



THE ECONOMIC IMPACT OF HIV

MASTER SLIDE SET

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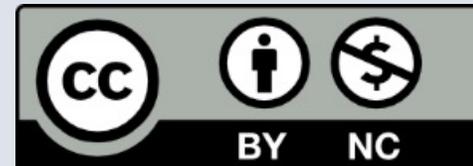
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BACKGROUND

The “Economic Impact of HIV” project synthesised the evidence on the economic impact of HIV into a series of 17 policy briefs and 3 summary briefs that can help decision makers in Ministries of Finance and Health in low- and middle-income countries (LMIC) decide on the future financing of their country’s HIV programme. The project incorporated a series of webinars with an academic and LMIC government staff audience to refine the content and presentation of the briefs. All briefs are available on <https://hivecon.co.za/>.

This slide set summarises the main briefs’ findings. The [Content](#) slide allows to quickly browse to the slides for each brief, and [References](#) are given on slides 92–96.

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CONTENTS

Please click on the brief # to navigate to the relevant slides

Brief #1:

State of HIV programme implementation

Brief #2:

Health & life prospects & their economic valuation

Briefs #3-7:

Overview of economic growth policy briefs

Briefs #8:

Interactions between HIV and poverty

Brief #9:

Disease burden across population sub-groups

Brief #10:

Trade-offs between allocation to health and other sectors

Briefs #11:

Domestic public funding for HIV

Briefs #12:

Trade-offs and synergies between HIV and other health objectives

Brief #13:

Assessing cost effectiveness across HIV and health interventions

Brief #14:

External and domestic health financing, and the role of public vs. private domestic health funding

Briefs #15:

Public and private provision of health and HIV services

Brief #16:

Trade-offs within the HIV budget

Brief #17:

The economics of HIV and of HIV programmes in the era of covid-19

References



THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #1

SERVICES: AVAILABILITY, EFFICIENCY, AND QUALITY

For the full brief, please go to

<https://hivecon.co.za/1-the-state-of-programme-implementation-to-reduce-hiv-transmission-aids-related-mortality/>

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PURPOSE AND METHODS



Purpose:

Discuss progress in extending access to HIV-related services and related outcomes:

- Treatment coverage and mortality among people living with HIV (PLWH)
- HIV transmission (incidence/prevalence ratio)
- PMTCT access and outcomes



Methods:

- Time series – trends in service coverage and health outcomes
- Cross-sectional data – gap between “leading” countries and others, association with other factors (e.g., economic development, severity of national HIV epidemic)

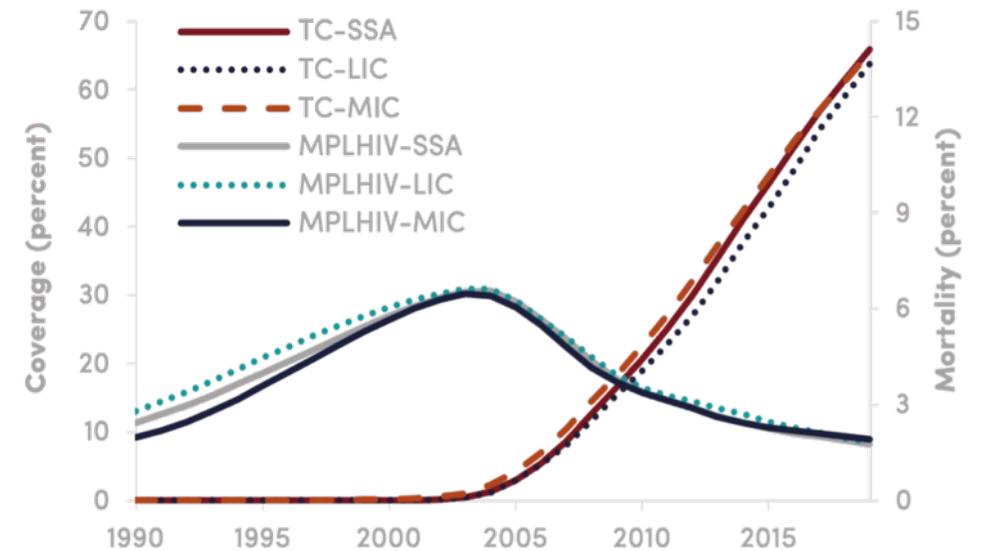
TREATMENT SCALE-UP

Steep and steady increase in treatment access
2003-2019

Similar for broad (low-/middle-) income
categories/sub-Saharan Africa

AIDS-related mortality among PLWH:

Figure 1.1: Treatment coverage and mortality among PLHIV, ages 15+, 1990-2019



Source: UNAIDS 2020.

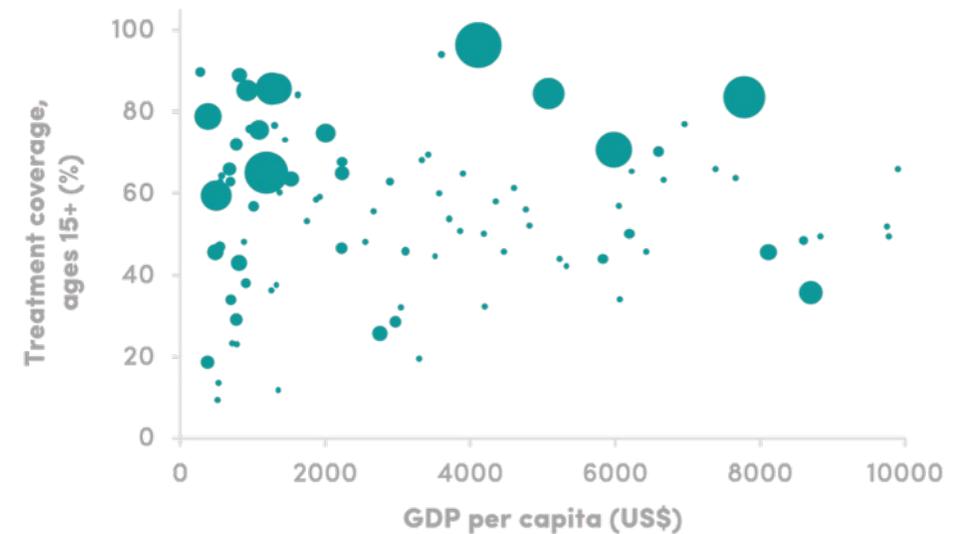
TREATMENT SCALE-UP

Large variation in treatment access and AIDS-related mortality across countries

Treatment scale-up most successful in countries facing high HIV prevalence

Success in overcoming economic barriers: little difference in treatment coverage by GDP per capita

Figure 1.3: Treatment coverage, ages 15+, and GDP per capita, 2019

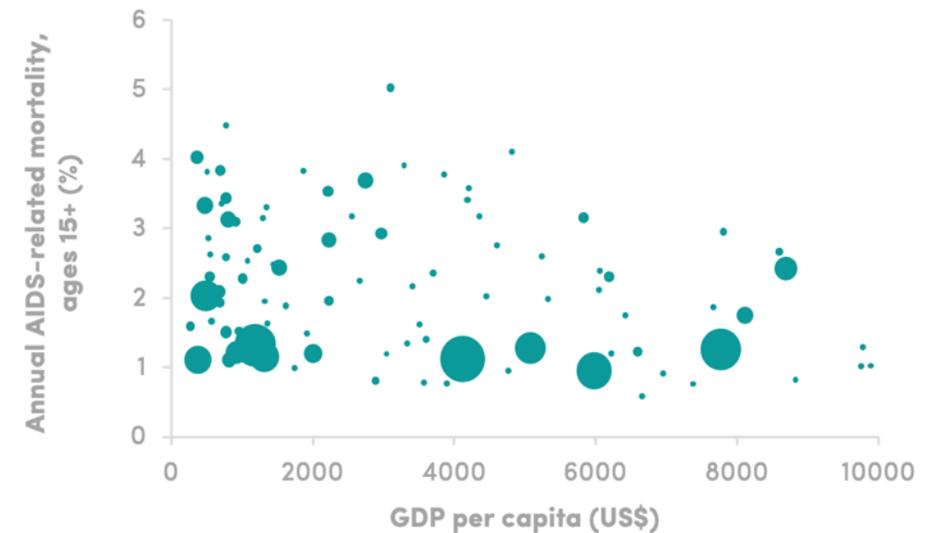


Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita.

TREATMENT SCALE-UP

Large unmet need: Using annual AIDS-related mortality of 1% as a benchmark, **over 1/3 of AIDS-related deaths occur because of lack of effective treatment access**

Figure 1.4: Annual AIDS-related mortality, ages 15+, and GDP per capita, 2019



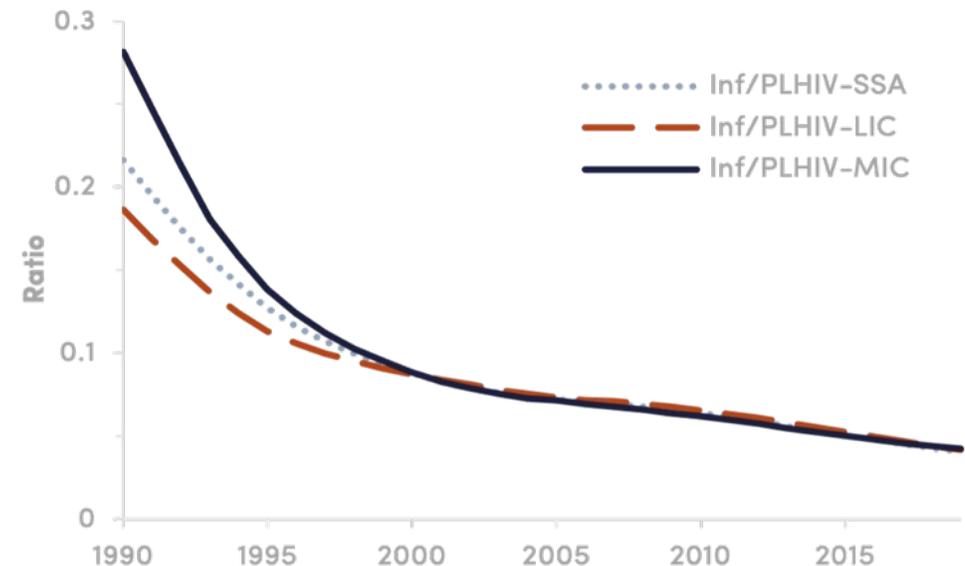
Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita.

HIV PREVENTION (INCL. TREATMENT AS PREVENTION): UNIVERSAL DECLINE IN HIV TRANSMISSION

Steep declines in HIV incidence

Transmission (approximated as incidence/prevalence) across low- and middle-income countries

Figure 1.6: Ratio of HIV infections to people living with HIV, ages 15+, 1990-2019

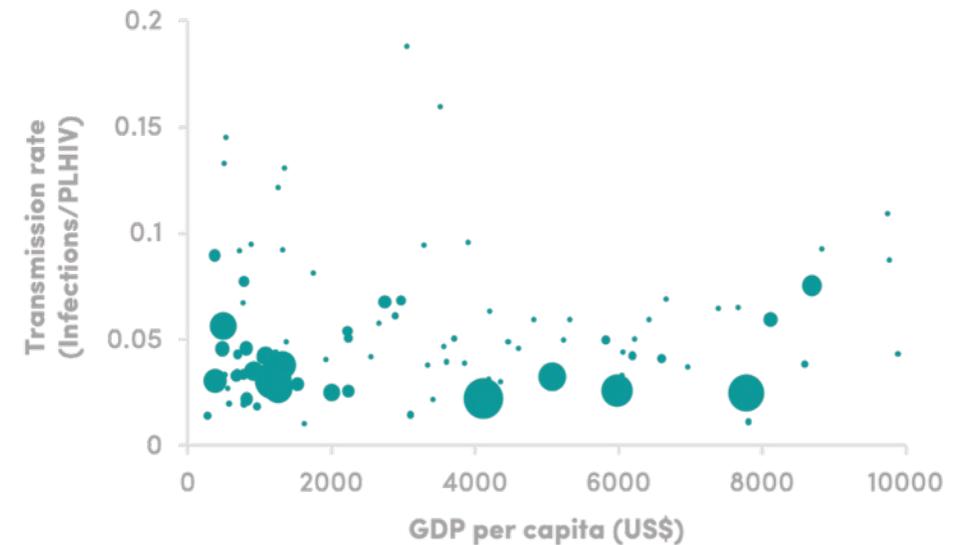


Source: UNAIDS 2020a.

HIV TRANSMISSION ACROSS COUNTRIES

Pattern of HIV transmission across countries resembles that of AIDS-related mortality: Little difference by GDP per capita, largest gains tend to occur in countries with high HIV prevalence

Figure 1.7: Annual HIV transmission, ages 15+, and GDP per capita, 2019



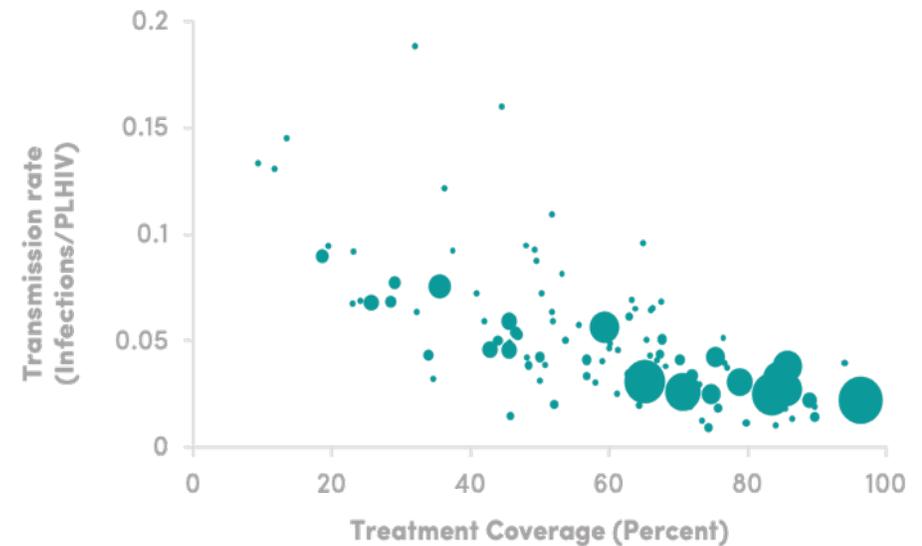
Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita.

HIV TRANSMISSION ACROSS COUNTRIES

Treatment statistically explains nearly one-half of the variation in HIV transmission in a regression, but impact on incidence more ambiguous owing to longer survival

If all countries in Fig. 1.7 brought transmission down to at most 2.5 percent, then 1/3 of new infections could be averted

Figure 1.8: Annual HIV transmission and treatment coverage, ages 15+, 2019



Source: UNAIDS 2020.

