




# SUSTAINING THE HIV AND AIDS RESPONSE IN ST. LUCIA: INVESTMENT CASE BRIEF

November 2014

This publication was produced for review by the United States Agency for International Development. It was prepared by Matt Hamilton and Stephen Musau for the Health Finance and Governance Project.

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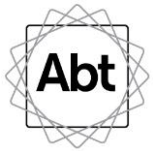


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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government.

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# ACRONYMS

| | |
|---|---|
| **ART** | Antiretroviral Therapy |
| **ARV** | Antiretroviral |
| **CSW** | Commercial Sex Workers |
| **EC CAP II** | Eastern Caribbean Community Action Program |
| **ECD** | Eastern Caribbean Dollars |
| **HTC** | HIV Testing and Counseling |
| **HFG** | Health Finance and Governance |
| **KfW** | German Development Bank |
| **MARPs** | Most-at-risk populations |
| **MoH** | Ministry of Health |
| **MSM** | Men who have sex with men |
| **OECS** | Organization of Eastern Caribbean States |
| **PEPFAR** | President's Emergency Plan for AIDS Relief |
| **PLHIV** | People living with HIV/AIDS |
| **PMTCT** | Prevention of Mother to Child Transmission |
| **STI** | Sexually transmitted infections |
| **UNAIDS** | Joint United Nations Program on HIV/AIDS |
| **UNGASS** | United Nations General Assembly Special Session |
| **VCT** | Voluntary Counseling and Testing |

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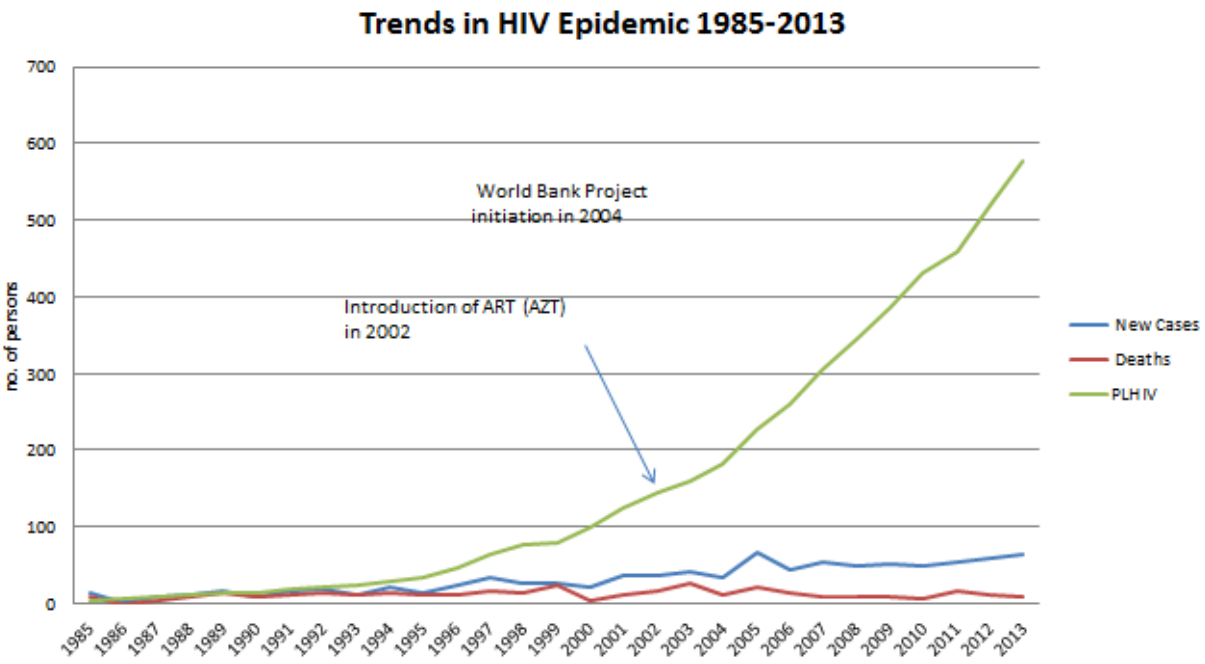
# 1. BACKGROUND

## 1.1 Introduction

The HIV prevalence in St. Lucia is estimated at 0.58%[1] based on reports from public and private laboratories on clients tested. This estimate is very likely an understatement given that some who engage in risky behavior do not go for testing and others also choose to be tested outside the country for fear of breaches of confidentiality[2]. The epidemic is concentrated among the most at risk groups including men who have sex with men (MSM), commercial sex workers (CSW), and other groups including prisoners and drug users.

The chart below gives a summary of the trends in the epidemic over the last 28 years[3].

**Figure 1: Trends in HIV Epidemic in St. Lucia 1985 to 2013**




*Source: D'Auverge, C. HIV Program Review 2014*

[1] Cleophas D'Auvergne. HIV Program Review. July 2014
[2] UNGASS report. March 2012
[3] Ibid

The HIV and AIDS response consists of prevention activities that have been mostly provided through non-governmental organizations and care and treatment provided mostly by the Ministry of Health (MoH). Prevention among most-at-risk populations (MARPS) was mainly provided by the President's Emergency Plan for AIDS Relief (PEPFAR)-funded Eastern Caribbean Community Action Program (EC CAP II), implemented by the Caribbean HIV/AIDS Alliance (CHAA) whose program ended in September 2014. The Ministry has succeeded in eliminating mother to child transmission of HIV; between 2007 and 2014 there have been no recorded cases. The MoH's care and treatment program is decentralized among several hospitals (Victoria Hospital; Bordelais Correctional Facility; and Vieux Fort Health Center). However the process of decentralization and integration of HIV and AIDS services into general primary care and into the private sector has been slow. The HIV/AIDS program has also been constrained by lack of reliable data. Behavioral surveys have not been conducted recently and hence the extent of HIV prevalence among key risk groups has not been easy to estimate. Other challenges include: the National HIV and AIDS Policy and Strategic Plan are still in draft form; uncertainty about sustainability of treatment care and support to PLHIV given decreasing donor funds; constraints with linkage to care after diagnosis and loss to follow up; costly access to viral load and genotype testing; increasing cost of ART coverage for government due to expanding patient volume as patients on ART live longer with the disease; punitive laws and practices around HIV transmission, sex work, drug use, buggery; and weak HIV governance structures[4].

## 1.2 Rationale

St. Lucia 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 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 Project, 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.

[4] Cleophas D'Auvergne. HIV Program Review. July 2014.

Beyond the development of an investment case and Concept Note for new external funding, this quantitative modelling will produce strategic information aimed to assist policymakers in St. Lucia 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.

# II. 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 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, 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 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. Goals 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. Goals 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.

The Goals model is also linked to the AIM module in Spectrum, which calculates the effects on children (aged 0-14) and those above the age of 49. The AIM module also includes the effects of programs to prevent mother-to-child transmission on pediatric infections.

### 2.1.2 Data and Assumptions

The model parameters and sources used are provided in Annex 1. Data on the epidemiology of HIV and AIDS in St. Lucia, including historical surveillance of HIV prevalence and the number of individuals receiving prevention of mother to child transmission therapy (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 (STIs), use of condoms, and other factors. The model was further parameterized using a combination of country-specific published data sources whenever available; when country-specific estimates were unavailable, we substituted estimates from published Caribbean regional sources or expert opinion derived from interviews with clinicians and program staff familiar with the local epidemic.

