SUSTAINING THE HIV AND AIDS RESPONSE IN ST. KITTS AND NEVIS: 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 Laurel Hatt for the Health Finance and Governance Project.

The Health Finance and Governance Project

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November 2014

Cooperative Agreement No: AID-OAA-A-12-00080

Submitted to: Scott Stewart, AOR
Office of Health Systems
Bureau for Global Health

Recommended Citation: Hamilton, Matthew and Laurel Hatt. November 2014. *Sustaining the HIV and AIDS Response in St. Kitts and Nevis: Investment Case Brief.* Bethesda, MD: Health Finance & Governance Project, Abt Associates Inc.

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DISCLAIMER

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
CHAA	Caribbean HIV/AIDS Alliance
CSW	Commercial Sex Workers
ECD	Eastern Caribbean Dollars
HFG	Health Finance and Governance
KfW	German Development Bank
MARPs	Most-at-risk populations
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
PMTCT	Prevention of Mother to Child Transmission
PSI	Population Services International
SKN	St. Kitts and Nevis
UNAIDS	Joint United Nations Program on HIV/AIDS
UNGASS	United Nations General Assembly Special Session
USAID	United States Agency for International Development

ACKNOWLEDGMENTS

This brief is the result of contributions from many individuals, and would not have been possible without their commitment of time and expertise. We are grateful for support from the Permanent Secretaries for Health in St. Kitts and in Nevis, Mr. Andrew Skerritt and Ms. Nicole Slack-Liburd. The authors would particularly like to thank Ms. Gardenia Destang-Richardson, St. Kitts and Nevis National AIDS Programme Coordinator, for her many contributions to the data collection, analysis, and scenario development in this brief. We are also grateful for inputs from Mr. Terry Morris and the CHAA animators who generously shared their experiences working with MARPs in St. Kitts and Nevis. Dr. Kathleen Allen-Ferdinand and Dr. Judy Nisbett shared essential insights from their many years of clinical care for PLHIV on both islands. Finally, we appreciate the inputs received from numerous participants during the validation meeting in Basseterre in July 2014.

1. BACKGROUND

1.1 Introduction

The HIV/AIDS program in St. Kitts and Nevis is at a turning point, facing both opportunities to expand and target its efforts and threats of decreasing funding. As its National HIV/AIDS Strategic Plan expires in 2014, the country must consider whether and how to revise strategic priorities related to controlling and mitigating the effects of the epidemic. Critical decisions must be made about programming and budgeting for the HIV response in the coming years.

This brief provides analytic inputs to help St. Kitts and Nevis develop an "investment case" for its HIV/AIDS program. UNAIDS and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) have encouraged the small-island countries of the eastern Caribbean to develop HIV investment cases – reports that aim to help program leaders target investments on the interventions and populations where they will have maximum impact, given limited resources (UNAIDS 2012).

A key component of UNAIDS' investment case framework is a quantitative analysis of trends in the HIV epidemic and the impact of various prevention and treatment efforts to date, along with a projection of possible future programming scenarios and their implications for the epidemic and program costs. The Goals and Resource Needs models – part of the Spectrum/OneHealth modeling system that estimates the impact and costs of future prevention and treatment interventions – are UNAIDS' suggested tools for this type of analysis. With funding from the U.S. Agency for International Development (USAID), experts from the Health Finance and Governance Project have applied these tools to analyze available data from St. Kitts and Nevis. The scenarios described in this report can help the Government of St. Kitts and Nevis and civil society stakeholders to advocate for increased domestic funding for HIV and AIDS, and apply for available external funding from donors.

1.2 Background: HIV and AIDS Response in St. Kitts and Nevis

With a population of approximately 53,000 people on its two small islands, the Federation of St. Kitts and Nevis has been aware of the threat posed by HIV since the first case was identified in 1984. A total of 358 HIV cases have been reported to date, though population prevalence estimates range from 0.5% to 1.1% of the adult population (National AIDS Programme 2014). Stigma and discrimination faced by persons living with HIV have constrained uptake of voluntary counseling and testing and made it extremely difficult to obtain precise prevalence estimates; it is highly likely that many infected individuals are unaware of their status.

St. Kitts and Nevis's national HIV and AIDS response was initiated in 2000 when the first National Strategic Plan was drafted and adopted. The country has benefited from substantial external financial and technical support for its HIV programming. This support has been essential to its ability to control the epidemic given the country's human resource constraints and vulnerability to economic downturns and weather events. The World Bank-funded "HIV/AIDS Prevention and Control Project" disbursed US$3.4 million in loans to St. Kitts and Nevis from 2003-2009 (World Bank 2009). St. Kitts and Nevis also benefited from a multi-country Global Fund Round 3 grant from 2005 to 2011 (Global Fund (a)). Today, St. Kitts and Nevis continues to access subsidized antiretroviral drugs through the Organization of Eastern Caribbean States (OECS) Pharmaceutical Procurement Service, with funding from a multi-country Global Fund Round 9 grant to the Caribbean Community (CARICOM). This grant will end in early 2016 (Global Fund (b)).

In 2009, St. Kitts and Nevis developed a revised HIV strategic plan for the 2010-2014 period. This plan focused on two overarching goals (reducing the spread of HIV infection; reducing the impact of HIV and AIDS on individuals, family and the community) and five priority areas (prevention of HIV infection; care, treatment and support for people with HIV and AIDS; advocacy, policy development and legislation; generating and using strategic information; and national program coordination and management). During this period, HIV funding from PEPFAR has played a prominent role in St. Kitts and Nevis. PEPFAR has provided technical assistance in each of the country's strategic priority areas, with a particular emphasis on reducing stigma and discrimination, behavior change and prevention, lab strengthening, improving the sustainability of health financing, enhancing the role of the private sector, and strengthening strategic information systems (PEPFAR 2010).

Today, St. Kitts and Nevis faces a transition point in its HIV programming. With an aging population and high prevalence of non-communicable diseases like hypertension and diabetes, the country faces many competing demands on its health resources. Moreover, in August 2014 the U.S. government announced that PEPFAR funding to the small-island states of the Eastern Caribbean will be largely reallocated to higher-burden countries (U.S. Department of State 2014). At this time, this appears to have resulted in the discontinuation of most PEPFAR technical assistance funding to St. Kitts and Nevis, including the termination of PEPFAR-supported USAID grant funding to the Eastern Caribbean Community Action Program (EC CAP II), implemented by Caribbean HIV/AIDS Alliance (CHAA), on September 30, 2014. In St. Kitts and Nevis, where CHAA has been the main provider of outreach and prevention activities to populations most at risk of contracting HIV (namely sex workers and men who have sex with men), the discontinuation of PEPFAR funding to CHAA may seriously disrupt key prevention efforts on the islands should alternative funding not be secured. In combination with the expiration of the Global Fund subsidy for antiretroviral drugs, St. Kitts and Nevis faces a potential funding crisis for HIV efforts.

The OECS countries have recently begun preparing to apply for newly-available Global Fund monies, which might help mitigate the funding crisis for the period from 2016-2018. A description of costs, inputs and the expected impact of investments in the HIV response is a required input for Global Fund concept notes. Thus, in addition to helping St. Kitts and Nevis to consider its strategic priorities and

budgetary needs for the next five-year period, it is hoped that this brief will provide useful inputs to the concept note development process.