PMTCT: IMPORTANT AND DISPROPORTIONAL CONTRIBUTION TO REDUCED HIV INCIDENCE

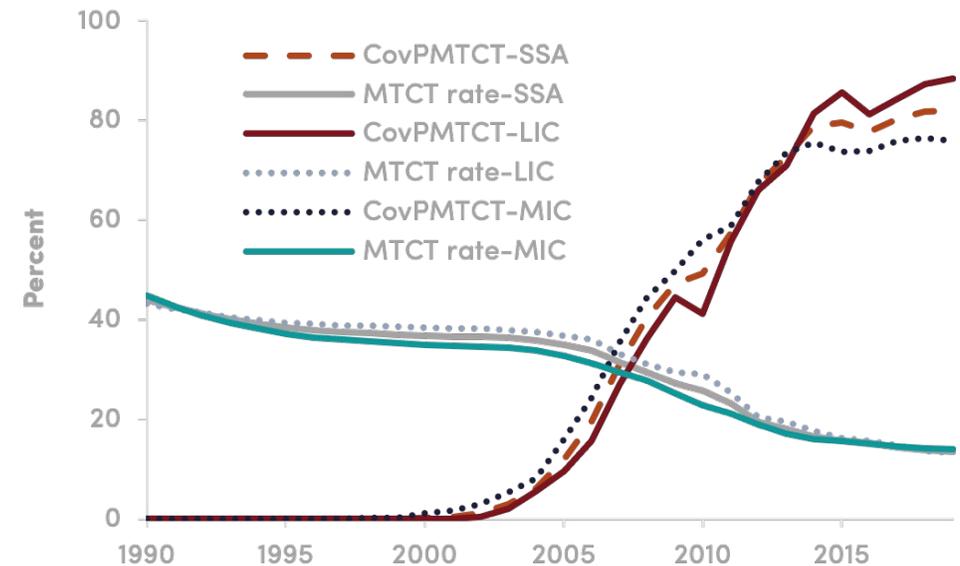
Mother-to-child transmission rate down

- 30% around 2005
- close to 10% by 2019

Share of new HIV infections that are due to MTCT halved

- 25% in 2005
- 12% in 2019

Figure 1.9: PMTCT coverage and MTCT rates, 1990-2019



Source: UNAIDS 2020.

MTCT ACROSS COUNTRIES

Coverage of PMTCT and MTCT rates more uneven across countries than access and outcomes for adult treatment and prevention

Stronger differences depending on level of economic development (GDP per capita)

If MTCT rates could be brought down to at most 5 percent, over 60 percent of current HIV infections among infants could be avoided as of 2019

Figure 1.10: Coverage of PMTCT and GDP per capita, 2019

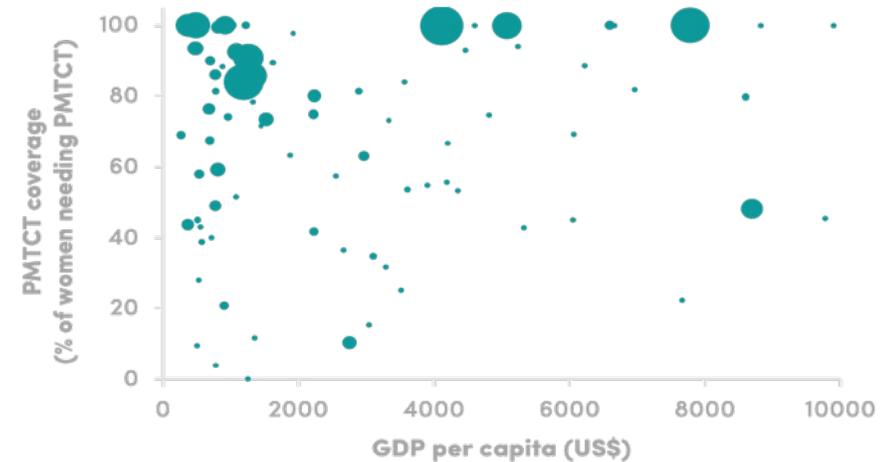
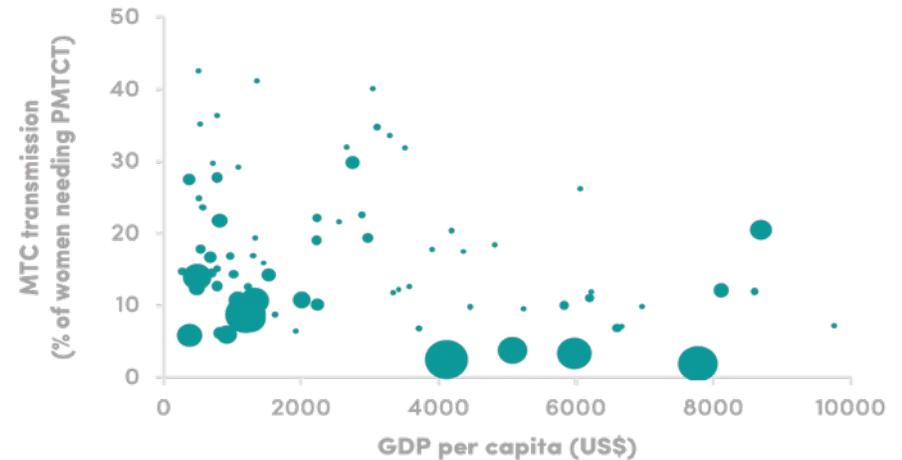


Figure 1.11: MTC transmission and GDP per capita, 2019



Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita.

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #2

HEALTH & LIFE PROSPECTS & THEIR ECONOMIC VALUATION

For the full brief, please go to

<https://hivecon.co.za/2-increased-health-and-life-prospects-and-their-economic-valuation/>

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PURPOSE AND METHODS



Purpose:

Discuss consequences of extended access to treatment:

- for individual and aggregate health outcomes, and
- leading up to discussion on economic valuation of health gains



Methods:

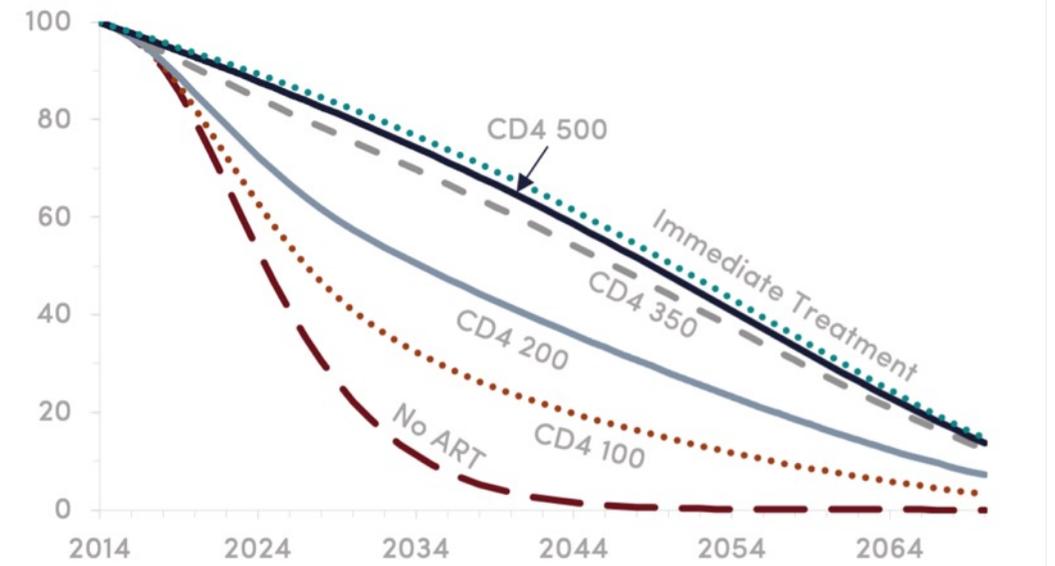
- Modelling on health and economic consequences of HIV and of antiretroviral therapy
- Estimates on aggregate health outcomes

TREATMENT AND DISEASE PROGRESSION: INDIVIDUAL-LEVEL PERSPECTIVE

Steep gains in expected survival as treatment initiated earlier

Lower survival gains for treatment initiation

Figure 2.1: Survival under different treatment eligibility criteria (percent)



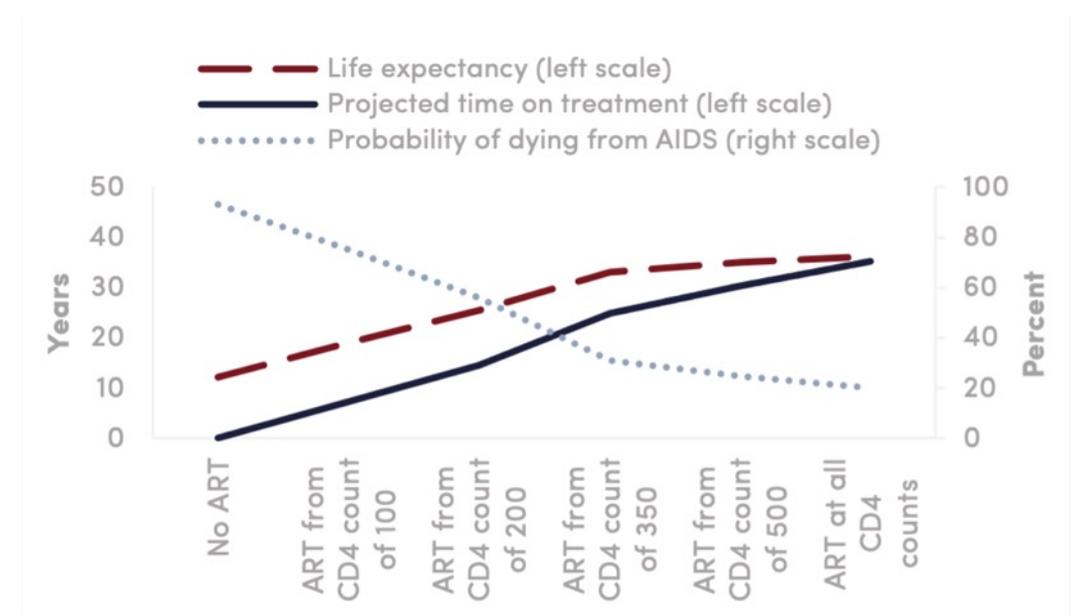
Source: Haacker, 2016.

TREATMENT AND DISEASE PROGRESSION: INDIVIDUAL-LEVEL PERSPECTIVE

Earlier initiation decreases time not on treatment (prerequisite for effective treatment as prevention)

Implications for cost-effectiveness analysis of HIV prevention – lower health gains, but more sustained treatment cost savings

Figure 2.2: Life expectancy, projected time on treatment, and probability of dying from AIDS



Source: Haacker, 2016.

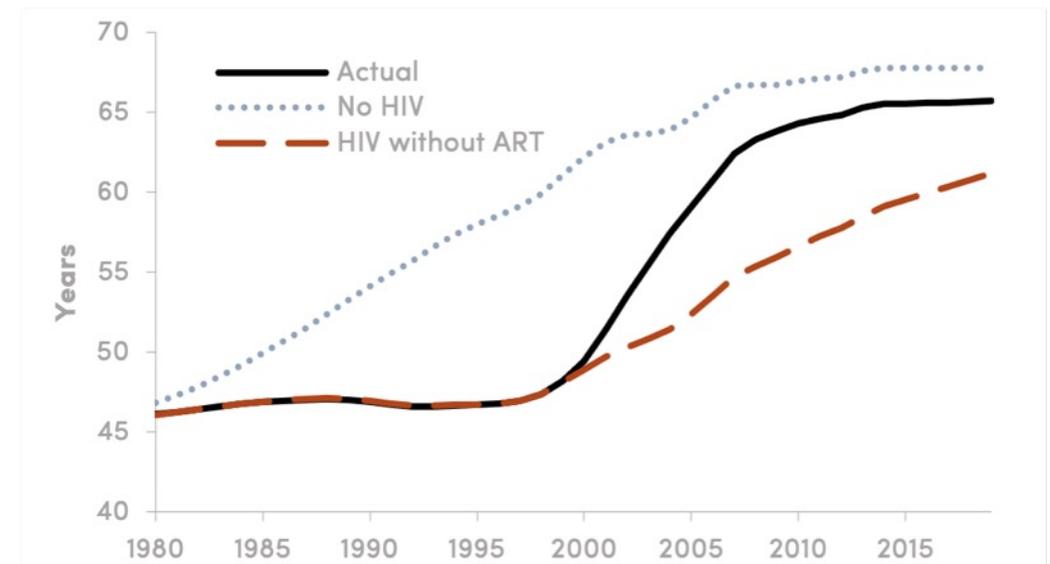
HIV AND LIFE EXPECTANCY

As is well known, HIV has often been a dominant driver of changes in life expectancy

Losses in life expectancy often peaked at well over 10 years around 2000

Steep increases in life expectancy, especially owing to PMTCT and early stages of adult treatment scale-up

Figure 2.4: Life expectancy, Malawi, 1980-2019



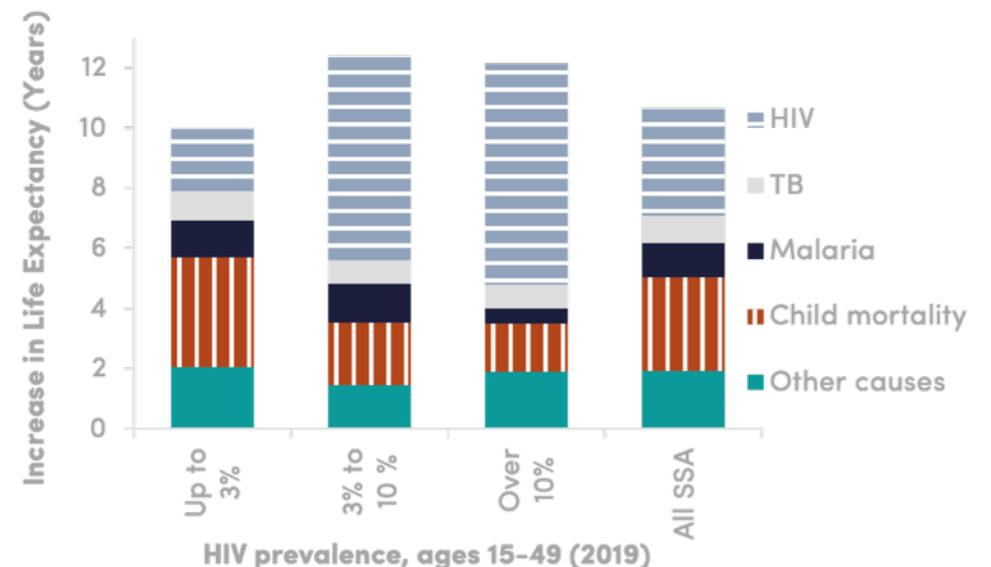
Source: UNAIDS 2020a, HIV estimate file for Malawi.