The model was first fit to the historical pattern of HIV prevalence in St. Lucia in order to reproduce the historical epidemic dynamics. Figure 2 displays the closeness of fit between observed prevalence (blue triangles) and the model-generated prevalence (red line) from the beginning of the epidemic in St. Lucia through 2013. The trend in historical prevalence over time was estimated statistically from national surveillance data among pregnant women as reported to UNAIDS. The quality of this fit provides assurance that the model will accurately predict future dynamics, subject to projected changes in program coverage.

**Figure 2: Model Fitting**

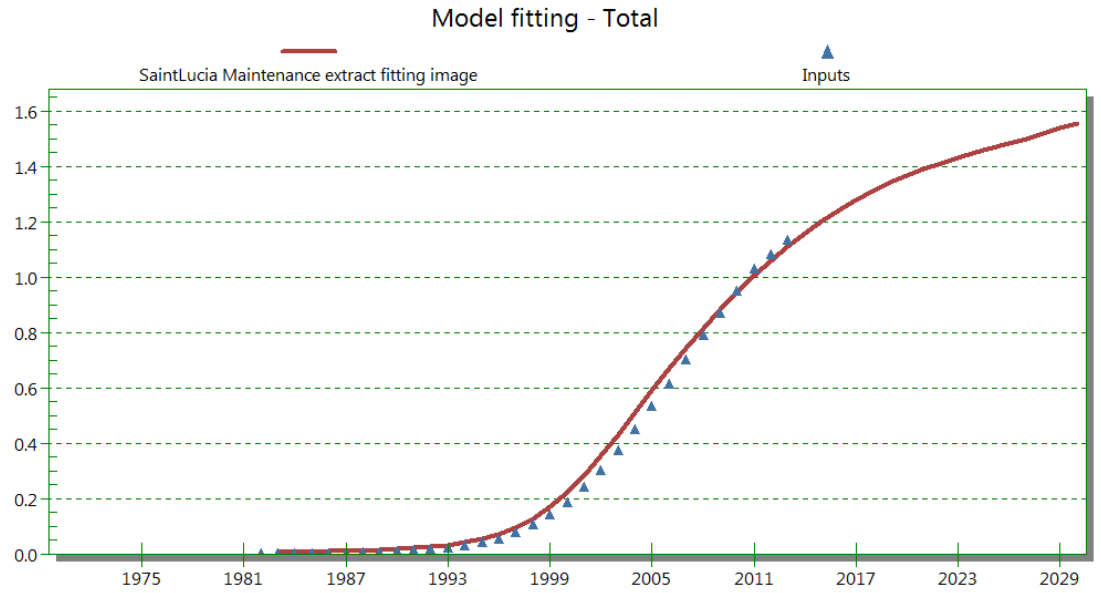


Table 1 summarizes the data used to estimate program costs. Most unit cost estimates were generated from studies conducted in the OECS (including estimates for testing and counseling, ART drug costs, and costs of prevention among most-at-risk populations). Some costs were derived from published regional averages.

**Table 1. Key Unit Cost Assumptions (US$)[5]**

| Intervention | Unit Cost | Source |
|---|---|---|
| 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 men who have sex with men (MSM) | $187.04 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 |

[5] The exchange rate used throughout this report for all years is US $1 = ECD 2.7.

| Intervention | Unit Cost | Source |
|---|---|---|
| | | and Barbados. Washington, DC: Caribbean HIV/AIDS Alliance and Futures Group, Health Policy Project |
| Prevention for sex workers and clients | $187.04 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 |

We included the costs of program support as a 9.2% percentage markup of direct costs, based on regional averages published in the National AIDS Spending Assessments (NASA) conducted by UNAIDS. Categories of program support are: enabling environment (estimated at 0.3% of direct costs), administration (5.5%), research (0.3%), M&E (1%), communications (.2%), program level HR (.9%) and training (1%).

## 2.2 Model projection scenarios

In consultation with the St. Lucia National AIDS Program, we created three model scenarios. Each reflects a possible set of changes in program coverages[6], 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. Program coverages are held constant from 2020 to the end of the projection period in 2030 in order to understand differences in impact across scenarios that may accumulate over time.

1. **Reduce Prevention**: In this scenario, coverage of prevention programs drops significantly in 2015 and remains constant thereafter, reflecting the discontinuation of CHAA's EC CAP II project

[6] Coverage is defined as the percentage of a target population that is reached with the intervention.

prevention activities among most-at-risk populations in October 2014. Coverage of community mobilization efforts drops by 33%, condom provision by 20%, and outreach among MARPs, such as sex workers and MSM, drops by 67% relative to 2013 baseline. The ART eligibility threshold is held constant at CD4 count of 350 cells/μL, and does not increase. The percentage of eligible individuals receiving ART remains constant.

2. **Maintenance**: Funding for prevention programs such as community mobilization, condom provision, and outreach to MARPs remains constant at current levels. All treatment parameters, including the eligibility threshold for ART and ART coverages are held constant at baseline levels.
3. **90-90-90 in 2020**: This scenario reflects the UNAIDS's 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)[7]. Funding to prevention programs remains constant. Voluntary counseling and testing coverage increases during 2015-2020 from 5.5% to 58% of the adult population testing each year; 59% being our calculated estimate of required VCT scale up increase to capture 90% of PLHIV aged 15-49. The CD4 threshold for ART eligibility increases from 350 to 500 cells/μL in 2015. ART coverage increases from current levels to 90% in during 2015-2020, and remains constant thereafter.

**Table 2. Coverage of Key Interventions Under Three Scenarios**

| Intervention | 2013 | 2020 | | |
|---|---|---|---|---|
| | Baseline | Reduce Prevention (1) | Maintenance (2) | 90-90-90 in 2020 (3) |
| CD4 Eligiblity threshold for adults (cells/μL) | 350 | 350 | 350 | 500 |
| Community mobilization | 10% | 6.7% | 10% | 10% |
| Percentage of the adult population tested every year | 5.5% | 5.5% | 5.5% | 59% |

[7] http://www.unaids.org/en/media/unaids/contentassets/documents/speech/2014/07/20140720_SP_EXD_AIDS2014opening_en.pdf (Accessed 9 December 2014)

| Intervention | 2013 | 2020 | | |
|---|---|---|---|---|
| Population covered by condom promotion and distribution | 28.9% | 23.1% | 28.9% | 28.9% |
| Prevention outreach to sex workers | 27.7% | 9.1% | 27.7% | 27.7% |
| Prevention outreach to MSM | 32.4% | 10.6% | 32.4% | 32.4% |
| STI treatment | 15% | 15% | 15% | 15% |
| Percent of primary school teachers trained in HIV/AIDS education | **3.3%** | **3.3%** | **3.3%** | **3.3%** |
| Percent of secondary school teachers trained in HIV/AIDS education | **20%** | **20%** | **20%** | **20%** |
| Blood safety | 100% | 100% | 100% | 100% |
| ART for eligible adults | | | | |
| Males | 34.7% | 34.7% | 34.7% | 34.7% |
| Females | 38.3% | 38.3% | 38.3% | 38.3% |
| ART for children | 80% | 80% | 80% | 100%* |
| PMTCT | 100% | 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/μl; plus all HIV+ pregnant women, serodiscordant couples, those co-infected with tuberculosis, and those co-infected with hepatitis B are automatically eligible. For children (aged 0-14) this means eligibility for all HIV+ children below the age of 5 and all others with CD4 counts < 500.

## 2.3 Limitations of the modeling process

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.

As noted in Annex 1, this analysis used regional or global estimates for some behavioral parameters (i.e. sex acts per partner, number of partners per year). Country-specific estimates were used whenever available, but in some cases, it was necessary to use regional or global estimates. Similarly, 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 St. Lucia were unknown for interventions such as mass media and counseling and testing. We used estimates from National AIDS Programme documents where available, supplemented with information from interviews with local stakeholders familiar with the programs.

