect those proposed by the Dominica's Strategic Plan targets by 2019. These targets were determined by National HIV/AIDS Response Program and are shown in Table 2.

### 2.2.3 90-90-90 in 2020

This scenario reflects the UNAIDS proposed target levels of HIV program coverage by the year 2020 (90% of HIV positive individuals aware of their status; 90% of ART eligible individuals on ART; and 90% of people on treatment have suppressed viral loads). Funding to prevention programs remains constant. Voluntary counseling and testing coverage increases from 9% to 58% of the population in order to capture 90% of all PLHIV aged 15-49. The CD4 threshold for ART eligibility increases from 350 to 500 cells/ $\mu$ L in 2015. ART coverage increases to 90% in 2020 and remains constant thereafter.

There is not a significant difference between the Strategic Plan Scale-Up and the 90/90/90 by 2020 scenarios. The key variation is a faster increase in scale-up of treatment coverage in the 90/90/90 scenario, which has a target year of 2020. The Strategic Plan scenario aims to reach 2019 targets at the end of the strategic planning period.

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<sup>6</sup> National Health Accounts, Dominica, 2011.

**Table 5. Coverage of key interventions under the Strategic Plan Scale-up Scenario and 90/90/90 Scenario**

Intervention	Current	Country Plan Target	90/90/90 Target
	2013	2019	2020
Percentage of the adult population tested every year	17.7%	20%	20%
Population covered by condom promotion and distribution	42%	80%	80%
Prevention for sex workers and clients	25.7%	50%	80%
Prevention for MSM	50.3%	75%	80%
STI treatment	13%	60%	80%
Blood safety	100%	100%	100%
ART for adults*	41.5%	80%	90%
ART for children*	80%	80%	90%
PMTCT**	100%	100%	100%

\*In this scenario, eligibility for ART for both adults and children changes in 2015 to the new WHO guideline recommendations. For adults this means eligibility begins once the CD4 count falls below 500 cells/ $\mu$ l; plus all HIV+ pregnant women, discordant couples, those co-infected with tuberculosis, and those co-infected with hepatitis B are automatically eligible. For children that means eligibility for all HIV+ children below the age of 5 and all others with CD4 counts < 500.

## 2.3 Limitations

Goals is a globally-recognized tool for modeling the costs and impact of HIV programs, and is being used in all OECS countries as well as other countries in the region, such as Guyana and the Dominican Republic. However, the precision of any compartmental model can be limited in describing small populations (less than ~100,000) with low HIV prevalence. There are a series of factors that limit the precision of the modeling including availability of data for projections, accurate coverage estimates by National Programs and the inability to account for all types of technical assistance that contribute to outcomes.

As noted in Annex A, country-specific estimates were used whenever available, but in some cases, it was necessary to use regional or global estimates. Regional or global estimates for some behavioral parameters (i.e. sex acts per partner, number of partners per year) as well as some cost estimates were drawn from regional estimates (i.e. treatment service delivery costs drawn from an Antigua and Barbuda study).

The estimated average impact of interventions, expressed in the Goals software's impact matrix, is drawn from a global review of the literature. This is commonly-accepted standard practice for modeling

exercises of this type because sufficient intervention impact studies have not been performed at the local or even the regional level.

Coverage estimates for Dominica were unknown for interventions such as mass media and counseling and testing. We used estimates from published documents where available, supplemented with information from interviews with local stakeholders familiar with the programs.

Another limitation of the model is that costs of more indirect, technical assistance support are not able to be quantified. Since they contribute to a number of different program components as a sort of “cross cutting” support, it is more difficult to tie to specific impacts. In this exercise, we have adjusted, when possible, to account only for resources available for direct programming to facilitate consistency between resources available and resources needed for the National HIV/AIDS response.

## 3. SCENARIO RESULTS

### 3.1 Impact of scenarios

The results outlined below show the impact of maintaining the current program coverage, scaling up efforts as detailed by the National Strategic Plan (2015-2019) as well as the 90-90-90 scenario. Scaling-up programs to meet the targets detailed in the Strategic Plan would produce significant benefits including averting more than 63 new HIV infections and around 75 AIDS-related deaths. Table 3 provides a summary of the impacts. The trend in new infections is shown in new infections by 10% annually.

**Figure 5** and AIDS deaths in

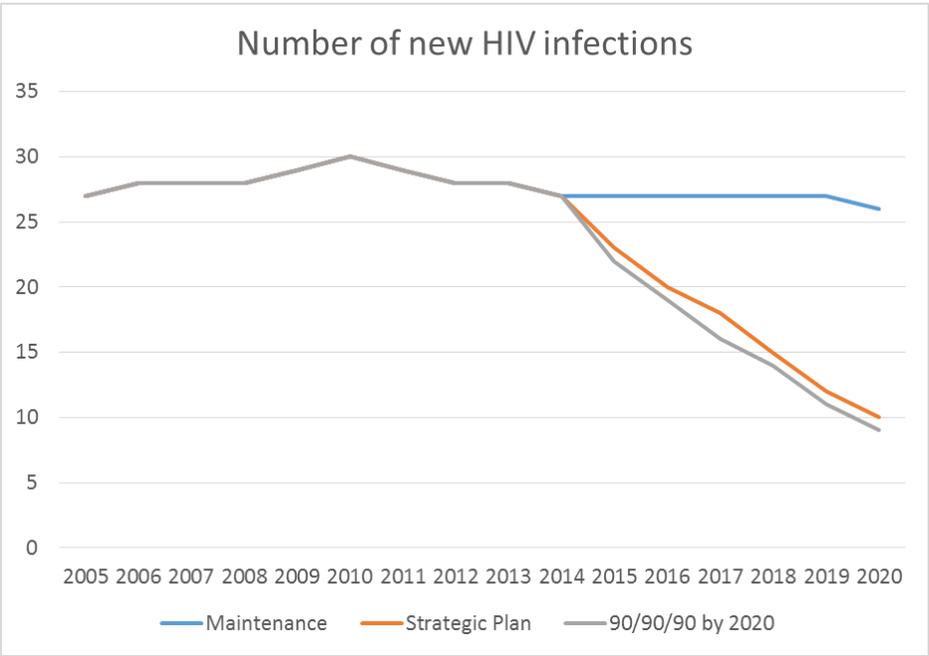
**Figure 6.**

**Table 6. Impact of Scaling Up Prevention and Treatment (projected impact generated by strategic plan and 90/90/90 scenarios).**