2. METHODS AND MODELS

2.1 Methodology

This analysis uses the Goals model (Futures Institute 2011), 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 (Bollinger 2008).

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.

2.2 Data and assumptions

The model parameters and sources used are provided in Annex 1. Data on the epidemiology of HIV and AIDS in St. Kitts and Nevis, 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 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. Kitts and Nevis 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. In the figure, the triangles represent observed prevalence and the solid line reflects the projection model.

Figure 1. Goals Model Fit to Historical Prevalence Trend

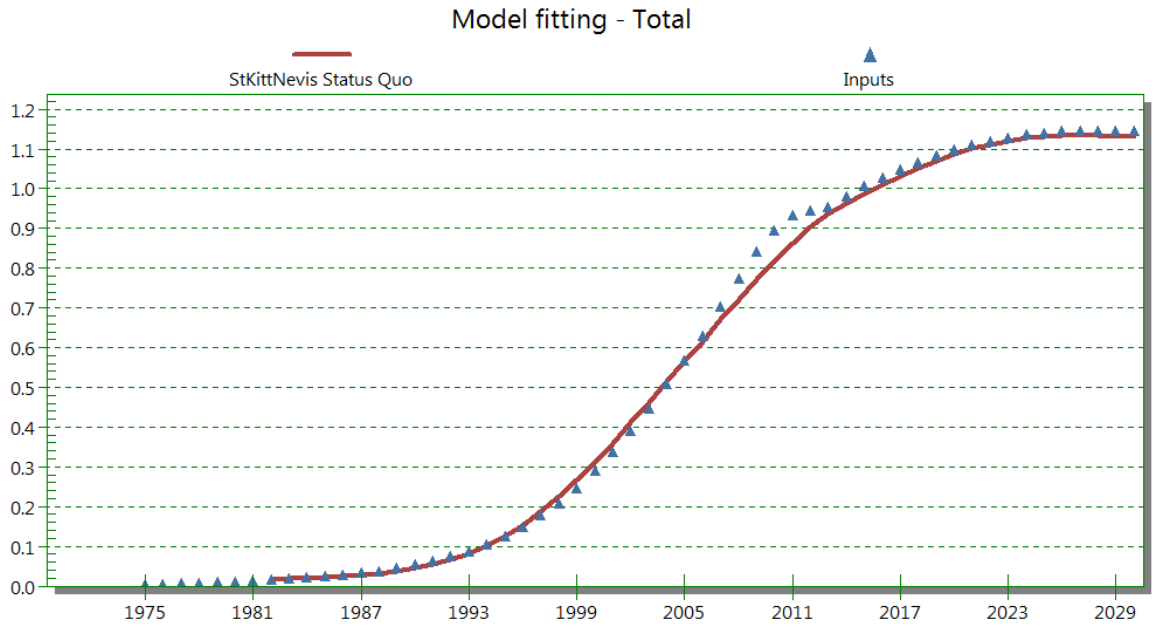


Table 1 summarizes the data used to estimate program costs. Most unit cost estimates were generated from studies conducted in the OECS (including cost estimates for testing and counseling, ART drug costs, and costs of prevention among most-at-risk populations). Some costs were derived from published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

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%).

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

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 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

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

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. Kitts and Nevis 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.

2.4 Projection scenarios

In consultation with the St. Kitts and Nevis National AIDS Program, we created three model scenarios. Each reflects a possible set of changes in program coverage[2], 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.

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 program 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 most-at-risk populations (MARPs, such as sex workers and MSM) drops by 67% relative to 2013 baseline. The

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

ART eligibility threshold remains constant at a CD4 count of 350 cells/μL, and the percentage of eligible individuals receiving ART (ART coverage) remains constant.

2. **Maintenance**: Funding for prevention programs such as community mobilization, condom provision, and outreach to MARPs remains constant at 2014 levels rather than dropping. The CD4 count threshold for ART eligibility remains constant at 350 cells/μL. ART coverage remains constant at present 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 (Sidibe, 2014). Funding to MARPs prevention programs remains constant. However, voluntary counseling and testing coverage increases from 7.2% to 57%% 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/μL in 2015, reflecting the new WHO guidelines. ART coverage increases to 90% in 2020, and remains constant thereafter.

Table 2. Coverage of Key Interventions Under Three Scenarios

	2013	2020		
Intervention	Baseline	Reduce Prevention (1)	Maintenance (2)	90-90-90 (3)
Community mobilization	10%	6.7%	10%	10%
Percentage of the adult population tested every year	7.2%	7.2%	7.2%	57%
Population covered by condom promotion and distribution	62.5%	50%	62.5%	62.5%
Prevention outreach to sex workers	77.9%	25.7%	77.9%	77.9%
Prevention outreach to MSM	53.4%	17.6%	53.4%	53.4%
STI treatment	55%	55%	55%	55%
Blood safety	100%	100%	100%	100%
ART for eligible adults				
Males	34.1%	34.1%	34.1%	90%*
Females	61.7%	61.7%	61.7%	90%*
ART for children*	80%	80%	80%	80%
PMTCT*	100%	100%	100%	100%

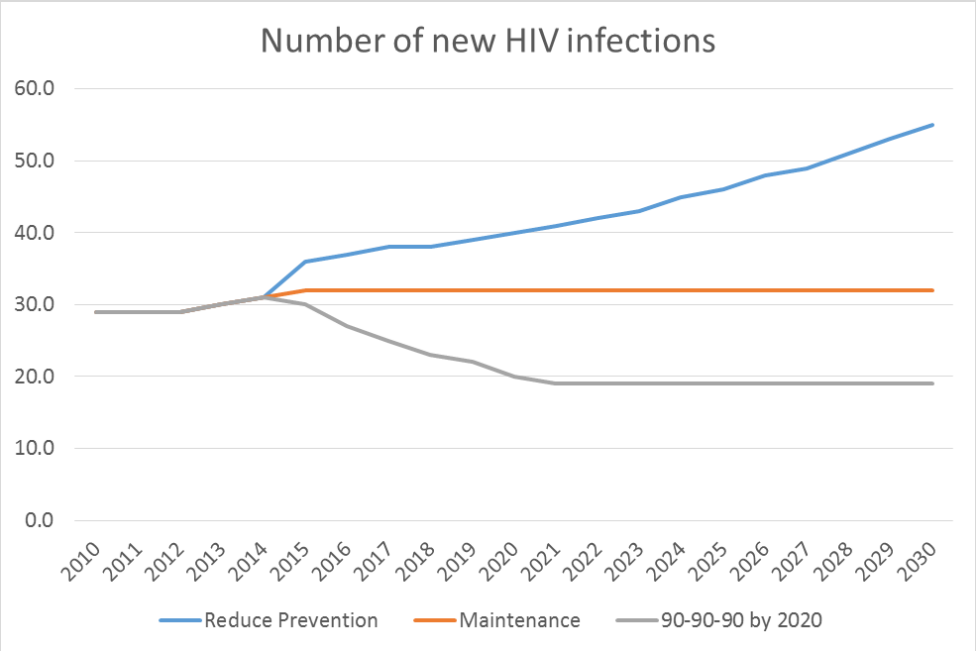
*In this scenario, eligibility for ART for both adults and children changes in 2015 to the new WHO guideline recommendations. For adults this means eligibility begins once the CD4 count falls below 500 cells/µl; plus all HIV+ pregnant women, discordant couples, those co-infected with tuberculosis, and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

3. SCENARIO RESULTS

3.1 Impact of scenarios

Figures 2-4 display selected results from each scenario. The three scenarios begin to diverge in 2015, when prevention efforts decrease ("Reduce Prevention" scenario) or when counseling and testing and ART eligibility increase ("90-90-90" scenario). The number of new HIV infections falls rapidly in the "90-90-90" scenario as ART coverage of eligible PLHIV increases to 90% by 2020.

