Health Economics Workshop:

Costing Tools

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Reminder: uses of cost data

Priority setting for new interventions or introducing new technologies, drugs, vaccines

Resource requirements and advocacy

Financial planning and budgeting/ information on sustainability

Economic evaluation/Improving technical efficiency

Uses of costing tools

- **Budget planning:** Governments and local health agencies can use tools to help in planning and budgeting processes
- **Decision making:** Target coverage, eg 50% of HIV positive persons on ART or impact guided: 30% reduction in HIV incidence.

	Coverage-guided decision making	Impact-guided decision making
With budget constraint		
No budget constraint		

- **Costing interventions and health outcomes**: Determining the costs and effectiveness (e.g. death or disease averted) associated with different interventions. Conducting a cost-effectiveness anaylsis

Costing tools can:

- Provide information on the cost of scaling up and sustaining health programs at different levels of the health system (and even for global programs)
- Aim to inform decision making and programming to achieve specific goals (i.e. sustainable development goals)
  - Help evaluate progress towards health targets, eg Millennium development goals: 17 health goals to be met over the next 15 years.

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Focus of tools:

- Determine:
  - Cost of scale up package of interventions
  - Cost of achieving target coverage
  - Cost of strategic multi-year plan
  - Impact of resource allocation on an outcome

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Characteristics of costing tools

- Most of the tools are designed to be used after formal training
  - Although it is possible to download and learn the tools on your own
- It's difficult to understand how the tools operate (black boxes). Even with user guides the computations are not clearly outlined
- Most are Excel-based
- Use the ingredients/bottom-up costing
- Each tool uses a different approach and different logic. Optimal tool depends on research question and available data.

How do the tools calculate cost and impact?

- Cost tools use two basic production functions
- **Intervention production function:** Calculated by multiplying the price of an input (eg unit cost of condom) times the quantity of inputs used (# of condoms distributed
  - **Cost*Quantity**

- **Health production function:** Calculated by multiplying the number of persons served by an intervention times the effectiveness of the intervention (eg # of adults served by nutritional intervention times effectiveness of intervention in reducing malnutrition.
  - **Coverage*effectiveness**

E.g. Vitamin A supplementation program

- Child health intervention involving distributing vitamin A to children using community health workers at health fairs with the goal of reducing <5 mortality

- **Health production function**: # of children served*effectiveness in reducing <5 mortality
- **Cost production function:** Unit cost of 2 vitamin A capsules* # children reached + # health workers needed*# of days they work*daily pay rate +cost of each community awareness campaign*# of campaigns

Data requirements for tools

- Most tools are pre-populated with costs for different health interventions, country demographics, intervention effectiveness
- Some data are better than others—its important to check the model assumptions and make sure they are accurate for your analysis. Many parameters need to be replaced to represent context of your analysis.

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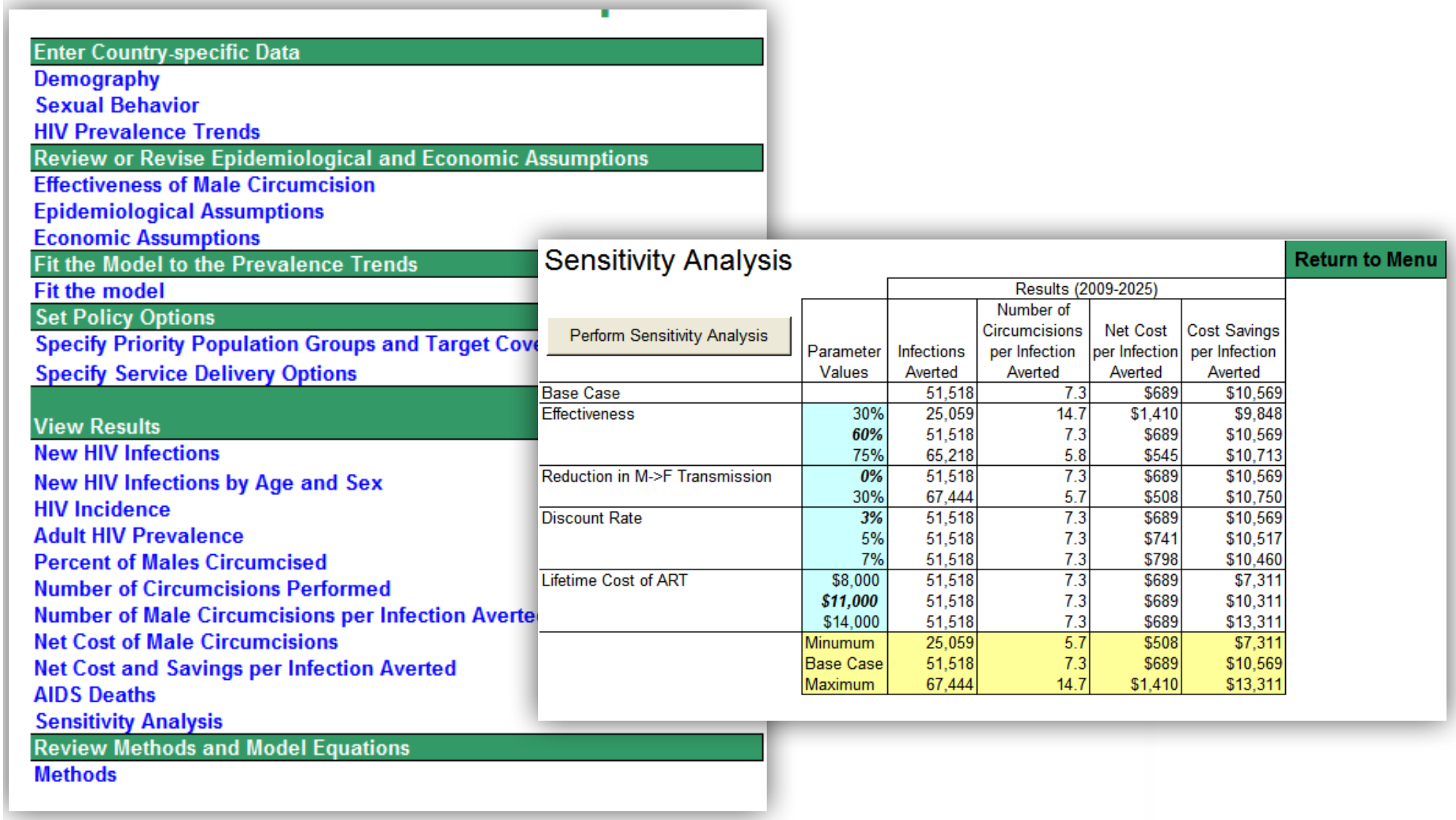
Selection of costing tools