<b>Indicator</b>	<b>Strategic Plan</b>		<b>90/90/90</b>	
	<b>2015-2020</b>	<b>Percentage Difference</b>	<b>2015-2020</b>	<b>Percentage Difference</b>
<b>Infections averted</b>	63	-47%	70	-52%
<b>AIDS-related deaths averted</b>	75	-65%	83	-72%

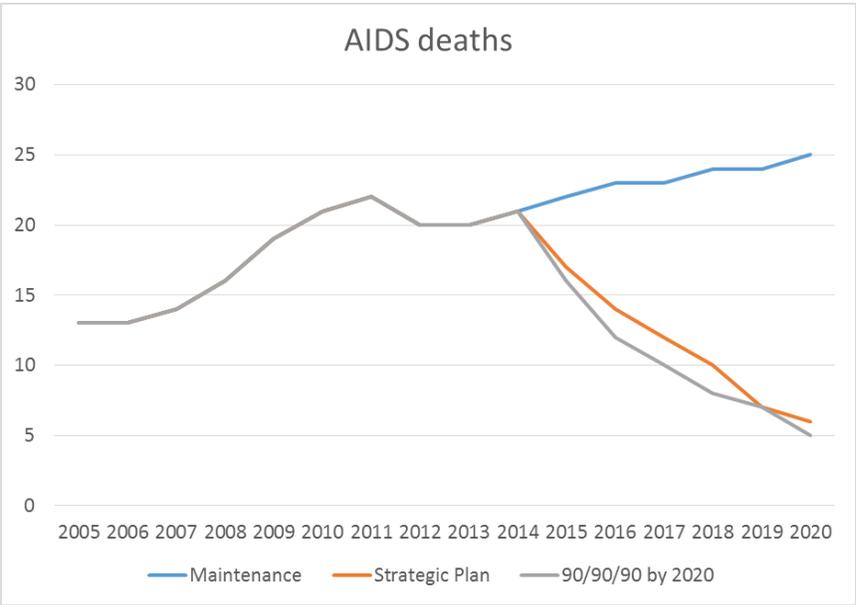
Implementation of the Strategic Plan would reduce the number of new infections by 47% over the period 2015-2019. The steeper increase in treatment scale-up of the 90/90/90 scenario would reduce new infections by 52% and avert 70 infections between 2015 and 2020. As illustrated in Figure 2, in absence of the rapid scale-up of interventions, there would still be about 27 new infections in 2019. New infections would remain virtually the same in the upcoming years if the status is maintained. However, given anticipated cuts in prevention funding for key populations, this is expected to have an extremely detrimental impact on the progress of the epidemic, leading to a projected increase in new infections by 10% annually.

**Figure 5. New HIV Infections**



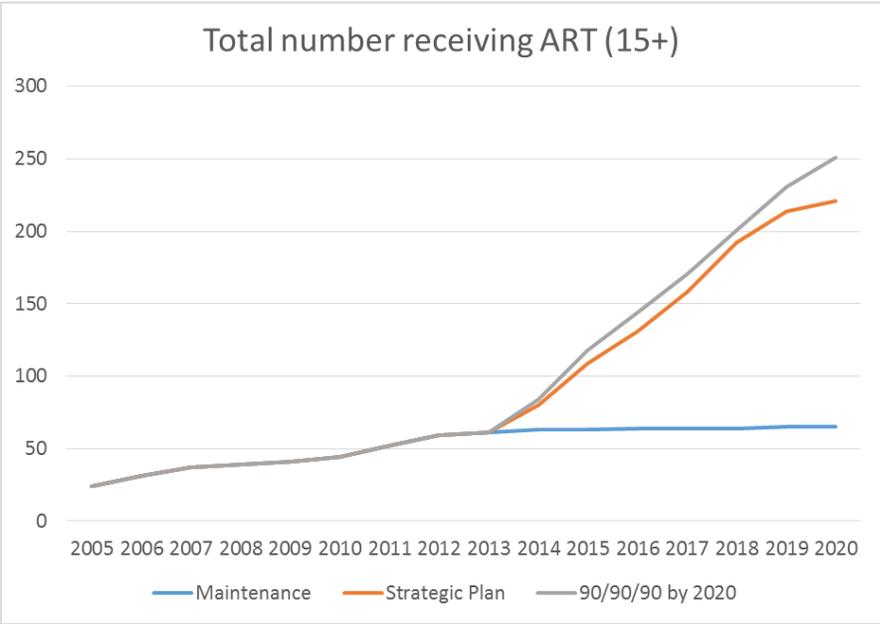
The number of AIDS deaths would also drop sharply if ART efforts were scaled up. Total AIDS-related deaths would be more than two-thirds lower over the time period if targets outlined in the Strategic Plan or 90/90/90 scenario are met.

Figure 6. AIDS-related Deaths



The large decline in AIDS-related deaths under the Strategic Plan scenario is the result of the increasing number of people receiving ART. The combination of achieving 80% coverage and the expanded eligibility guidelines means that the number of adults receiving ART would increase to more than 200 by 2019, a more than three-fold increase. In the 90/90/90 scenario, ART would reach 250 persons by 2020.

**Figure 7. Number of Adults Receiving ART**



In addition, the successes achieved by the PMTCT program to date will be maintained in all scenarios, assuming that current efforts will be maintained. The PMTCT program is projected to avert 5 new infections over the course of the Strategic Plan period 2015-2019. This would be achieved by reducing the transmission rate from 35% in years before the PMTCT program scaled up to the approximately 5% achieved by rolling out the PMTCT Option B+.

