Resource optimization to maximize the HIV response in Ukraine

Executive summary

In order to maintain the HIV response in Eastern Europe and Central Asia it is imperative to ensure that national HIV programs continue to be sustainably financed. Continued commitment by national governments to finance the HIV the response is critical. Moreover, with planned transition away from donor support, there will be increased demand on domestic fiscal investment. As such it is vital to make cost-effective funding allocations decisions to maximize impact. An allocative efficiency modeling analysis was conducted through partnership with the Ukrainian Government, the Global Fund, UNAIDS, and the Burnet Institute. The Optima HIV model was applied to estimate the optimized resource allocation across a mix of HIV programs. It is anticipated that recommendations from this analysis, as summarized below, will inform subsequent National Strategic Plans and Global Fund funding applications.

Key recommendations for HIV resource optimization include:

- **Scaling up antiretroviral therapy (ART),** which could lead to increased treatment coverage of people diagnosed with HIV from 71% (status quo) to 87% (optimized) in 2019, with high coverage levels maintained to 2030.
- **Scaling up investment for HIV testing and prevention programs targeting people who inject drugs (PWID).** At 100% optimized budget, results suggest scaling up investment for HIV testing and prevention programs targeting PWID, given that over 50% of new HIV infections in Ukraine are estimated to have occurred among PWID in 2018. Should additional resources become available, investment in PWID programs should continue to be scaled-up.
- **Scaling up investments for HIV testing and prevention programs targeting men who have sex with men (MSM) as additional resources become available.** As additional resources become available investments in HIV testing and prevention programs targeting MSM should be scaled up at budget levels greater than the 100% budget level.

Given relatively low new HIV infections among the general population, it is **not recommended to prioritize HIV investments towards the general population at the latest reported budget level**, but rather to target limited funds towards key populations at higher risk of acquiring and transmitting HIV.

Background

Ukraine has the second-largest HIV epidemic in Eastern Europe and Central Asia, accounting for 9% of new HIV infections in the region in 2016.[1] The epidemic is concentrated in key populations with prevalence of 22.6% among people who inject drugs (PWID), 5.2% among female sex workers (FSW), and 7.5% among men who have sex with men (MSM).[1] Ukraine has committed to the UNAIDS 90-90-90 Fast-Track targets.[2] At the end of 2018, 71% of people living with HIV were aware of their status, of whom 73% were on treatment. Of those on treatment, 93% had achieved viral suppression.[3]

Recent gains in Ukraine's HIV response are threatened by unrest in the regions of Donetsk, Luhansk and Crimea which continues to impact on access to HIV services. It is estimated that 1.7 million people are internally displaced by the conflict.[4] Risk of ART interruption; disruption of harm reduction services, sexual violence, and a lack of prevention measures for the armed forces undermine the impact of Ukraine's national HIV response in these areas, which were already disproportionately affected by the epidemic.[5]

Over the 2014-2015 period, an HIV allocative efficiency analysis was conducted using the Optima HIV model with support from the World Bank, UNAIDS, the Global Fund, and other partners. Since then, following on recommendations from the 2014-2015 analysis, there have been significant improvements in the adoption of updated HIV testing and treatment protocols, reductions in treatment costs, updated epidemiological values, and improvements in service delivery leading to cost savings. Following on from this initial study, an updated allocative efficacy modeling analysis was conducted to estimate the optimal allocation of HIV resources based on latest reported values with findings described below.

Objectives

1. Given 2015-2017 resource allocation, how many new HIV infections, HIV-related deaths, and HIV-related DALYs (comparable to QALYs saved) are estimated to have been averted through HIV program implementation?
2. What is the optimized resource allocation to minimize HIV infections and HIV-related deaths by 2030 under optimized varying budget levels?
3. What is the optimized HIV resource allocation for best achieving the 90-90-90 and 95-95-95 targets by 2020 and by 2030, respectively, and what are the minimum levels of resources required for best achieving these targets?

Methodology

An allocative efficacy modeling analysis was undertaken in collaboration with the HIV program of Ukraine. Epidemiological and program data was provided by the Ukraine country team and validated during a regional workshop that was held July 2019 in Kiev, Ukraine. Country teams were consulted before and after the workshop on data collation and validation, objective and scenario building, and results validation. Demographic, epidemiological, behavioural, programmatic, and expenditure data from various sources including UNAIDS Global AIDS Monitoring and National AIDS Spending Assessment reports, Integrated bio-behavioural surveillance surveys, national reports, and systems, as well as from other sources were collated. This allocative efficacy analysis was conducted using Optima HIV, an epidemiological model of HIV transmission overlayed with a programmatic component and a resource optimization algorithm. A more detailed description of the Optima HIV model has been published by Kerr et al.[6]

Populations and HIV programs modeled

Populations considered in this analysis were:

- Key populations
  - Female sex workers (FSW)
  - Clients of female sex workers (Clients)
  - Men who have sex with men (MSM)
  - People who inject drugs (PWID)
  - Prisoners
- General populations
  - Males 0-14 (M0-14)
  - Females 0-14 (F0-14)
  - Males 15-49 (M15-49)
  - Females 15-49 (F15-49)
  - Males 50+ (M50+)
  - Females 50+ (F50+)

HIV programs considered in this analysis:

- Antiretroviral therapy (ART)
- HIV testing and prevention targeting prisoners
- HIV testing and prevention targeting PWID
- HIV testing and prevention targeting MSM
- HIV testing and prevention targeting FSW
- HIV testing services (HTS) for the general population
- Prevention of mother-to-child transmission (PMTCT)
- Opiate substitution therapy (OST)

Model constraints

Within the optimization analyses, no one on treatment, including ART, PMTCT, or OST, can be removed from treatment, unless by natural attrition.

Model weightings

Objective weightings to minimize new HIV infections and HIV-related deaths by 2030 were weighted as 1 to 1 for infections to deaths.

Findings

Objective 1. Given 2015-2017 resource allocation, how many new HIV infections, HIV-related deaths, and HIV-related DALYs are estimated to have been averted through HIV program implementation?

To estimate the impact of past HIV spending on the status of HIV in Ukraine, all spending on targeted HIV programs (non-targeted HIV program spending was not considered) was removed from 2015 to 2017, representing the previous Global Fund funding cycle period. This was compared with actual program spending over the same period. This is referred to as the baseline scenario.

Results suggests that past investments have had an important impact on the HIV response. Had the HIV program not been implemented from 2015 to 2017, by 2018 it is estimated that there could have been almost 200% more new HIV infections (almost 49,000 more HIV infections) and almost 140% more HIV-related deaths (approximately 30,000 more HIV-related deaths) over this period (figure 1). The total annual spending of the HIV program in 2018 amounted to US$99.5, of which the estimated share of Global Fund contribution is 14%.