- Decision Makers Program Planning Tool (DMPPT)
- Reproductive Health (RH) Costing Tool
- Integrated Healthcare Technology Package (iHTP) Simulation Tool
- Spectrum: PMTCT Cost Effectiveness
- Goals Model
- Planning, Costing and Budgeting Framework (PCBF)
- CORE Plus
- Integrated Health Model
- Planning & Budgeting for TB Control
- Resource Needs Model HIV/AIDS
- One Health Model (synthesis of all modeling tools)

Decision Makers Program Planning Tool (DMPPT) developed by UNAIDS

- Excel-based model that can estimate costs and effectiveness (infections averted) associated with different scenarios of male circumcision (MC) scale-up.
- Scenarios can vary:
  - Priority populations: all males, young adults, newborns, or most-at-risk groups
  - Coverage levels and scale-up rates
  - Service delivery modes: hospital, clinic, mobile van; public, private, NGO
  - Surgical technique used for MC, kit used
  - Task shifting, task sharing
  - Risk compensation
  - Male → Female transmission reduction with MC
  - Population age-structure, birth and mortality rate
  - Sexual behavior
  - Discounting

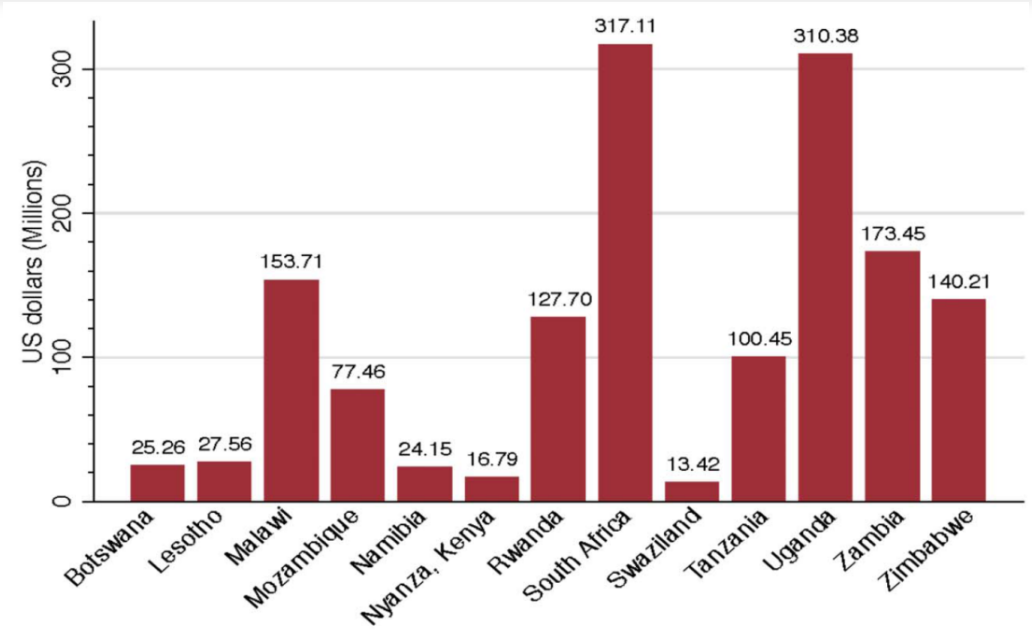
Decision Makers Program Planning Tool



Example of analysis conducted with DMPPT

Voluntary Medical Male Circumcision: Modeling the Impact and Cost of Expanding Male Circumcision for HIV Prevention in Eastern and Southern Africa

Emmanuel Njeuhmeli[1*☯], Steven Forsythe[2☯], Jason Reed[3], Marjorie Opuni[4], Lori Bollinger[2], Nathan Heard[5], Delivette Castor[1], John Stover[2], Timothy Farley[6], Veena Menon[7], Catherine Hankins[8]