## 3.2 Need and Availability of Financial Resources for HIV and AIDS

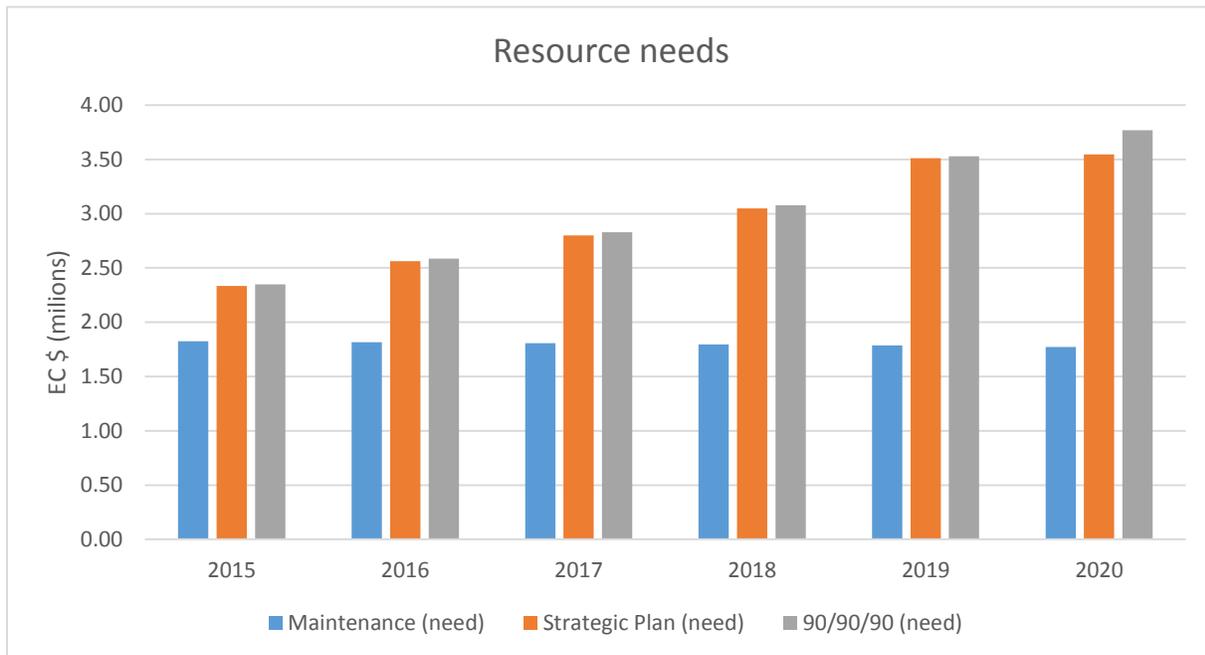
To provide strategic information reflecting the cost implications of each scenario and illustrate the potential funding gap, the model has included estimates of the financial resources required for outlined scenarios as well as funding available. The information helps to clearly visualize the funding gap that exists to execute the Maintenance and Strategic Plan scenarios.

### 3.2.1 Estimates of financial resources needed for HIV and AIDS programming

Cost estimates for program and service delivery in Dominica's national HIV/AIDS response were used to estimate the cost of each scenario. These are illustrated in Figure 6 by prevention, care and treatment and policy and program support costs.

As observed in Figure 5, even maintaining current coverage of HIV and AIDS services and programs in Dominica will require increased resources each year, from 1.9 million ECD in 2015 to over 2.2 million ECD in 2019. The increase is due to a growing population. In the Strategic Plan scenario, nearly \$3.5 million ECD per year will be required (increase of nearly 50%) by 2019 to successfully support the proposed scale up. The 90/90/90 scenario will require 3.8 million ECD per year by 2020. The additional costs are due to higher treatment costs associated with additional people in care and outreach with key populations.

**Figure 5. Total Financial Resources Needed: 2015-2020**



As observed in Figure 6, the maintenance scenario would cost 10.8 million ECD over the time period, while the Strategic plan scenario would cost 17.8 million ECD and the 90/90/90 scenario would cost 18.2 million ECD. The majority of costs for each scenario are for prevention, followed by care and treatment, and policy and program support. Costs for treatment scale up are offset by reduced costs for treatment of opportunistic infections.

**Figure 6. Financial Resources Needed by Prevention, Care, Treatment, 2015-2020**

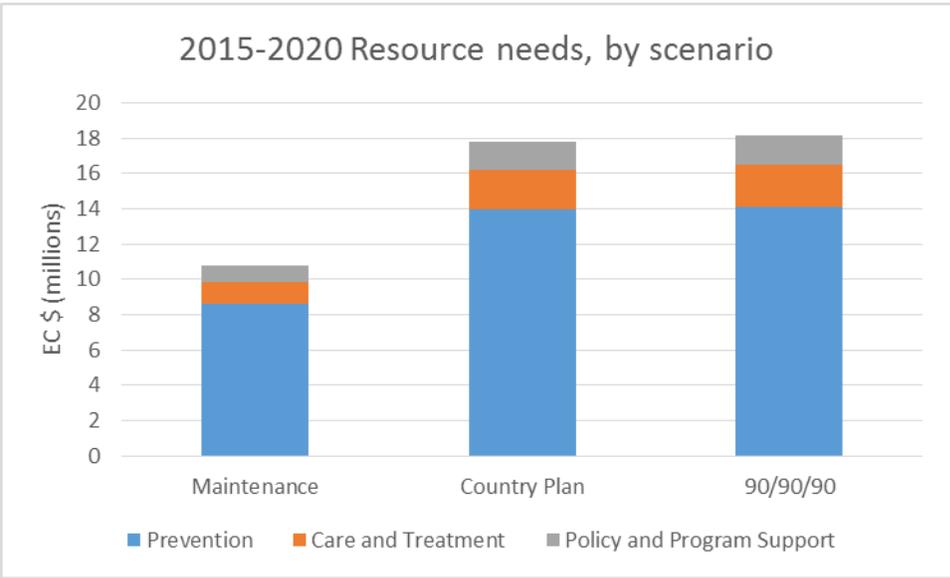
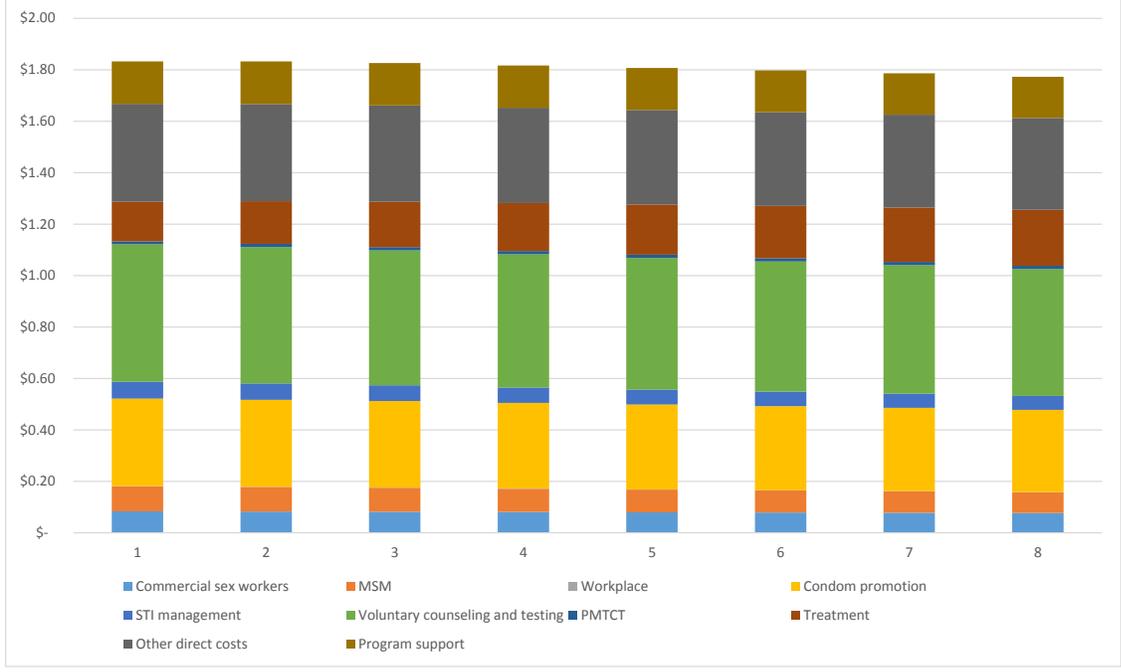


