

# The cost-effectiveness of HIV testing and treatment initiatives in British Columbia, Canada: 2011-2013

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## Background

- Recognition of the secondary preventive benefits of antiretroviral therapy (ART) has mobilized global efforts to 'seek, test, treat and retain' people living with HIV/AIDS (PLHIV) in HIV care.
- British Columbia (BC) Ministry of Health in Canada launched the "Seek and Treat for Optimal Prevention of HIV/AIDS" (STOP HIV/AIDS) pilot program in 2010.
- We aimed to determine the cost-effectiveness of a set of HIV testing and treatment engagement interventions, as part of the STOP HIV/AIDS pilot program in 2011-2013.

## Methods

- We used a previously-validated dynamic, compartmental HIV transmission model, with population-level linked health administrative data.
- We estimated the cost-effectiveness of primary care testing (hospital, emergency department, outpatient), ART initiation and ART retention initiatives (**Table 1**), versus a counterfactual scenario approximating the status quo.
- HIV incidence, mortality, costs (in 2015\$CDN), quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios were estimated.
- Analyses were executed over 25-year time horizons, from a government-payer perspective.

**Table 1. Description of selected STOP HIV/AIDS interventions delivered in 2011-2013**

Intervention	Description
Hospital-based testing	Integrate the routine offering of HIV testing into clinical practice in hospitals.
Emergency department (ED) testing	Integrate the routine offering of HIV testing into clinical practice in EDs.
Outpatient clinic testing	Increase the routine offering of HIV testing to adult patients who had not been tested in the last year or presented specific risk, clinical symptoms, or the diagnosis of another sexually transmitted disease.
ART initiation	Expanded support to help gain access to ART.
ART retention	Expanded case management to maintain ART adherence and help ART re-initiation among patients who have discontinued ART.

## Results

- Emergency Department testing was the best value at \$30,216 per QALY gained (**Table 2**) and had the greatest impact on incidence and mortality among PLHIV (**Figure 1**), while ART initiation provided the greatest QALY gains.
- HIV testing and ART initiation interventions were cost-effective, while the ART retention intervention was not by international standards.
- Delivered in combination at the observed scale and sustained throughout the study period, we estimated a 12.8% reduction in cumulative HIV incidence and a 4.7% reduction in deaths among PLHIV at an incremental cost of \$55,258 per QALY gained.

**Table 2. Benefits, costs and incremental cost-effectiveness of STOP HIV/AIDS interventions**

25-year time horizon	Intervention <sup>^</sup> costs \$CDN (M)	Total costs \$CDN (B)	QALYs (Millions)	ICER*
Status Quo	--	\$193.01	71.69	--
	Δ cost (M)	Δ cost (M)	Δ QALYs	
Hospital-based testing	3.98	10.22	295.88	\$34,544
Outpatient clinic testing	5.04	14.54	333.29	\$43,623
ED testing	3.73	14.03	464.44	\$30,216
ART initiation	9.55	19.60	586.52	\$33,423
ART retention <sup>#</sup>	32.93	48.51	304.02	\$159,551
Combined interventions, sustained	55.23	105.34	1,906.30	\$55,258
Combined interventions, 2011-13 only**	15.18	23.17	637.42	\$36,356

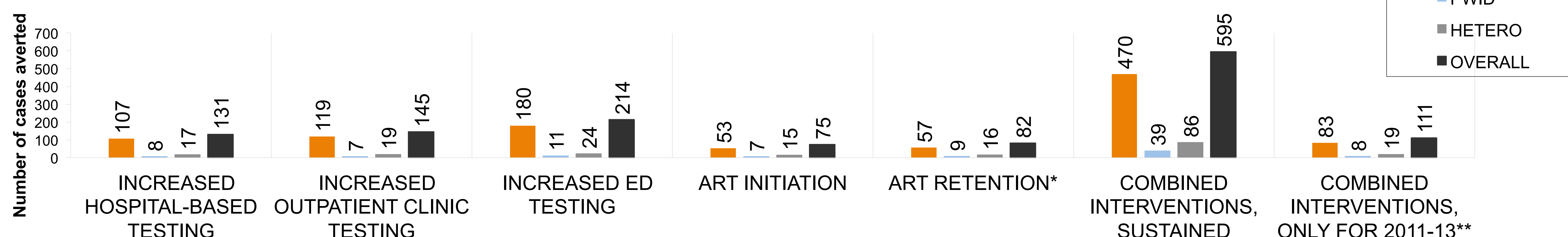
M: millions; B: billions; Δ incremental costs/QALYs. <sup>^</sup> Costs of public health intervention; \* Incremental Cost-Effectiveness Ratio of the intervention versus the counterfactual 'status quo': ICER = (Cost<sub>intervention</sub> - Costs<sub>status quo</sub>) / (QALY<sub>intervention</sub> - QALY<sub>status quo</sub>). <sup>#</sup>ART retention includes the initiatives targeting preventing ART dropouts and enhancing re-engagement among treatment-discontinued PLHIV. \*\* Reverting back to the counterfactual 'status quo'-levels of HIV testing and treatment engagement for the remainder of the study time horizon.

## Conclusions

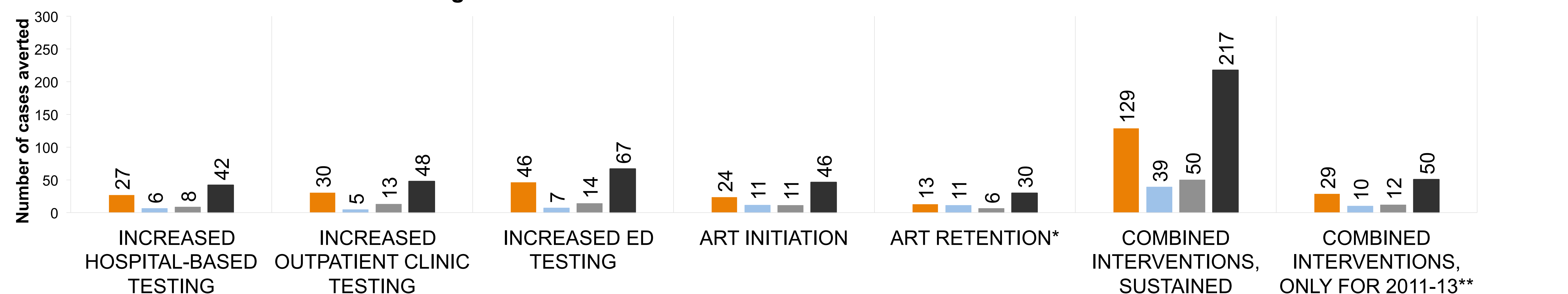
- We have demonstrated the cost-effectiveness and potential long-term impact of five key components of a coordinated combination HIV prevention strategy executed in British Columbia, Canada.
- Our results demonstrate the substantial value these programs have added despite limited-scale implementation, and underline the need to expand and sustain public health intervention efforts to curb the HIV epidemic in BC.

**Fig 1. Epidemiological effects of the STOP HIV/AIDS initiative interventions evaluated (25-year time horizon)**

**Panel A: Estimated averted incident cases of HIV**



**Panel B: Estimated averted deaths among PLHIV**



\* Combined initiatives to prevent treatment dropout and enhance re-engagement; \*\* Reverting back to the counterfactual 'status quo'-levels of HIV testing and treatment engagement for the remainder of the study time horizon.

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