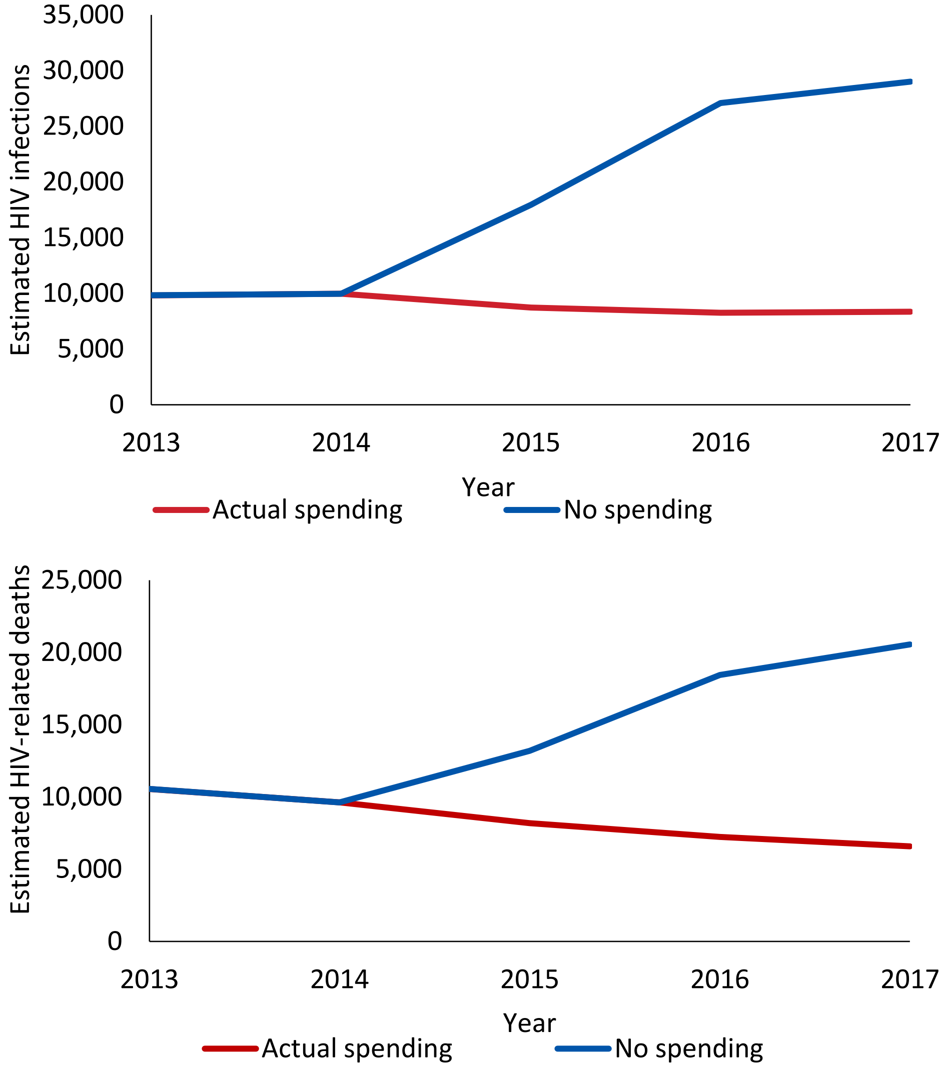


Figure 1. Estimated new HIV infections and HIV-related deaths in the absence of HIV program spending from 2015 to 2017

Objective 2. What is the optimized resource allocation to minimize HIV infections and HIV-related deaths by 2030 under varying budget levels?

In 2018, Ukraine reported an HIV program budget of US$99.5M, with approximately 48% of the overall budget invested in non-targeted HIV programs (figures 2 and 3). As non-targeted HIV programs are not considered within the optimization, budgets for these programs are fixed. Optimization results suggest scaling up ART, which could lead to increased treatment coverage those diagnosed with HIV from 71% (status quo) to 81% (optimized) in 2019, with high coverage levels maintained to 2030 (figures 2 and 3; table A4).

At 100% optimized budget, results suggest scaling up investment for HIV testing and prevention programs targeting PWID (figures 2 and 3; table A4), given that over 50% of new HIV infections in Ukraine are estimated to have occurred among PWID in 2018. Should additional resources become available, investment in PWID programs should continue to be scaled-up (figure 2; table A4). As additional resources become available investments in HIV testing and prevention programs targeting MSM should be scaled up at budget levels greater than 100% (figure 2; table A4). Investment in FSW programs should also be scaled up as additional resources become available.

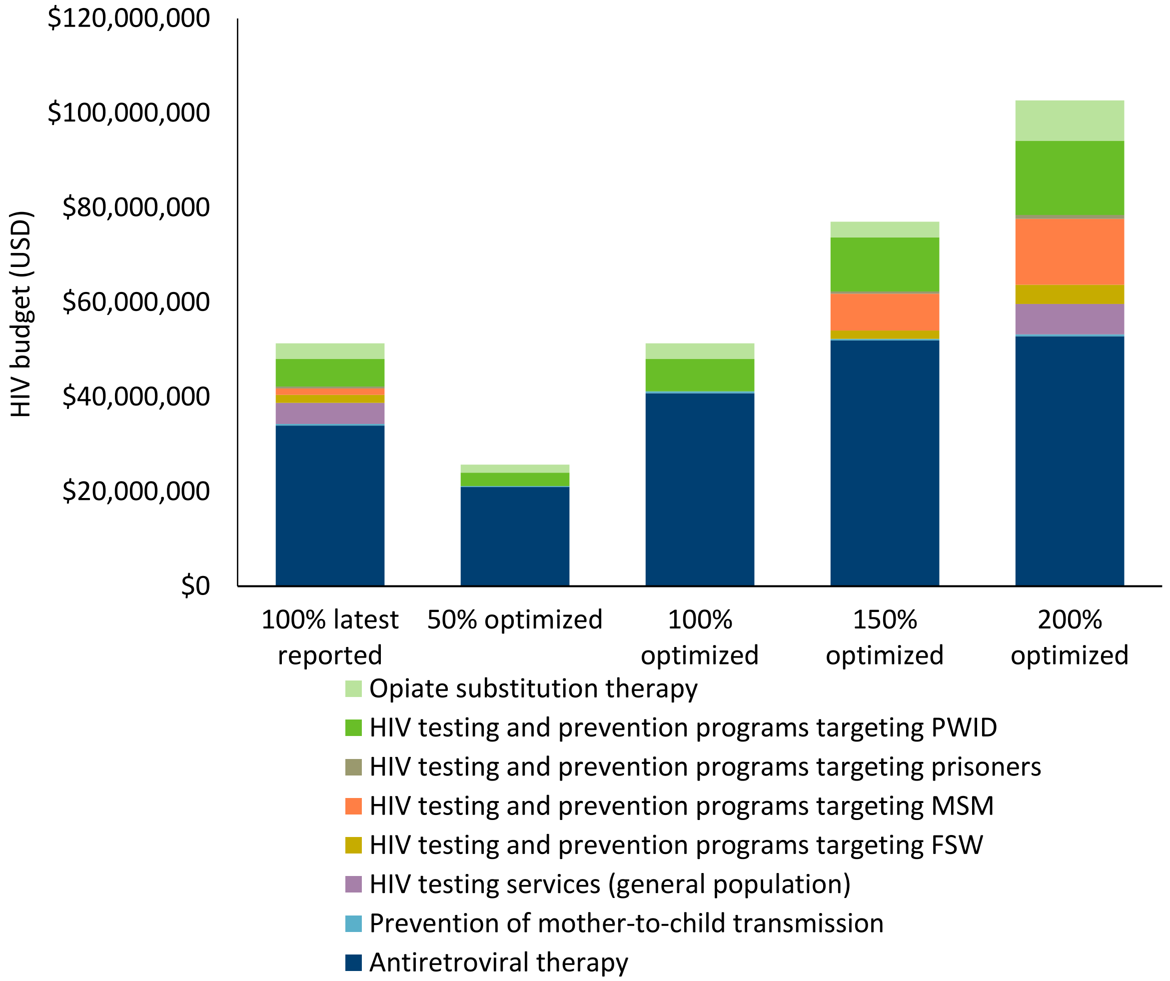


Figure 2. Optimized allocations under varying levels of annual HIV budgets for 2019 to 2030, to minimize new infections and HIV-related deaths by 2030