Results: Costs of scaling up VMC to 80% by country

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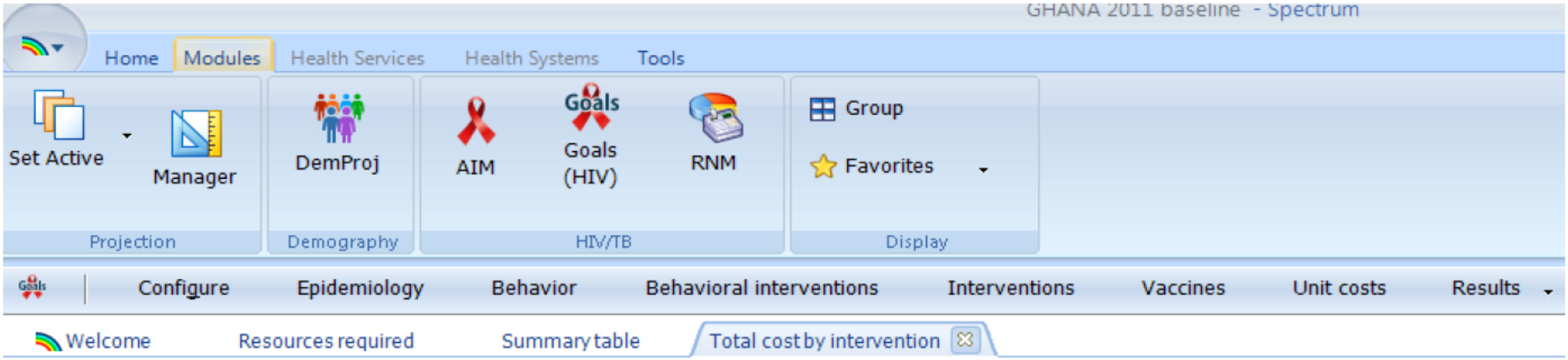
Example: Goals Tool



Total cost by intervention

	2011	2012	2013	2014	2015
GHANA 2011 baseline					
General population					
Community mobilization	6,606,931	9,620,392	12,765,398	16,043,890	19,458,304
Mass media	5,421,074	8,060,329	10,815,128	13,687,162	16,678,546
VCT	21,430,166	23,920,976	26,505,942	29,187,180	31,967,212
Condoms	28,180,694	30,245,142	32,294,234	34,328,256	36,348,044
AIDS education	2,707,968	2,879,844	3,056,101	3,236,745	3,423,249
Out-of-school youth	1,819,755	2,616,544	3,433,945	4,272,504	5,134,873
Workplace programs	4,116,627	6,084,248	8,137,942	10,278,967	12,508,909

Example: Spectrum Model

- Used to estimate the cost effectiveness of scaling up HIV self-testing in 3 developing countries