HIV AND LIFE EXPECTANCY (II)

HIV has been most important driver of improving life expectancy across sub-Saharan Africa, together with reductions in (non-AIDS-related) child mortality

This applies even across countries with relatively low HIV prevalence

Figure 2.3: Contributors to increased life expectancy across Sub-Saharan Africa, 2003-2019



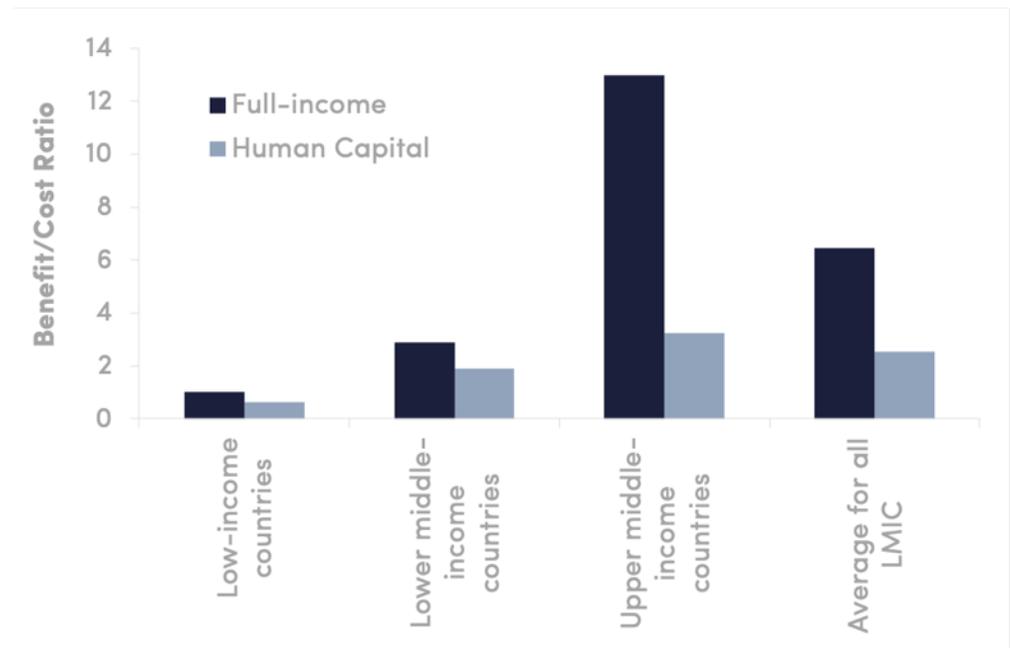
Source: UNAIDS 2018.

“VALUE OF STATISTICAL LIFE” OR “FULL-INCOME”

Based on lifetime utility framework

Risk aversion (to early death) means that valuation of projected gains in life years is higher than income that can be generated over this period

Figure 2.5: Returns to investment under “full-income” and “human capital” approaches



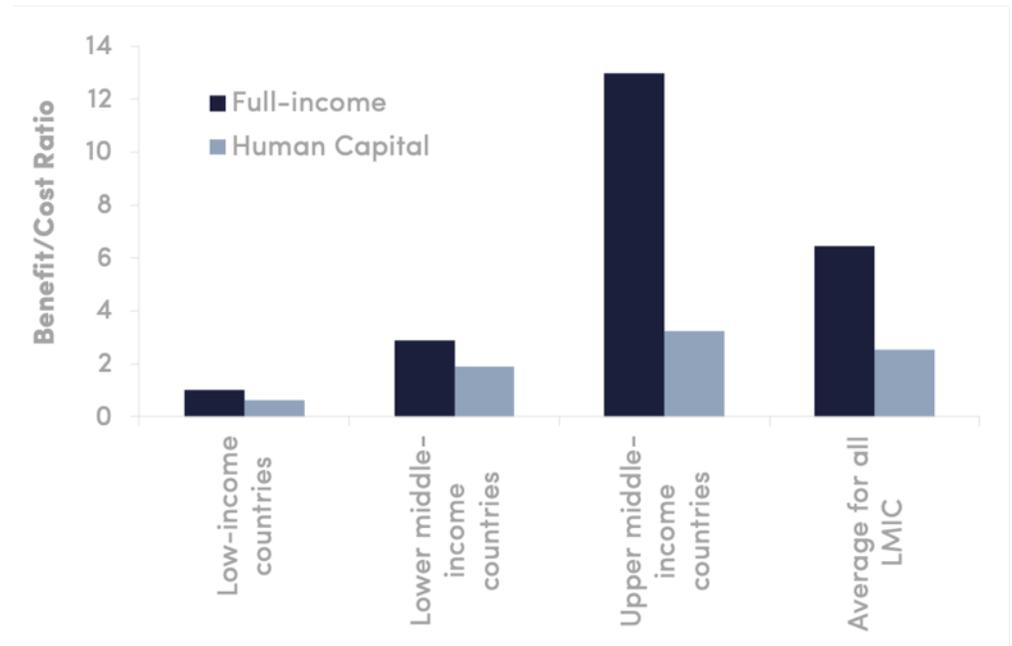
Source: Lamontagne, Over and Stover 2019.

“VALUE OF STATISTICAL LIFE” OR “FULL-INCOME”

Important to not conflate economic gains with earnings

But important to be precise on “economic gains” applied – “full income” often dominated by valuation of health gains, rather than measuring resources that could be utilized in a straightforward manner to offset costs of HIV investments

Figure 2.5: Returns to investment under “full-income” and “human capital” approaches



Source: Lamontagne, Over and Stover 2019.

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #3-7

OVERVIEW OF ECONOMIC GROWTH POLICY BRIEFS

For the full briefs, please go to

<https://hivecon.co.za>

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PURPOSE AND INTENTION OF THESE BRIEFS



Provide overview of knowledge on consequences of HIV and HIV policies on economic growth



Accessible, with policy community in mind:

- Each brief about 2,000 words, one page of references
- Typically organized around about 3 main points

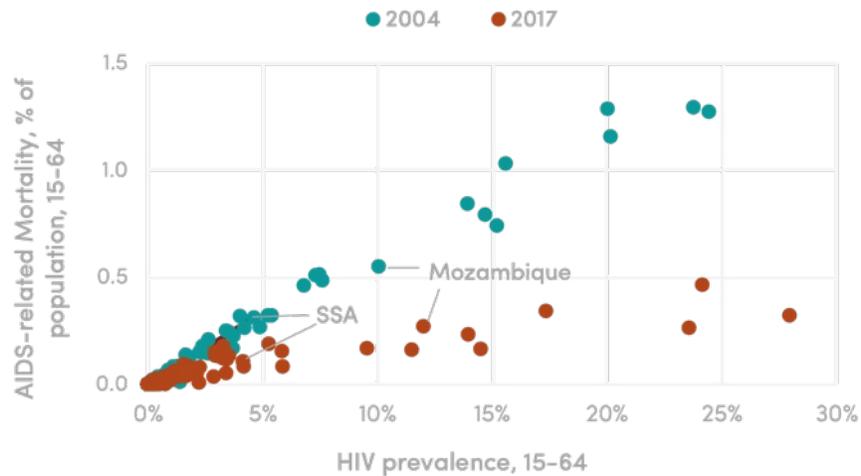


Evidence and data-based – available data and studies, some 22 figures over 4 topical briefs

MORTALITY AND GROWTH OF WORKING-AGE POPULATION

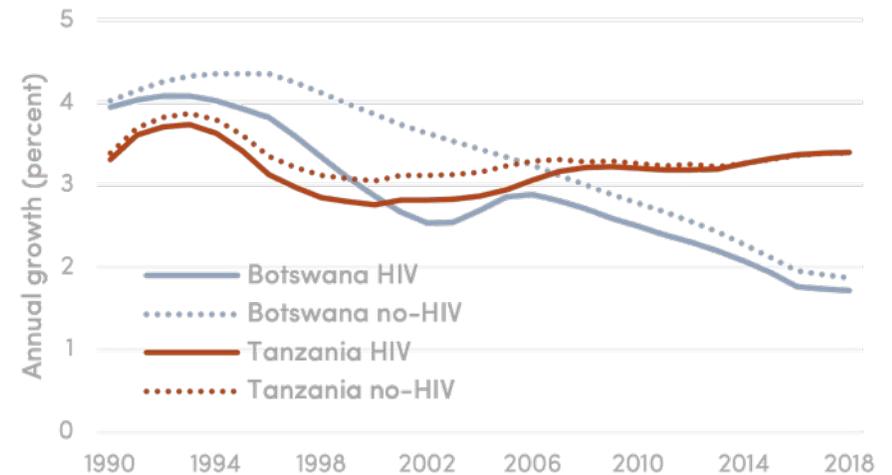
AIDS-related mortality among working-age adults reduces GDP growth but has an ambiguous effect on GDP per capita.

Figure 3.1: Contribution of AIDS to mortality, ages 15-64, against HIV prevalence



Source: UNAIDS 2019.

Figure 3.2: Growth of working-age population, with and without HIV, Botswana and Tanzania

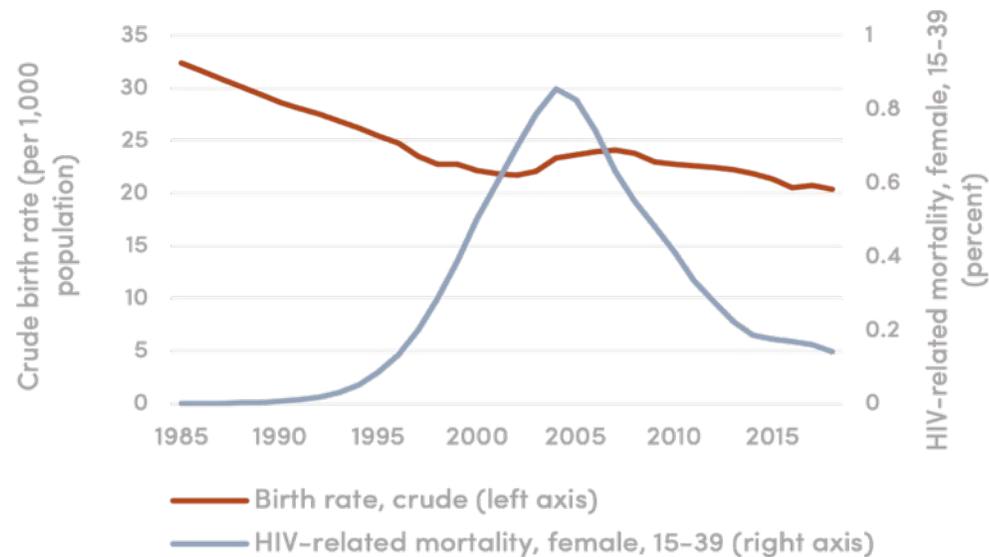


Source: UNAIDS 2019b.

CHILD MORTALITY AND BIRTH RATES

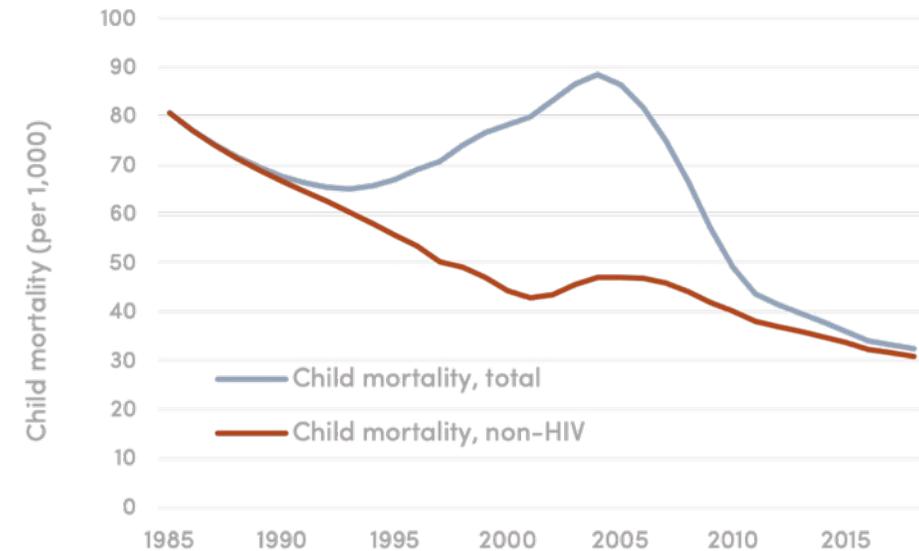
Reduced fertility and increased child mortality raise GDP per capita in short run but result in lower growth of the working-age population and of GDP in the long run.

Figure 3.3: South Africa, crude birth rate and HIV-related mortality among women 15-39



Source: Johnson and Dorrington, 2019.

Figure 3.4: South Africa, child mortality, total and non-HIV

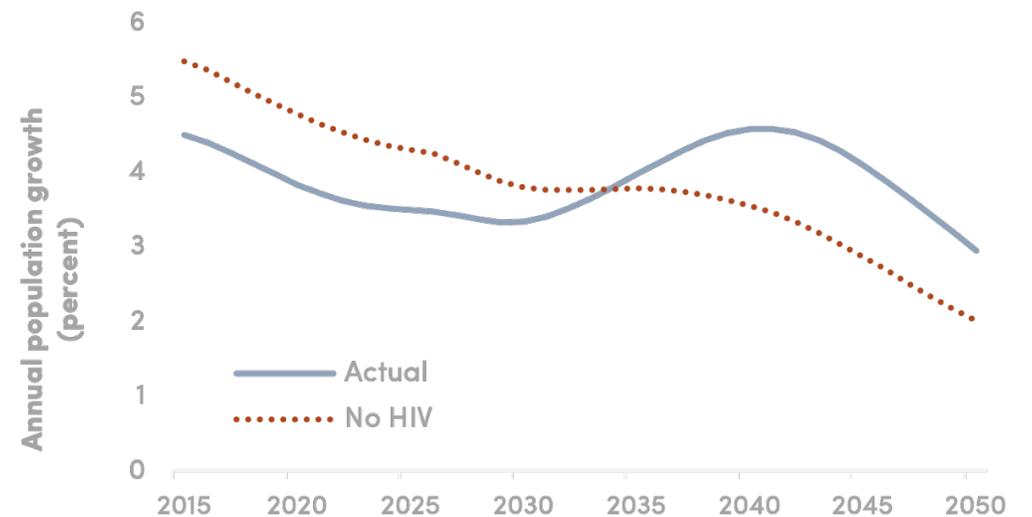


Source: Johnson and Dorrington, 2019.

SLOWDOWN AND ACCELERATION IN GROWTH OF OLD POPULATION

HIV response mitigates immediate effects of HIV on mortality and births, but impact on population structure plays out over decades.

Figure 3.5: Botswana, growth of population 60+, HIV and no HIV



Source: Haacker, Bärnighausen, and Atun 2019.

POPULATION SMALLER OWING TO HIV BUT LESS OBVIOUS EFFECT ON SHARE OF WORKING-AGE POPULATION

Table 3.1: Impact of HIV on working age population, 2018

	Adult HIV prevalence (15-49)	Effect on size of working age population	Effect on share of working age population	Change in dependency rate
	(percent)	(percent)	(percentage point)	(decimal)
Botswana	20.3	-11.7	-0.7	0.010
Haiti	2.0	-2.5	-0.2	0.003
Malawi	9.2	-8.6	-0.6	0.011
Namibia	11.8	-6.5	-0.5	0.008
Uganda	5.7	-7.3	-0.7	0.014

Source: UNAIDS (2019b) and authors' calculations.