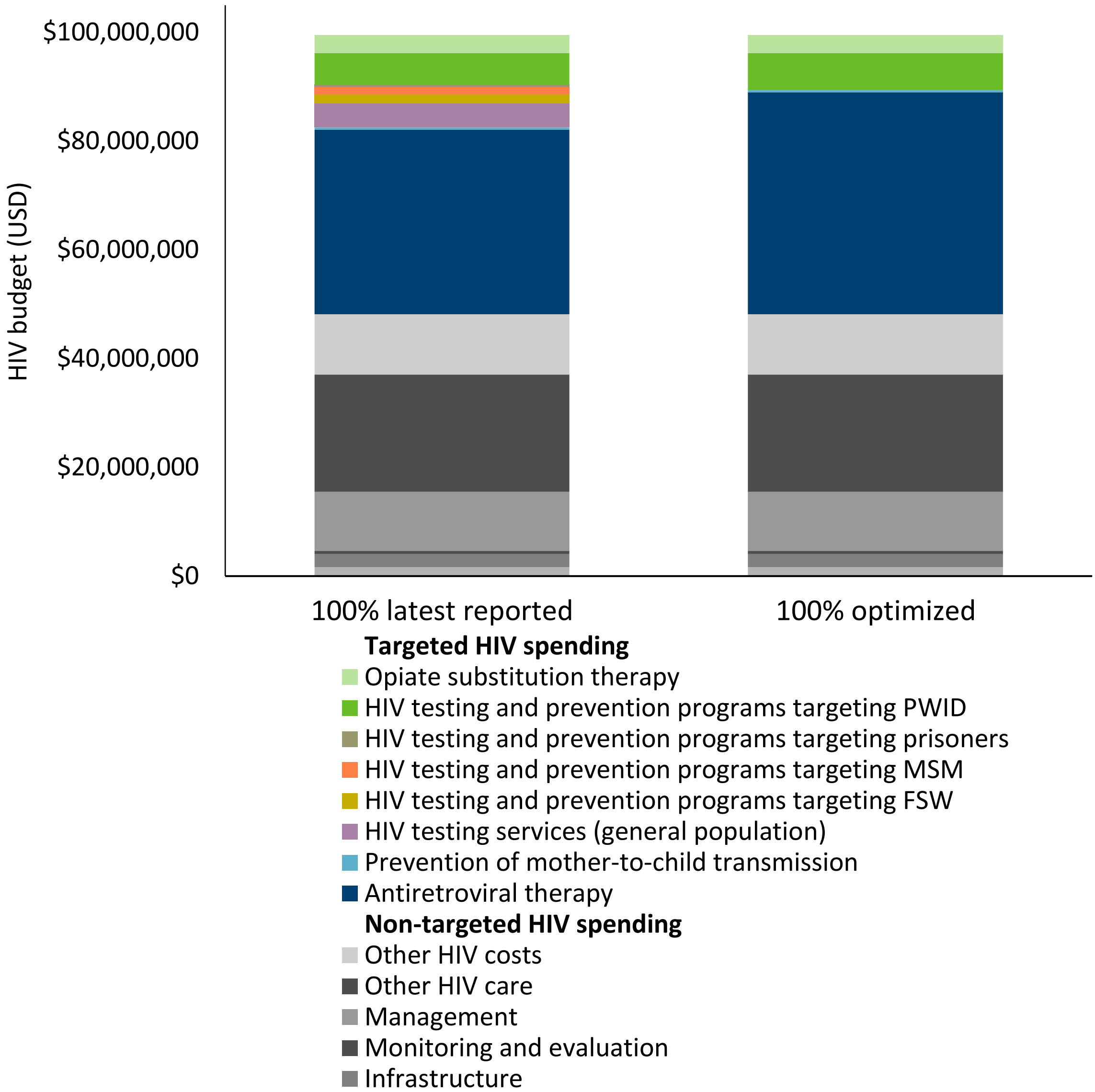


Figure 3. Optimized HIV annual resource allocation, 2019 to 2030 to minimize new infections and HIV-related deaths by 2030. Non-targeted HIV program budgets are shown here but are not considered within the optimization.

Under 100% optimized annual budget to minimize new HIV infections and HIV-related deaths from 2019 to 2030, it is estimated that by 2030 an additional 18% of new HIV infections could be averted (17,000 more infections averted) and 13% more HIV-related deaths could be averted (7,000 more deaths averted) compared with the latest reported allocation being maintained over the same period (figure 4). By 2030, an additional 180,000 DALYs could be averted under optimized budget allocation.

If the budget were doubled to 200% and the allocation optimized, it is estimated that by 2030 new HIV infections could be reduced by an additional 45% (44,000 more infections averted), HIV-related deaths by 25% (14,000 more deaths averted), and HIV-related DALYs by 20% (330,000 more DALYs averted) compared with 100% budget under the latest reported allocation (figure 4). It is estimated that optimized investment beyond 270% budget will have only a marginal impact on reducing HIV infections and deaths given the current mix of programs, as programs will reach set saturation levels (modeled as 95% of the maximum achievable reduction in new infections and HIV-related deaths in 2030 compared to 2018 levels) (table A5).

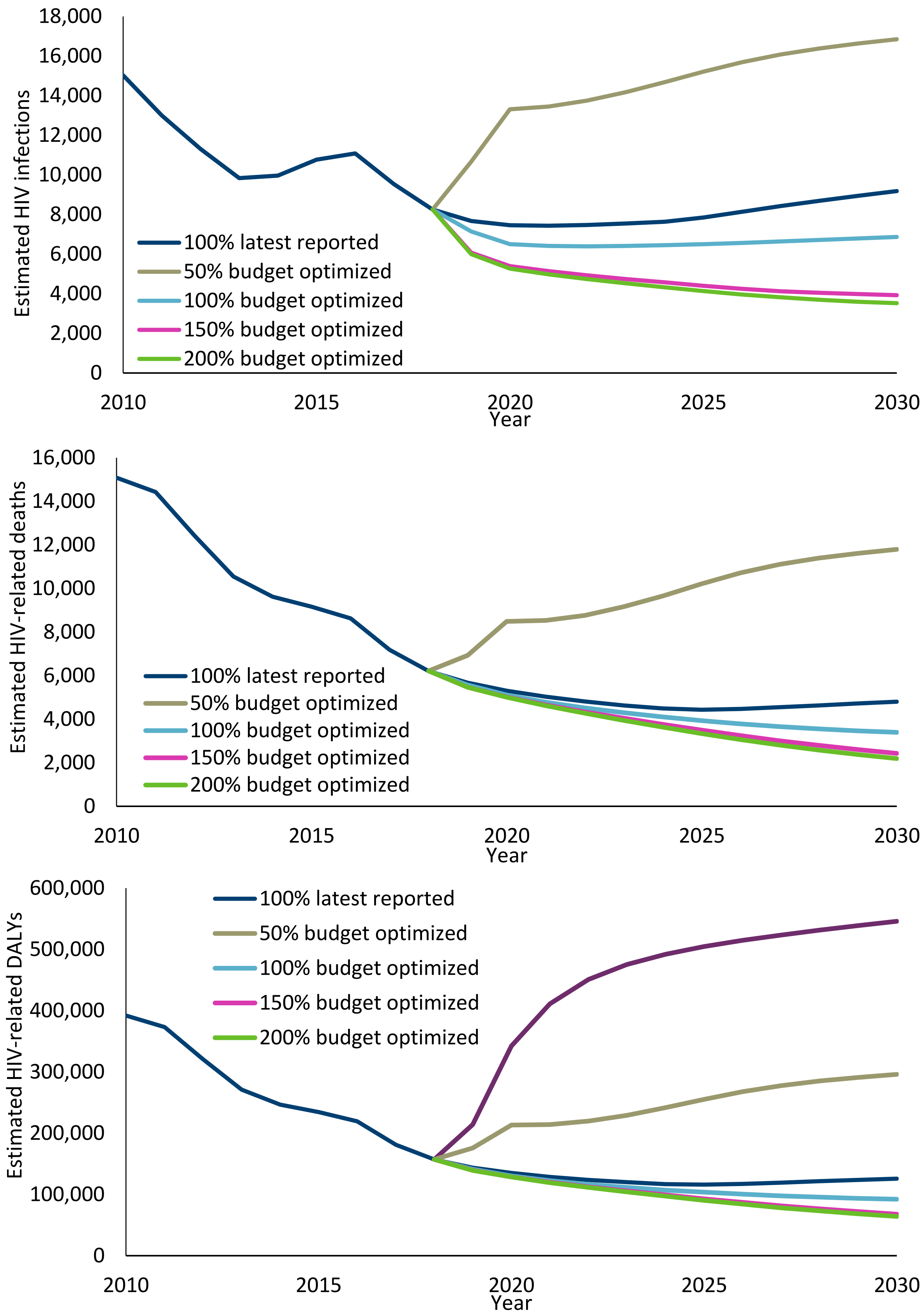


Figure 4. Estimated new HIV infections, HIV-related deaths, and HIV-related DALYs under optimized varying annual budget levels 2019 to 2030 to minimize infections and deaths by 2030

Objective 3. What is the optimized HIV resource allocation for best achieving the 90-90-90 and 95-95-95 targets by 2020 and 2030, respectively, and what are the minimum levels of resources required for best achieving these targets?

Under latest reported budget, it is estimated that by 2020, 71% of people living with HIV will be diagnosed, 70% of those diagnosed will receive treatment, and 89% of those on treatment will achieve viral suppression (figure 5). Even with an increased budget, optimization results suggests that 90-90-90 targets will not be met by 2020, as this is such a short timeframe.

To approach 95-95-95 targets, it is estimated that the annual HIV program budget from 2019 to 2030 should be increased to 240% of the latest reported budget level (an additional US$74M annually) and optimized with prioritization of antiretroviral therapy (ART), HIV testing and prevention programs targeting PWID, HIV testing and prevention programs targeting MSM, and opiate substitution therapy (OST) (figure 6). By 2030, this could allow Ukraine to have 88% of people living with HIV be aware of their status, 97% of those diagnosed on treatment, and 95% of those on treatment to have achieved viral suppression (figure 5).