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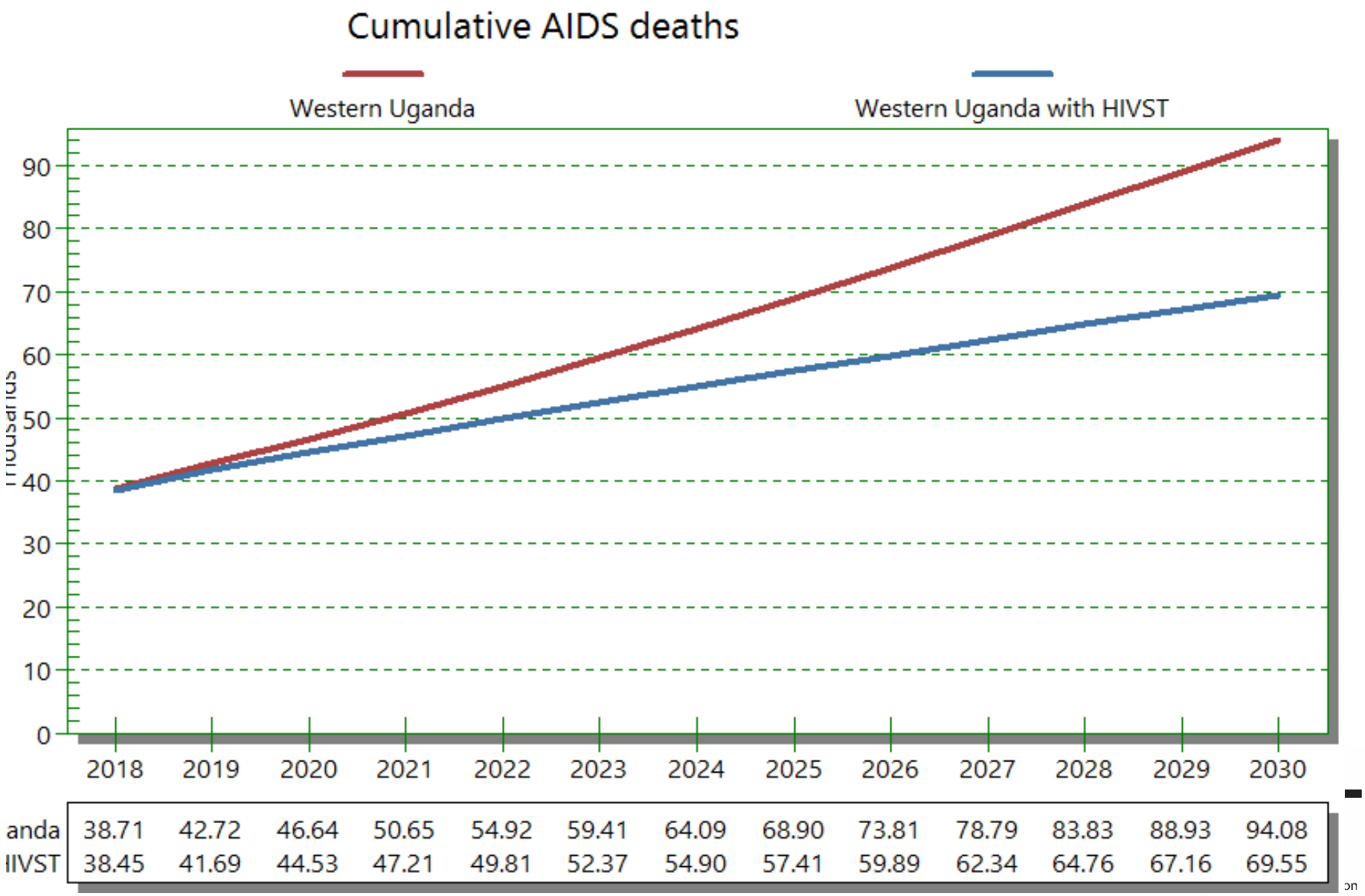
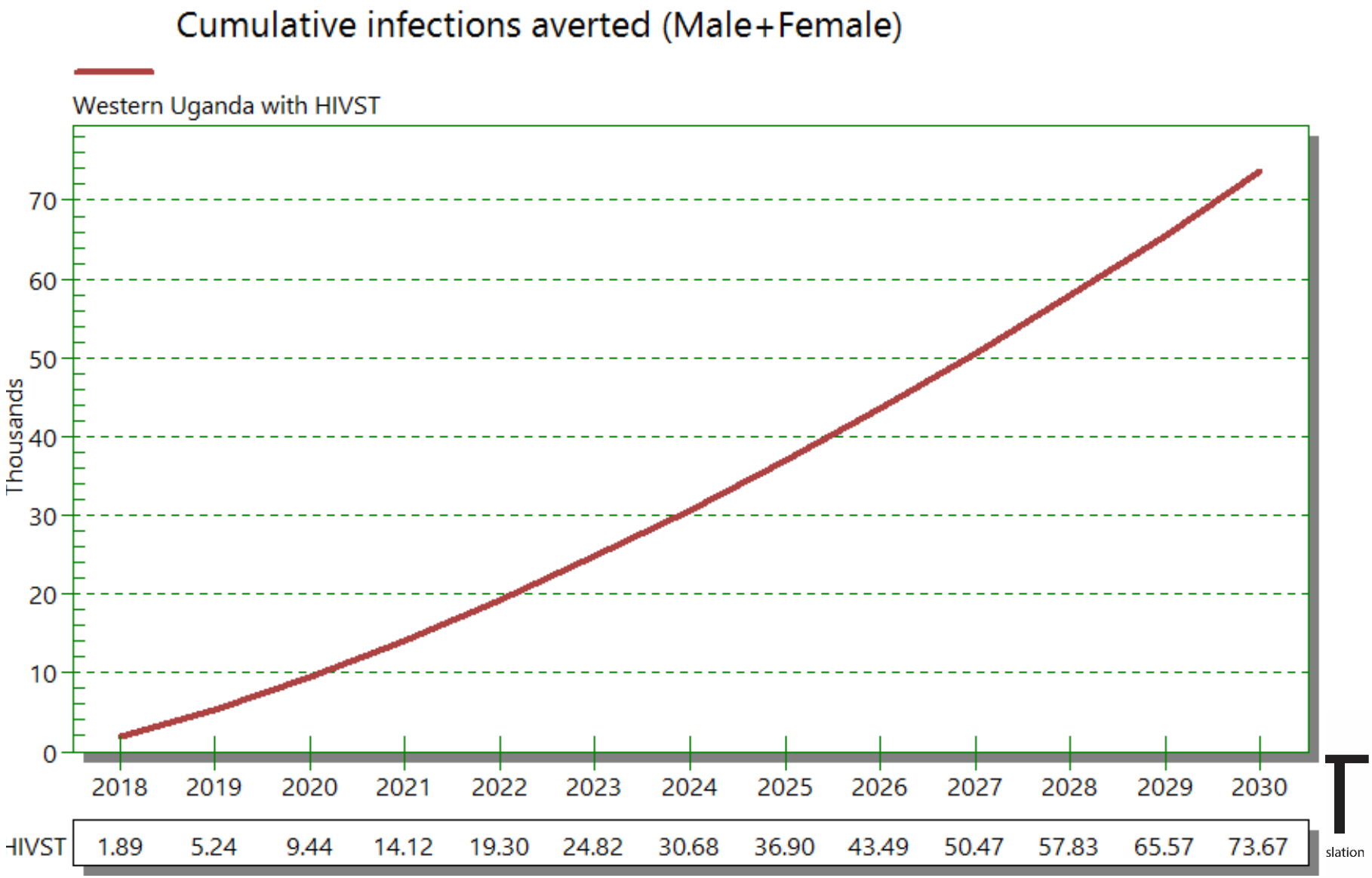
Deaths averted