Figure 2. Projection of the total number of new HIV infections annually, 2010-2030, under each scenario.



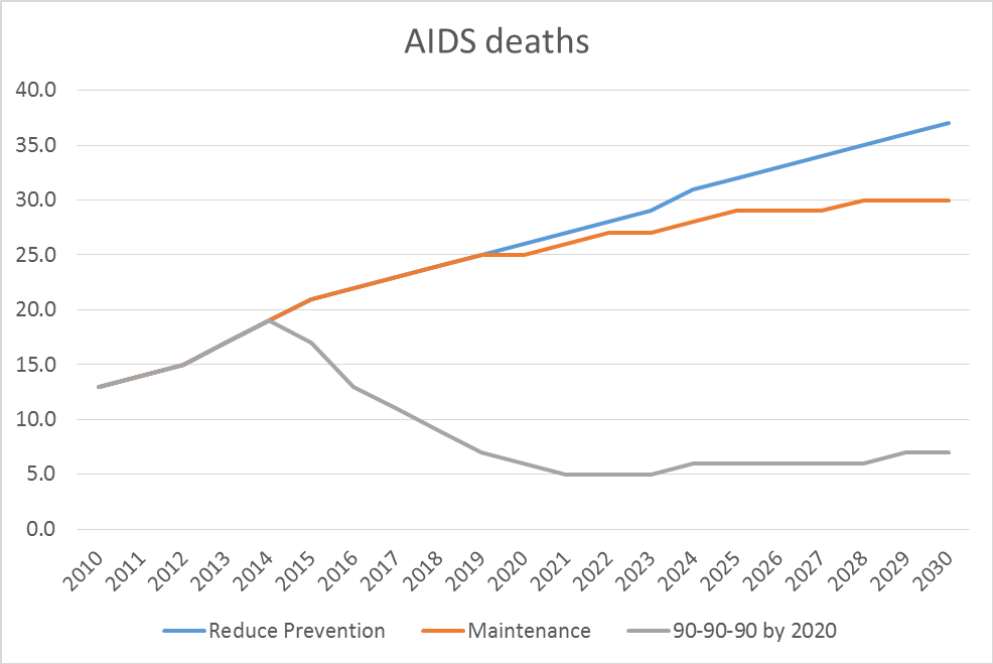
In the Reduce Prevention scenario (Figure 2), the pace of the epidemic begins to accelerate after 2015 as prevention efforts among most-at-risk populations largely come to a halt. Incidence increases because outreach efforts and testing rates are insufficient to reduce transmission and infections among sex workers, MSM, and those groups with highest prevalence and highest annual risk of infection. By 2030, the number of new infections per year has nearly doubled.

The number of new infections in the Maintenance scenario remains nearly constant through 2030, reflecting the level of success observed in recent years in slowing the epidemic among most-at-risk

populations. In the 90-90-90 scenario, there is a steep decline in the number of new infections until the target year of 2020, after which incidence rates remain steady.

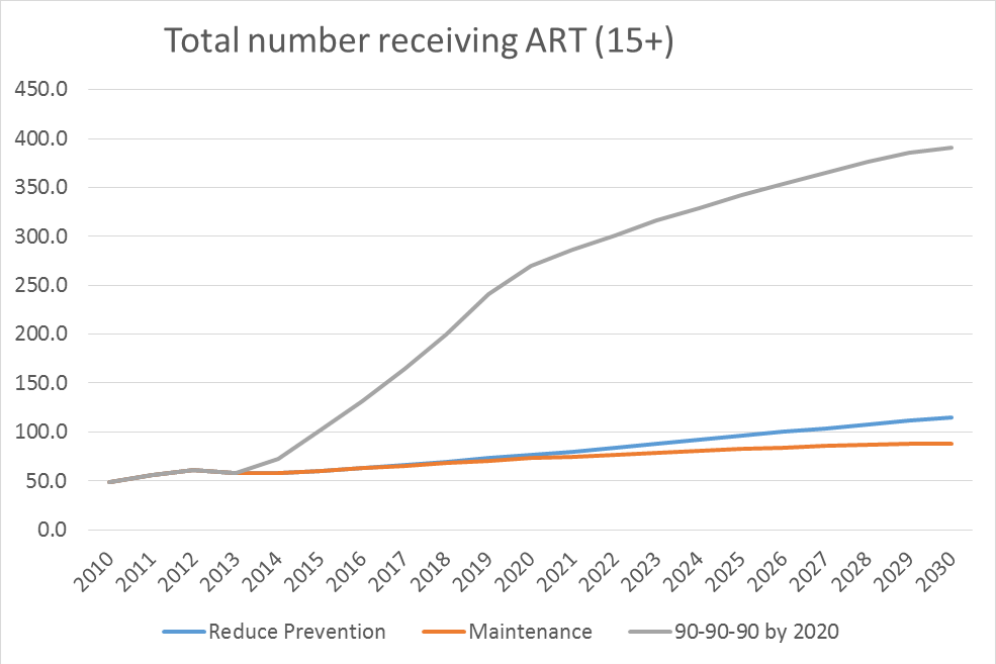
Figure 3 summarizes AIDS mortality per year. At first, there is little difference between the Reduce Prevention and Maintenance scenarios in the number of AIDS deaths per year, because ART coverage is maintained among those already on treatment. However, by 2019 we begin to see an increase in AIDS deaths in the Reduce Prevention scenario. Some at-risk individuals missed by outreach efforts early after exposure will likely progress more rapidly to AIDS. AIDS deaths are projected to level off by around 2028 under the Maintenance scenario. Under the 90-90-90 scenario, there is a profound and steep decrease in AIDS deaths because of expanded ART coverage, falling to less than 10 deaths per year by 2018.

Figure 3. Projection of the annual number of AIDS deaths, 2010-2030, under each scenario.



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 4) 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 outreach programs among most-at-risk populations. 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. Thus it is likely that costs for prevention and outreach associated with reaching these targets could be higher than estimated below.

Figure 4. Projection of the number of adults >15 years old who are receiving ART, 2010-2030, under each scenario.