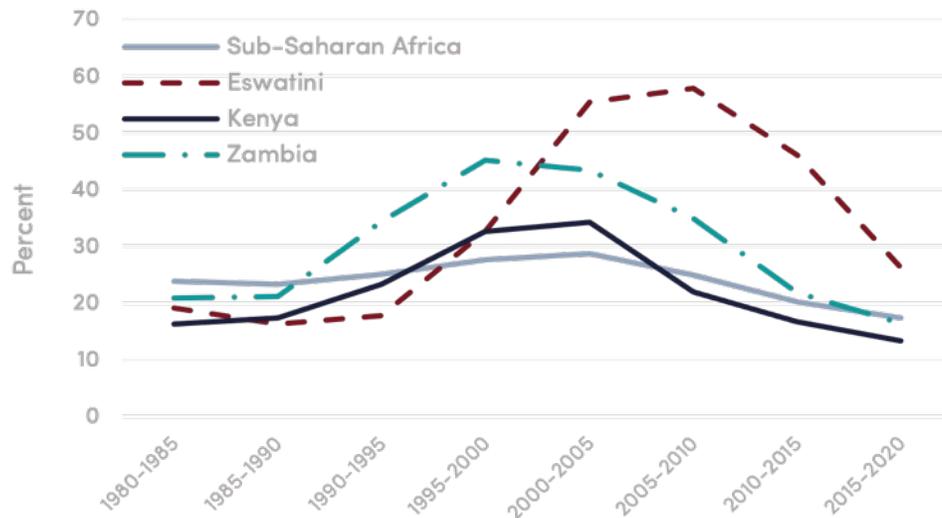
Note: Working-age population is defined as population at ages 15-64.

DIMINISHED LIFE EXPECTANCY & LOSS OF EXPERIENCE

Increased early mortality has resulted in loss of experience.

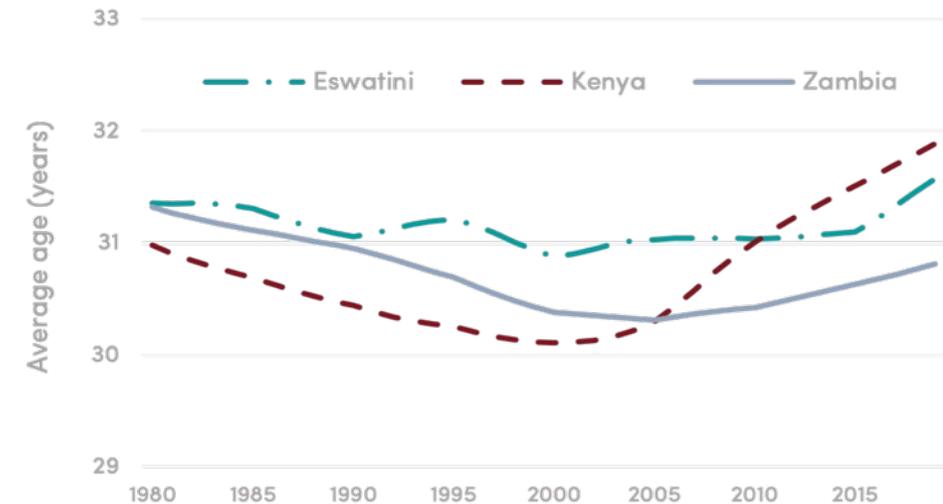
HIV response affects human capital directly through reduced mortality and indirectly through incentives to invest in skills and education.

Figure 4.3: Probability of dying before reaching age 50 for a 15-year old



Source: UNPD 2019

Figure 4.4: Average age of working-age population (ages 15-64)

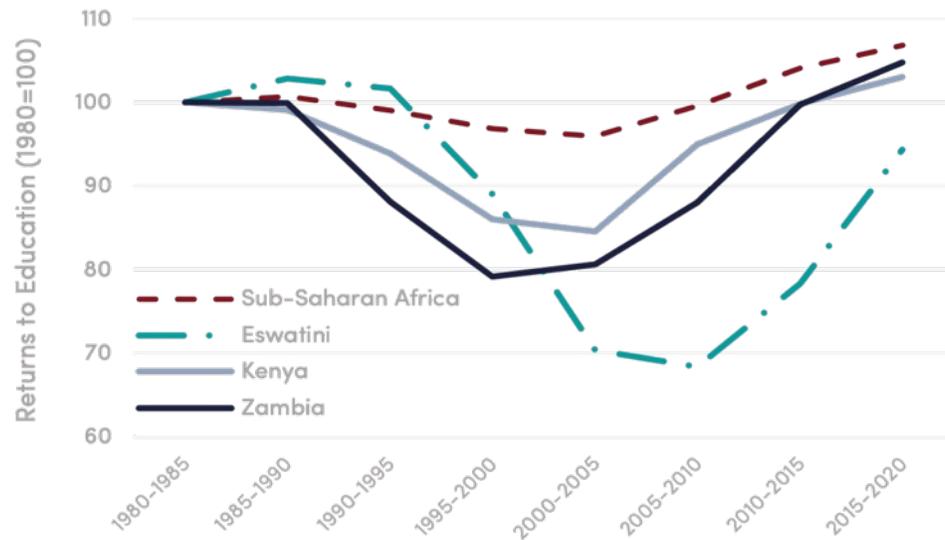


Source: UNPD 2019

DIMINISHED LIFE EXPECTANCY & LOSS OF EXPERIENCE

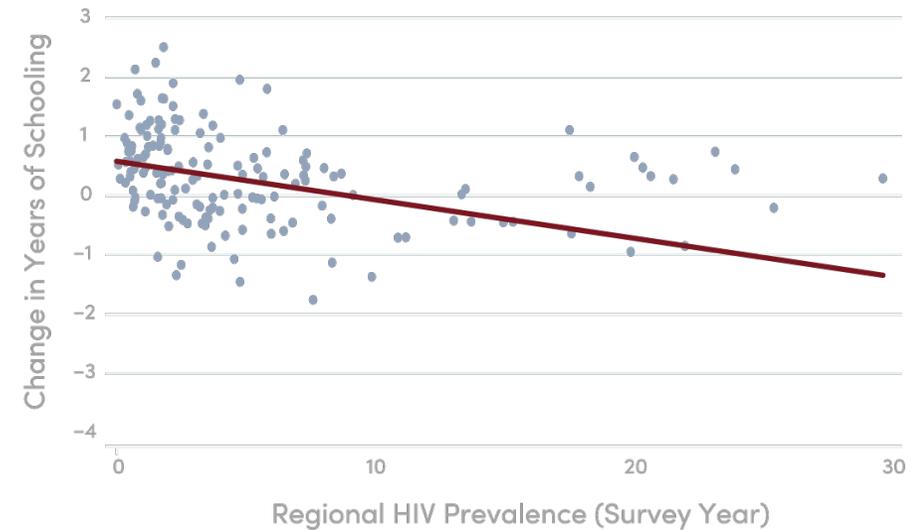
Early mortality among adults diminishes returns to investment in education.

Figure 4.5: Effect of changing mortality on returns to education



Source: Authors' calculations, based on UNPD 2019.

Figure 4.6: HIV prevalence and change in years of schooling

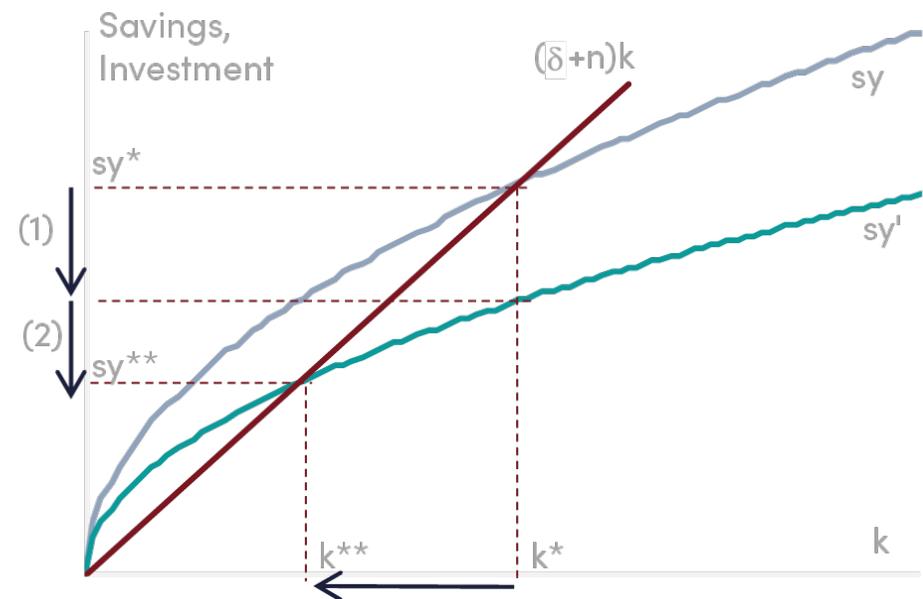


Source: Fortson 2011.

IMMEDIATE AND TOTAL EFFECT OF PRODUCTIVITY SHOCK

Investment and capital (de)accumulation roughly double the immediate effects of a productivity shock, but the process is slow (1/2 of the adjustment takes about 10 years).

Figure 5.A.2: Consequences of a productivity shock



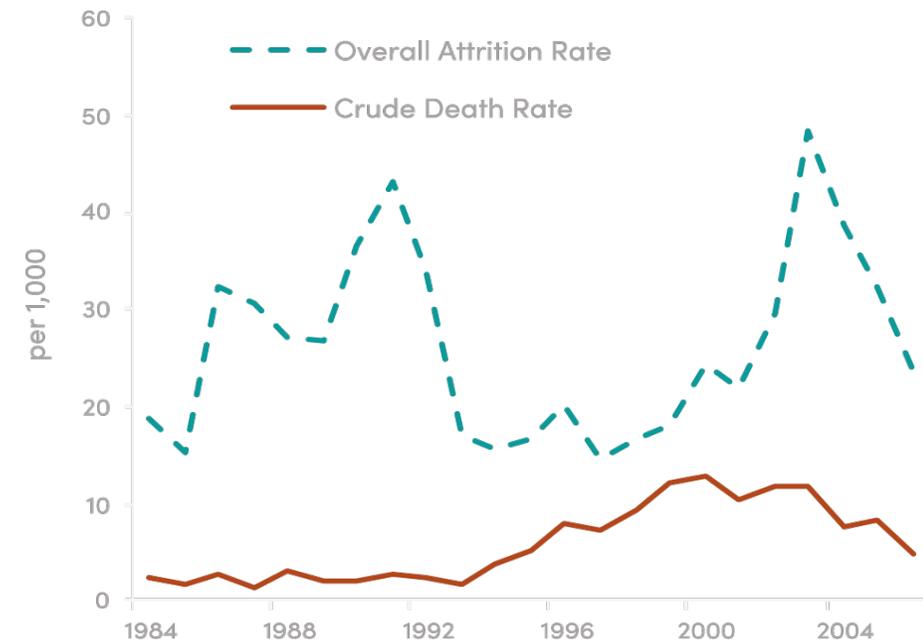
Source: Authors' illustration.

HIV, ATTRITION, AND GOVERNMENT CAPACITIES

Early concerns that AIDS-related mortality would disrupt the functioning of governments, with implications for security and education, and other government services.

Unclear whether these fears have been realized, perhaps because mortality typically accounts for a small proportion of attrition among public servants only.

Figure 6.2: Death and attrition rates in the Botswana police and prison services, 1984-2006

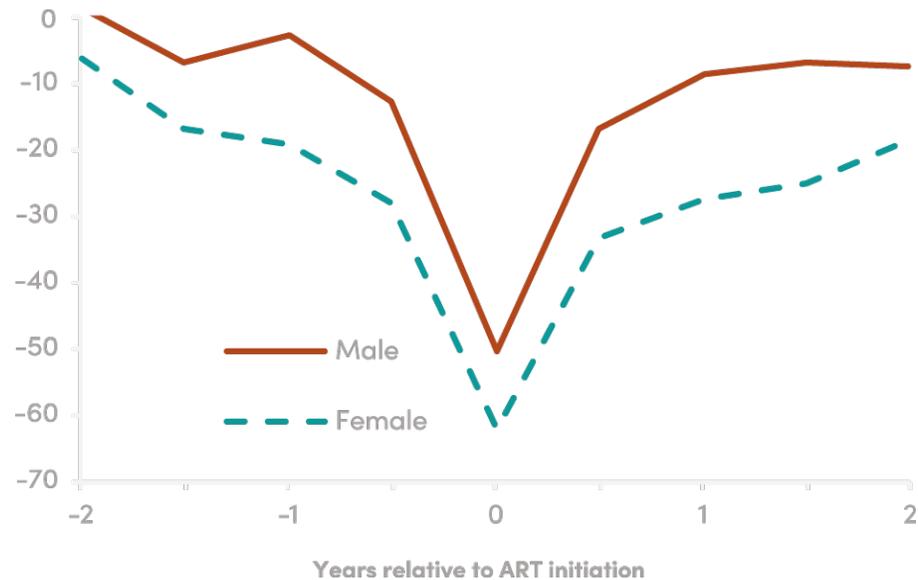


Source: Gossett (2010).

PRODUCTIVITY AND EMPLOYMENT

Treatment has been effective in restoring the productivity and – with some delay – employment of people living with HIV.

Figure 6.4: Loss in kilograms harvested per month (percent)



Source: Haacker (2016), adapted from Larson and others (2013).

Figure 6.5: Antiretroviral therapy, employment and impairment



Source: Rosen and others, 2010

CONCLUSIONS FROM 5 GROWTH BRIEFS

- Beyond **consensus that HIV** – through smaller populations than otherwise – **slows down GDP**, there is an **ambiguous effect and weak evidence the impact of HIV on GDP per capita**.
- **Wild swings in growth** in countries with high HIV prevalence implied by some empirical work on health and growth in general **have not happened**.
- However, overview shows some **consistent evidence on effects of HIV on productivity and employment** which represent important economic gains in their own right.

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #8

INTERACTIONS BETWEEN HIV AND POVERTY

For the full brief, please go to

<https://hivecon.co.za/8-interactions-between-hiv-and-poverty/>

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INEQUALITY AND INEQUITY: CONTRAST (& OVERLAP) BETWEEN HIV POLICY & ECONOMIC PERSPECTIVE

HIV policy (e.g., UNAIDS “End Inequalities” strategy 2021–2026):

- Focus on key populations at high risk and agency/human rights.
- In UNAIDS strategy, most references to poverty in context of pointers to SDGs.
- Otherwise, it (rarely) appears as one of several determinants of barriers to access, typically in combination with factors like gender and stigma.

Economic perspective focuses on socio-economic determinants and outcomes.