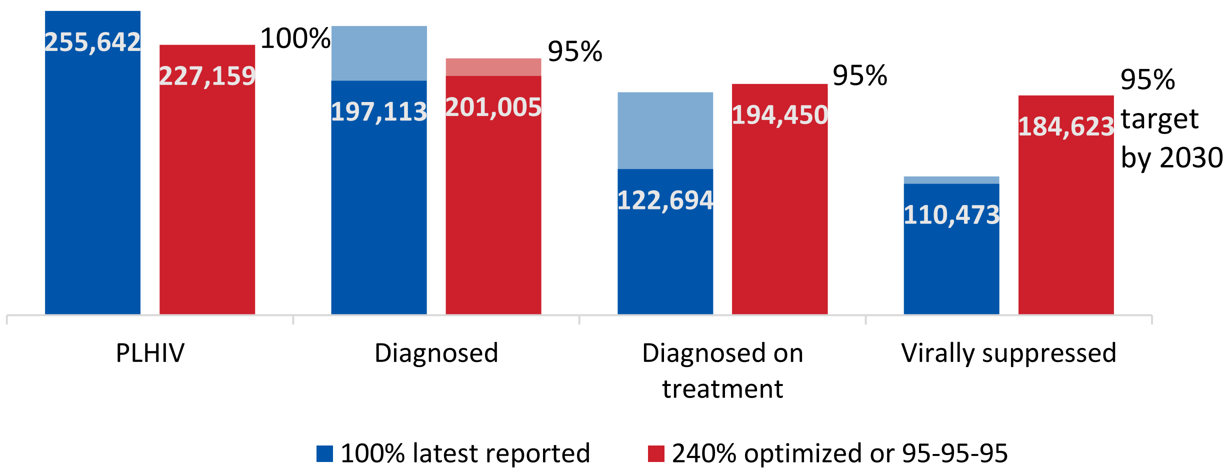


Figure 5. HIV cascade under optimized resource allocation to best achieve 95-95-95 targets by 2030. Dark blue bars represent progress towards 95-95-95 targets under 100% latest reported budget, with light blue bars showing the gap to achieving targets. Red bars represent progress towards 95-95-95 targets under 240% optimized resource allocation to best achieve 95-95-95 targets, with light red bars showing the gap to achieving targets.

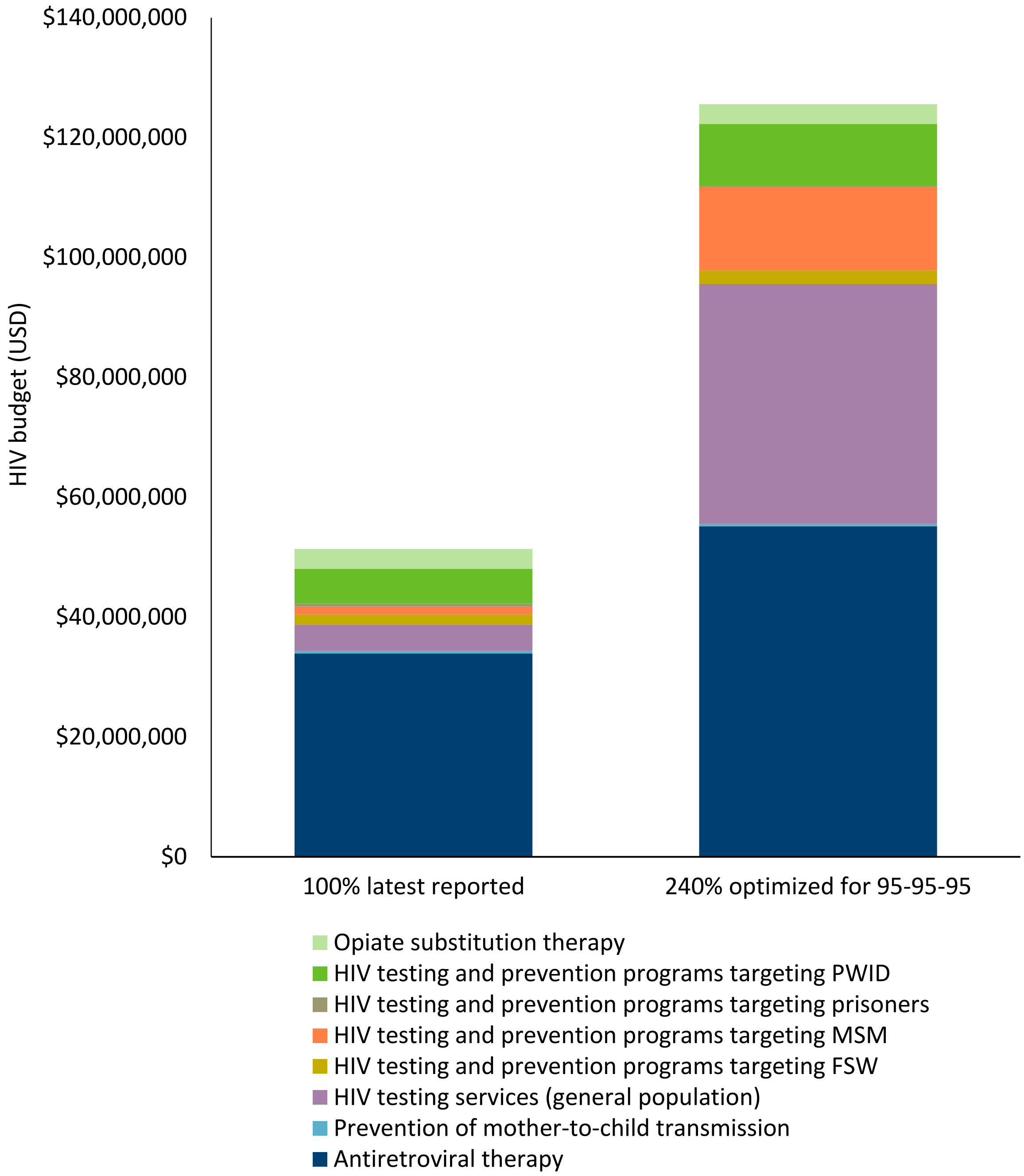


Figure 6. Optimized HIV budget level and allocation to best achieve 95-95-95 targets by 2030

Compared with latest reported 100% budget allocation, by 2030 under optimized allocation of 240% budget towards achieving 95-95-95 targets it is estimated that an additional 50% of new HIV infections could be averted (approximately 46,000 more infections averted) and 30% of HIV-related deaths could be averted (approximately 16,000 more deaths averted) (figure 8).

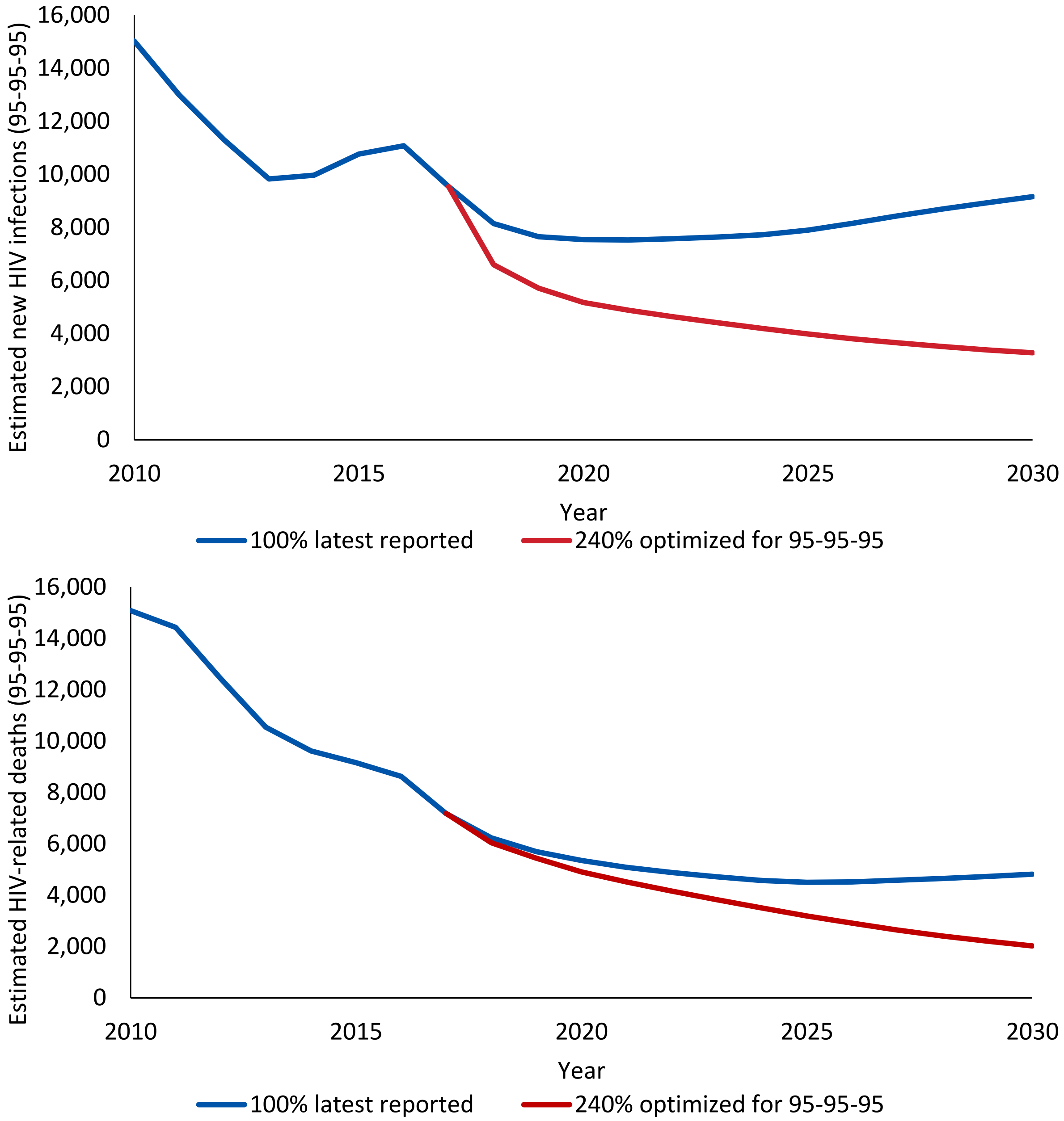


Figure 8. Estimated new HIV infections and HIV-related deaths under optimized allocation towards best achieving 95-95-95 targets by 2030