3.2 Estimates of financial resources available for HIV and AIDS programming

In this section, we estimate the envelope of financial resources available to St. Kitts and Nevis to support HIV prevention, care, treatment, and program management in the coming years. The primary source of information used is the St. Kitts and Nevis National Health Accounts (NHA) estimation conducted for calendar year 2011 (Nakhimovsky et al. 2011).3 NHA is an internationally recognized and standardized resource tracking methodology that measures past health expenditures. It tracks the magnitude and sources of health spending (including from national governments, employers, donors, and households) and identifies how these funds are allocated among health care providers and functions.

[3] The St. Kitts and Nevis 2011 NHA and HIV Subaccounts exercise was conducted between June 2012 and September 2013.To gather NHA data, a research team collaborated with the Ministry of Health to survey institutions including government, employers, nongovernmental organizations, health insurance providers, and donors on their health expenditures in 2011. Household out-of-pocket expenditures were identified through a household expenditure survey, while health spending by people living with HIV was gathered through a separate survey. Stakeholders of the St. Kitts and Nevis health system verified the findings and policy implications of these data during a dissemination workshop held in St. Kitts in September 2013.

The HIV "subaccounts" track spending on HIV and AIDS programs specifically. For this analysis, we make the assumption that patterns of HIV spending by households, government, and employers are likely to remain relatively consistent into the future (barring any major economic disruptions), and that the 2011 HIV subaccounts estimates can thus function as an acceptable proxy for future resource allocations to HIV by these sources. Contributions from international donors, on the other hand, may change substantially from year to year, and thus past spending levels are less useful for predicting future allocations.

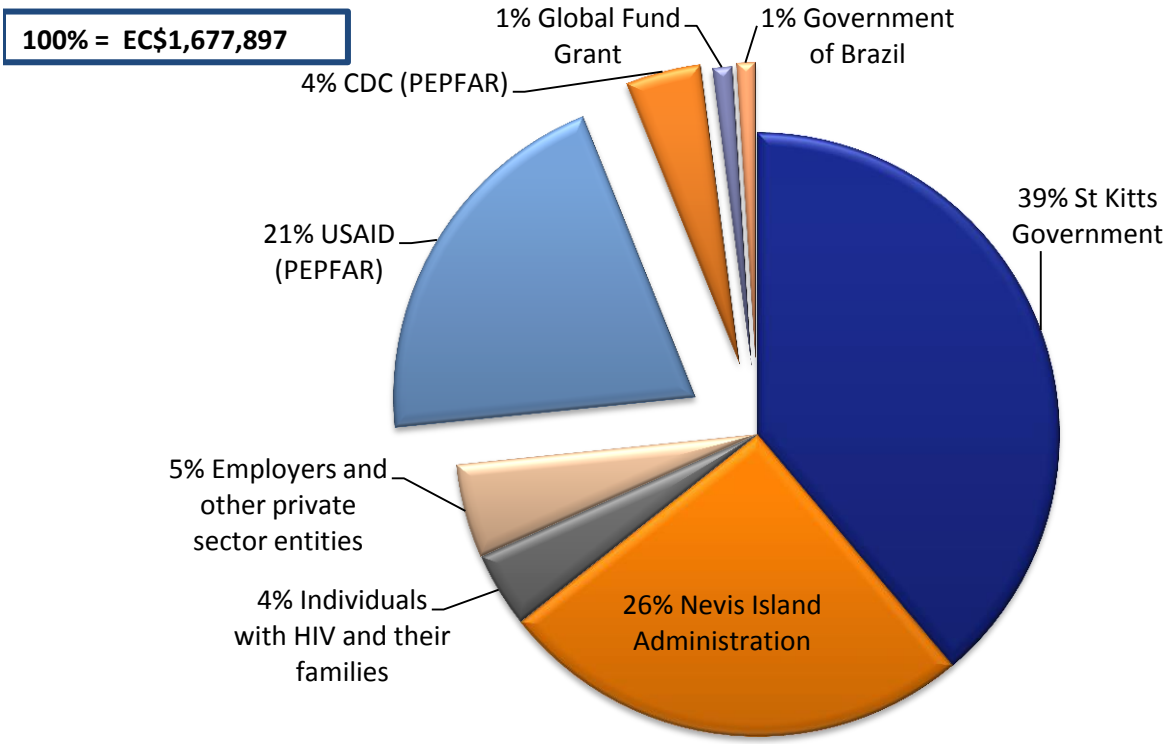
3.2.1 Government resources for HIV and AIDS

In 2011, the Government of St. Kitts and Nevis spent an estimated **EC $1,079,779** (US $399,918) on HIV and AIDS. Government spending represented 64% of the country's total HIV and AIDS spending. Government resources for HIV and AIDS were allocated as follows:

- 29% to inpatient care (**EC $309,368** or US $114,581)
- 9% to outpatient care (**EC $96,391** or US $35,700)
- <1% to laboratories (**EC $3,542** or US $1,312)
- 62% to population-based prevention campaigns, counseling and testing, and program management (**EC $670,477** or US $248,325).

Unfortunately, it was not possible to distinguish between the government's program management spending (for activities such as leadership, coordination, monitoring, and routine training) and direct spending on prevention and outreach efforts.

Figure 5. Sources of HIV Funding in St. Kitts and Nevis (NHA 2011)



3.2.2 Household resources for HIV and AIDS

Based on survey results reported in the 2011 NHA, persons living with HIV spent an estimated **EC $67,372** (US $24,952) on their health care. This constituted approximately 4% of total HIV spending. For the 111 persons with HIV known to the National AIDS Programme at the time of the study, this was approximately **EC $607 per capita** (US$225).

3.2.3 Employer, NGO and other private sector resources for HIV and AIDS

Employers, NGOs and other private sector sources reported that they contributed approximately **EC $84,436** (US $31,273) to HIV prevention, care, and treatment in 2011. This was approximately 5% of total HIV spending.

3.2.4 External (donor) resources for HIV and AIDS

While the donor funding landscape has changed dramatically in recent months, it is worth briefly highlighting patterns of donor HIV spending from the 2011 NHA. In 2011, in-kind donations of

antiretroviral drugs and HIV testing kits were provided through the Pan-Caribbean Partnership against HIV & AIDS (PANCAP) with funding from the Global Fund Round 9 grant; these were valued at **EC $17,627** (US $6,529). This funding is being phased out and the last transfer will be made in December 2015. Donations of antiretroviral drugs by the Government of Brazil were valued at **EC $16,843** (US $6,238). In total, these two sources represented 3% of total HIV spending. In 2014, the German development bank KfW reported EC $77,990 (US $28,885) in grant funding to Population Services International for condom promotion and distribution. This funding was expected to end after the first quarter of 2015.

In 2011, the U.S. Government through the PEPFAR program was contributing approximately 25% of St. Kitts and Nevis's total HIV resources (**EC $411,840** or US $152,533) for prevention, care and treatment. Most of this contribution was transferred directly to CHAA, which provided the bulk of the country's direct outreach and prevention services to high-risk populations such as men who have sex with men and sex workers. A portion of the PEPFAR contribution was also allocated to pay for laboratory tests, such as CD4 counts and viral load tests.