# III. SCENARIO RESULTS

## 3.1 Impact of scenarios

Figures 3 - 5 below display selected results from each scenario. The 90-90-90 scenario begins to diverge from the Maintenance scenario in 2015, when CD4 eligibility threshold increases from 350 to 500. Starting in 2016, ART coverage of eligible PLHIV begins to increase rapidly to 90% in 2020.

In the Reduce Prevention scenario (Figure 3), although the expansion of ART eligibility temporarily reduces the annual number of infections, incidence continues to increase because outreach efforts and testing rates are insufficient to reduce transmission and infections among sex workers, MSM, and those groups with highest prevalence and highest annual risk of infection. The number of new infections in the Maintenance scenario remains nearly constant through 2025; it begins to decrease later. In the 90-90-90 scenario, there is a steep and continued decline in the number of new infections.

The number of annual deaths in the Reduce Prevention scenario (Figure 4) remains below the number of annual deaths in the Maintenance scenario much longer, however, because a larger proportion of PLHIV are on ART and therefore at much lower risk of mortality. Under the 90-90-90 scenario, there is a profound and steep decrease in AIDS deaths because of expanded ART coverage.

The 90-90-90 scenario has an immediate and profound effect on all aspects of the epidemic. The dramatic increase in the proportion of PLHIV receiving ART (Figure 5) is responsible for reducing both mortality and transmission, but implies a proportional increase in costs. Note that the 90-90-90 scenario as modeled here represents an increase in testing and ART coverage only; we do not model any increase in coverage of prevention programs. This is therefore a conservative analysis in terms of both impact and costs, since it would be very difficult to achieve the target of 90% of PLHIV knowing their status without an increase in coverage of such prevention programs – especially outreach to vulnerable populations with low testing rates and high prevalence.

**Figure 3: Number of New HIV infections by scenario**

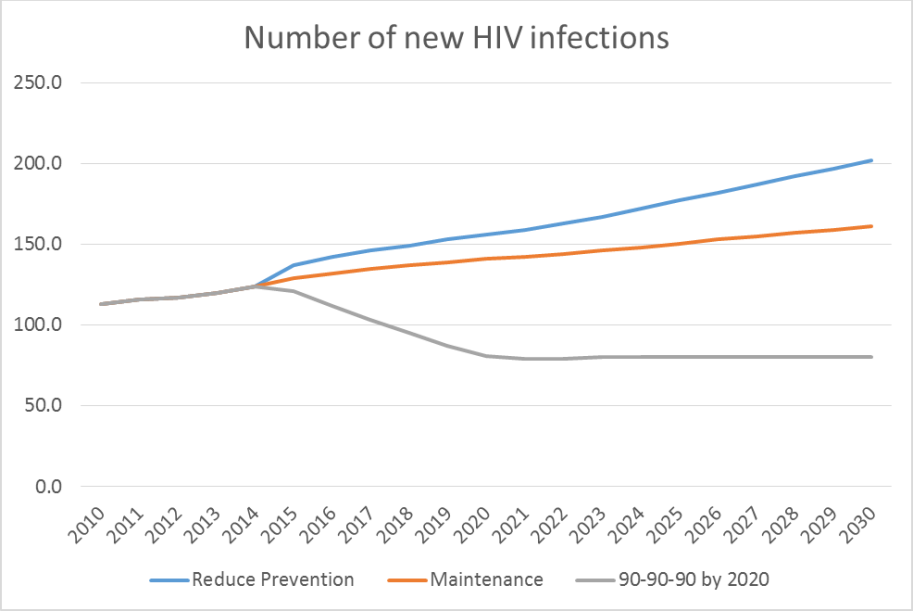



**Figure 4: AIDS deaths by scenario**

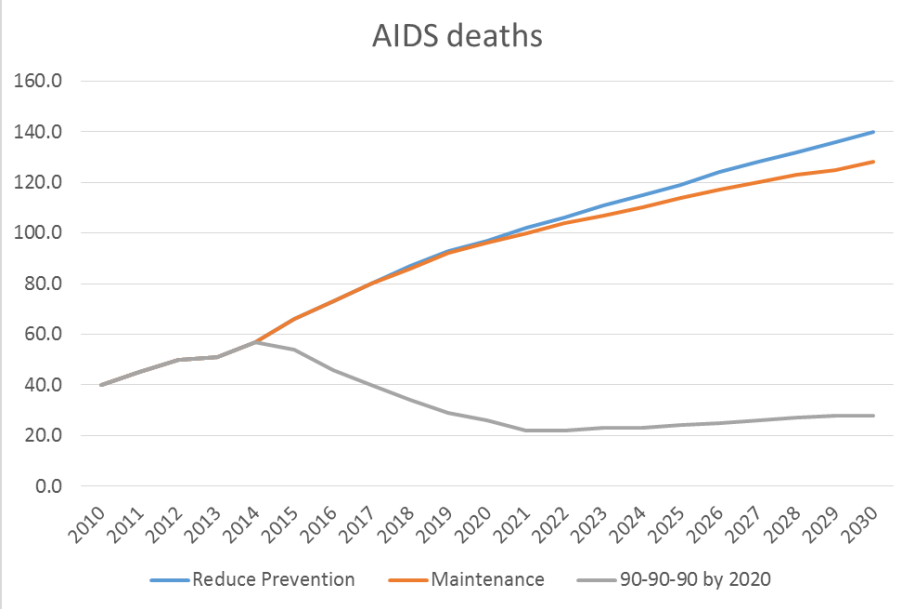


**Figure 5. Total number aged 15+ receiving ART at the end of each year**

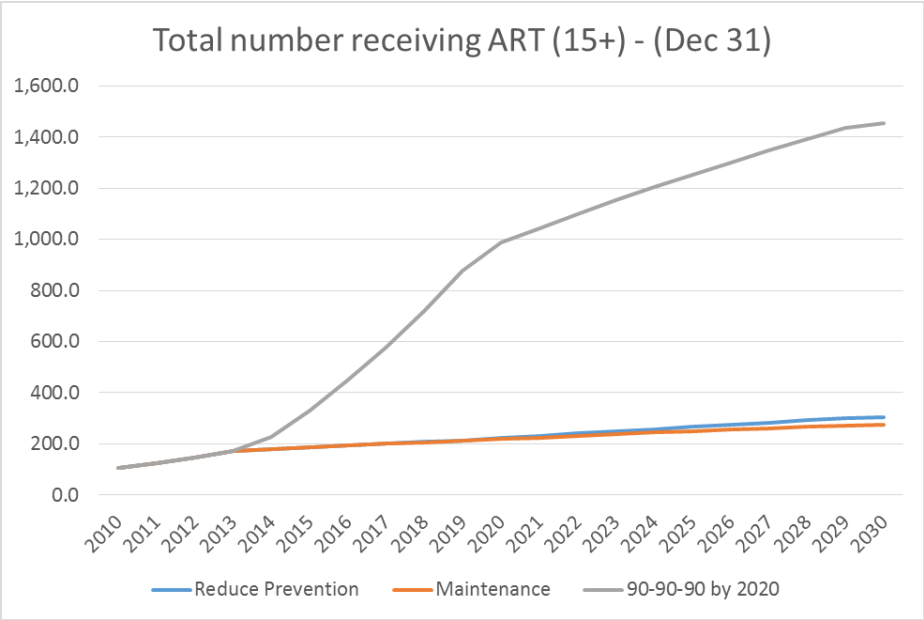



Table 3 shows several costs per infection and death averted during 2015-2020 by the 90-90-90 scenario relative to the Maintenance scenario, and for the Maintenance scenario relative to the Reduce Prevention scenario. For each comparison, the total difference in costs (discounted at 3% per year[8]) during 2015-2020 between the two scenarios is divided by the cumulative difference in number of infections (or deaths) during 2015-2020. The result is a simple metric of cost-effectiveness.