Study limitations

As with any modelling study, there are limitations that should be considered when interpreting results and recommendations from this analysis. First, limitations in data availability and reliability can lead to uncertainty surrounding projected results. Although the model optimization algorithm accounts for inherent uncertainty, it might not be possible to account for all aspects of uncertainty because of poor quality or insufficient data, particularly for cost and coverage values informing cost functions. Coupled with epidemic trends, cost functions are a primary factor in modeling optimized resource allocations. Second, we used contextual values and expert opinion where available, otherwise evidence from systematic reviews of clinical and research studies were used to inform model assumptions. Lastly, we did not capture the effects of migration of on the HIV epidemic.

Conclusions

The results of this allocative efficiency modeling analysis demonstrate the impact that an optimized resource allocation across a mix of HIV programs can have on reducing infections and deaths. The purpose of this modelling analysis was to evaluate the allocative efficiency of core HIV programs. However, additional gains could be achieved through improving technical or implementation efficiency. In addition, policy makers and funders are encouraged to consider resources required to improve equity, such as through investment in social enablers to remove human rights-based barriers to health. These elements have not been explicitly dealt with in this analysis.

References

1. Ending AIDS: Progress towards the 90–90–90 targets. UNAIDS 2017
2. Ukraine progress report, Global AIDS Monitoring 2018. UNAIDS, 2018.
3. UNAIDS ‘AIDSinfo' (accessed November 2019)
4. Internal Displacement Monitoring Centre (2017) Ukraine: Country information 2015. Available at www.internal-displacement.org/countries/ukraine
5. Vasylyeva TI, Liulchuk M, Friedman SR, Sazonova I, Faria NR, Katzourakis A, Babii N, Scherbinska A, Thézé J, Pybus OG, Smyrnov P, Mbisa JL, Paraskevis D, Hatzakis A, Magiorkinis G. Molecular epidemiology reveals the role of war in the spread of HIV in Ukraine. PNAS. 2018,115(5):1051-1056.
6. Kerr CC, Stuart RM, Gray RT, Shattock AJ, Fraser-Hurt N, Benedikt C, et al. Optima: A model for HIV epidemic analysis, program prioritization, and resource optimization. JAIDS, 2015;69(3):365-76.

Appendices

Appendix 1. Model parameters

Table A1. Model parameters: transmissibility, disease progression, and disutility weights

Interaction-related transmissibility (% per act)		
	Insertive penile-vaginal intercourse	0.04%
	Receptive penile-vaginal intercourse	0.08%
	Insertive penile-anal intercourse	0.09%
	Receptive penile-anal intercourse	1.38%
	Intravenous injection	0.80%
	Mother-to-child (breastfeeding)	36.70%
	Mother-to-child (non-breastfeeding)	20.50%
Relative disease-related transmissibility		
	Acute infection	5.60
	CD4 (>500)	1.00
	CD4 (500) to CD4 (350-500)	1.00
	CD4 (200-350)	1.00
	CD4 (50-200)	3.49
	CD4 (<50)	7.17
Disease progression (average years to move)		
	Acute to CD4 (>500)	0.30
	CD4 (500) to CD4 (350-500)	1.11
	CD4 (350-500) to CD4 (200-350)	3.10
	CD4 (200-350) to CD4 (50-200)	3.90
	CD4 (50-200) to CD4 (<50)	1.90
Changes in transmissibility (%)		
	Condom use	95%
	Circumcision	58%
	Diagnosis behavior change	0%
	STI cofactor increase	265%
	Opiate substitution therapy	54%
	PMTCT	90%
	Pre-exposure prophylaxis	73%
	Unsuppressive ART	50%
	Suppressive ART	92%
Disutility weights		
	Untreated HIV, acute	0.15
	Untreated HIV, CD4 (>500)	0.01
	Untreated HIV, CD4 (350-500)	0.02
	Untreated HIV, CD4 (200-350)	0.07
	Untreated HIV, CD4 (50-200)	0.27
	Untreated HIV, CD4 (<50)	0.55
	Treated HIV	0.05

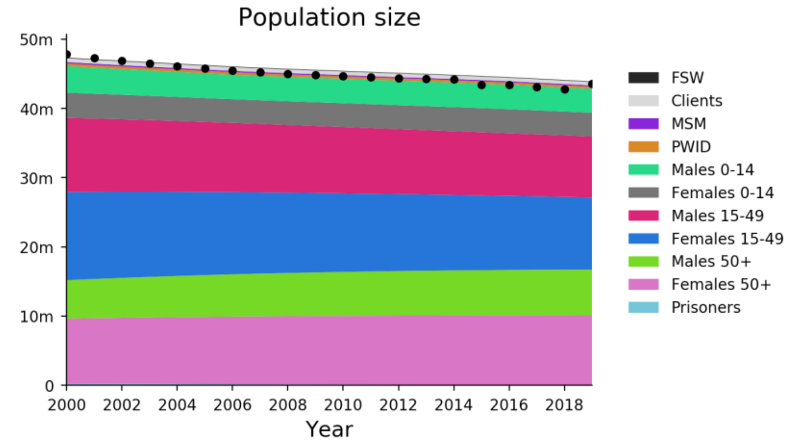
Source: Optima HIV User Guide Volume VI Parameter Data Sources

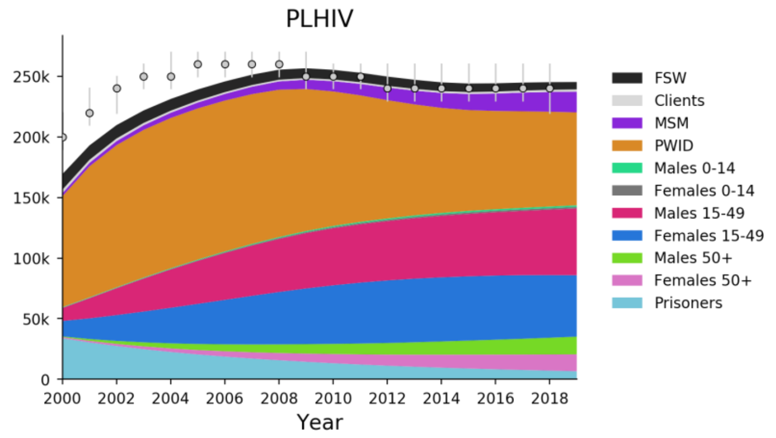
Table A2. Model parameters: treatment recovery and CD4 changes due to ART, and death rates

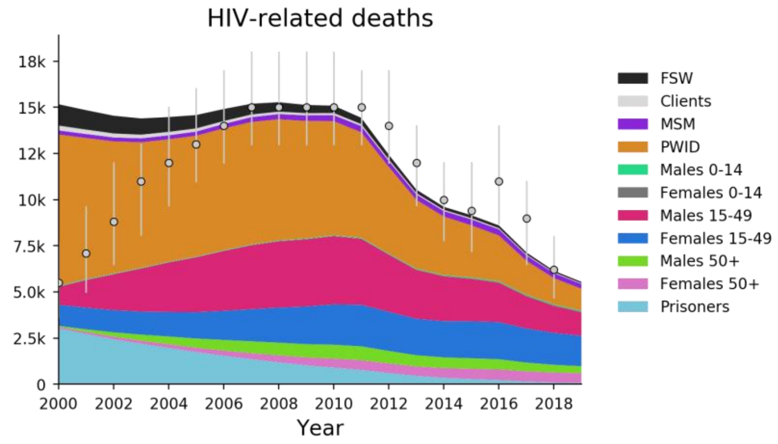
Treatment recovery due to suppressive ART (average years to move)		
	CD4 (350-500) to CD4 (>500)	2.20
	CD4 (200-350) to CD4 (350-500)	1.42
	CD4 (50-200) to CD4 (200-350)	2.14
	CD4 (<50) to CD4 (50-200)	0.66
	Time after initiating ART to achieve viral suppression (years)	0.20
	Number of VL tests recommended per person per year	2.00
CD4 change due to non-suppressive ART (%/year)		
	CD4 (500) to CD4 (350-500)	3%
	CD4 (350-500) to CD4 (>500)	15%
	CD4 (350-500) to CD4 (200-350)	10%
	CD4 (200-350) to CD4 (350-500)	5%
	CD4 (200-350) to CD4 (50-200)	16%
	CD4 (50-200) to CD4 (200-350)	12%
	CD4 (50-200) to CD4 (<50)	9%
	CD4 (<50) to CD4 (50-200)	11%
Death rate (% mortality per year)		
	Acute infection	0%
	CD4 (>500)	0%
	CD4 (350-500)	1%
	CD4 (200-350)	1%
	CD4 (50-200)	8%
	CD4 (<50)	43%
	Relative death rate on suppressive ART	30%
	Relative death rate on non-suppressive ART	70%
	Tuberculosis cofactor	217%