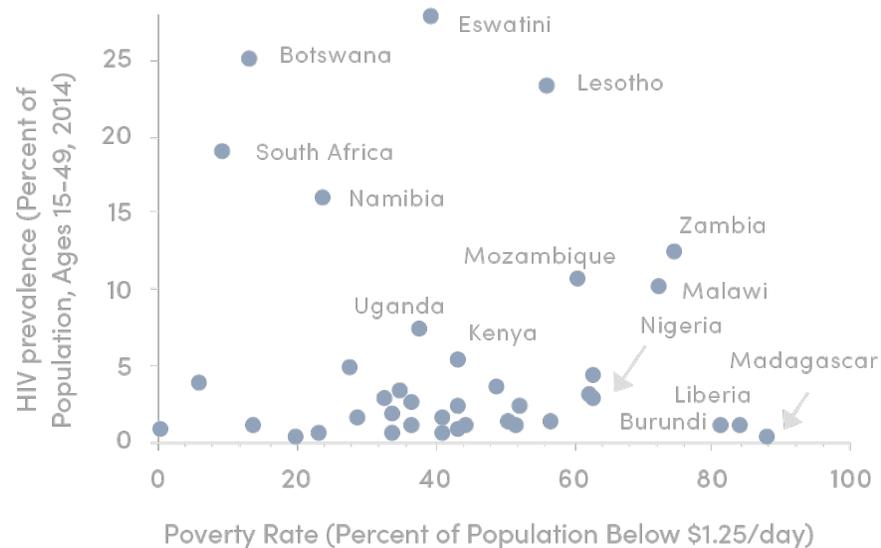
- How are HIV, access to HIV services, and the impacts of the pandemic distributed across socio-economic groups?
- How do HIV policies contribute to mitigating social and economic inequity?

CROSS-COUNTRY EVIDENCE: HIV, POVERTY, INEQUALITY

Evidence on socio-economic gradient of HIV more consistent with social opportunity than poverty as driver of HIV.

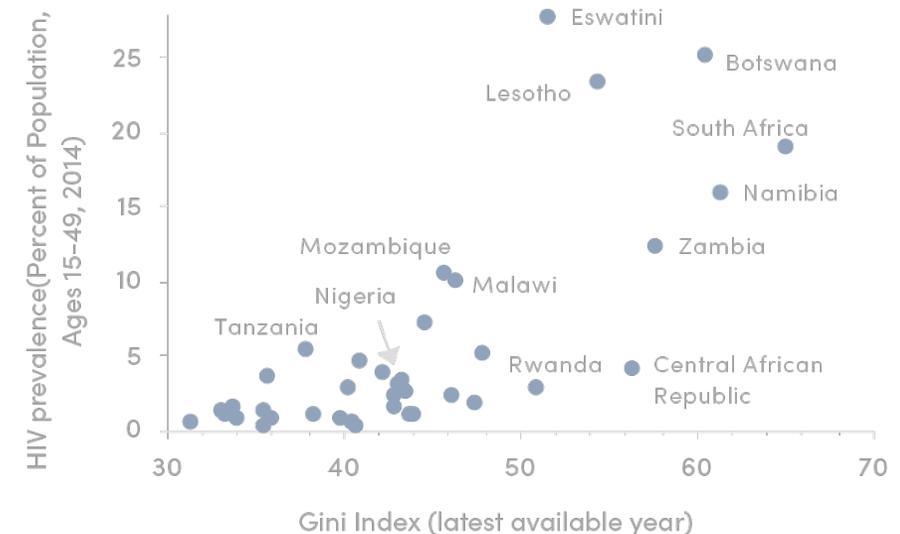
Agency/rights perspective: Focus on circumstances in which lack of opportunity contributes to HIV risk (and exacerbates the consequences of this lack).

Figure 8.1: HIV prevalence and poverty across sub-Saharan Africa



Source: Haacker 2016.

Figure 8.2: HIV prevalence and inequality across sub-Saharan Africa



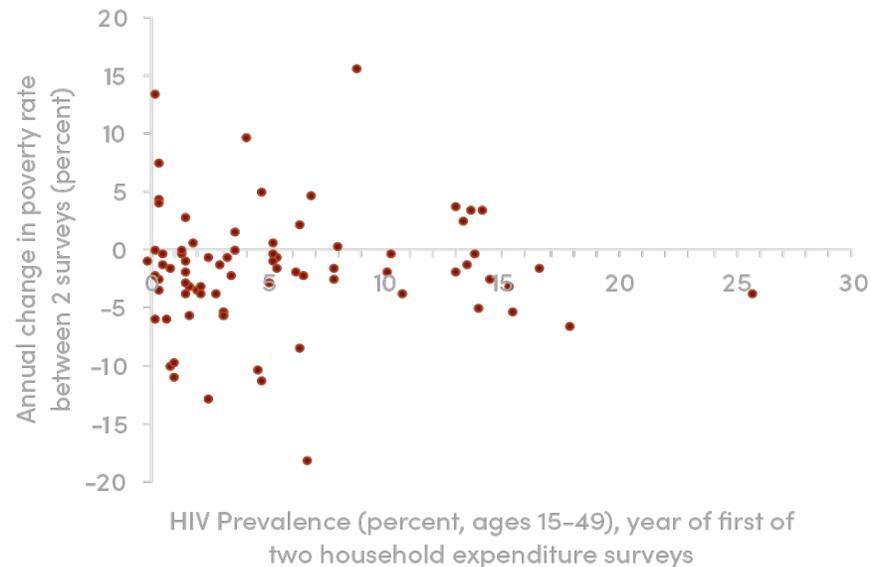
Source: Haacker 2016.

CROSS-COUNTRY EVIDENCE: IMPACT OF HIV ON POVERTY AND INEQUALITY?

There is no obvious effect of HIV on population-level poverty or inequality.

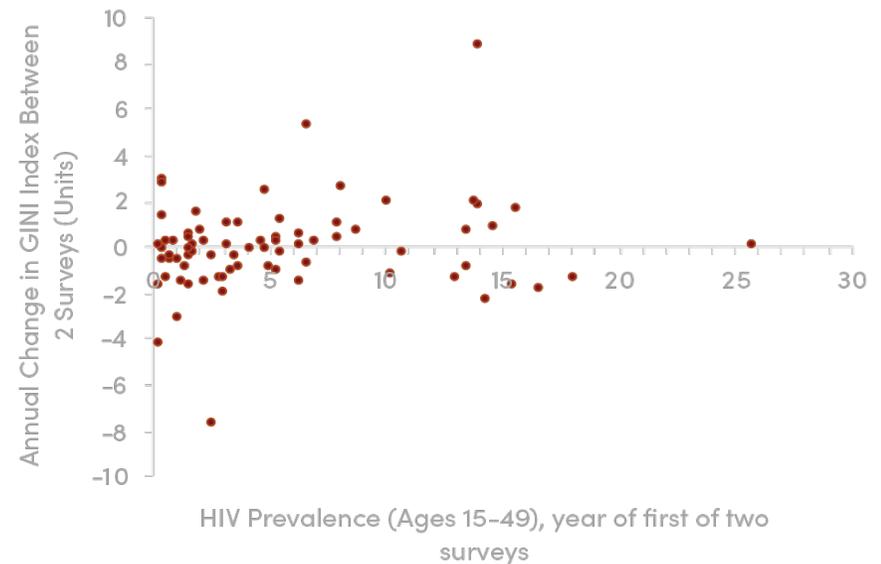
Importance of general-equilibrium effects: One household's losses (e.g., employment) often are another household's gains.

Figure 8.3: HIV prevalence and changes in poverty



Source: Haacker 2016.

Figure 8.4: Changes in inequality and HIV prevalence

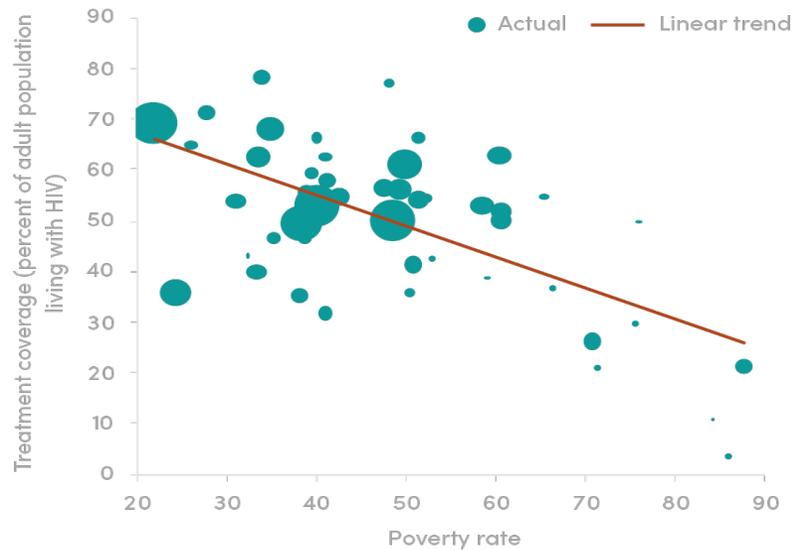


Source: Haacker 2016.

POVERTY AND TREATMENT ACCESS

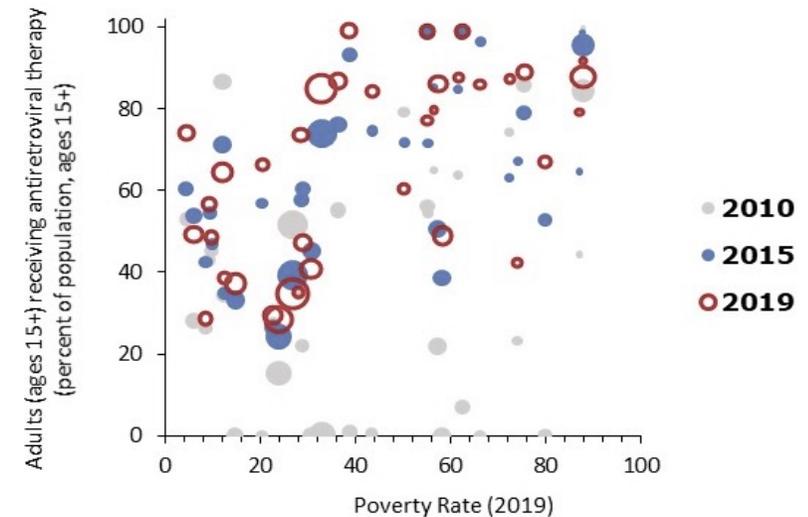
Fairly flat socio-economic gradient of treatment access – do HIV programs contribute to mitigating socio-economic inequity in health?

Figure 8.1: HIV prevalence and poverty across sub-Saharan Africa



Source: Haacker and Burungi 2018.

Nigeria: Treatment coverage for PLWH and Poverty, by State



Source: UNAIDS 2020a

SUMMARY

- Evidence on socio-economic gradient of HIV more consistent with social opportunity than poverty as driver of HIV.
- Agency/rights perspective: Focus on circumstances in which lack of opportunity contributes to HIV risk (and exacerbates the consequences of this lack).
- Fairly flat socio-economic gradient of treatment access – do HIV programs contribute to mitigating socio-economic inequity in health?

**THE
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POLICY BRIEF #9

**DISEASE BURDEN ACROSS
POPULATION SUB-GROUPS**

For the full brief, please go to

<https://hivecon.co.za/9-disease-burden-across-population-sub-groups/>

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AGEING POPULATION LIVING WITH HIV

Ageing of population living with HIV well-known trend, primarily because of improved survival following treatment roll-out

In sub-Saharan Africa, share of people at ages 50 or higher among PLHIV has been increasing from 11% in 2010 to 19% in 2019

Share of young adults (ages 15-24) declining, not only because more older adults survive:

- Receding “youth bulge” following declining birth rates in previous decades
- HIV incidence declined more among young adults than for older adults

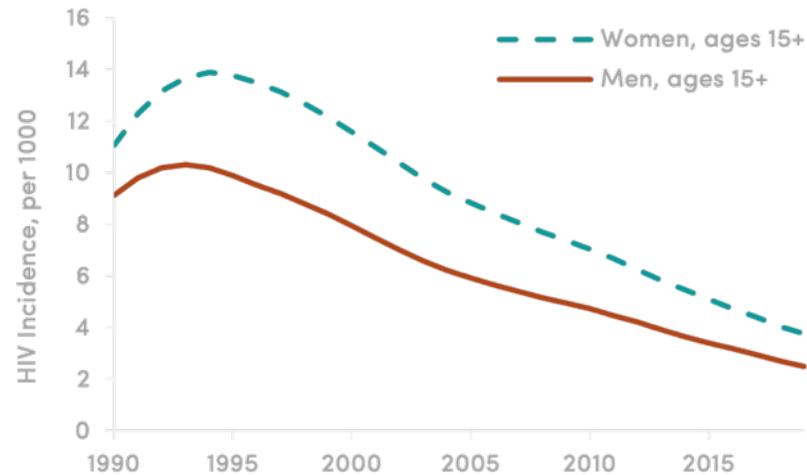
GENDER DIFFERENCES IN HIV PREVALENCE & INCIDENCE

HIV incidence among women and girls declined in most locations, but the relative risk (compared to HIV incidence among men) persisted.

Population surveys show higher HIV prevalence among young women in age-disparate sexual relationships.

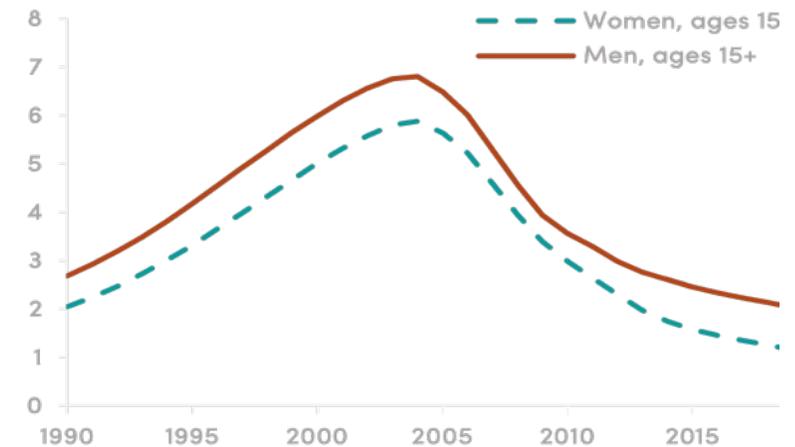
Evidence on HIV incidence is less conclusive though.

Figure 9.2.1: HIV incidence, ages 15+



Source: UNAIDS 2020.

Figure 9.2.2: AIDS-related mortality among people living with HIV, ages 15+



Source: UNAIDS 2020.