Under the 90-90-90 Scenario, it would cost EC$75,739 per infection averted as compared with the Maintenance scenario in the six-year period between 2015 and 2020. Under the Maintenance Scenario, it would cost EC$39,775 per infection averted relative to the Reduced Prevention Scenario in the six-year period between 2015 and 2020. Similarly, under the 90-90-90 scenario, it would cost EC$961,265 per death averted as compared with the Maintenance scenario. Under the Maintenance Scenario, it would cost EC$93,656 per death averted relative to the Reduced Prevention Scenario. The costs per infection and death averted appear high in the short-term six-year period because the Maintenance and 90-90-90 scenarios diverge slowly from the Reduced Prevention scenario in their numbers of infections

[8] When considering future costs (or benefits) it's typical to apply a discount rate. One reason is that money can earn value over time (concept of time value of money). Another is that people tend to value future costs/benefits less than present costs/benefits – rationally because the future is uncertain, and irrationally because we are impatient. 3% is a standard discount rate.

and deaths; the epidemiological impact of the two more expensive scenarios relative to Reduced Prevention will continue to accumulate into the future, improving cost-effectiveness of the investment over time.

**Table 3. Comparative cost-effectiveness metrics**

| **Cost per infection averted, 2015-2020** | ECD | USD |
|---|---|---|
| 90-90-90 scenario relative to Maintenance scenario | $ 75,739 | $ 28,051 |
| Maintenance scenario relative to Reduce Prevention scenario | $ 39,775 | $ 14,731 |
| **Cost per death averted, 2015-2020** | | |
| 90-90-90 scenario relative to Maintenance scenario | $ 961,265 | $ 356,024 |
| Maintenance scenario relative to Reduce Prevention scenario | $ 93,656 | $ 34,687 |

* Discounted at 3% per year. Exchange rate 1 USD = 2.7 ECD.

## 3.2 Scenario Costs

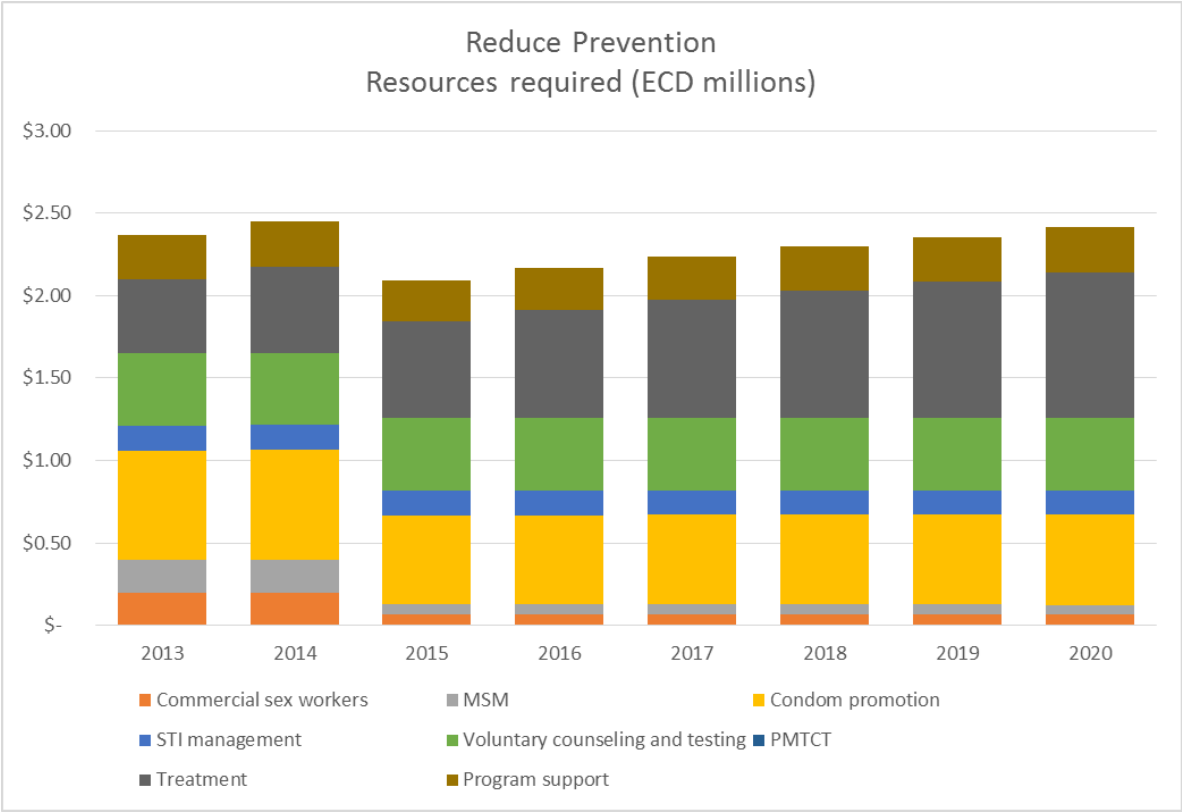
The Resource Needs Model is a tool to estimate the future cost of each scenario and is developed in parallel with the Goals model. Table 4 below lists the annual total costs projected for each scenario from 2014 through 2020. In 2014, resource needs for all three scenarios are ECD 3.25 million. Beginning in 2015, resource needs begin to gradually increase per annum for the maintenance scenario to ECD 3.64 million by 2020 and for the 90-90-90 scenario the increase is significant, to ECD 10.44 million by 2020. The Reduce Prevention scenario reflects a drop in funding needs and coverage, therefore maintaining costs at ECD 3.20 million by 2020. This scenario with reduced prevention efforts also produces increased HIV infections and AIDS deaths, as reflected by the projected impact described in the previous section.

**Table 4. Resource needs by Scenario (ECD millions)**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|
| **Reduce Prevention** | 3.25 | 2.86 | 2.94 | 3.01 | 3.07 | 3.13 | 3.20 |
| **Maintenance** | 3.25 | 3.33 | 3.41 | 3.47 | 3.53 | 3.59 | 3.64 |
| **90-90-90 by 2020** | 3.25 | 3.51 | 4.77 | 6.09 | 7.47 | 8.92 | 10.44 |