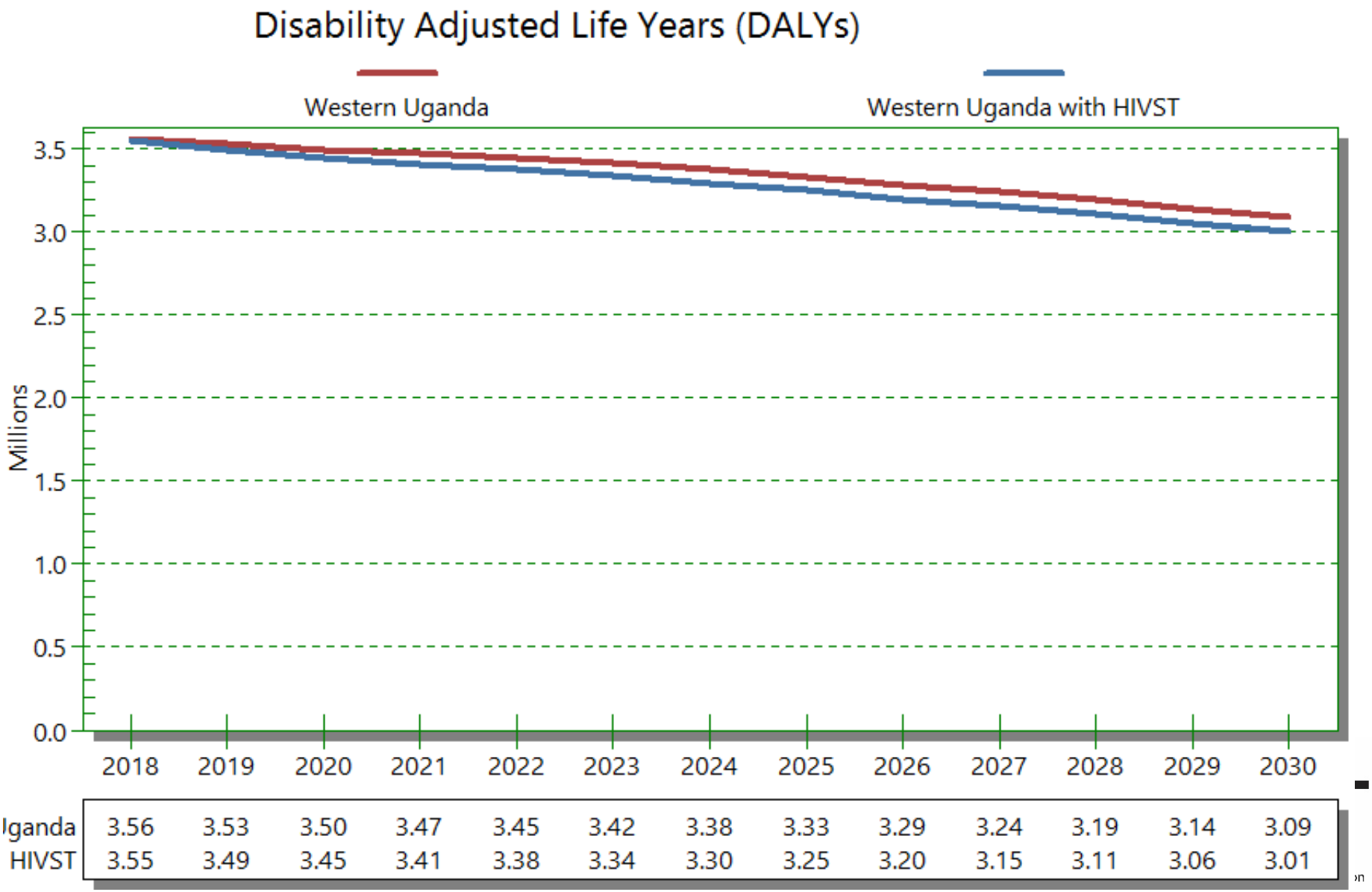


anda	38.71	42.72	46.64	50.65	54.92	59.41	64.09	68.90	73.81	78.79	83.83	88.93	94.08
IIVST	38.45	41.69	44.53	47.21	49.81	52.37	54.90	57.41	59.89	62.34	64.76	67.16	69.55