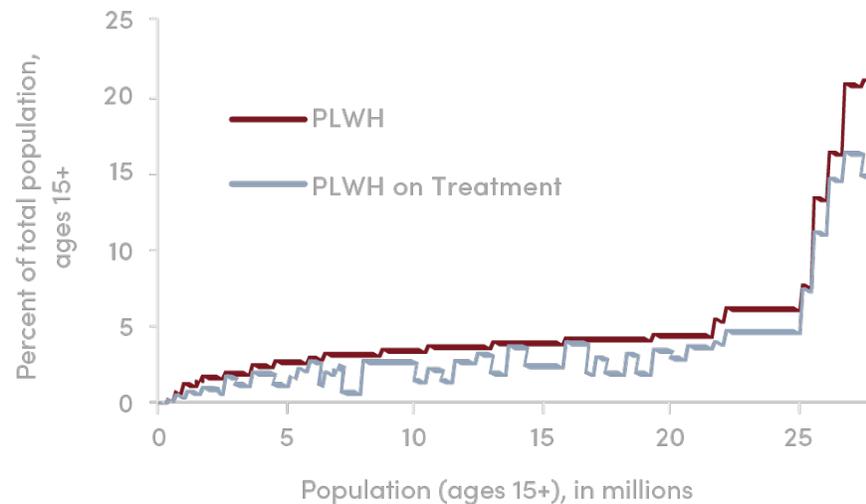
CROSS-COUNTRY EVIDENCE: IMPACT OF HIV ON POVERTY AND INEQUALITY?

Often steep differences in HIV transmission and prevalence within countries.

Potential to adjust treatment scale-up accordingly – for prevention purposes or (where coverage is low) immediate survival benefits.

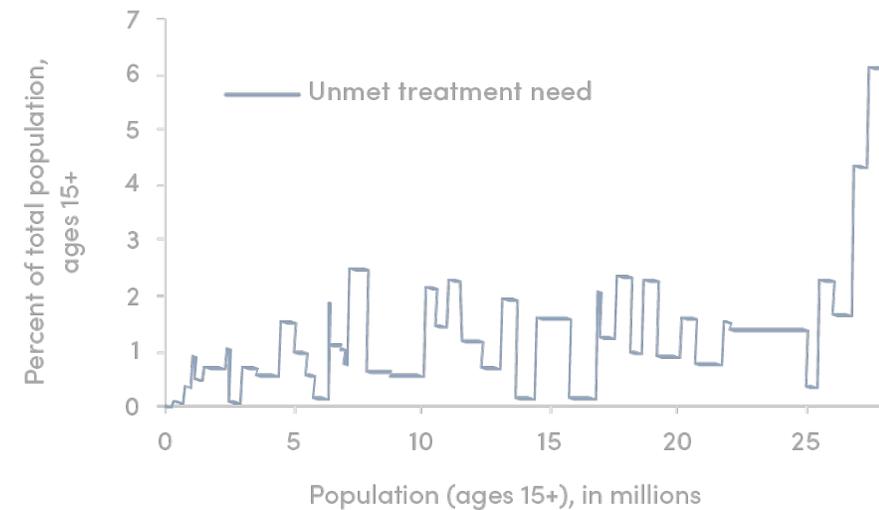
Calibrate HIV prevention policies accordingly: Identify and focus on local HIV hotspots.

Figure 9.3: Kenya: PLHIV, with and without treatment (percent of total population)



Source: NACC and NASCOP 2018.

Figure 9.4.1: Unmet need (percent of total population)



Source: NACC and NASCOP 2018.

KEY POPULATIONS

Typically describes populations with intense HIV transmission (including men who have sex with men, transgender people, sex workers and their clients, and people who inject drugs), or who are subject to other socio-economic risk factors.

Small population share, large share in HIV prevalence and transmission.

- E.g., Ukraine: people who inject drugs account for 0.9 percent of the adult population but make up 33 percent of people living with HIV.

With regard to key populations, “HIV epidemic has represented an acute health inequality” (UNAIDS, 2021) and thus contributes to exacerbating social and economic inequalities.

Economic perspective: Downstream infections multiply effects of HIV prevention interventions.

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #10

TRADE-OFFS BETWEEN ALLOCATION TO HEALTH AND OTHER SECTORS

For the full brief, please go to

<https://hivecon.co.za/brief-10-trade-offs-between-allocation-to-health-and-other-sectors/>

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PURPOSE OF BRIEF #10



Address lessons from economic analysis for policy choices on allocations to HIV/health rather than other sectors



Highlight two approaches:

- Assess **contribution of health/HIV investment to national development objectives**
- **Transforming health and other outcomes into valuations that can be compared – benefit-cost analysis, “full-income” approach**

EXAMPLES OF HIV/HEALTH AND HIGH-LEVEL POLICY DOCUMENTS

Kenya Vision 2030 (2007)

- Central objective of transforming “country into a rapidly industrializing middle-income nation.”
- HIV principal cause of divergence from peer countries in terms of health outcomes.
- Human resources critical in improving competitiveness, but focus on skills and education rather than health.
- Good health contributes to poverty reduction and economic growth.
- Aims to “improve access and equity in the availability of essential health care; emphasis on preventive services as well as local delivery.

EXAMPLES OF HIV/HEALTH AND HIGH-LEVEL POLICY DOCUMENTS

South Africa
National
Development Plan
2030 (2011)

- Emphasis on growing an inclusive economy and redressing inequities.
- “Health outcomes are shaped by factors largely outside the health system;” “good health is essential for a productive and fulfilling life.”
- Quality free or low-cost health care is a contributor to reducing cost of living for low-income households.
- HIV has had major impact on life expectancy, resulted in higher dependency rates, and exacerbated existing discrepancies between population groups. Continuing challenge for at least another generation.

EXAMPLES OF HIV/HEALTH AND HIGH-LEVEL POLICY DOCUMENTS

Zambia National
Development Plan
2017-2021

- “Guide towards Zambia’s aspirations of being a developed middle-income nation.” Focus on economic development.
- “Human development involves [...] freedoms to live long, healthy and creative lives,” and contributes to employment and socio-economic growth.
- HIV recognized as key cross-cutting issue but addressed largely in line with other health challenges.
- HIV and lack of health cover as contributors to poverty and vulnerability.

“FULL-INCOME” APPROACH (I)

Add **value of gains in longevity to output gains** (economic growth) to obtain overall improvement in living standards.

HIV has been a **dominant driver of changes in full income** in high prevalence countries, more important than either growth of GDP per capita or gains in life expectancy from any other sources.

	Guyana	Botswana	Malawi	Uganda
1985-2000				
Growth of "full income"	3.0	-2.4	0.3	1.5
Growth of real GDP per capita	2.3	3.7	0.0	2.2
Contribution from life expectancy	0.6	-6.2	0.3	-0.8
of which: HIV/AIDS	-0.08	-7.5	-4.8	-3.2
2000-2018				
Growth of "full income"	3.1	9.1	8.3	5.9
Growth of real GDP per capita	2.6	2.2	1.8	2.5
Contribution from life expectancy	0.5	6.8	6.4	3.4
of which: HIV/AIDS	0.03	5.6	4.1	2.5
Memorandum items:				
HIV prevalence, ages 15-49 (2018)	1.5	20.3	9.2	5.8
Treatment coverage, % of PLHIV (2018)	67	85	79	73

Source: IMF (2019) for GDP per capita, UNAIDS (2019) for life expectancy. See Haacker (2016, chapter 4) for a discussion on methods.

Note: PLHIV = People living with HIV

“FULL-INCOME” APPROACH (II)

Add value of gains in longevity to output gains (economic growth) to obtain overall improvement in living standards.

	Guyana	Botswana	Malawi	Uganda
1985-2000				
Growth of "full income"	3.0	-2.4	0.3	1.5
Growth of real GDP per capita	2.3	3.7	0.0	2.2
Contribution from life expectancy	0.6	-6.2	0.3	-0.8
of which: HIV/AIDS	-0.08	-7.5	-4.8	-3.2
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Source: IMF (2019) for GDP per capita, UNAIDS (2019) for life expectancy. See Haacker (2016, chapter 4) for a discussion on methods.

Note: PLHIV = People living with HIV

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #11

DOMESTIC PUBLIC FUNDING FOR HIV

For the full brief, please go to

<https://hivecon.co.za/11-domestic-public-funding-for-hiv/>

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BACKGROUND TO BRIEF #11

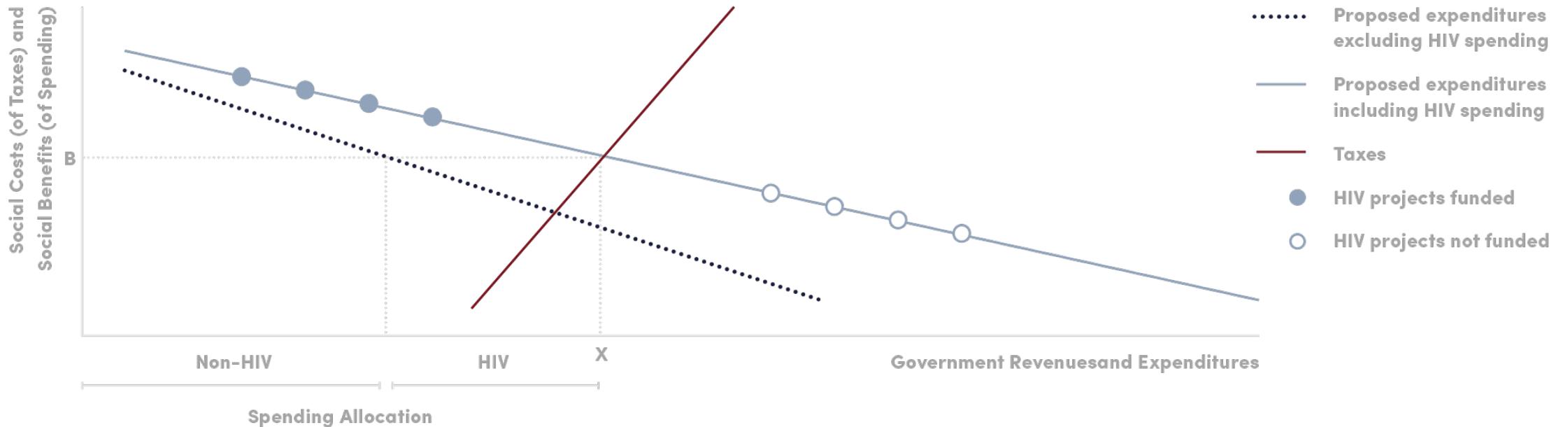
The issue of raising additional domestic public funding plays an important role in the HIV policy discourse

- **HIV strategies are often developed as stand-alone programmes**, often accompanied by an “investment case” for additional HIV spending, identifying a funding gap that needs to be overcome
- The ongoing shift from external to domestic HIV funding in many countries means that **domestic funding challenges** (HIV-specific and the wider fiscal context) **become more relevant** in developing coherent and realistic HIV policies

However, in public finance, **most decisions on spending are separate from decisions on taxation or borrowing**

A FISCAL PERSPECTIVE ON DOMESTIC HIV FINANCING (I)

Effective choices on allocation of funding reflect the social benefits of alternative spending options.



Source: Authors' illustration.

ROLE OF INNOVATIVE FINANCING

The contributions of such “innovative” financing tools to domestic HIV financing, though, has been minimal so far, and potential considered small (*Booth & Whiteside 2016*)

Government officials (in a well-documented survey on funding options in Malawi) have gravitated to more traditional taxes rather than innovative ones (*Chansa et al. 2018*)

Discussions on the potential role of “innovative” financing instead emphasize the importance of raising taxes overall and improving public financial management as primary sources of creating fiscal space for HIV or any other government programs
(*Atun et al. 2016, Booth & Whiteside 2016, Chansa et al. 2018*)

THE ECONOMIC IMPACT OF HIV



POLICY BRIEF #12

TRADE-OFFS AND SYNERGIES BETWEEN HIV AND OTHER HEALTH OBJECTIVES

For the full brief, please go to

<https://hivecon.co.za/12-trade-offs-and-synergies-between-hiv-and-other-health-objectives/>

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PURPOSE OF BRIEF #12



Complements briefs on cost-effectiveness (#13) in support of decisions between alternative health interventions – compare costs of health interventions and outcomes which can be (more or less) directly attributed to the intervention.



Present brief adopts more of a health systems perspective, addressing:

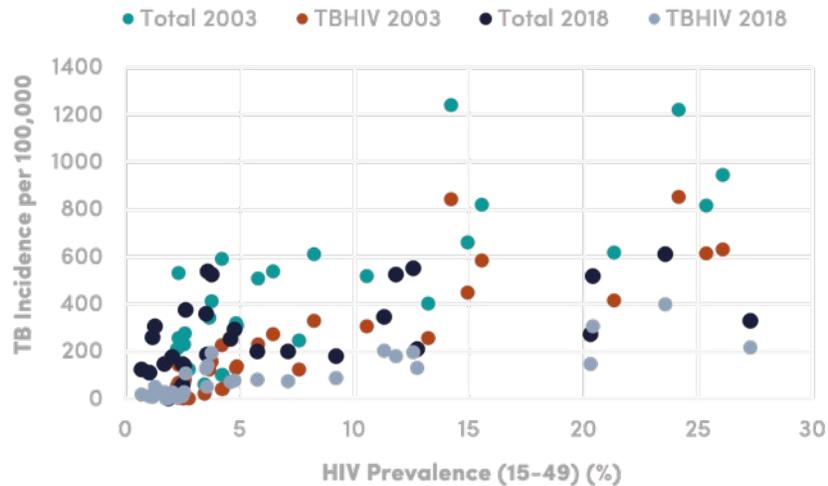
- Intersections between diseases
- Evidence on HIV crowding out other health services
- Integration of HIV and other health services

ILLUSTRATION: HIV AND TB INCIDENCE

Countries with high HIV prevalence have experience steep increases in TB cases, including among people not living with HIV.

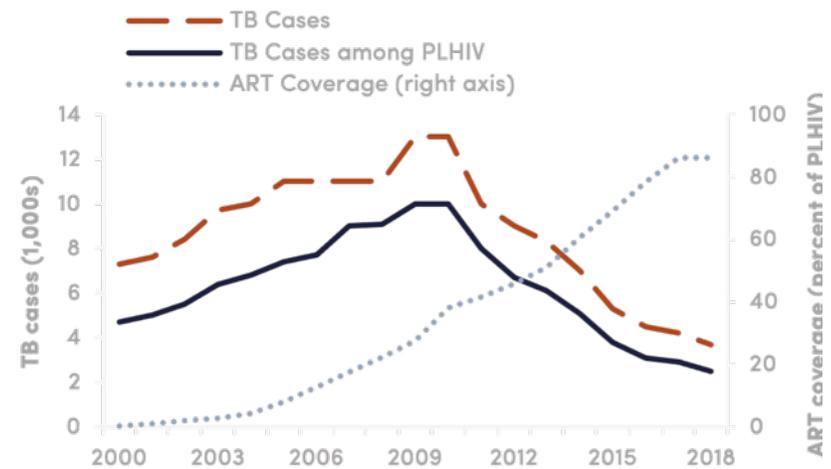
Steep drop in TB cases following scaling-up of treatment.

Figure 12.1: TB incidence total and linked to HIV versus HIV prevalence (15-49)



Source: WHO (2020) for TB incidence and population, UNAIDS (2019) for HIV prevalence.