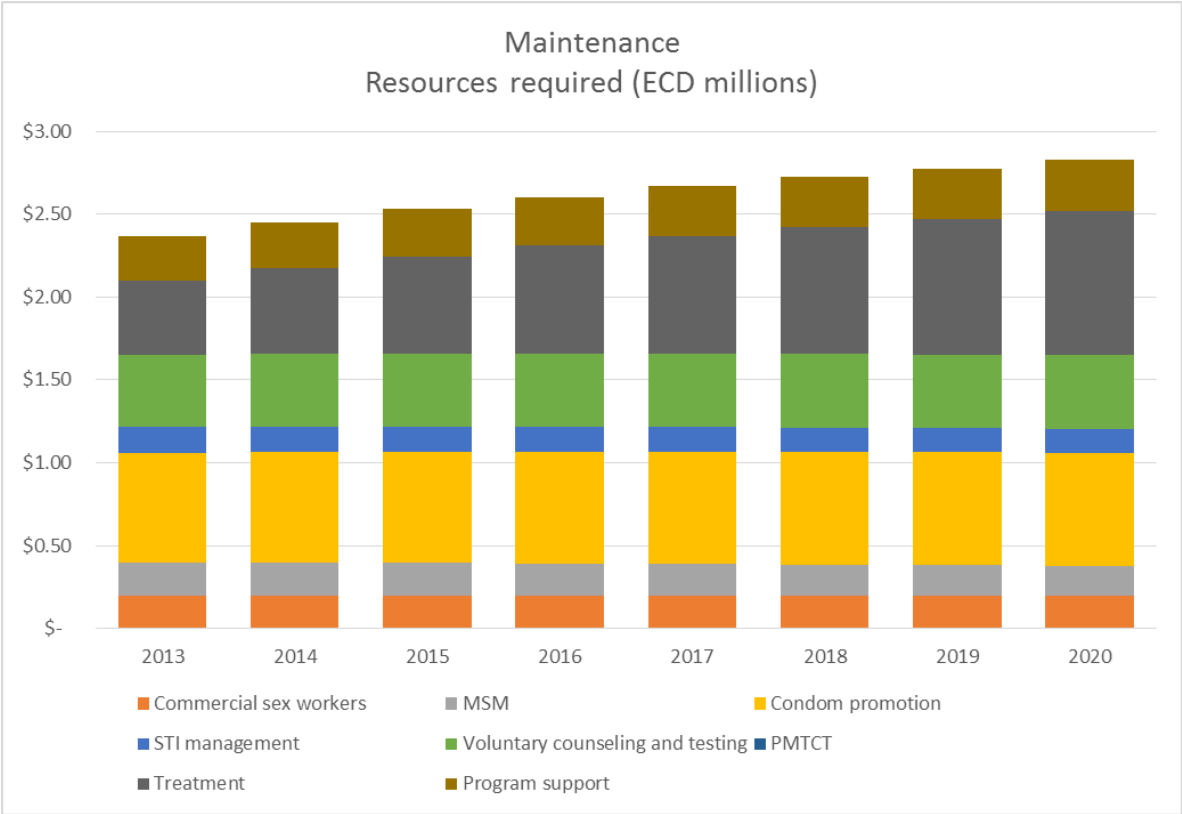
Figures 6-8 provide a more in-depth breakdown of each scenario by spending category, from 2013 through 2020. These categories include commercial sex workers, STI management, treatment, MSM, commercial sex workers, voluntary counselling and testing, program support, condom promotion, and PMTCT. For 2013 and 2014, costs for condom promotion, VCT and treatment account for more than 50% of overall HIV and AIDS costs.

**Figure 6. Resources required: Reduce Prevention scenario**



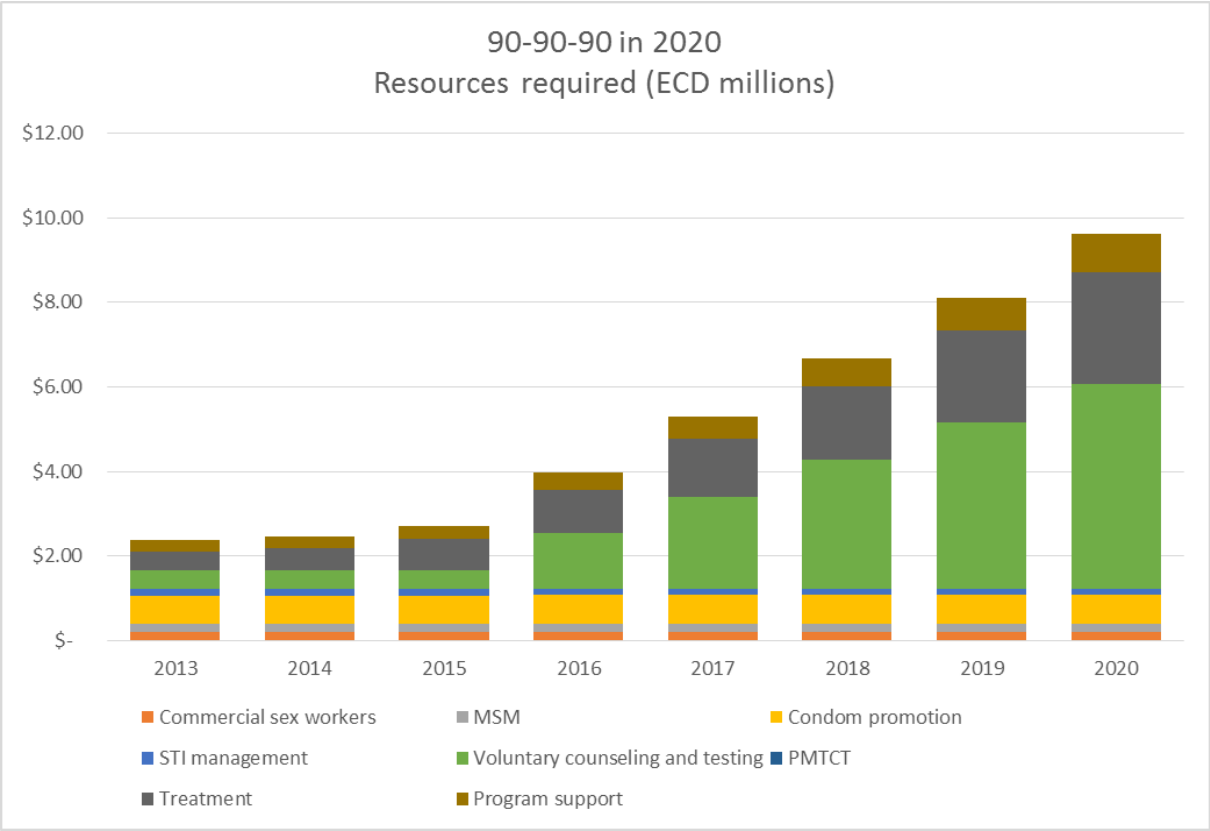

Beginning in 2015, the reduction in projected prevention programming shows declines in funding needs for most-at-risk populations, including MSM and CSWs, as well as declines in funding for condom promotion.

**Figure 7. Resources required: Maintenance scenario**




In the Maintenance scenario (Figure 7), the situation remains virtually unchanged from 2015-2020, while the needs for the 90-90-90 are marked by increase investment in treatment and HIV testing and counseling (Figure 8).

**Figure 8. Resources required: 90-90-90 scenario**




## 3.3 Resource availability analysis

St. Lucia has not yet conducted resource tracking by way of health accounts or public expenditure reviews to be able to say with any certainty how much is spent on HIV/AIDS in any given year. In order to estimate the total expenditure on HIV and AIDS, HFG obtained data from various sources:

- Finance Department of the Ministry of Health for information on salary payments for staff engaged on the HIV/AID program and on-budget funding from PEPFAR.
- PEPFAR HIV/AIDS regional coordinator for information on total funding to St. Lucia. This funding included direct support to the HIV program through prevention activities and technical assistance through external contractors.
- Antiretroviral (ARV) medicines projections from the OECS Pooled Procurement System (PPS).
- Other donors e.g. KfW and Global Fund
- Own calculations of expenditures by hospitals on HIV patients (excluding drugs which were obtained separately) based on a recent costing study and other sources.