From 2010-2014, PEPFAR also contributed several millions of US dollars for one-time technical assistance, training, and capacity building to St. Kitts and Nevis. This support has included health system assessments, monitoring and surveillance capacity building, local NGO capacity building, stigma reduction policy development, support for regional coordination on HIV policy, strategic planning, and conducting the NHA, among many other things. This technical assistance funding (which was transferred to non-government implementing partners), though it has greatly benefited the country's National AIDS Program as well as other St. Kitts and Nevis health sector programs, is not included in the "resources available" or resource gap analysis estimates below, as it is not available for direct service provision efforts.

As indicated in the background section, in August 2014 the US government announced substantial cutbacks to its PEPFAR programs in OECS countries, which resulted in the termination of grant funding to CHAA. According to PEPFAR's Regional Coordinator (U.S. Department of State 2014), PEPFAR's expected support will decrease to less than one-fifth of its prior levels over the coming three years; by 2019, PEPFAR funding to St. Kitts and Nevis will be discontinued. Though not fully determined yet, the focus of remaining PEPFAR support will likely be on laboratory strengthening, surveillance, and prevention efforts (the latter aimed specifically at the St. Kitts and Nevis National Defense Force). We assume based upon results from the 2011 NHA that approximately 25% of total PEPFAR funding going forward 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 (Table 3).

Table 3. Current and projected PEPFAR funding to St. Kitts and Nevis (ECD)

	2014	2015	2016	2017	2018	2019
Total indicated PEPFAR funding to all implementing partners working in SKN	$2,671,637	$675,000	$540,000	$405,000	$270,000	$0
Of which:						
Estimated PEPFAR resources available for **direct** HIV programming in SKN	$667,909	$168,750	$135,000	$101,250	$67,500	$0
Estimated PEPFAR resources available for **training and technical assistance** to SKN	$2,003,727	$506,250	$405,000	$303,750	$202,500	$0

3.2.5 Summary of resources available from all sources

Finally, Table 4 below summarizes our projection of resources available for HIV programming in St. Kitts and Nevis through the year 2020. We adjust the NHA 2011 estimates of government, household and employer spending for observed inflation in 2012, 2013 and 2014 and then use 2014 as our baseline for projections.[4] Going forward from 2014, we present published estimates of decreases in direct HIV funding from PEPFAR, as well as the remaining Global Fund subsidy for antiretroviral drugs. Government spending on antiretroviral drugs is assumed to increase slightly in 2014 and 2015 as the Global Fund subsidy decreases. From 2015 onwards, government spending on HIV is assumed to increase by 1% per year.

[4] The estimated inflation rate is was 1.41% in 2012, 0.72% in 2013, and 0.64% in 2014; we used constant dollars for the subsequent years for consistency with the unit cost estimates (IMF, World Economic Outlook Indicators, http://www.imf.org/external/data.htm).

Table 4. Estimated past spending and projected resources available for direct HIV programming St. Kitts and Nevis (ECD)

	2011**	2012	2013	2014	2015	2016	2017	2018	2019	2020
Government	$1,079,779	$1,095,003	$1,102,888	$1,117,490	$1,132,003	$1,143,323	$1,154,756	$1,166,304	$1,177,967	$1,189,747
Employers & NGOs	$84,437	$85,628	$86,244	$86,796	$86,796	$86,796	$86,796	$86,796	$86,796	$86,796
Households	$67,370	$68,320	$68,812	$69,253	$69,253	$69,253	$69,253	$69,253	$69,253	$69,253
Global Fund (Round 9)	$17,627	$17,627	$21,556	$14,011	$22,057	$19,410	$0	$0	$0	$0
Government of Brazil	$16,843	*	*	*	*	*	*	*	*	*
KfW (condoms)	*	*	*	$77,990	$19,498	*	*	*	*	*
PEPFAR (direct)	$411,840	$476,921	$542,003	$667,909	$168,750	$135,000	$101,250	$67,500	$0	$0
Total	$1,677,897	$1,743,501	$1,821,503	$2,033,448	$1,498,357	$1,453,782	$1,412,055	$1,389,853	$1,334,016	$1,345,795

* Funding allocations unknown
**Estimates from 2011 National Health Accounts estimation

3.3 Resource gap analysis: Comparison of resources required with resources available

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. Figure 6 below shows the projected short-run total costs ("resources required") of the three scenarios through the year 2020, along with the estimated resources available, represented by the decreasing red line. Table 5 summarizes the costs, resources available, and the estimated resource gaps for each scenario.

Figure 6. Estimated resources required compared to resources available, 2014-2020

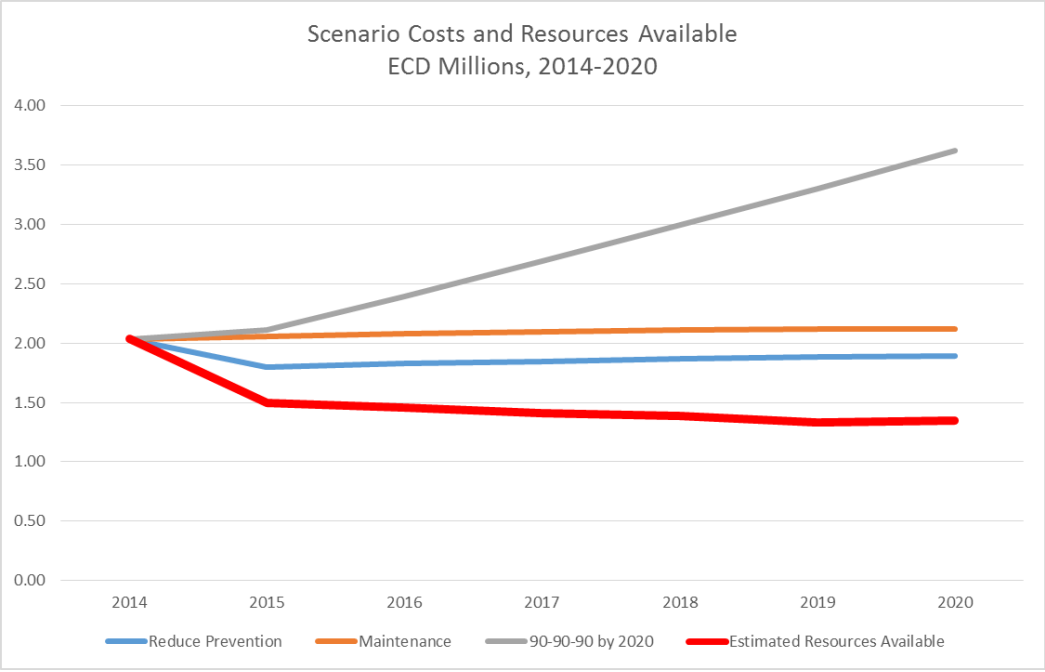


Table 5. Costs, resources available, and resource gaps for each scenario, 2015-2020 (EC$ millions)

Scenarios	2015	2016	2017	2018	2019	2020
Cost: Reduce prevention	$1.80	$1.83	$1.85	$1.87	$1.88	$1.89
Cost: Maintenance	$2.05	$2.08	$2.10	$2.11	$2.12	$2.12
Cost: 90/90/90	$2.11	$2.39	$2.69	$2.99	$3.31	$3.62
Resources available	$1.50	$1.45	$1.41	$1.39	$1.33	$1.35
Resource gap: Reduce prevention	$0.30	$0.37	$0.44	$0.48	$0.55	$0.55
Resource gap: Maintenance	$0.56	$0.63	$0.69	$0.72	$0.79	$0.78
Resource gap: 90/90/90	$0.61	$0.94	$1.28	$1.60	$1.97	$2.28

As shown in both Figure 6 and Table 5, the 90-90-90 scenario is by far the most costly, increasing in total cost from approximately EC $2.1 million to EC $3.6 million from 2015 to 2020, as the costs of ART and counseling and testing increase to meet the ambitious targets. (Figure 9 below provides a more detailed breakdown of program costs for this scenario.) The projected resource gap for this scenario in 2015 is EC $610,000 which increases to **EC $2,280,000** by the year 2020**.** Costs are driven in part by the introduction of rapid testing to supplement traditional counseling and testing. 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 similarly higher cost interventions that would be required in any real-world campaign to test and treat 90% of PLHIV in a concentrated epidemic context. The true costs of implementing a scenario like 90-90-90 by 2020 would likely be even higher than this analysis indicates.