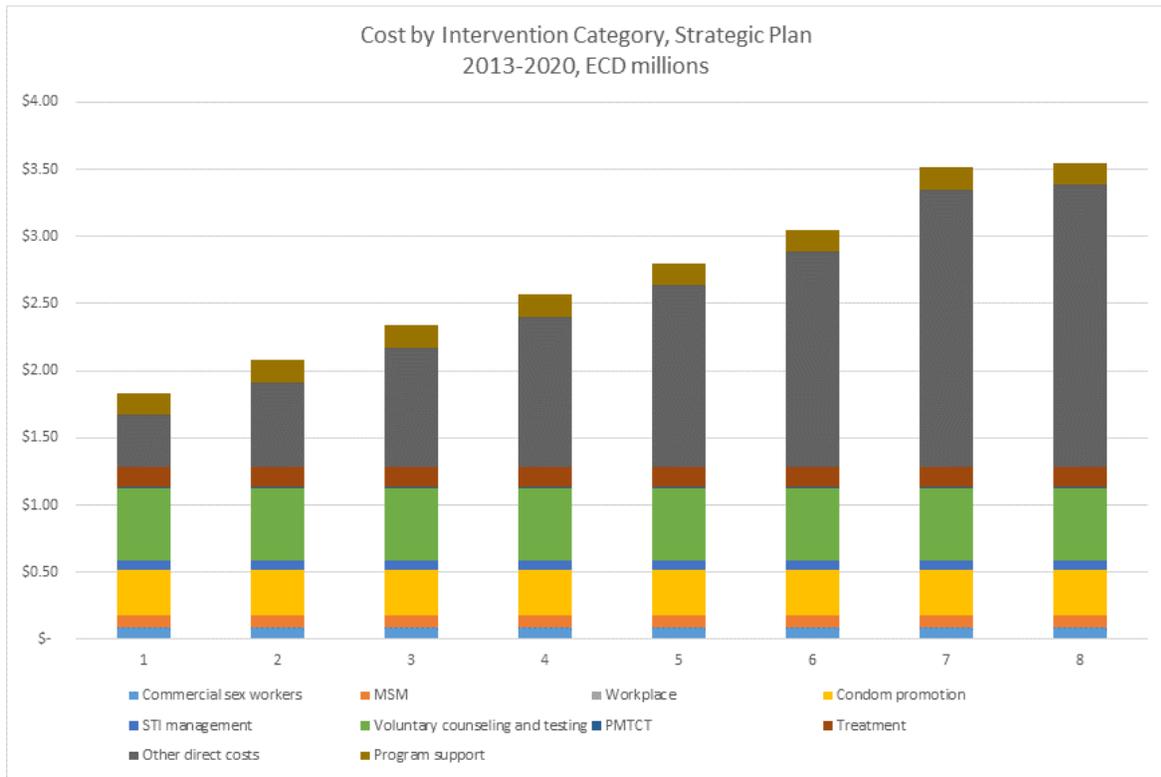
Figure 7, 8 and 9 illustrate resource needs by program component for each of the scenarios. In the maintenance scenario, the largest proportion of costs is invested in HIV testing and counseling, other program costs and condom promotion respectively. In the Strategic Plan and 90/90/90 scenarios (Figures 8 &9), other costs such as blood safety, community mobilization, mass media, prevention with other key populations along with other additional costs make up the largest spending needs followed by HIV counseling and testing and condom promotion.

**Figure 7: Break down of resources required by program element: Maintenance Scenario.**

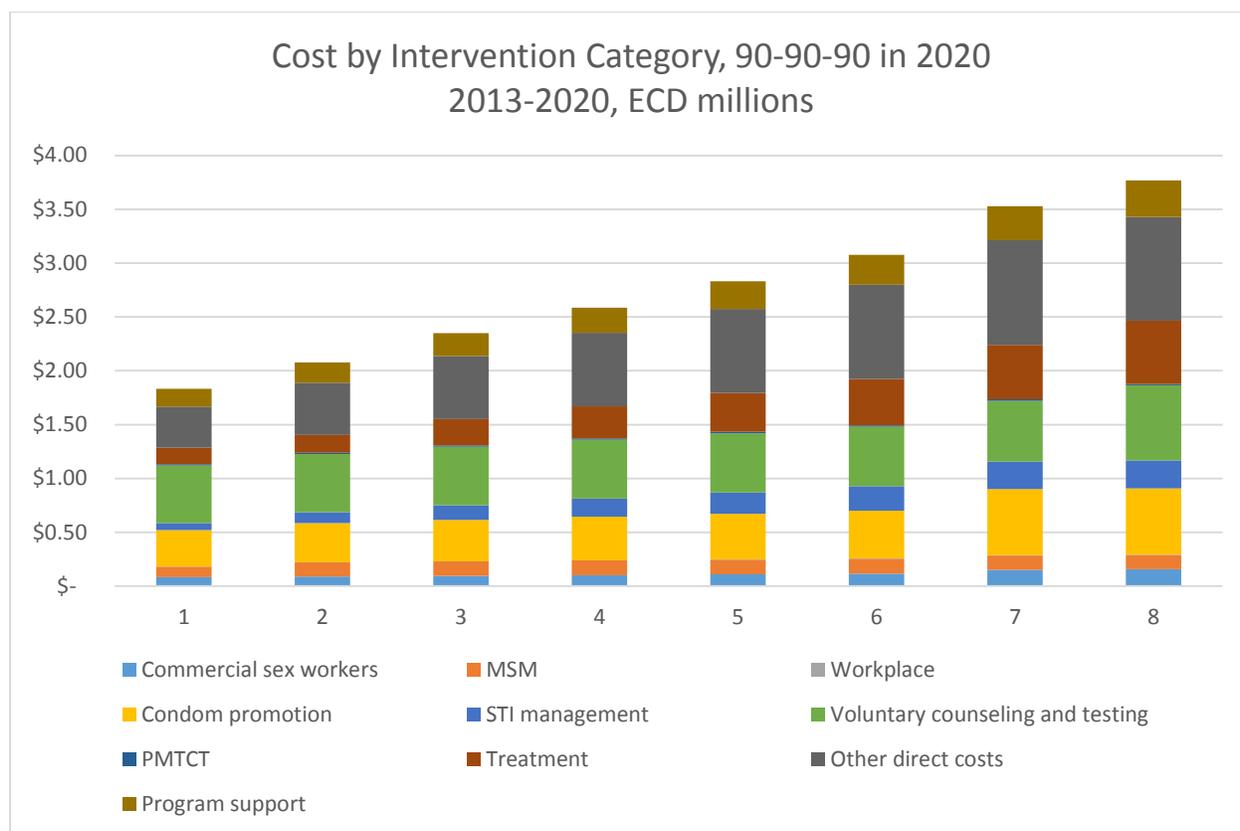
Cost by Intervention Category, Maintenance  
2013-2020, ECD millions