Total expenditure on HIV/AIDS activities in 2014 amounted to EC$ 2,352,761, of which the key sources were the government of St. Lucia and PEPFAR, contributing 55% and 37% respectively, as shown in Table 5 and Figure 9 below. Data on funding from 2012 and 2013 follows a similar pattern, with the

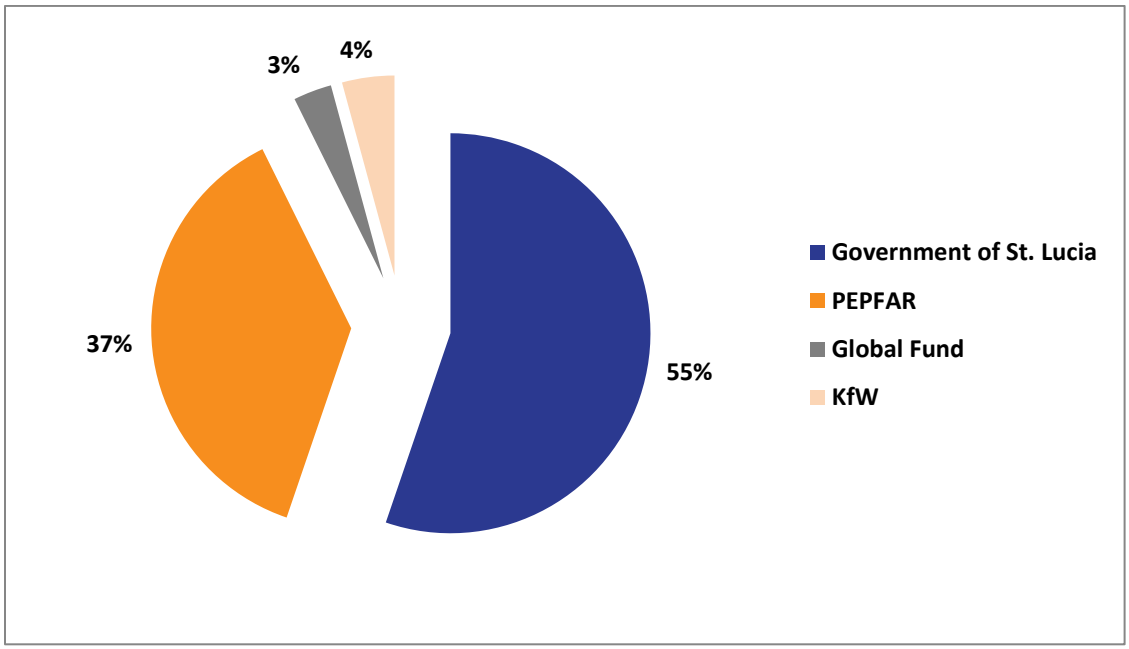
most funding coming from the Government of St. Lucia, PEPFAR and KfW respectively. Note that in the absence of a health accounts estimation including a household survey, estimations of out of pocket expenditures are unavailable.

### Table 5. Past spending trends for HIV/AIDS (2012-2014) (ECD)

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| Government of St. Lucia | 1,084,852 | 1,210,922 | 1,299,616 |
| Estimated PEPFAR resources available for direct HIV programming in St Lucia | 672,484 | 682,538 | 880,830 |
| Global Fund | 103,729 | 68,950 | 72,849 |
| KfW | 249,498 | 103,512 | 99,466 |
| **Resources spent by government and donors** | **2,110,563** | **2,065,922** | **2,352,761** |

The estimate of PEPFAR funding is based on 25% of total funding to St. Lucia, assuming that 75% was spent on non-direct HIV programming such as external technical assistance. This estimate was based on data from countries that have conducted a National Health Accounts estimation in the region, which indicates that out of the total amount of PEPFAR funding received in these OECS countries, about 25% goes directly to prevention, care and treatment.

**Figure 9: Estimated HIV/AIDS Expenditures by Funding source, 2014 (ECD)**




Funding for HIV/AIDS activities will see a drastic drop from 2014 levels. With the expected cut in PEPFAR funding, estimates for 2015 show an overall funding decline of 44%. No information was available for funding from other donors beyond 2016. In the absence of precise estimates of future Government of St. Lucia funding, estimates were made based on an annual increase of 1% from the 2014 funding. This annual increment incorporates the commitment the government has made to take up current Global Fund spending on ARVs in 2016. It is a small increment, conservative, as it is taking into account the current economic situation that is constraining government spending.

**Table 6: Estimated resources available for HIV/AIDS in St. Lucia (2014-2020) (ECD)**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| Government of St. Lucia | 1,299,616 | 1,518,982 | 1,331,658 | 1,364,512 | 1,378,157 | 1,391,938 | 1,405,858 | 1,419,916 |
| PEPFAR resources available for direct HIV programming | 682,538 | 880,830 | 168,750 | 135,000 | 101,250 | 67,500 | 0 | 0 |
| Global Fund | 68,950 | 72,849 | 68,023 | 83,190 | 0 | 0 | 0 | 0 |
| KfW | 103,511 | 99,466 | 24,866 | 0 | 0 | 0 | 0 | 0 |
| Total resources available | 2,154,615 | 2,572,127 | 1,593,297 | 1,582,702 | 1,479,407 | 1,459,438 | 1,405,858 | 1,419,916 |

## 3.4 Resource gap analysis

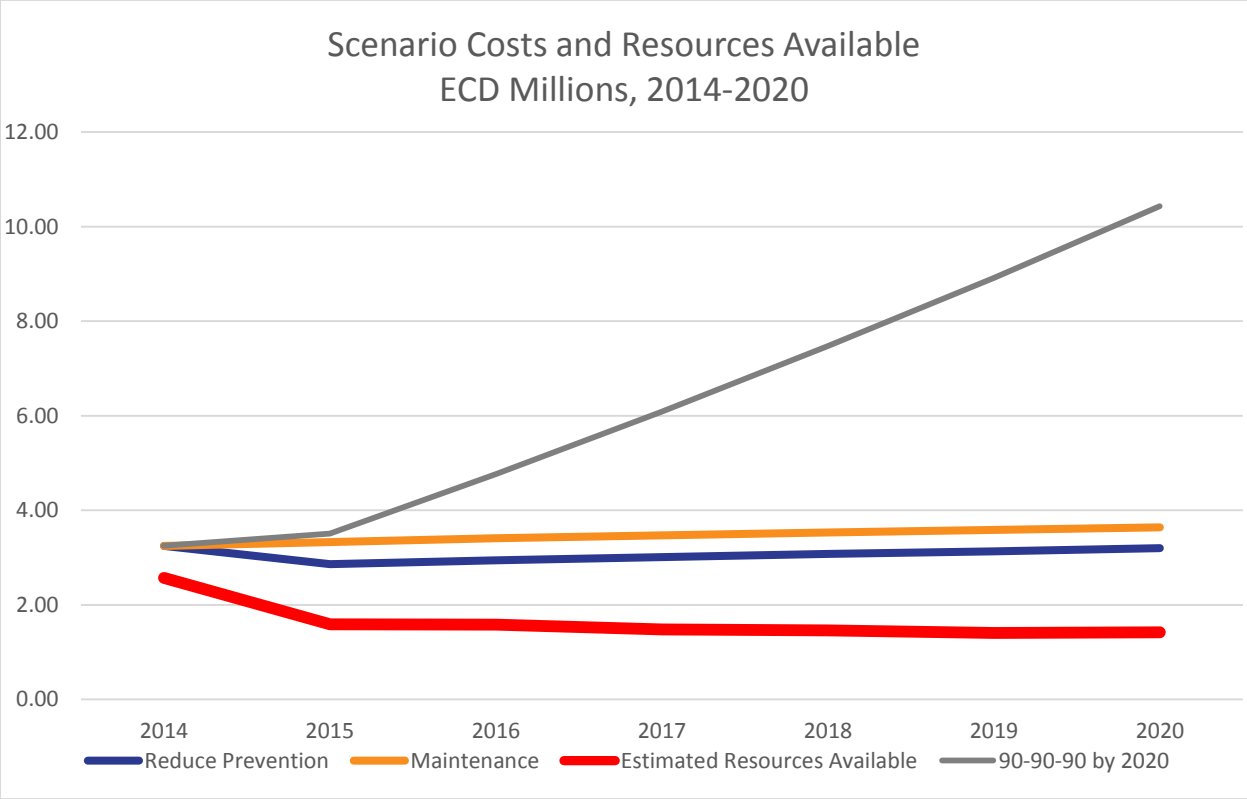
Finally, we estimate the costs of each of the three projection scenarios and compare these to the estimated resources available from domestic and international sources. Figures 7 to 10 below show the projected total costs ("resources required") of the three scenarios through the year 2020. As illustrated in Table 7 below, the resource gap begins in 2015 and increases per annum, for a total gap of EC$1.27million for reduced prevention, EC$ 1.74 million for maintenance and EC$1.92 million for the 90-90-90 scenario. A cumulative total of EC$ 9.96 million would be required for the reduce prevention scenario, EC$12.71 million for maintenance and EC$ 32.93 million for the 90-90-90 scenario.