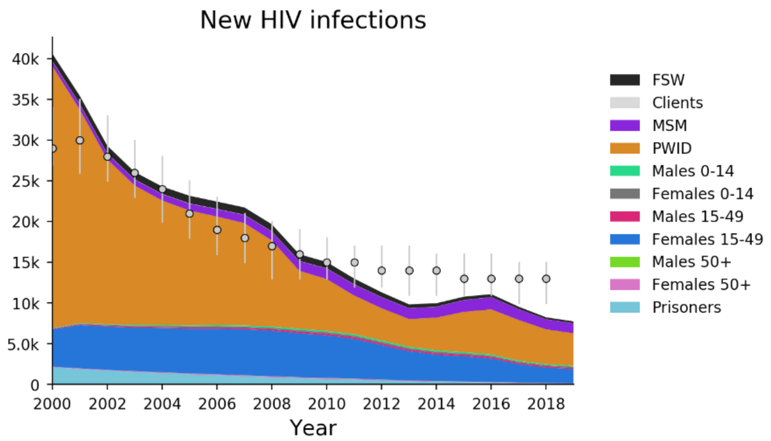
Source: Optima HIV User Guide Volume VI Parameter Data Sources

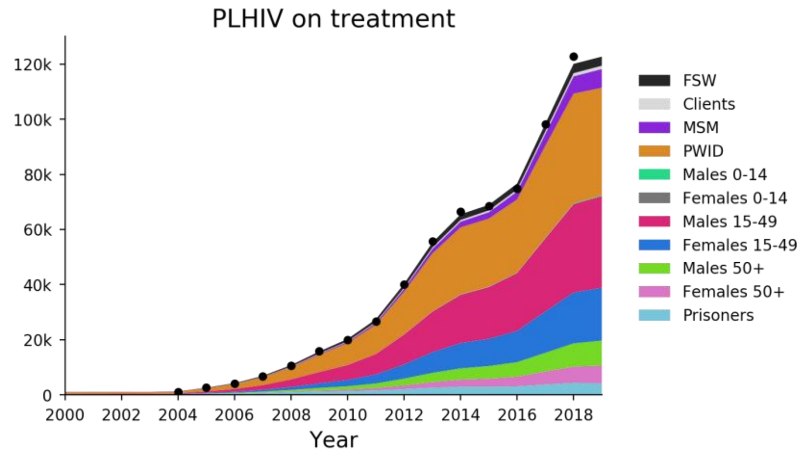
Appendix 2. Model calibration

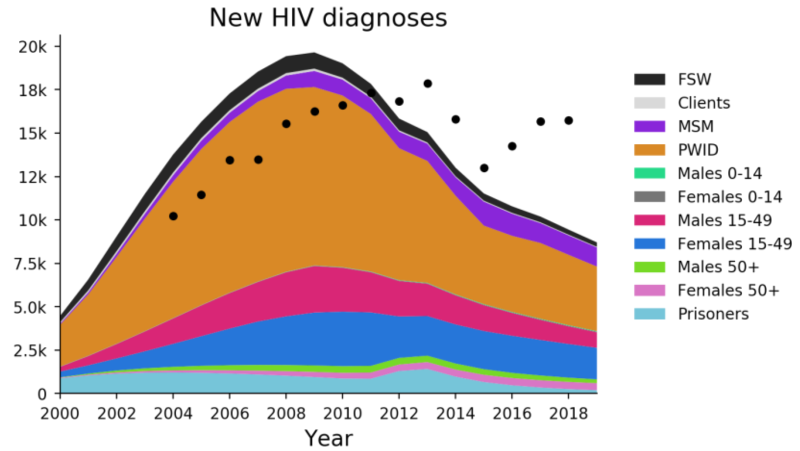




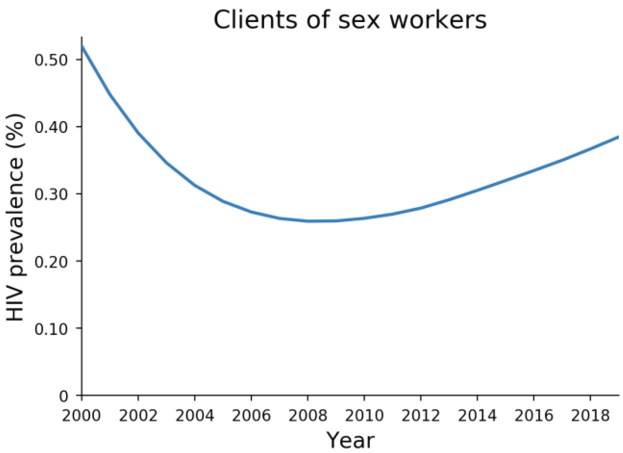


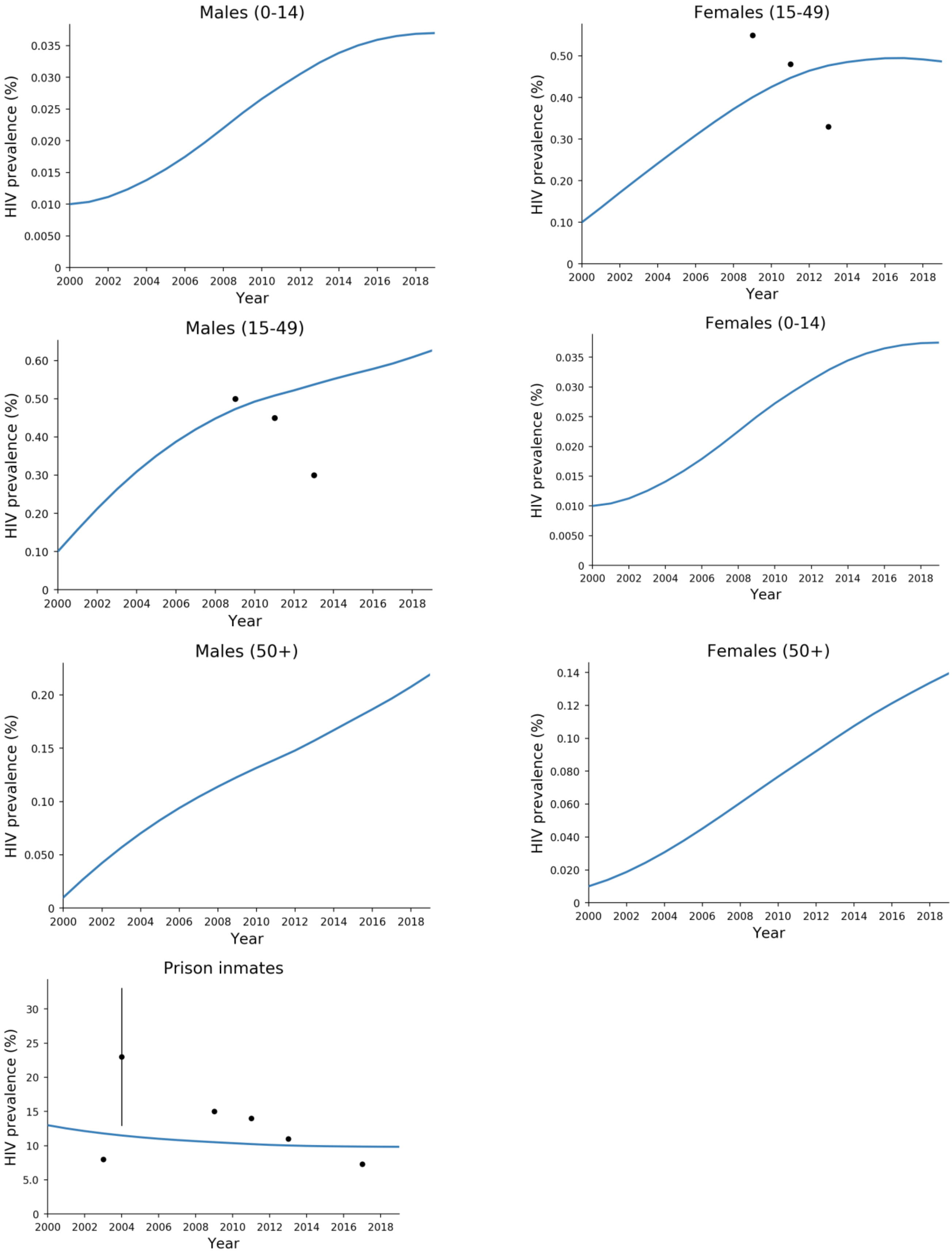



PLHIV on treatment
120k
100k
80k
60k
40k
20k
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
FSW
Clients
MSM
PWID
Males 0-14
Females 0-14
Males 15-49
Females 15-49
Males 50+
Females 50+
Prisoners