Infections averted

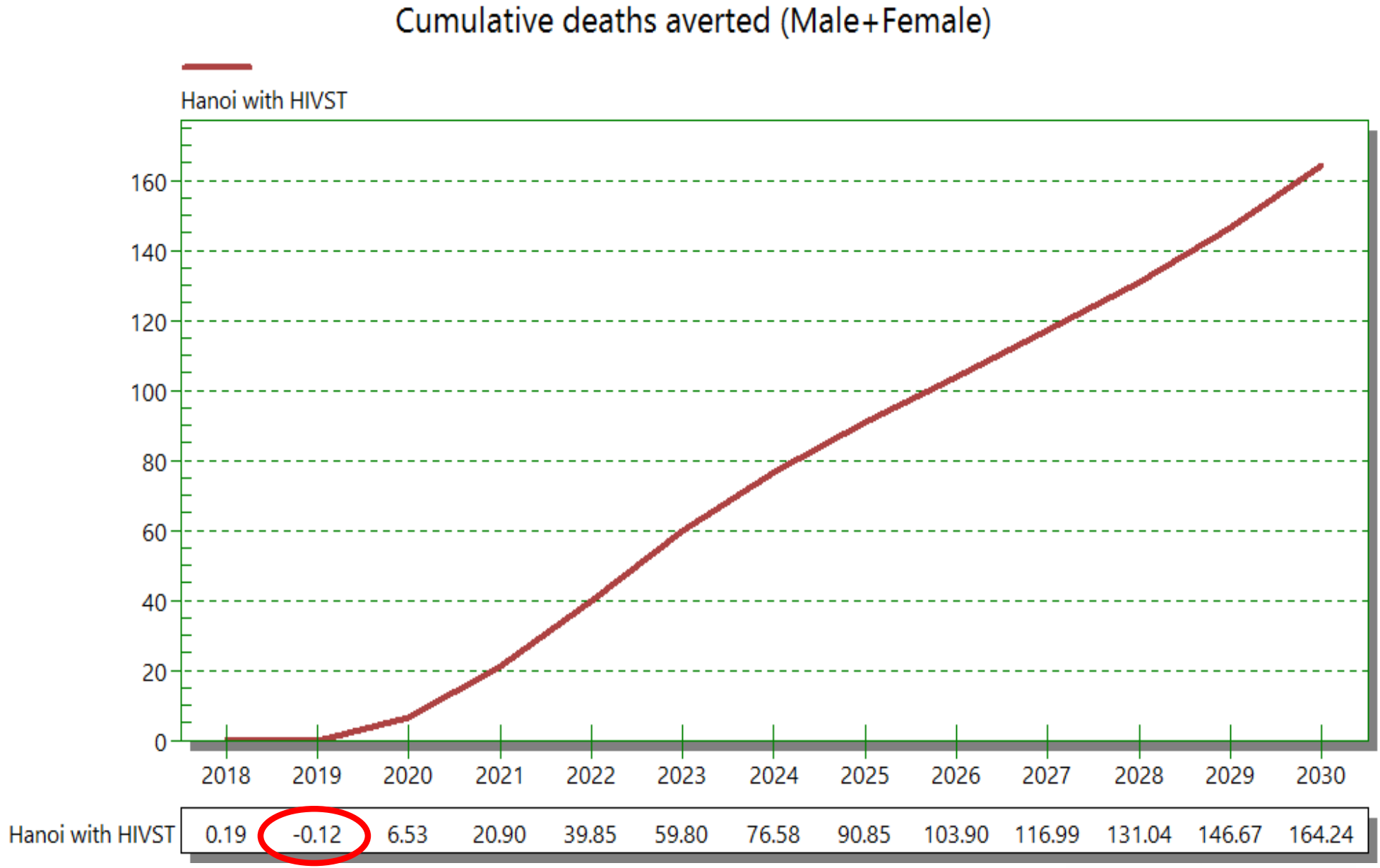


DALYS averted



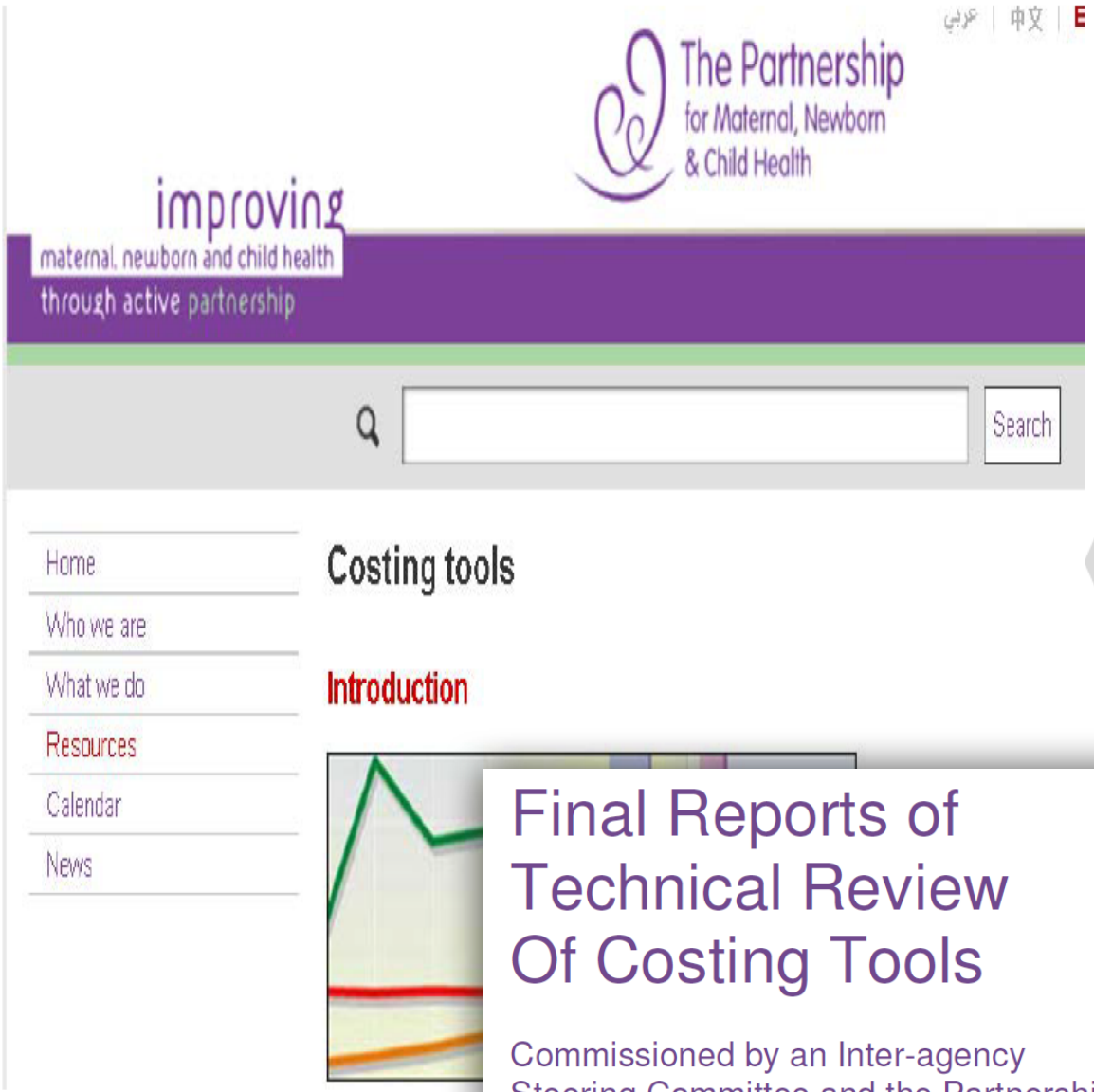
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Iganda	3.56	3.53	3.50	3.47	3.45	3.42	3.38	3.33	3.29	3.24	3.19	3.14	3.09
HIVST	3.55	3.49	3.45	3.41	3.38	3.34	3.30	3.25	3.20	3.15	3.11	3.06	3.01

Deaths averted in Hanoi (possible bug)



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Hanoi with HIVST	0.19	-0.12	6.53	20.90	39.85	59.80	76.58	90.85	103.90	116.99	131.04	146.67	164.24