The Reduce Prevention scenario reflects the greatest cost reductions, due to reduced condom distribution, community outreach, and MARPs outreach (see Figures 8 and 9). Even under this dramatically scaled-back scenario, we estimate resource gaps of EC $300,000 in 2015 that increase to **EC $550,000** by 2020. However, the assumption that ART coverage can be maintained at 2013 levels under the Reduce Prevention scenario may not hold in real-world implementation, since it will be challenging to identify new eligible PLHIV and link them to care if prevention outreach is dramatically cut. Declining outreach among MSM and commercial sex workers – the populations with highest prevalence and risk of infection – might actually lead to falling rates of ART coverage. The negative impact of reductions in outreach and other prevention activities might be worse than this Reduce Prevention scenario indicates.

The Maintenance scenario is slightly more costly than the Reduce Prevention scenario because it maintains current levels of prevention outreach; it projects a resource gap of EC $560,000 in 2015 that grows to **EC $780,000** by 2020.

Finally, Figures 7 through 9 display the distribution of costs across different program elements under the three scenarios. Again, in Figure 7 (Reduce Prevention) the reduction in PEPFAR spending on prevention among MARPs accounts for the dropoff in costs between 2014 and 2015. In Figure 8 (Maintenance), while program coverages are kept steady, costs associated with ART steadily increase as more and more PLHIV become eligible for treatment and remain alive longer. Finally, in Figure 9 (90/90/90), growth in total costs is driven by expanded spending on voluntary counseling and testing (identifying more HIV positive people) and expanded ART coverage (as identified PLHIV are put onto ART).

Figure 7. Break down of resources required by program element: Reduce Prevention Scenario

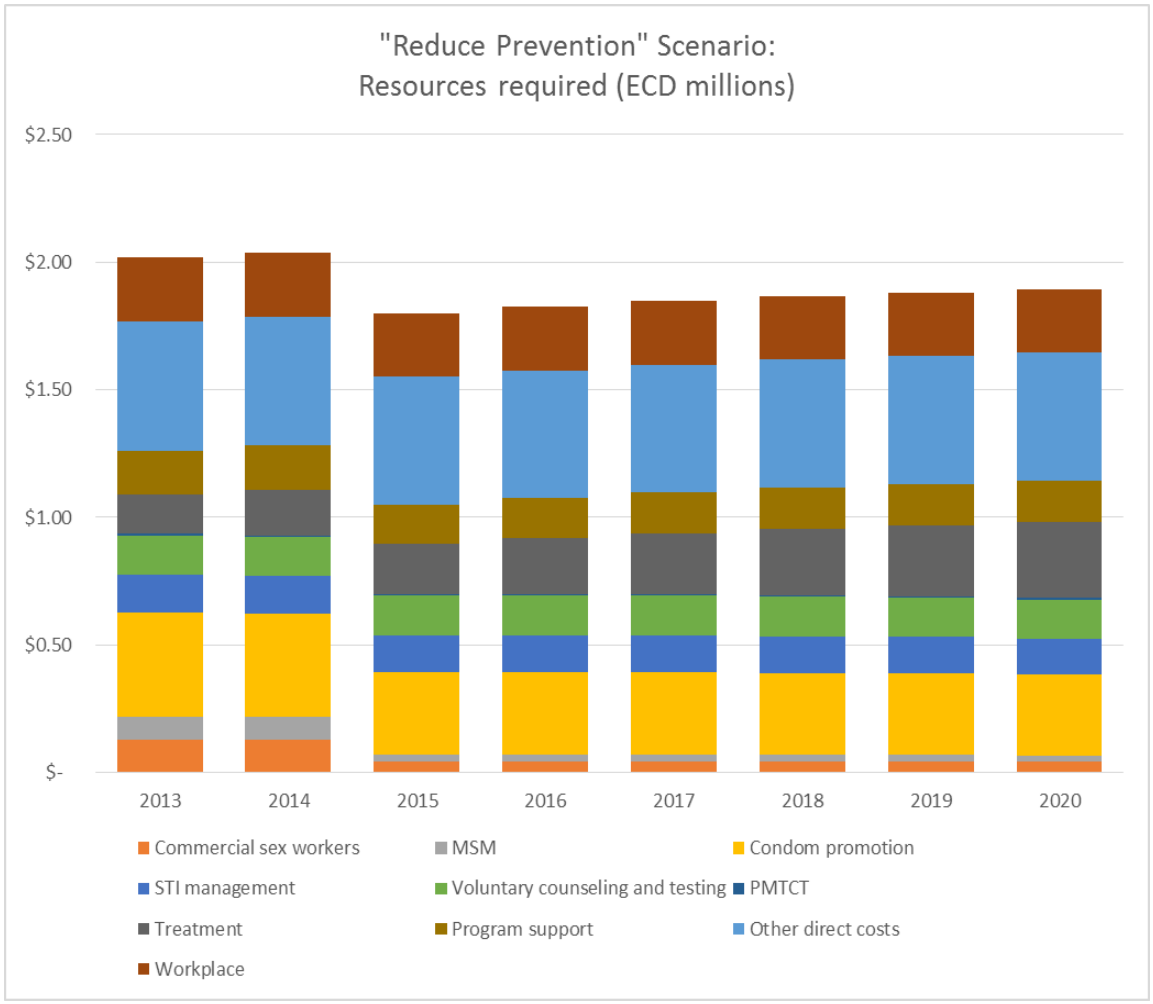


Figure 8. Break down of resources required by program element: Maintenance scenario