**Figure 8: Break down of resources required by program element: Strategic Plan Scenario.**



**Figure 9: Break down of resources required by program element: 90-90-90 Scenario.**



### 3.2.2 Financial resources available for HIV and AIDS programming

The estimated financial resources available to Dominica to support HIV prevention, care, treatment, and program management from 2015-2019 was calculated using the Dominica’s National Health Accounts (NHA) estimation. NHA is a standardized resource tracking methodology that measures past health expenditures by sources and identifies how these funds are allocated among health care providers and functions. The HIV “subaccounts” track spending on HIV and AIDS programs specifically.

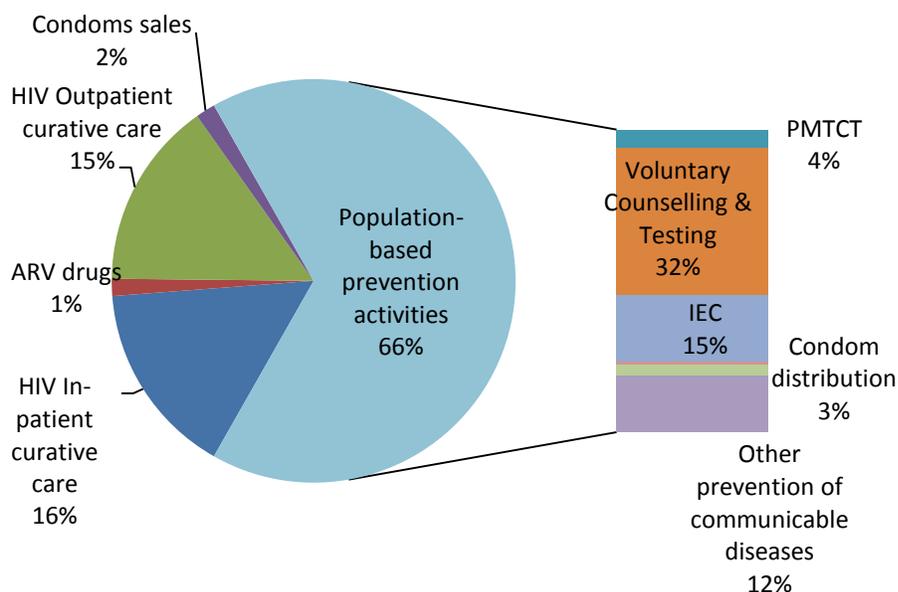
For the purpose of this analysis, it is assumed that patterns of government HIV spending are likely to remain relatively consistent into the future and that the 2011 HIV subaccounts estimates for government spending can thus function as an acceptable proxy for future resource allocations to HIV by these sources. Contributions from international donors and NGOs, on the other hand, may change

substantially from year to year, and thus past spending levels are less useful for predicting future allocations.

HIV spending in 2010-2011 totaled 1.9 million ECD (US\$ 719,000), which represented 2% of total health spending in Dominica. Government spending represented just over half (56%) of the total spending on HIV. The remainder was funded by external donors. Resources for HIV from households, employers, and insurance have not been included in this analysis. The 2010-2011 NHA was not able to capture out-of-pocket expenditure because the PLHIV survey conducted only captured people who were registered with the National HIV and AIDS Response Program and who typically use public facilities where HIV services are free. Employer and insurance expenditure was also not significant according to the data collected.

As illustrated in Figure 10, considering HIV spending from all sources, the largest sum of resources allocated was for population-based prevention activities, followed by care and treatment and administration and management (Table 5).

**Figure 10. Total HIV/AIDS spending by type (NHA, 2010-2011)**



Government spending for HIV includes subsidies provided to the NHARP as well as spending on HIV via Princess Margaret hospitals and other public facilities. In 2010-11, donors funded the majority of HIV prevention spending (58%), while the government funded the majority of HIV curative care spending. Anti-retroviral drugs were provided by external donors.

**Table 4. Government spending for HIV/AIDS (NHA, 2010-2011)**

Type of expense	ECD	USD
Inpatient HIV care	299,427	111,986
Outpatient HIV care	289,103	108,124
Spending on ARV drugs	26,294	9,833
Prevention activities	761,730	284,887
<b>Total</b>	<b>1,376,554</b>	<b>514,831</b>

The main donors that have traditionally contributed to Dominica’s HIV and AIDS response include PEPFAR, PAHO, UNAIDS the Global Fund and KfW. Each of these donors has supported direct services and programs and provided technical assistance. Since the Goals model focuses on the cost and impact of interventions and program support at the country level, rather than resources provided for technical assistance, the resource estimates included in Table 6 have been adjusted to account for those components that can be directly attributed to impact, such as service delivery, prevention programs, and media outreach. To illustrate, Table 5 reflects PEPFAR contributions, in which 25% of funding will be available to the country for direct HIV programming around care, treatment, and prevention efforts, with the remainder allocated to technical assistance and training efforts. The proportion of funding allocated to “direct” support was calculated using past funding patterns (NHA, NASA/UNGASS reports) which indicated that approximately 25% of total remaining PEPFAR funding is directed to support the aforementioned components. This same exercise was also conducted when calculating KfW contributions to “direct programming”.

**Table 5. Expected PEPFAR contributions to Dominica National HIV/AIDS Response Program**

Funding commitment (EC\$)	2014	2015	2016	2017	2018
<b>Total indicated PEPFAR funding to all implementing partners working in Dominica</b>	672,500	538,000	403,500	269,000	0
<i>Of which:</i>					
Estimated PEPFAR resources available for <b>direct</b> HIV programming in Dominica (25%)	168,125	134,500	100,875	67,250	0
Estimated PEPFAR resources available for <b>training and technical assistance</b> to Dominica (75%)	504,375	403,500	302,625	201,750	0

Table 6 below summarizes projected resources available for direct HIV programming in Dominica over the next four years. NHA estimates were used to calculate available government funding. Projected donor contributions were provided by PEPFAR, KfW and Global Fund representatives. All values are expressed in EC dollars.