Figure 12.2: Total number of TB cases and number of TB cases among PLHIV, Eswatini



Source: WHO (2020) for TB incidence and population, UNAIDS (2019) for HIV prevalence.

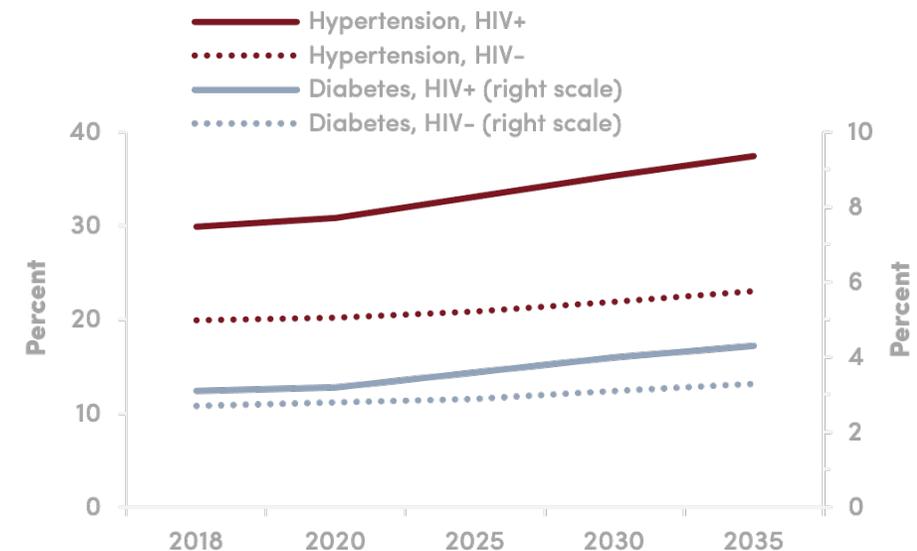
ILLUSTRATION: HIV AND NCDs

Ageing results in increasing prevalence of NCDs among PLWH, and decoupling of HIV prevalence among population affected by NCDs from headline HIV prevalence (Smit et al. 2019; Haacker et al. 2019)

New challenges:

- Need to adapt HIV and NCD care.
- HIV as model for chronic disease care and prevention.
- Adapt treatment for PLWH to minimize NCD risks.

Figure 12.3: Projected prevalence of selected NCDs in Kenya, by HIV status (ages 18+)



Source: Adapted from Smit et al. 2019, using data provided by Smit.

INTEGRATION OF HIV AND OTHER HEALTH SERVICES

Empirical evidence broadly supportive of positive interactions:

- PLWH receiving ART “are more likely to have received health-care services for diabetes and hypertension” (Manne-Goehler 2017).
- Facility-level data (Kruk 2015) and cross-country evidence (Grepin 2012) suggest positive impact of the presence of HIV programmes on maternal health services.
- But scaling-up of HIV services may have affected health services negatively in areas not directly linked to the delivery of HIV services, including neonatal health (Lee & Izama 2015) and immunisation (Grepin 2012; Wilson 2015; Brugha 2010).

THE
ECONOMIC
IMPACT OF
HIV



POLICY BRIEF #13

**ASSESSING COST-
EFFECTIVENESS ACROSS HIV
AND HEALTH INTERVENTIONS**

For the full brief, please go to

<https://hivecon.co.za/brief-13-assessing-cost-effectiveness-across-hiv-and-health-interventions/>

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PURPOSE / APPROACH



Policy decisions on providing specific health services involve choices between services offered and those which are not. (The alternatives might also be located outside the health sector brief #10)



Focus of this brief: Choices require

- Comparisons between alternatives
- Selection criterion.



In some cases, focus on direct costs and outcomes insufficient, e.g., in presence of capacity constraints or if there are interactions between diseases (brief #12)

EXAMPLE: HIV AND CVD IN DCP3

Table 13.1: Cost-effectiveness of selected interventions (*Disease Control Priorities, 3rd Edition*)

Intervention	Cost-effectiveness (US\$/DALY)
Blood pressure management, upper-middle-income countries	Cost-saving
Polypill for high-absolute-risk cardiovascular disease, upper-middle-income countries	Cost-saving
Giving female condom to sex workers, South Africa	Cost-saving
Salt reduction policy in food	Cost-saving to 45
Voluntary male circumcision	10
Prevention of mother-to-child transmission of HIV Option B versus no treatment, Africa	26
ACE inhibitor versus no medication, heart failure, no access to treatment	28
Scale up HIV antiretroviral therapy to all with a T-cell count <350, or all infected, South Africa	188–256
Beta-blocker and ACE inhibitor vs no med, heart failure, no access to treatment	274
Primary prevention of cardiovascular disease with four drugs, middle-income countries	1070–3207
Pre-exposure prophylaxis with HIV antiretrovirals for non-infected partner in serodiscordant couples	Cost-saving to 6468

Source: Horton, 2018.

Note: US\$ are at 2012 prices. Table shows selection from interventions covered by DCP3, focusing on HIV and cardiovascular diseases.

APPLYING ECONOMIC CRITERIA

Establish economic gains from investment in health, adopt if gains exceed costs.

Most common examples 1- and 3-times GDP thresholds:

- Do output gains attributed to health intervention exceed costs? And could they be used to refinance the intervention?
- Does value of gains (health plus output) exceed costs so that there is a net benefit?

Such criteria attractive because of ease-of-use, but

- Same extrapolation issues as for value of statistical life.
- Difficulties with interpreting economic gains.
- Little practical relevance in terms of informing health investments.

THE
ECONOMIC
IMPACT OF
HIV



POLICY BRIEF #14

**EXTERNAL & DOMESTIC HEALTH
FINANCING, AND THE ROLE OF
PUBLIC VS. PRIVATE DOMESTIC
HEALTH FUNDING**

For the full brief, please go to

<https://hivecon.co.za/brief-14-external-and-domestic-health-financing-and-the-role-of-public-vs-private-domestic-health-funding/>

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PURPOSE AND OUTLINE



Complements brief on domestic public financing.



Stocktaking on role of different sources of financing

- HIV programs more reliant on external financing than other government functions
- Makes domestic resource generation more pertinent
- Role of private health spending across countries.



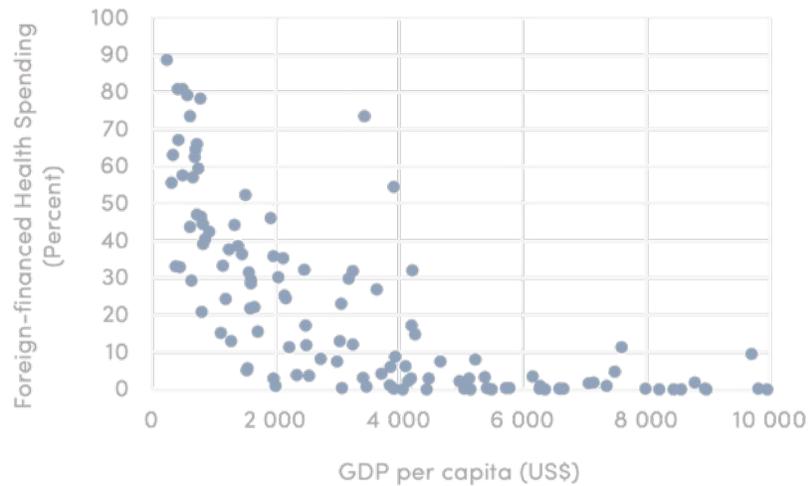
Focus then on potential role of private HIV funding (public funding being discussed more extensively in brief #11).

- Out-of-pocket spending.
- Contributory prepaid schemes.

ROLE OF EXTERNAL FINANCING

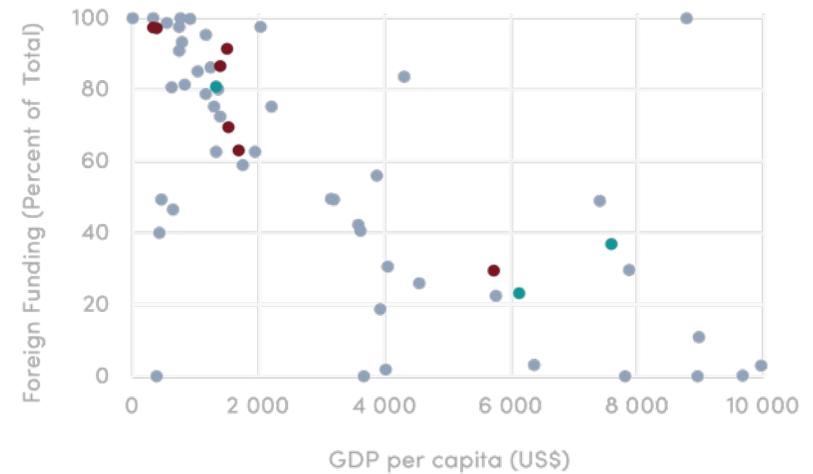
As is well known, external financing plays bigger role in HIV financing than in health overall.

Figure 14.1: Foreign-financed health spending (percent of domestic public plus foreign-financed spending, 2017)



Source: WHO 2020 for health spending and financing overall, UNAIDS 2020 for HIV spending and funding, and IMF 2019 for GDP per capita.

Figure 14.2: Share of foreign funding in HIV spending (latest year, median 2017) HIV prevalence (15-49)

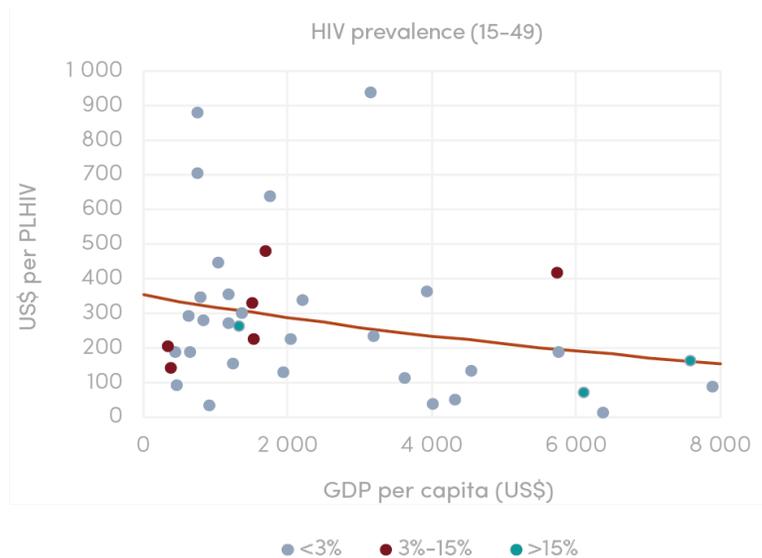


Source: WHO 2020 for health spending and financing overall, UNAIDS 2020 for HIV spending and funding, and IMF 2019 for GDP per capita.

EXTERNAL VS. DOMESTIC PUBLIC HIV FINANCING PER PLWH

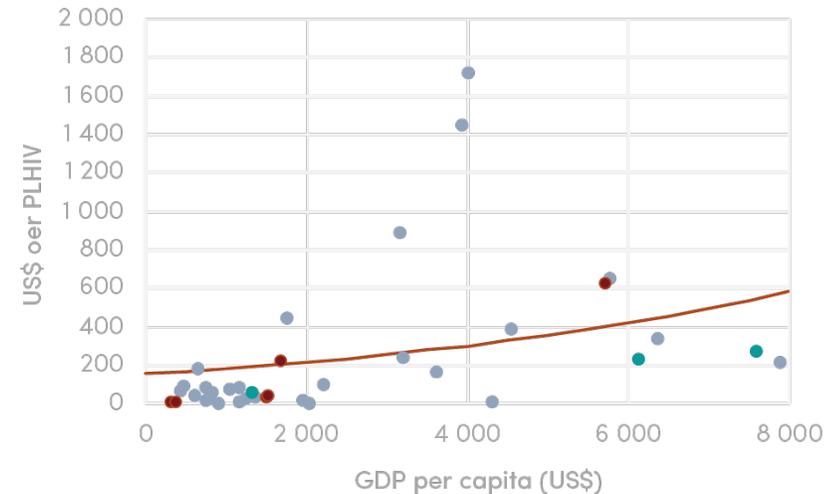
Very large role of external financing makes domestic resource generation more pertinent because of risks associated with drops in external HIV financing.

Figure 14.7: Foreign HIV funding per PLHIV (latest year, median 2017)



Source: UNAIDS 2020 for HIV financing and spending data, UNAIDS 2019 for HIV prevalence and the number of people living with HIV, IMF 2019 for GDP per capita.

Figure 14.8: Domestically financed public HIV spending per PLHIV (latest year, median 2017)

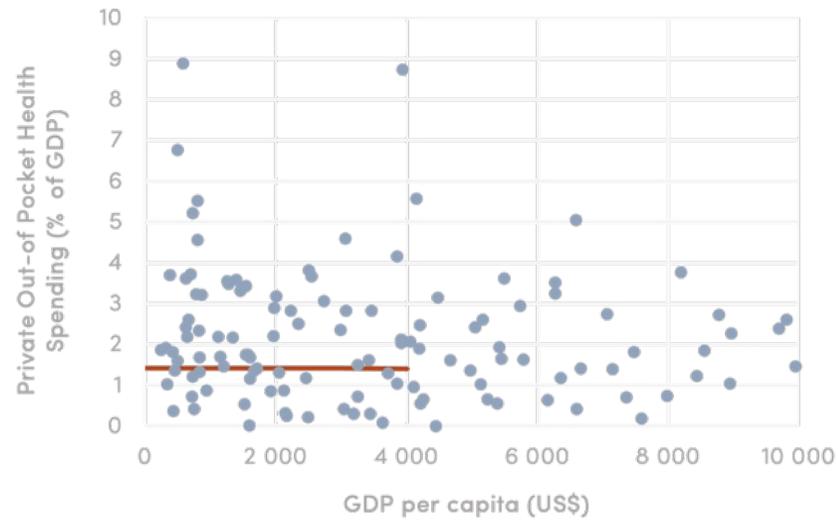


Source: UNAIDS 2020 for HIV financing and spending data, UNAIDS 2019 for HIV prevalence and the number of people living with HIV, IMF 2019 for GDP per capita.