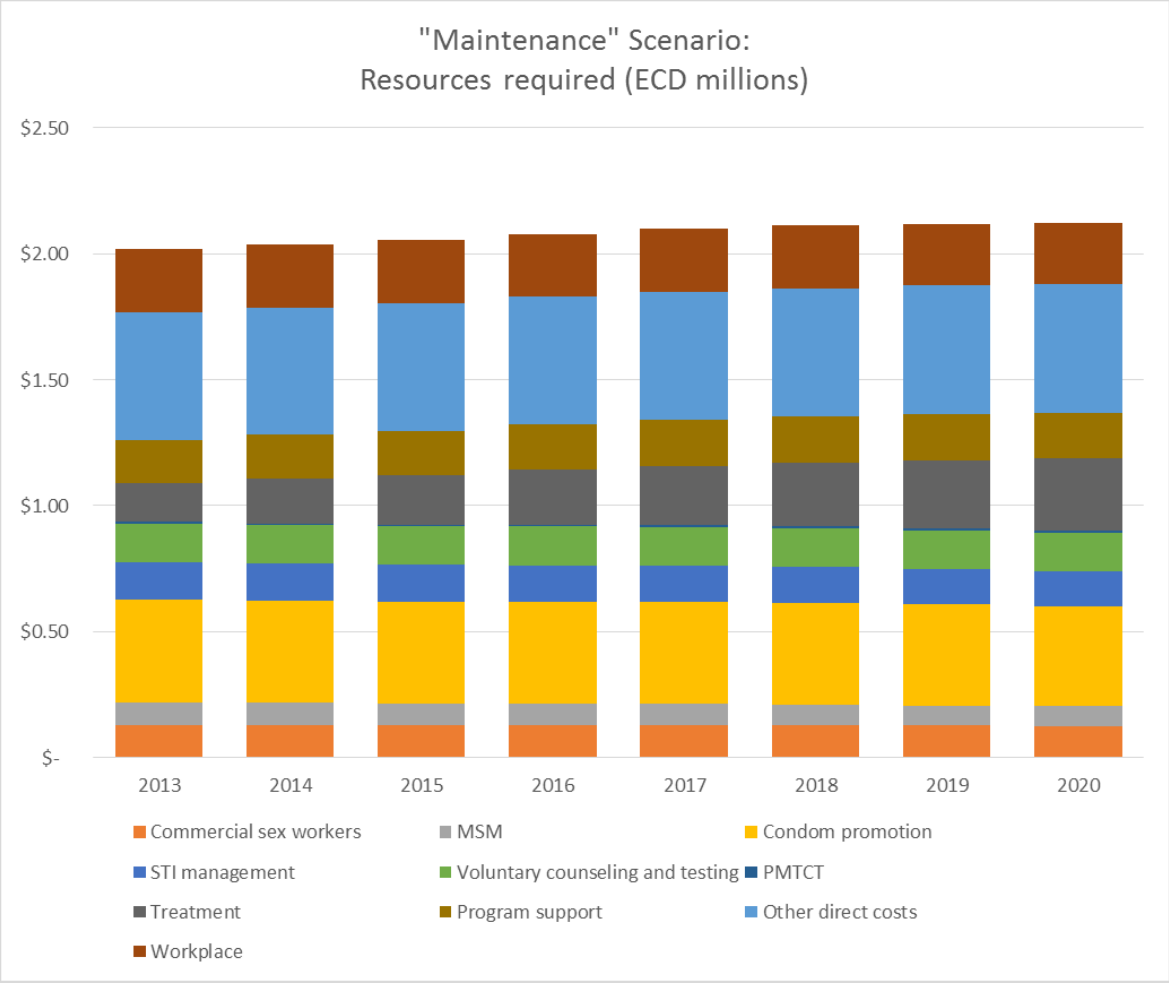
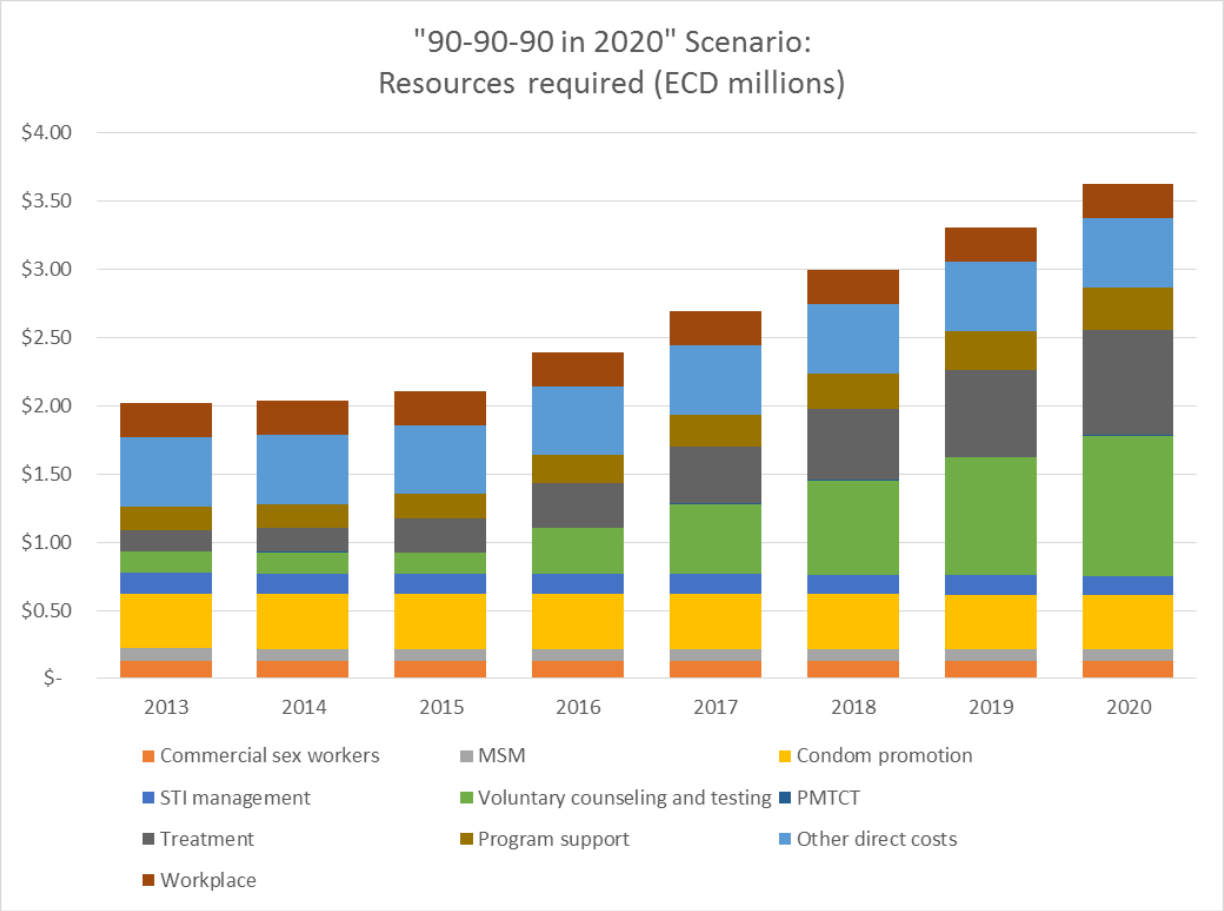


Figure 9. Break down of resources required by program element: 90-90-90 in 2020 scenario



4. CONCLUSION

St. Kitts and Nevis does not have the necessary resources to implement an adequate response to its HIV epidemic. Simply maintaining the status quo requires the government or other donors to step in to fill the gaps in prevention program coverage left by the discontinuation of funding for CHAA. Other possible gaps in HIV response management and programming impacted by the changing PEPFAR regional priorities include lab strengthening and health system strengthening.