Choosing the right tool: Summary of costing tools available thru WHO



- In collaboration with NORAD, UNFPA, UNICEF, UNAIDS, UNDP, WHO, World Bank, USAID (through the Health Systems 20/20 and BASICS Projects)
- Review of 13 costing tools with the following information:
  - Tool description
  - Links to the tool
  - Links to user manuals and technical documentation
  - Contact information for developers/focal points

http://www.who.int/pmnch/topics/economics/costing_tools

Choosing the right tool

Tool Name	Marginal Budgeting for Bottlenecks	Reproductive Health (RH) Costing Tool	Planning & Budgeting for TB Control	Spectrum: PMTCT Cost Effectiveness	Goals Model	Resource Needs Model HIV/AIDS	CORE Plus	Integrated Health Model	O M
Tool developer	UNICEF / World Bank	UNFPA	WHO / MRC	Constella Futures/ Futures Institute	Constella Futures/ Futures Institute	MSH	MSH	UNDP	WH
Objective	To identify bottlenecks and model impact of reducing them to increase coverage of	To help users estimate cost to scale up a package of reproductive health services from	To help users improve health service delivery by identifying the optimal mix of resources needed for interventions. Can also determine	To evaluate costa and benefits of various strategies to prevent mother-to-child transmission of HIV and	Tool allows users to determine the effect of resource allocation onachievement of HIV/AIDS	To translate strategic program goals into costs and budgets, calculate funding gaps--originally designed for	To estimate the expected number of each type of intervention and the	To estimate scale-up costs of health system as a whole to ensure capacity to deliver	To com bud rec
Intended users	Health economists & policymakers at MOHs	Health planners at the country level	Planners, decision-makers and managers at all levels of healthcare system, technical assistance	Public sector policy makers and planners	National, multidisciplinary team of government planners and civil society	National and sub-national policy makers and planners, program-specific technical	Planners and managers of government, private	Health system planners	TB the
Built in interventions	PMTCT including counseling ART, and feeding counseling. Condom use. Cotrimoxazole prophylaxis for HIV+ adults and children of HIV+ mothers, ART for	HIV/AIDS prevention and treatment, family planning, newborn health interventions. Condom promotion for commercial sex workers, MSM, and other vulnerable populations.	6,000 built-in WHO scenarios.	7 interventions: Long-course ZDV, Short-course ZDV (Thailand regimen), Shortcourse ZDV - PETRA Arm A, Short-course ZDV - PETRA Arm B, Neonatal only, Nevirapine HIVNET 012 protocol, Universal	VCT, social marketing, behavior change interventions for high-risk/vlunerable populations including MSM, sex workers, and IDU. Condom promotion, PMTCT, ARVs, M & E, capacity building.	N/A. User inputs strategic plan with coverage target, health outcomes, costs and quantities.	Scenarios-- A: Actual services and actual costs; B: Actual services and normative costs; C: Needed services and normative costs; D: Projected	HIV/AIDS home-based & palliative care, ARVs, treatment of OIs, nutrition, other STIs, facilities, vehicles, human resources, HIV prevention for vulnerable populations, condom	HIV pati TB HIV
Assumptions	Reductions in bottlenecks are hierarchical and reduction of one has a cascading downstream affect, Efficacy stays	Data in tool is from sources like UN Population Division, WHO's Burden of Disease, UNICEF, Demographic Health	Medical equipment and pharmaceutical database based on WHO database, clinical guidelines, epidemiological profiles, other built-in data linked to International Statistical Classification of Diseases	Built-in demographics data, input prices and quantities and effectiveness, HIV vertical transmission rate	Default data on impact values, sexual behavior, costs, STI prevalence, cost-effectiveness interventions, HAART success rate and standard epidemiological	All assumptions are inputted by the user	User inputs intervention prices and quantities, and demographic and epidemiologic information.	Demographic data from UNFPA.	Def Glo the 200 WH and
Training	5 day training course needed, partially complete user's manual available. Using tool require a	1 to 4 days of training generally needed. Detailed user manual available. Skills required include finance,	3-5 day training workshop suggested and three to six months to use the tool and get results. Post-training help file and resource kit available.	1 day of training to use. User manual available, knowledge of PMTCT programs needed. Tool free on internet.	Several days of training required. Takes users two weeks to set up the tool and get results from it. Users should have knowledge of	2-day training recommended. User's manual available.	3 day training suuggested, users should possess skills in epidemiology,	1-2 day training suggested and user's manual available.	3 da wee Hel mar use
Software	Excel file	Excel file	Program-based (non-Excel)	Program-based (non-Excel)	Excel file	Excel file	Excel file	Excel file	Exc
Ease of use	Intended for use with UNICEF or World Bank	Training and technical assistance needed to use	Technical assistance required.			Fairly simple to use			Use
Website	http://www.aidstar-one.com/focus_areas/tre	http://www.who.int/pmnch/topics/economics/cos	\http://www.who.int/pmnch/topics/economics/costing_tools/en/index9.ht	www.futuresinstitute.org/pages/resources.aspx	http://www.futuresinstitute.org/pages/resources.aspx		http://erc.msh.org/toolkit/Tool.cfm?lang	http://www.undp.org/poverty/tools.htm#nact	http ts/p
Limitations	The ordering of bottlenecks appears to	This tool does not incorporate budget &	Does not include health outcome, health production function,	Does not consider service availability (counseling,	Does not incorporate macroeconomic conditions.		Does not incorporate	Does not incorporate budget & financing,	Doe effe

Categories tools by health intervention

Child Health	HIV/AIDS/TB/Malaria	Reproductive health	General
Child Health Cost Estimation tool CHCET	Goals Model HIV/AIDS	Reproductive Health Costing Tool	Cost Revenue Analysis Tool Plus (CORE plus
cMYP-Comprehensive multi year plan Immunization	Malaria cost estimation tool		Integrated Healthcare Technology Package (iHTP)
	Planning & Budgeting for TB Control		Integrated Health Model (IHM)
	Resource needs Model HIV/AIDS		Marginal Budgeting for Bottlenecks (MBB)
	Spectrum PMTCT CE		Planning, costing and budgeting framework (PCBF)
	Optimize HIV/AIDS		OneHealth

Methods used?