New HIV diagnoses
20k
18k
15k
12k
10k
7.5k
5.0k
2.5k
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
FSW
Clients
MSM
PWID
Males 0-14
Females 0-14
Males 15-49
Females 15-49
Males 50+
Females 50+
Prisoners


Female sex workers
HIV prevalence (%)
14
12
10
8.0
6.0
4.0
2.0
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year


Clients of sex workers
HIV prevalence (%)
0.50
0.40
0.30
0.20
0.10
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year



Males (0-14)
HIV prevalence (%)
0.035
0.030
0.025
0.020
0.015
0.010
0.0050
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Females (15-49)
HIV prevalence (%)
0.50
0.40
0.30
0.20
0.10
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Males (15-49)
HIV prevalence (%)
0.60
0.50
0.40
0.30
0.20
0.10
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Females (0-14)
HIV prevalence (%)
0.035
0.030
0.025
0.020
0.015
0.010
0.0050
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Males (50+)
HIV prevalence (%)
0.20
0.15
0.10
0.050
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Females (50+)
HIV prevalence (%)
0.14
0.12
0.10
0.080
0.060
0.040
0.020
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year
Prison inmates
HIV prevalence (%)
30
25
20
15
10
5.0
0
2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Year

Appendix 3. HIV program costing

Table A3. HIV program unit costs and saturation values

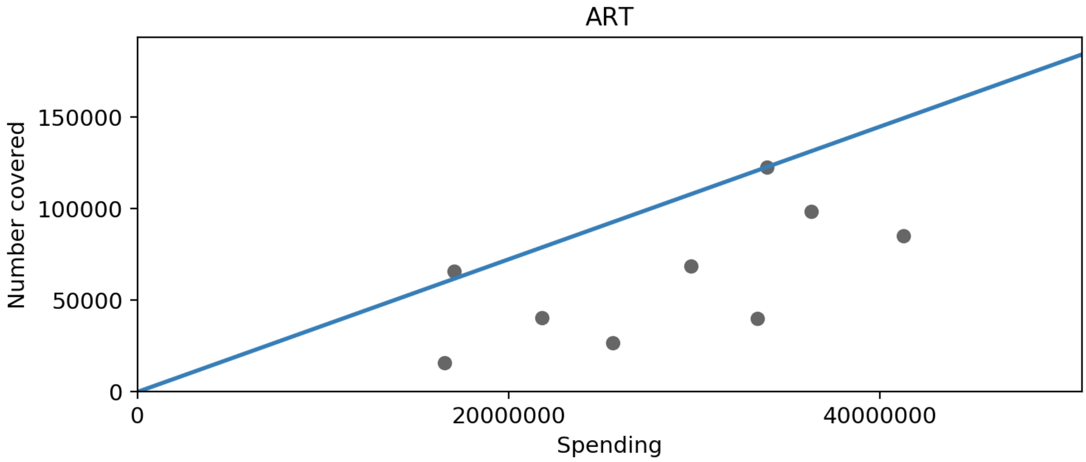
HIV programs	Unit cost (low) (USD)	Unit cost (high) (USD)	Saturation (low)	Saturation (high)
Antiretroviral therapy (ART)	$276.50	$276.50	85%	95%
HIV testing services (general population)	$2.45	$2.45	50%	60%
HIV testing and prevention targeting FSW	$42.65	$42.65	60%	70%
HIV testing and prevention targeting MSM	$29.24	$29.24	40%	80%
HIV testing and prevention targeting PWID	$24.00	$28.00	45%	55%
Opiate substitution therapy (OST) (2016)	$290.52	$290.52	5%	10%
Prevention of mother-to-child transmission (PMTCT)	$173.93	$173.93	98%	100%
HIV testing and prevention targeting prisoners	$6.89	$6.89	100%	100%

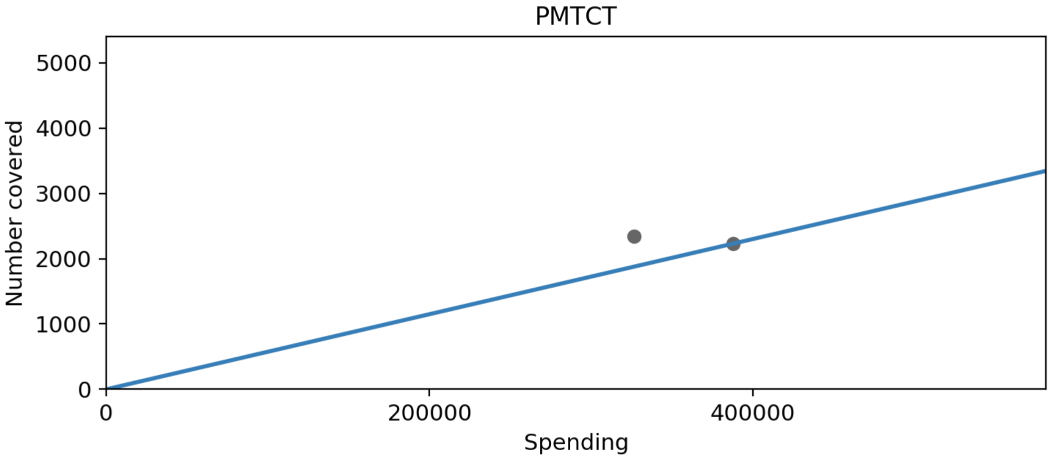
Table A4.Values used to inform HIV program cost functions

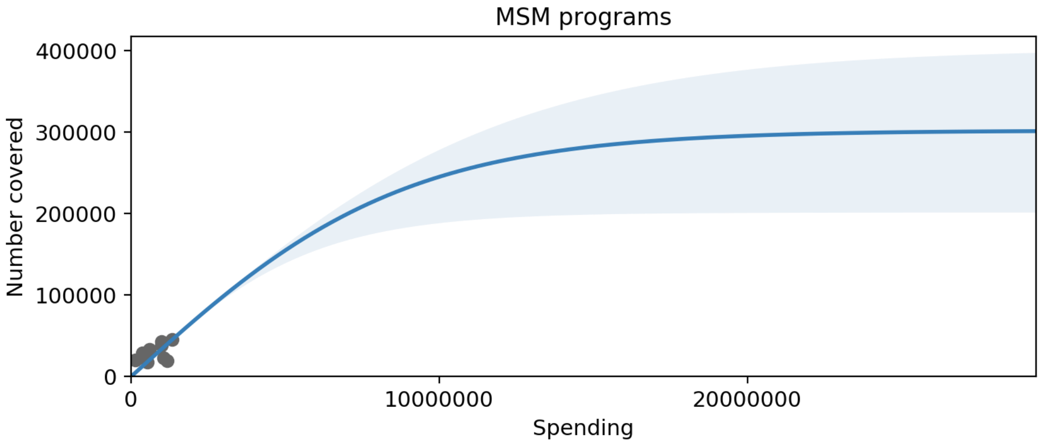
HIV programs	Parameters	Population interactions or populations	In absence of any programs		At max attainable coverage	
			low	high	low	high
PWID programs	Needle sharing	(PWID, PWID)	23%	23%	1%	1%
PWID programs	Needle sharing	(Prisoners, Prisoners)	92%	92%	7%	10%
PWID programs	Condom use (casual acts)	(PWID, PWID)	48%	57%	89%	95%
PWID programs	Condom use (casual acts)	(PWID, Females 15-49)	29%	45%	95%	97%
MSM programs	Condom use (casual acts)	(MSM, MSM)	85%	85%	97%	97%
FSW programs	Condom use (commercial acts)	(Clients, FSW)	90%	90%	94%	94%