If prevention outreach is scaled down, the number of new HIV infections each year will likely increase sharply because of reduced investments in prevention among most-at-risk populations. Even under this scenario, the estimated resource gap during the four year period 2015-2018 is EC$1.59 million total, or about EC$400,000/year.

If MARPs prevention resources are maintained, ART eligibility remains unchanged, and treatment coverage levels are maintained, St. Kitts and Nevis will face a EC$2.59 million resource gap over that four year period, or approximately EC$675,000 per year. HIV incidence will stay relatively constant, and the number of individuals on ART will continue to climb slowly.

The ambitious 90-90-90 by 2020 scenario has the greatest impact on the epidemic, dramatically curtailing new HIV infections and saving many lives through its greater emphasis on counseling, testing, and expanded ART eligibility and coverage. Over the long-term, this approach will eventually mean overtaking and potentially ending the epidemic. But it is also very costly, as it entails testing many more individuals and long-term maintenance of a substantial number of people on ART. Under this scenario, the projected resource gap over the next four years is EC$4.4 million or EC$1.11 million per year.

ANNEX A: INPUTS TO THE GOALS & RESOURCE NEEDS MODELS

Distribution of the Population by Risk Group		Value	Source
Percentage of males			
	Not sexually active (Never had sex)	14.7%	2011 KAPB Table 99
	Low risk heterosexual (One partner in the last year)	51.6%	remaindered
	Medium risk heterosexual (more than one partner in last year)	23.6%	2011 KAPB Appendix I page 163
	High risk heterosexual (Client of sex worker)	7.8%	2011 KAPB Table 125 page 143
	MSM	2.30%	2012 PEPFAR annual report
Percentage of females			
	Not sexually active (Never had sex)	9.0%	2011 KAPB Table 99 Page 113
	Low risk heterosexual (One partner in the last year)	64.8%	remaindered
	Medium risk heterosexual (more than one partner in last year)	23.6%	Assumed to be similar to medium risk percentage among males.
	High risk heterosexual (Sex worker)	2.6%	2011 KAPB Page 108 for Dominica. Not available for St. Kitts.
Percentage of IDU sharing needles			

Condom use in last sex act (Latest available, plus earlier years if available)			
	Low risk	38.0%	2011 KAPB indicator Table 126 page 145
	Medium risk	62.5%	2011 KAPB Appendix I page 164
	High risk	62.5%	2011 St. Kitts KAPB Appendix I
	MSM	60.0%	2012 UNAIDS Progress Report, 2011 cross-sectional anonymous survey of 150 MSM.
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. See Calculations. Possibly too high.
	MSM	6	Not available; reasonable value consistent with 14 partners/year.
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.
	High risk	3	Not available; standard value.
	MSM	14	Not available; standard value.
Age at first sex			
	Males	16.0	The 2011 KAPB asks about age at first sex, but age ranges are too broad to be of use.
	Females	15.0	These are assumed values. See Calculations, KAPB Table 100: data indicate 17 for males, 19.5 for females. Likely too high.
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	26.0%	2012 UNGASS survey: 74% report not in monogamous relationship.
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.
	MSM	22%	Not available; standard value.
Females			
	Low risk	6%	2011 KAPB page 161
	Medium risk	15%	Not available; standard value.
	High risk	30%	Not available; standard 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 (%)	7.2%	See Calculations. From program data reported in UNGASS and in slides from National AIDS Programme. Many more females than males. However, KAPB Table 59 indicates 34.3% of respondents had some HIV test in past 12 months. 39% and 29% of these receive pre-test and post-test counseling respectively; so not all testing is VCT properly speaking. 90% received results. And again, the 2012 GARP cites the same 2011 KAPB survey when claiming 68.7% of respondents had tested in past 6 months with 95%

			knowing their results.
	Condom coverage (%)	62.5%	Equal to medium risk use
	Primary students with teachers trained in AIDS (%)	3.33%	Calculated by NAP Coordinator
	Secondary students with teachers trained in AIDS (%)	20.0%	Calculated by NAP Coordinator
	Out-of-school youth reached (%)	20.0%	NAP Coordinator estimate
	Workforce receiving peer education (%)	45.0%	NAP Coordinator estimate
Most-at-risk populations			
	Female sex workers (%)	77.9%	McLean et al., "The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados". HPP Report 2014.
	MSM outreach (%)	53.4%	McLean et al., "The Cost of HIV Prevention Interventions for Key Populations in the Eastern Caribbean and Barbados". HPP Report 2014.
Medical services			
	Males with STI receiving treatment	55%	NAP Coordinator estimate
	Females with STI receiving treatment	55%	NAP Coordinator estimate
	Units of blood for transfusion tested	100%	NAP Coordinator estimate
	Post exposure prophylaxis: need that is met	100%	NAP Coordinator estimate
	Universal precautions: Hospital beds covered	75%	NAP Coordinator estimate
Treatment			
	(CD4 count threshold for eligibility by year)		
	Percent of adult males in need receiving ART	34%	Estimated number on ART in 2012 from 2014 UNGASS report

	by year		divided by estimated number eligible.
	Percent of adult females in need receiving ART by year	62%	Number on ART in 2012 from 2014 UNGASS report divided by estimated number eligible.
Unit Costs (in USD)			
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 UNAIDS GRNE" (2014). These are estimates for costs in 2013.
	Cost of peer education for out of school youth	$16.22	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 person in employment reached (peer education)	$9.65	LAC Regional Average; Bollinger and Stover, "Background paper on update of unit costs for UNAIDS GRNE" (2014). These are estimates for costs in 2013.

Most-at-risk populations			
	Cost per female sex worker reached	$187.04	CHAA cost per person reached in SKN. 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	$187.04	CHAA cost per person reached in SKN. 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, Treatment, Care and Support, 2014.
Treatment			
	Adults (cost per patient per year): First line	$174.38	OECS data point from GPRM: TDF/3TC/EFV

	ART drugs		
	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 and 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 and 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 and 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 and 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
	Migration from first to second line (% per year)	15%	2014 St. Vincent UNGASS report
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.* 2010, Gray *et al.* 2007
Multiplier on transmission per act for		
Male to female	1.0	Galvin and Cohen 2004, 2.2-11.3
Presence of STI	5,5	Powers *et al.* 2008, 5.1-8.2
MSM contacts	2.6	Vittinghoff *et al.* 1999
Relative infectiousness by stage of infection		
Primary infection	9 –40	Boily *et al.* 2009, 9.17 (4.47-18.81)
Asymptomatic	1	Pinkerton 2008
Symptomatic	7	Boily *et al.* 2009, 7.27 (4.45-11.88)
On ART	0.04 – 0.08	Cohen et al. 2011
Efficacy in reducing HIV transmission		Weller and Davis 2004
Condom use	0.8	Weller and Davis 2004, Auvert *et al.* 2005, Gray *et al.* 2007, Bailey *et al.* 2007
Male circumcision	0.6	Grant *et al. 2010,* Partners PrEP Study
PrEP	0.55 – 0.73	Partners PrEP Study
Microbicide	0.6	Karim *et al.* 2010

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