**Table 7: Resource gap (needs vs. resources available) in St. Lucia (ECD millions)**

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| **Reduce Prevention (need)** | 2.86 | 2.94 | 3.01 | 3.07 | 3.13 | 3.20 |
| **Maintenance(need)** | 3.33 | 3.41 | 3.47 | 3.53 | 3.59 | 3.64 |
| **90-90-90 by 2020 (need)** | 3.51 | 4.77 | 6.09 | 7.47 | 8.92 | 10.44 |
| **Estimated Resources Available** | 1.59 | 1.58 | 1.48 | 1.46 | 1.41 | 1.42 |
| **Reduce Prevention (gap)** | 1.27 | 1.36 | 1.53 | 1.61 | 1.73 | 1.78 |
| **Maintenance(gap)** | 1.74 | 1.83 | 1.99 | 2.07 | 2.18 | 2.22 |
| **90-90-90 by 2020 (gap)** | 1.92 | 3.19 | 4.61 | 6.01 | 7.51 | 9.02 |

Figure 10 compares these total costs in the short run (2014-2020), represented by the solid bars, to the estimated resources available, represented by the red line. The 90-90-90 scenario is by far the most costly, which is around 2.5 times the cost from 2015 to 2020, as the costs of antiretroviral therapy (ART) and counseling and testing increase to meet the ambitious targets. The costs of this 90-90-90 scenario are driven in part by the introduction of rapid testing to supplement traditional counseling and testing, as well as the falling costs of treatment. The targets for testing and treatment coverage are ambitious both in absolute terms and in the pace of scale-up required to achieve them by the year 2020. As mentioned in the limitations section above, it should also be noted that the scenario as modeled here does not include scale-up of MARPs outreach or other interventions that would be required in any real-world campaign to test and treat 90% of PLHIV in a concentrated epidemic context. Thus, the true costs of implementing a scenario like 90-90-90 by 2020 would likely be even higher than this analysis indicates.

**Figure 10. Scenario costs and resources available, 2014 – 2020 (ECD millions)**

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# V. CONCLUSIONS

Through the modeling of these scenarios in St. Lucia, 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 aspires to scaling to a 90/90/90 scenario, and adhering to WHO guidelines for increasing the CD4 threshold for ART eligibility from 350 to 500 cells/μL, making this a reality in St. Lucia 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 like condom promotion and HIV testing and counseling that represent a significant proportion of the resource need, key decisions need to ensure that efforts are cost-efficient and well targeted. Strategic exercises to obtain this type of focus include, but are not limited to, expanding the list of 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. St. Lucia should use the next few

years of Global Fund support, to continue to lay the ground work for nationally and regionally sustained HIV response within a strengthened health system. In terms of funding needs, diversification of donors including more active participation of private sector partners is also necessary to scale up the National HIV and AIDS Response.

# ANNEX A: INPUTS TO THE GOALS MODEL

| INDICATOR | Value | Source |
|---|---|---|
| **Distribution of the Population by Risk Group** | | |
| **Percentage of males** | | |
| Not sexually active (Never had sex) | 14.70% | 2011 St. Kitts KAPB Appendix I page 163. Not available for St. Lucia. |
| Low risk heterosexual (One partner in the last year) | 51.87% | remaindered |
| Medium risk heterosexual (more than one partner in last year) | 23.60% | 2011 St. Kitts KAPB Appendix I page 163. Not available for St. Lucia. |
| High risk heterosexual (Client of sex worker) | 7.80% | 2011 St. Kitts KAPB Table 125 page 143, see Calculations. Previously used 6.4% from 2011 St. Kitts KAPB Page 108 for Domenica. Data from St. Kitts St. Kitts KAPB pp 142-143 are subject to very high nonresponse. Nevertheless, balancing number of sex acts in high risk category required using slightly higher estimate from SKN. See Calculations. |
| MSM | 2.03% | 2012 from PEPFAR annual report, estimated number of MSM divided by males aged 15-49 |
| | | |
| **Percentage of females** | | |
| Not sexually active (Never had sex) | 9.0% | 2011 St. Kitts KAPB Appendix I page 163. Not available for St. Lucia. |
| Low risk heterosexual (One partner in the last year) | 64.8% | remaindered |
| Medium risk heterosexual (more than one partner in last year) | 23.6% | Equal to medium risk males. |

| INDICATOR | Value | Source |
|---|---|---|
| High risk heterosexual (Sex worker) | 2.6% | 2011 KAPB Page 108 for Dominica. Not given in KAPB for St. Kitts. |
| | | |
| **Condom use in last sex act (Latest available, plus earlier years if available)** | | |
| Low risk | 38.0% | 2011 St. Kitts KAPB indicator Table 126 page 145. Not available for St. Lucia. |
| Medium risk | 62.5% | 2011 St. Kitts KAPB Appendix I page 164. |
| High risk | 62.5% | Equal to medium risk category. |
| MSM | 53.8% | St. Lucia TRaC Summary Report, 2012, page 8 |
| | | |
| **Number of partners per year** | | |
| Males | | |
| Low risk | 1 | by definition |
| Medium risk | 4.0 | Not available; standard value |
| High risk | 30 | Required to balance number of high risk sex acts. |
| MSM | 6 | Not available; standard value |
| Females | | |
| Low risk | 1 | by definition |
| Medium risk | 4.0 | Not available; standard value |
| High risk | 100 | Required to balance number of high risk sex acts. |
| | | |
| **Sex acts per partner** | | |
| Low risk | 80 | Typical international value |
| Medium risk | 20 | Not available; standard value |

| INDICATOR | Value | Source |
|---|---|---|
| High risk | 3 | Not available; standard value |
| MSM | 14 | Not available; standard value |
| | | |
| **Age at first sex** | | |
| Males | 16.0 | Not available; standard value |
| Females | 15.0 | Not available; standard value |
| | | |
| **Percent married or in union** | | |
| Males | | |
| Low risk | 100.0% | By definition all are married/in union |
| Medium risk | 27.0% | Not available; value for Dominica |
| High risk | 27.0% | Not available; value for Dominica |
| MSM | 27.0% | Not available; value for Dominica |
| Females | | |
| Low risk | 100.0% | By definition all are married/in union |
| Medium risk | 27.0% | Not available; value for Dominica |
| High risk | 27.0% | Not available; value for Dominica |
| | | |
| **STI prevalence (Latest available, plus earlier years if available)** | | |
| Males | 2030 value | |
| Low risk | 3% | Half of female estimate. |
| Medium risk | 10% | Not available; standard value |
| High risk | 15% | Not available; standard value |