**Table 6. Projected resources available for direct HIV programming Dominica (ECD)**

	2013	2014	2015	2016	2017	2018
<b>Government*</b>	1,376,554	1,376,554	1,390,320	1,404,223	1,418,265	1,432,448
<b>Global Fund**</b>	33,037	15,463	23,905	21,036	0	0
<b>PEPFAR *** (direct)</b>	652,162	735,656	134,500	100,875	67,250	0
<b>KfW</b>	113,293	93,761	23,440.13	0	0	0
<b>Total</b>	2,175,046	2,221,434	1,572,165	1,526,134	1,485,515	1,432,448

\*National Health Accounts (NHA), 2011

\*\*OECS Pharmaceutical Procurement Services Records September 2014, assuming reduction to 25% of total cost in 2015 and no contribution following 2015.

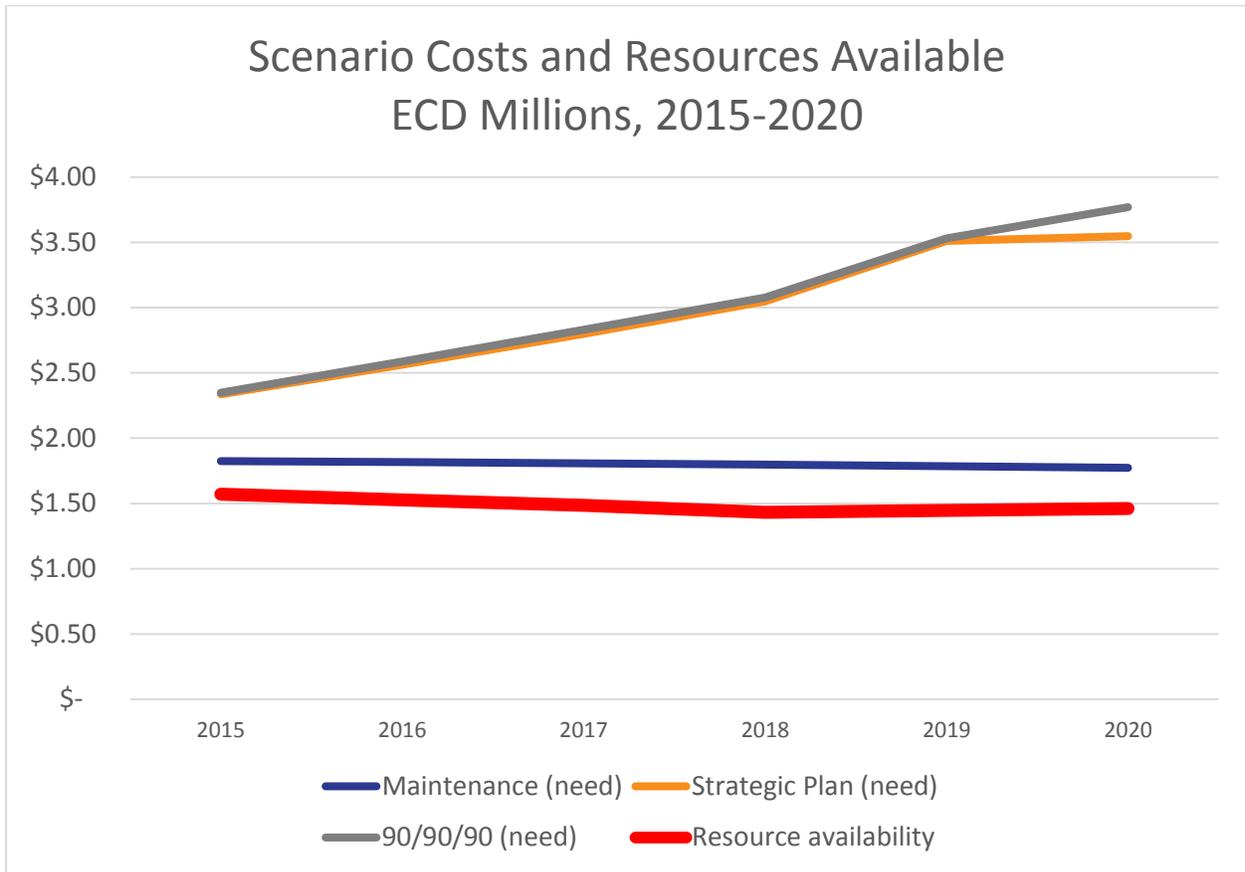
### 3.2.3 Expected Funding Gaps

Given declining donor funding commitments, Dominica's overall HIV program needs do not coincide with available funding. As illustrated in Figure 9 below, the funding gap is 440,000 ECD for the Maintenance scenario in 2015 and continues at or around this level until 2020. For the Strategic Plan scale-up scenario, the funding gap increases from 950,000 ECD to 960,000 ECD between 2015 and 2012. Table 7 shows the breakdown of the resource gap by year and scenario.

**Table 7. Projected resource gap for each scenario (ECD millions)**

	2014	2015	2016	2017	2018	2019	2020
Maintenance (need)	\$1.83	\$1.83	\$ 1.82	\$ 1.81	\$ 1.80	\$ 1.79	\$ 1.77
Country plan (need)	\$ 2.08	\$ 2.34	\$ 2.56	\$ 2.80	\$ 3.05	\$ 3.51	\$ 3.55
90/90/90 (need)	\$ 2.08	\$ 2.35	\$ 2.59	\$ 2.83	\$ 3.08	\$ 3.53	\$ 3.77
Resource availability	\$ 2.22	\$ 1.57	\$ 1.53	\$ 1.49	\$ 1.43	\$ 1.45	\$ 1.46
Resource gap (maintenance)	\$(0.39)	\$ 0.25	\$ 0.29	\$ 0.32	\$ 0.36	\$ 0.34	\$ 0.31
Resource gap (country plan)	\$ (0.14)	\$ 0.76	\$ 1.04	\$ 1.32	\$ 1.62	\$ 2.06	\$ 2.09
Resource gap (90/90/90)	\$ (0.14)	\$ 0.78	\$ 1.06	\$ 1.34	\$ 1.65	\$ 2.08	\$ 2.31

Figure 11. Resource requirements and gap for 3 scenarios



## V. CONCLUSIONS

Through the modeling of these scenarios in Dominica, it is clear that both the maintenance and scaling up of the National HIV and AIDS response requires additional financial investment. While the Caribbean Region has committed to scaling to a 90/90/90 scenario, making this a reality in each of the countries, as is the case for Dominica, will require a targeting of existing resources available to evidence-based strategies proven most effective to reduce transmission. Especially in the case of prevention interventions, which represent the greatest proportion of the resource need, key decisions need to be made about what populations are most-at-risk and what interventions are most effective, in terms of impact and cost efficiency to direct implementation efforts. Organizations like the CDC recommend high-impact prevention strategies as a cost-effective way to reduce infections, which targets high risk populations while prioritizing wider population-based interventions that have proven effective.<sup>7</sup> Strategic exercises to obtain this type of focus include, but are not limited to revision of the country's most-at-risk populations, determining how to target high risk populations through HIV testing and counseling efforts to then link to care and treatment and what general prevention strategies are most effective.