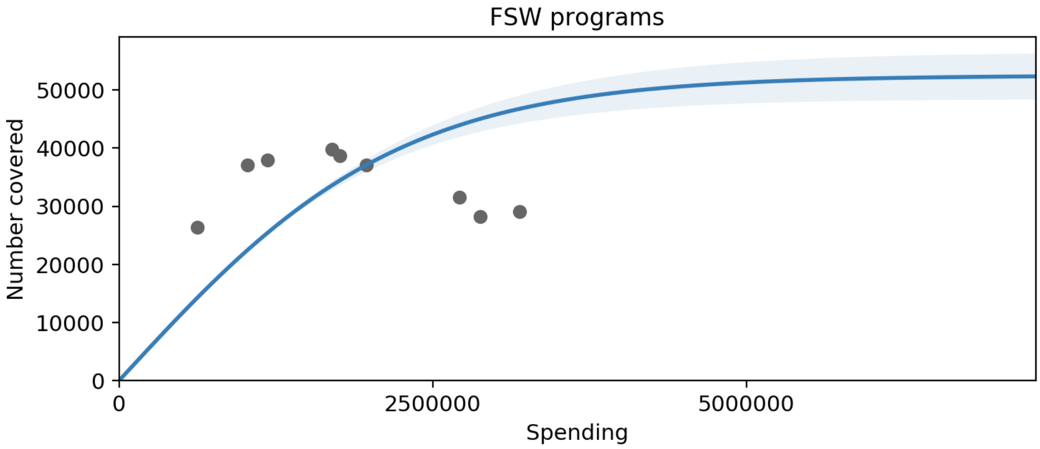
HIV programs	Parameters	Population interactions or populations	In absence of any programs		At max attainable coverage	
			low	high	low	high
FSW programs	Condom use (commercial acts)	(PWID, FSW)	17%	17%	88%	88%
FSW programs	HIV testing rate	FSW	9%	9%	50%	55%
HTS	HIV testing rate	Clients	15%	15%	40%	40%
HTS	HIV testing rate	Males 15-49	10%	10%	20%	25%
HTS	HIV testing rate	Females 15-49	3%	3%	20%	30%
HTS	HIV testing rate	Males 50+	3%	2%	18%	25%
HTS	HIV testing rate	Females 50+	1%	1%	25%	30%
MSM programs	HIV testing rate	MSM	15%	15%	80%	90%
PWID programs	HIV testing rate	PWID	4%	4%	41%	41%
NSP and PWID programs	HIV testing rate	Prisoners	1%	1%	10%	15%
Prisoner programs	HIV testing rate	Prisoners	1%	1%	40%	50%

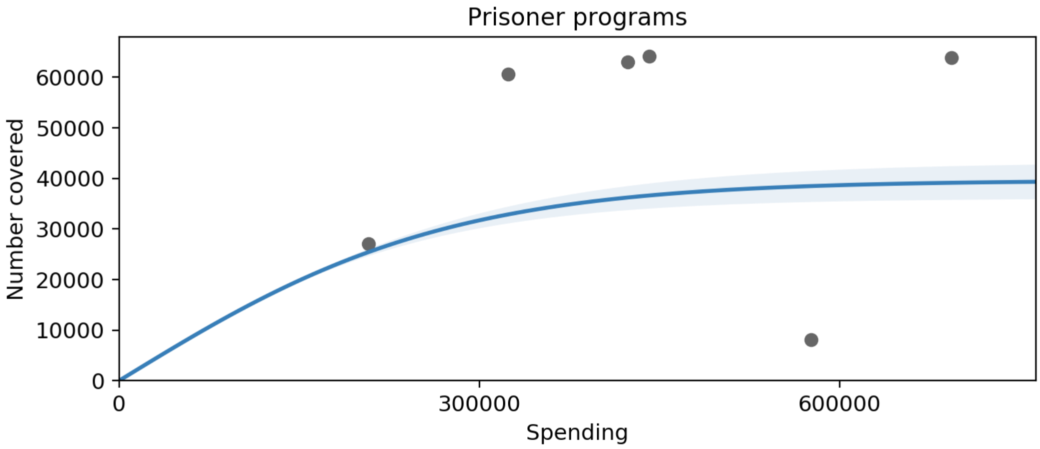
Appendix 4. Cost functions

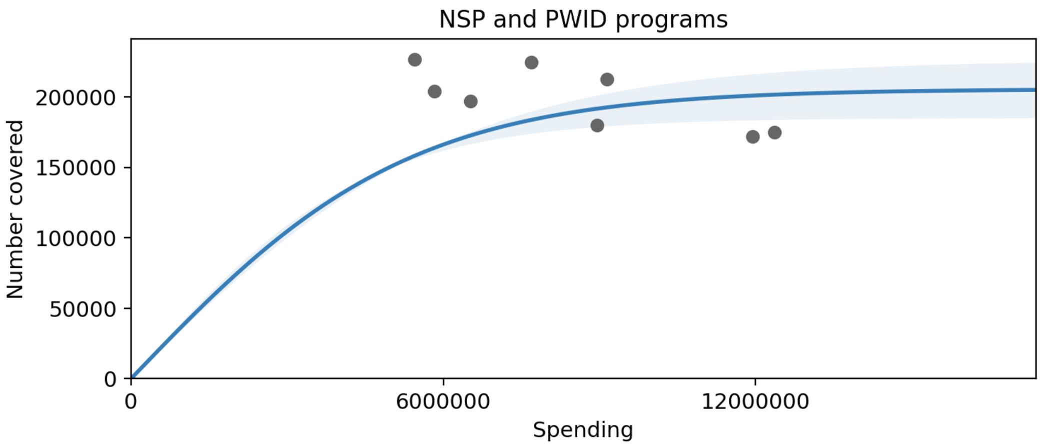







FSW programs
Number covered
0
10000
20000
30000
40000
50000
0
2500000
5000000
Spending


Prisoner programs
Number covered
0
10000
20000
30000
40000
50000
60000
0
300000
600000
Spending


NSP and PWID programs
Number covered
0
50000
100000
150000
200000
0
6000000
12000000
Spending

Appendix 5. Annual HIV budget allocations at varying budgets

Table A4. Annual HIV budget allocations at varying budgets for 2019 to 2030

	100% latest reported (2018)	50% optimized	100% optimized	150% optimized	200% optimized
Targeted HIV program					
Antiretroviral therapy (ART)	$33,925,108	$20,989,637	$40,806,741	$51,918,238	$52,851,818
Prevention of mother-to-child transmission (PMTCT)	$387,680	$193,840	$387,680	$387,680	$387,680
HIV testing services (general population)	$4,444,576	$0	$0	$0	$6,419,302
HIV testing and prevention programs targeting FSW	$1,698,911	$0	$0	$1,733,318	$4,025,233
HIV testing and prevention programs targeting MSM	$1,323,895	$0	$0	$7,792,535	$13,943,299
HIV testing and prevention programs targeting prisoners	$441,729	$0	$0	$461,508	$860,210
HIV testing and prevention programs targeting PWID	$5,823,076	$2,839,011	$6,850,554	$11,425,009	$15,686,570
Opiate substitution therapy (OST)	$3,301,650	$1,650,825	$3,301,650	$3,301,650	$8,519,137
Non-targeted HIV program					
Enabling environment	$1,650,723	$1,650,723	$1,650,723	$1,650,723	$1,650,723
Infrastructure	$2,439,859	$2,439,859	$2,439,859	$2,439,859	$2,439,859
Monitoring and evaluation	$554,190	$554,190	$554,190	$554,190	$554,190
Management	$10,888,616	$10,888,616	$10,888,616	$10,888,616	$10,888,616
Other HIV care	$21,518,554	$21,518,554	$21,518,554	$21,518,554	$21,518,554
Other HIV costs	$11,113,669	$11,113,669	$11,113,669	$11,113,669	$11,113,669
Total HIV program budget	$99,512,235	$73,838,923	$99,512,235	$125,185,547	$150,858,860

Table A7. Maximum estimated achievable HIV budget to minimize new HIV infections and HIV-related deaths by 95% under optimized allocation

Maximum impact budget	Reduction in HIV infections in 2030 compared to 2018	Reduction in HIV-related deaths in 2030 compared to 2018	Reduction in HIV infections in 2030 compared to 2010	Reduction in HIV-related deaths in 2030 compared to 2010
270%	57% (4,700)	67% (4,100)	76% (11,500)	86% (13,000)

Estimated as the budget required to achieve 95% of the maximum reduction in infections and deaths achievable. This is the maximum reduction in infections and deaths with the current mix of programs, delivered with the current program impacts. Additional reductions in infections and deaths could be realized if the current programs could be delivered more cost-efficiently or additional targeted HIV programs were to be implemented.