| INDICATOR | Value | Source |
|---|---|---|
| MSM | 22% | Not available; standard value |
| Females | | |
| Low risk | 6% | 2011 St. Kitts KAPB page 161, 6.2% have had genital discharge in past 12 months. Not available for St. Lucia. |
| Medium risk | 15% | Not available -- assumed value. |
| High risk | 30% | Not available -- assumed value. |
| | | |
| **Coverage of behavior change interventions** | | |
| **General population** | | |
| Community mobilization: reached by intervention per year (%) | 10.0% | NAP Coordinator estimate |
| Mass media: reached by campaigns per year (%) | 50.0% | NAP Coordinator estimate |
| VCT: Adult population receiving VCT each year (%) | 5.5% | 2012 GARP Report, page 18. |
| Condom coverage (%) | 28.9% | St. Lucia TRaC Summary Report, 2012, page 8 |
| Primary students with teachers trained in AIDS (%) | 3.3% | NAP Coordinator estimate |
| Secondary students with teachers trained in AIDS (%) | 20.0% | NAP Coordinator estimate |
| **Most-at-risk populations** | | |
| Female sex workers (%) | 27.7% | See Calculations. This estimate is not very reliable, but no better estimate is available. |
| MSM outreach (%) | 32.0% | See Calculations. This estimate is not very reliable, but no better estimate is available. |
| **Medical services** | | |

| INDICATOR | Value | Source |
|---|---|---|
| Males with STI receiving treatment | 15% | NAP Coordinator estimate of number consuming STI care |
| Females with STI receiving treatment | 15% | NAP Coordinator estimate of number consuming STI care |
| Units of blood for transfusion tested | 100% | NAP Coordinator estimate |
| **Treatment** | | |
| (CD4 count threshold for eligibility by year) | | |
| Percent of adult males in need receiving ART by year | 34.7% | Estimated number on ART in 2012 divided by estimated number eligible. |
| Percent of adult females in need receiving ART by year | 38.3% | Estimated number on ART in 2012 divided by estimated number eligible. |
| | | |
| **Unit Costs** | | |
| **General populations** | | |
| Community mobilization cost per person reached | $ 3.29 | LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014 |
| Cost per VCT client | $ 30.00 | LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014 |
| Cost per male condom distributed by the public sector | $ 0.29 | LAC Regional Average; Bollinger and Stover, "Background paper on update of unit costs for UNAIDS GRNE" (2014). These are estimates for costs in 2013. |
| Cost per teacher trained in primary school education | $ 68.61 | LAC Regional Average; Bollinger and Stover, "Background paper on update of unit costs for UNAIDS GRNE" (2014). These are estimates for costs in 2013. |
| Cost per teacher trained in secondary school education | $ 68.61 | LAC Regional Average; Bollinger and Stover, "Background paper on update of unit costs for |

| INDICATOR | Value | Source |
|---|---|---|
| | | UNAIDS GRNE" (2014). These are estimates for costs in 2013. |
| **Most-at-risk populations** | | |
| Cost per female sex worker reached | $ 214.11 | CHAA cost per person reached in SLU. McLean et al., "The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados". HPP Report 2014. |
| Cost per MSM targeted | $ 214.11 | CHAA cost per person reached in SLU. McLean et al., "The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados". HPP Report 2014. |
| **Medical Services** | | |
| Cost per STI treated in clinics | $ 65.00 | Global average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014 |
| Cost of screening a unit of blood for HIV | $ 18.57 | LAC Regional Average; Bollinger and Stover, "Background paper on update of unit costs for UNAIDS GRNE" (2014). These are estimates for costs in 2013. |
| Cost per PEP kit | $ 14.53 | LAC regional average; Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014. Bollinger and Stover give $134.12 -- check with Gardenia |
| **PMTCT** | | |
| HIV testing (per test): PCR for infant after birth | $ 62.00 | Default |
| ARVs (cost per person per day): Triple treatment (AZT+3TC+NVP/EVF) | $ 1.66 | $607/year divided by 365 days. SAS regional average, from: Financial Resources Required to Achieve National Goals for HIV Prevention, Treatment, Care and Support, 2014. |
| ARVs (cost per person per day): Triple prophylaxis | $ 1.66 | $607/year divided by 365 days. SAS regional average, from: Financial Resources Required to Achieve National Goals for HIV Prevention, |

| INDICATOR | Value | Source |
|---|---|---|
| | | Treatment, Care and Support, 2014. |
| **Treatment** | | |
| Adults (cost per patient per year): First line ART drugs | $ 174.38 | OECS data point from GPRM: TDF/3TC/EFV |
| Adults (cost per patient per year): Second line ART drugs | $ 518.80 | OECS data point from GPRM: TDF/FTC/LPV/ritonavir |
| Adults (cost per patient per year): Lab costs for ART treatment | $ 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. |
| Children (cost per patient per year): ARV drugs | $ 174.38 | OECS data point from GPRM: TDF/3TC/EFV |
| Children (cost per patient per year): Lab costs for ART treatment | $ 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. |
| Service delivery costs: Cost per in-patient day | $ 332.92 | 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. |
| Service delivery costs: Cost per out-patient visit | $ 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. |
| Service delivery requirements (per patient per year): ART out-patient visits | $ 1.00 | Annual cost |
| Service delivery requirements (per patient per year): OI treatment in-patient days | $ 1.00 | Annual cost |

| INDICATOR | Value | Source |
|---|---|---|
| Migration from first to second line (% per year) | 13% | "About 87% of PLHIV on ART (166) are on first line regimen.", in 2012. Annual HIV and AIDS Surveillance Report, 2012. Not a perfect estimate, since mortality and adherence may different across groups, and may fluctuate from year to year. Estimate not available for SKN. |
| **Policy and Program Support** | | |
| Enabling environment | 0.3% | Regional NASA average |
| Program management | 5.5% | Regional NASA average |
| Research | 0.3% | Regional NASA average |
| Monitoring and evaluation | 1.0% | Regional NASA average |
| Strategic communication | 0.2% | Regional NASA average |
| Programme-level HR | 0.9% | Regional NASA average |
| Training | 1.0% | Regional NASA average |
| Laboratory equipment | 0.2% | Regional NASA average |

# ANNEX B: EPIDEMIOLOGICAL PARAMETERS

| Parameter | Value | Source |
|---|---|---|
| Transmission of HIV per act (female to male) | 0.0019 | Baggeley *et al*[i]., Gray *et al.* |
| Multiplier on transmission per act for | | |
| Male to female | 1.0 | Galvin and Cohen[ii], 2.2-11.3 |
| Presence of STI | 5.5 | Powers *et a.l*[iii]. 5.1-8.2 |
| MSM contacts | 2.6 | Vittinghoff *et al*[iv]. |
| Relative infectiousness by stage of infection | | |
| Primary infection | 9 –40 | Boily *et a.l*[v]. 9.17 (4.47-18.81) |
| Asymptomatic | 1 | Pinkerton[vi] |
| Symptomatic | 7 | Boily *et al*[6]. 7.27 (4.45-11.88) |
| On ART | 0.04 – 0.08 | Cohen *et al.*[vii] |
| Efficacy in reducing HIV transmission | | Weller and Davis[viii] |
| Condom use | 0.8 | Weller and Davis[ix] Auvert *et al*[x], Gray *et al.* (2007)[xi], Bailey *et al.*[xii] |

| | | |
|---|---|---|
| Male circumcision | 0.6 | Grant *et al.*[xiii] Partners PrEP Study |
| PrEP | 0.55 – 0.73 | Partners PrEP Study |
| Microbicide | 0.6 | Abdool Karim *et al.*[xiv] |

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