\*63 infections would be averted with the Strategic Plan scenario or 70 with the 90/90 scenario by 2020.

\*Prevention efforts account for the majority of past spending and future resource needs.

\*Dominica will eventually need an additional 1-2 million ECD investment per annum to achieve the Strategic Plan and 90/90/90 scale ups.

In terms of funding needs, diversification of donors including more active participation of private sector partners is necessary to scale up the National HIV and AIDS Response in Dominica. National Health insurance and private insurance coverage for HIV and AIDS services also pose promise to generate resources to maintain and scale the current response.

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<sup>7</sup> Centers for Disease Control (2013). *High-Impact HIV Prevention: CDC's Approach to Reducing HIV Infections in the United States*

# ANNEX A: INPUTS TO THE GOALS & RESOURCE NEEDS MODELS

	Value	Source
<b>Distribution of the Population by Risk Group</b>		
<b>Percentage of males</b>		
Not sexually active (Never had sex)	19.90%	KAPB, 2011, p. 90
Low risk heterosexual (One partner in the last year)	42.6%	Remaindered
Medium risk heterosexual (more than one partner in last year)	29.8%	KAPB, 2011, p. 108
High risk heterosexual (Client of sex worker)	6.4%	KAPB, 2011, p. 108
MSM	1.3%	MSM size mapping 2012, p. 20
<b>Percentage of females</b>		
Not sexually active (Never had sex)	15.70%	KAPB, 2011, p. 90
Low risk heterosexual (One partner in the last year)	50.34%	Remaindered
Medium risk heterosexual (more than one partner in last year)	31.36%	KAPB, 2011, p. 108
High risk heterosexual (Sex worker)	2.60%	KAPB, 2011, p. 108
<b>Percentage of IDU sharing needles</b>		

		Value	Source
<b>Condom use in last sex act (Latest available, plus earlier years if available)</b>			
	Low risk	13.9%	KAPB, p. 121
	Medium risk	42.0%	KAPB, p. 123
	High risk	65.6%	KAPB, p. 128
	MSM	63.0%	2010 BSS, p. 55
<b>Number of partners per year</b>			
Males			
	Low risk	1.0	By definition
	Medium risk	3.2	KAPB, p. 114 (regular partner + 2.2 irregular)
	High risk	9.0	Regional default
	MSM	6.0	2010 KAP reports highest number in 3-5 range for 6 months; 6.7 in previous plan p. 10
Females			
	Low risk	1.0	By definition
	Medium risk	1.9	KAPB, p. 114 (regular partner + .9 irregular)
	High risk	140.0	Estimated to balance male acts
<b>Sex acts per partner</b>			
	Low risk	70.0	Global Default
	Medium risk	30.0	Estimated

		Value	Source
	High risk	1.9	Estimated
	MSM	14.0	Estimated
<b>Age at first sex</b>			
	Males	15.0	KAPB, 2011, p. 90
	Females	18.0	KAPB, 2011, p. 90
<b>Percent married or in union</b>			
Males			
	Low risk	100.0%	By definition
	Medium risk	27.0%	KAPB, p. 11
	High risk	27.0%	KAPB, p. 11
	MSM	27.0%	KAPB, p. 11
Females			
	Low risk	100.00%	By definition
	Medium risk	27.00%	KAPB, p. 11
	High risk	27.00%	KAPB, p. 11
<b>Coverage of behavior change interventions</b>			
<b>General populations</b>			
	Community mobilization	10.0%	Whistlestop campaigns
	Mass media	68.0%	KAPB, heard through radio

		Value	Source
	VCT (percent of adults tested in the last year)	17.7%	3686, from UNGASS/adult population
	Condoms	42.0%	Equal to medium risk use
	Youth in school	50.0%	Estimate based on teachers trained
	Youth out of school	0.0%	
	Workplace	35.5%	11 companies/31
<b>Most-at-risk populations</b>			
	Female sex workers	25.7%	CHAA report
	MSM outreach	50.3%	CHAA report
	Kalinago	0.0%	
	Prisoners	0.0%	
	Migrants	0.0%	
<b>Medical Services</b>			
	STI treatment	13.0%	KAPB, p. 133
	Blood safety	100.0%	last NSP
<b>Unit Costs</b>			
<b>General populations</b>			
	Community mobilization	\$ 3.29	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014

		Value	Source
	VCT (percent of adults tested in the last year)	\$ 30.00	Routh, Subrata, Josef Tayag. September 2012. Costing of Primary Health Care and HIV/AIDS Services in Antigua and Barbuda: A Preliminary Report. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc. Abt
	Condoms	\$ 0.29	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Youth in school	\$ 68.61	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Youth out of school	\$ 16.22	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Workplace	\$ 9.65	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Blood safety	\$ 18.57	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
<b>Most-at-risk populations</b>			
	Female sex workers	\$ 42.00	McLean R., V. Menon, A. Scott, T. Couture, S. Alkenbrack . 2013. The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados. Washington, DC: Caribbean HIV/AIDS Alliance and Futures Group, Health Policy Project

		Value	Source
	MSM outreach	\$ 242.00	McLean R., V. Menon, A. Scott, T. Couture, S. Alkenbrack . 2013. The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados. Washington, DC: Caribbean HIV/AIDS Alliance and Futures Group, Health Policy Project
	Kalinago	\$ 49.22	Proxy from Belize National Resource Needs Estimates, Health Policy Project 2010. Price to reach Garifuna.
	Migrant workers	\$ 4.30	Cost drawn from HIV/AIDS Unit cost repository: <a href="http://policytools.futuresinstitute.org/UC/">http://policytools.futuresinstitute.org/UC/</a>
	Prisoners	\$ 45.00	Belize National Resource Needs Estimates, Health Policy Project. 2010.
<b>Medical Services</b>			
	STI treatment	\$ 65.00	Global average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Blood safety	\$ 18.57	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	Post exposure prophylaxis	\$ 14.53	LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	ART (ARVs)	\$ 174.38	OECS data point from GPRM: TDF/3TC/EFV
	ART (second line)	\$ 518.78	OECS data point from GPRM: TDF/FTC/LPV/ritonavir