- Coverage guided decision making with budget constraint
- Impact guided decision making with budget constraint
- Short-term 1 year
- Medium term focus (1-10 years)
- Long term focus (10+ years)
- Most measure quantities and prices associated with activities

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Types of outputs from these tools

- Average cost per intervention
- Total cost
- Scale up cost
- Funding gap
- Resource bottleneck
- Coverage
- Impact on health outcome
- Budget
- Summary table of costs and/or benefits
- Graphs

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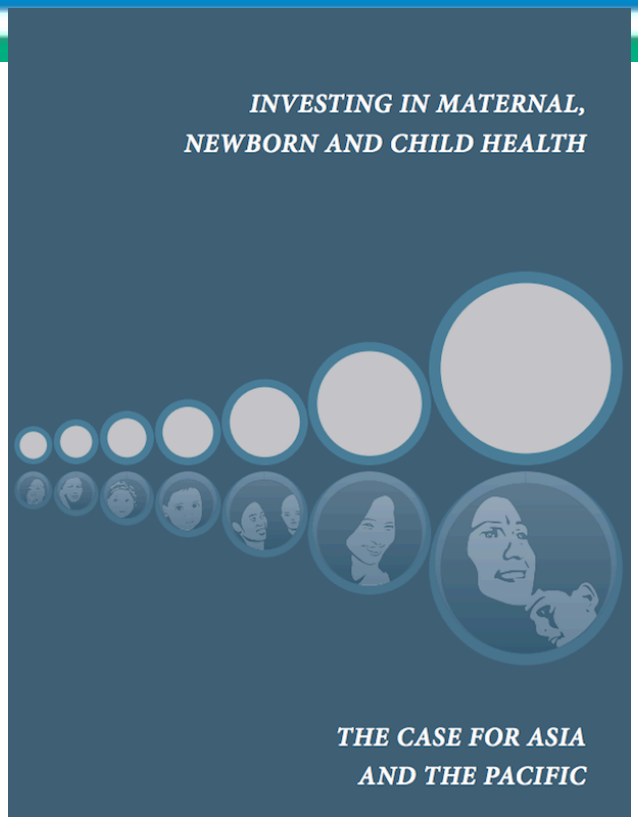
Other analyses conducted with costing tools




The Lancet Commissions

GLOBAL HEALTH 2035

THE LANCET

Global health 2035: a world converging within a generation

Dean T Jamison*, Lawrence H Summers*, George Alleyne, Kenneth J Arrow, Seth Berkley, Agnes Binagwaho, Flavia Bustreo, David Evans, Richard G A Feachem, Julio Frenk, Gargee Ghosh, Sue J Goldie, Yan Guo, Sanjeev Gupta, Richard Horton, Margaret E Kruk, Adel Mahmoud, Linah K Mohohlo, Mthuli Ncube, Ariel Pablos-Mendez, K Srinath Reddy, Helen Saxenian, Agnes Soucat, Karen H Ulltveit-Moe, Gavin Yamey

Lancet 2013; 382: 1898–955

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This online publication has been corrected. The corrected version first appeared at thelancet.com on Jan 17, 2014

See Comment pages 1859, 1861, e33, e34, e36, and e38

*Denotes co-first authors

See Online for video infographic

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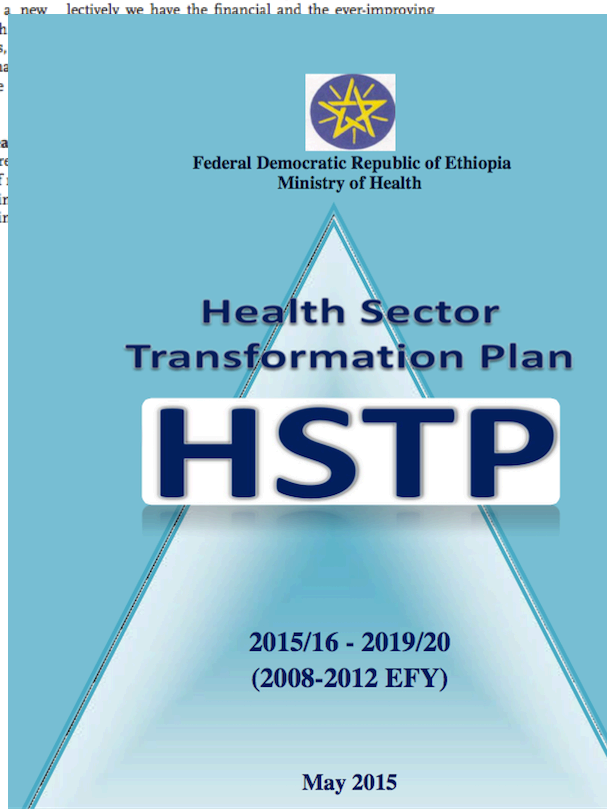
Executive summary

Prompted by the 20th anniversary of the 1993 World Development Report, a *Lancet* Commission revisited the case for investment in health and developed a new investment framework to achieve dramatic health by 2035. Our report has four key messages, accompanied by opportunities for action by na governments of low-income and middle-income tries and by the international community.

There is an enormous payoff from investing in hea The returns on investing in health are impre Reductions in mortality account for about 11% of economic growth in low-income and middle-in countries as measured in their national in accounts.

A "grand convergence" in health is achievable within our lifetimes

A unique characteristic of our generation is that collectively we have the financial and the ever-improving



Tools used by:
WHO, UNAIDS
Commissions, eg Lancet commission on Global Health 2035 which estimated cost to scale up interventions to lower mortality rates in developing countries. This may be academic or research organizations who do the work.
National governments use tools in their health sector strategic planning—either MOH staff or consultants

THANK YOU

- WHO Guide summarizing available costing tools:

http://www.who.int/pmnch/knowledge/publications/costing_tools/en/

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