		Value	Source
	Diagnostic tests	\$ 216.00	Routh, Subrata, Josef Tayag. September 2012. Costing of Primary Health Care and HIV/AIDS Services in Antigua and Barbuda: A Preliminary Report. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc. Abt
	PMTCT	\$ 607.00	SAS regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014
	PCR for infant	\$62	Default
	ART outpatient care	\$ 233.70	Routh, Subrata, Josef Tayag. September 2012. Costing of Primary Health Care and HIV/AIDS Services in Antigua and Barbuda: A Preliminary Report. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc. Abt
	ART inpatient care	\$332.90	Average cost per HIV/AIDS associated inpatient day, drawn from Routh, Subrata. June 2013. Costing of Service Provision at the Mount St. John's Medical Center in Antigua and Barbuda: Final Report. Bethesda, MD: Health Systems 20/20 Caribbean project, Abt Associates Inc. Abt
<b>Policy and Program Support</b>		% over direct costs	
	Enabling environment	0.3	Regional NASA average
	Program management	5.5	Regional NASA average
	Research	0.3	Regional NASA average
	Monitoring and evaluation	1	Default
	Strategic communication	0.2	Regional NASA average

		<b>Value</b>	<b>Source</b>
	Program-level HR	0.9	Regional NASA average
	Training	1	Regional NASA average

# ANNEX B: EPIDEMIOLOGICAL PARAMETERS

Parameter	Value	Source
Transmission of HIV per act (female to male)	0.0019	Baggeley <i>et al.</i> <sup>i</sup> , Gray <i>et al.</i>
Multiplier on transmission per act for		
Male to female	1.0	Galvin and Cohen <sup>ii</sup> , 2.2-11.3
Presence of STI	5.5	Powers <i>et al.</i> <sup>iii</sup> , 5.1-8.2
MSM contacts	2.6	Vittinghoff <i>et al.</i> <sup>iv</sup>
Relative infectiousness by stage of infection		
Primary infection	9 –40	Boily <i>et al.</i> <sup>v</sup> , 9.17 (4.47-18.81)
Asymptomatic	1	Pinkerton <sup>vi</sup>
Symptomatic	7	Boily <i>et al.</i> <sup>6</sup> , 7.27 (4.45-11.88)
On ART	0.04 – 0.08	Cohen <i>et al.</i> <sup>vii</sup>
Efficacy in reducing HIV transmission		Weller and Davis <sup>viii</sup>
Condom use	0.8	Weller and Davis <sup>ix</sup> , Auvert <i>et al.</i> <sup>v</sup> , Gray <i>et al.</i> (2007) <sup>xi</sup> , Bailey <i>et al.</i> <sup>xii</sup>
Male circumcision	0.6	Grant <i>et al.</i> <sup>xiii</sup> Partners PrEP Study
PrEP	0.55 – 0.73	Partners PrEP Study
Microbicide	0.6	Abdool Karim <i>et al.</i> <sup>xiv</sup>

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- <sup>i</sup> Baggaley RF, Fraser C. Modelling sexual transmission of HIV: testing the assumptions, validating the predictions. *Curr Opin HIV AIDS*. 2010; **5**(4): 269-76.
- <sup>ii</sup> Galvin and Cohen, "The Role of Sexually Transmitted Diseases in HIV Transmission" *Nature Reviews Microbiology* Volume 3, January 2004, pps. 33-42.
- <sup>iii</sup> Powers KA, Poole C, Pettifor AE, Cohen MS Rethinking the heterosexual infectivity of HIV-1: a systematic review and meta-analysis *The Lancet* Published on line August 5, 2008 DOI:10.1016/S1273-3099(08)70156-7.
- <sup>iv</sup> Vittinghoff E, Douglas J, Judson F, McKirnan D, MacQueen K, Buchbinder SP. Per-Contact Risk of Human Immunodeficiency Virus Transmission between Male Sexual Partners *Am J Epidemiol* (1999)150:3;306-31 suggests 0.0016/0.0011.
- <sup>v</sup> Boily MC, Baggaley RF, Wang L, Masse B, White RG, Hayes RJ, Alary M. Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies *Lancet Infect Dis* 2009; **9**: 118-29.
- <sup>vi</sup> Pinkerton SD. Probability of HIV transmission during acute infection in Rakai, Uganda. *AIDS Behav*. 2008; **12**(5): 677-84.
- <sup>vii</sup> Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 Infection with Early Antiretroviral Therapy *N Engl J Med* 2011; 10.1056/NEJMoa1105243.
- <sup>viii</sup> Weller S, Davis, K. Condom effectiveness in reducing heterosexual HIV transmission (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley & Sons, Ltd.
- <sup>ix</sup> Weller S, Davis, K. Condom effectiveness in reducing heterosexual HIV transmission (Cochrane Review). In: *The Cochrane Library*, Issue 1, 2004. Chichester, UK: John Wiley & Sons, Ltd.
- <sup>x</sup> Auvert B, Puren A, Taljaard D, Lagarde E, JoëlleTambekou-Sobngwi, RémiSitta. The impact of male circumcision on the female-to-male transmission of HIV : Results of the intervention trial : ANRS 1265. IAS 2005: INSERM, France; 2005.
- <sup>xi</sup> Bailey RC, Moses S, Parker CB, Agot K, Maclean I, Krieger JN, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. *Lancet*. 2007; **369**(9562): 643-56.
- <sup>xii</sup> Bailey RC, Moses S, Parker CB, Agot K, Maclean I, Krieger JN, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. *Lancet*. 2007; **369**(9562): 643-56.
- <sup>xiii</sup> Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L. Preexposure Chemoprophylaxis for HIV Prevention in Men Who Have Sex with Men *New Engl J Med* 2010, 10.1056/NEJMoa1011205.
- <sup>xiv</sup> Karim QA, Karim SSA, Frohlich J, Grobler AC, Baxter C, Mansoor LE, et al. Effectiveness and Safety of Tenofovir Gel, an Antoretroviral Microbicide, for the Prevention of HIV Infection in Women. *Science* 329; 1168-1174 (September 2010).



BOLD THINKERS DRIVING  
REAL-WORLD IMPACT