ROLE OF DOMESTIC PRIVATE HEALTH SPENDING ACROSS COUNTRIES

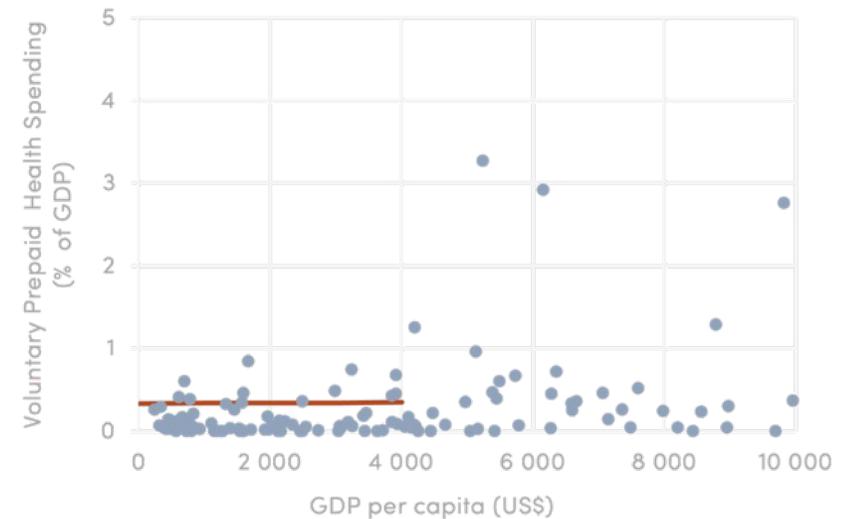
Large variation in role of private funding (out-of-pocket (OOP) and prepaid) across countries. Dominant role of OOP (and marginal/no role of prepaid) in most LICs and LMICs

Figure 14.5: Private out-of-pocket health spending (percent of GDP, 2017)



Source: WHO 2020 for health spending and financing overall, UNAIDS 2020 for HIV spending and funding, and IMF 2019 for GDP per capita.

Figure 14.6: Voluntary prepaid private health expenditures (percent of GDP, 2017)



Source: WHO 2020 for health spending and financing overall, UNAIDS 2020 for HIV spending and funding, and IMF 2019 for GDP per capita.

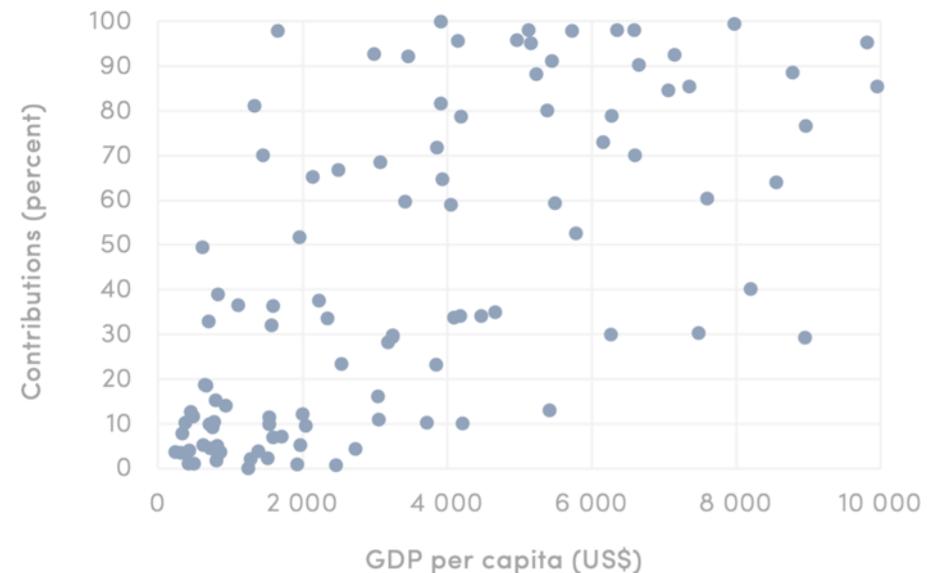
VOLUNTARY HEALTH INSURANCE

(Do not cover compulsory health insurance here, as it closely resembles a tax > Brief #11 on public domestic funding.)

Most voluntary insurance schemes in LICs and LMICs are heavily subsidized.

Assigning funding for HIV services to these schemes would often require large increases in premiums or larger subsidies.

Figure 14.9: Private contributions (percent of funds administered through voluntary contributory schemes, 2017)



Source: WHO 2020 for health spending and financing overall, UNAIDS 2020 for HIV spending and funding, and IMF 2019 for GDP per capita.

THE
ECONOMIC
IMPACT OF
HIV



POLICY BRIEF #15

**PUBLIC AND PRIVATE
PROVISION OF HEALTH AND
HIV SERVICES**

For the full brief, please go to

<https://hivecon.co.za/brief-15-public-and-private-provision-of-health-and-hiv-services/>

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COVERAGE

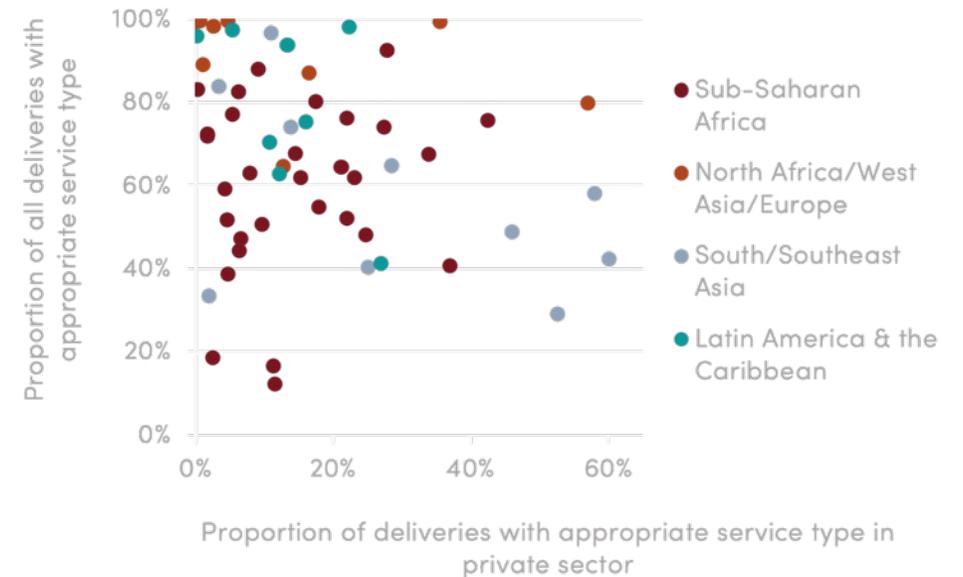
Spending data illustrate widespread reliance on private providers across LMICs, but data on service coverage is rare.

DHS data on maternal health services.

Wide dispersion in overall coverage and contribution of private sector.

Weak negative correlation between overall coverage and share of private sector – countries where public sector plays larger role tend to achieve higher coverage of maternal health services.

Figure 15.2: Deliveries with appropriate service type



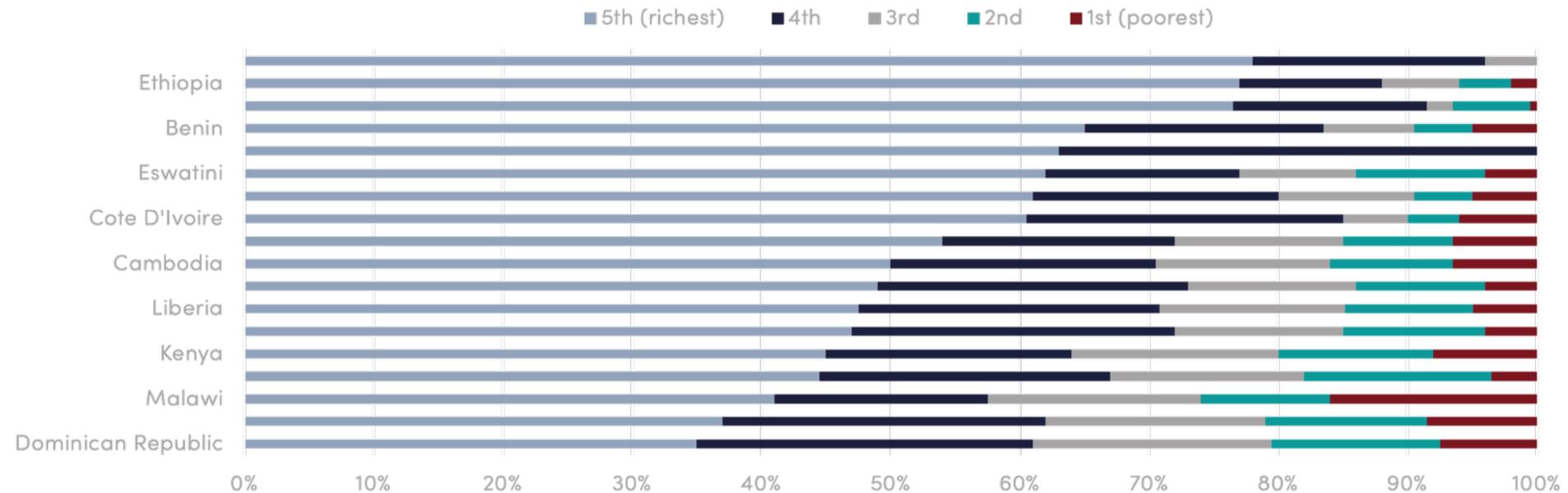
Source: Benova and others 2015.

EQUITY

Data on utilization suggests private health services predominantly utilized by wealthier patients (but this does not yet account for quality differences).

According to DHS data from 18 countries, 69 (58–100) percent of HIV tests in private ANC facilities from top 2 wealth quintiles, but only 8 (0–16) percent are from lowest quintile.

Figure 15.3: Users of private health services by wealth quintile



Source: Johnson and Cheng 2014.

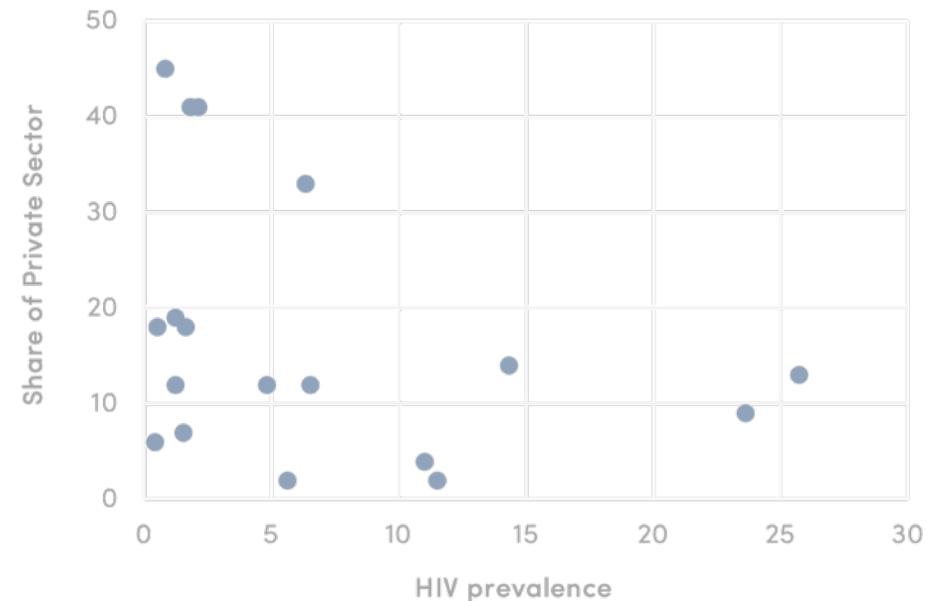
EFFICIENCY (PROGRAM-LEVEL PERSPECTIVE)

Use (smaller) private sector facilities when there is no clear advantage of delivery through public sector, or exploiting differences in coverage of alternative providers

E.g., absence of economies of scale, or in context of differentiated care

Data on HIV testing – larger role of private sector in countries where HIV prevalence is lower.

Figure 15.4: HIV prevalence and private sector share in HIV testing (percent)



Source: Johnson & Cheng (2014).

HARNESSING PRIVATE SECTOR'S POTENTIAL?

Ambiguous evidence on the efficiency of private vs. public health services

Role of local context and other considerations such as oversight, quality assurance, regulation, and transaction costs (Hanson et al., 2008; Rao et al., 2011)

Utilize underused capacities and differences in reach of public vs. private providers.

Potential of private providers to reach poor populations unclear – some examples, but often without counterfactual of public sector provision

**THE
ECONOMIC
IMPACT OF
HIV**



POLICY BRIEF #16

**TRADE-OFFS WITHIN
THE HIV BUDGET**

For the full brief, please go to

<https://hivecon.co.za/brief-16-trade-offs-within-the-hiv-budget/>

Markus Hacker

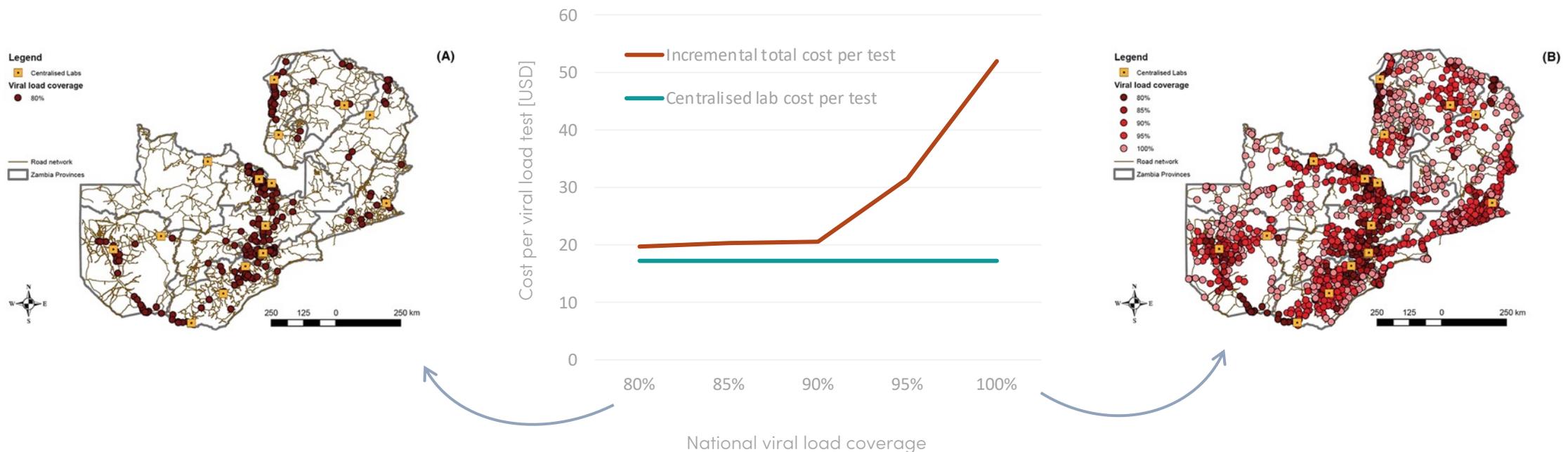
University College London and Center for Global Development

PURPOSE

- Even within HIV budget, choices have to be made between trade-offs
- Traditionally, economic value of interventions is analysed considering one intervention at a time (league table) > less useful when considering the allocation of a budget across a number of interventions
- Additional aspects to be considered: impact of one intervention on another, non-linear effects at different coverage levels, spatial targeting, additional objectives such as equitable coverage or epidemic control
- Review methods for optimising efficiency of HIV budget allocation (allocative efficiency)
- HIV as example of (siloes) programme of health interventions, often at fairly high coverage

SPATIAL OPTIMISATION: LIMITS

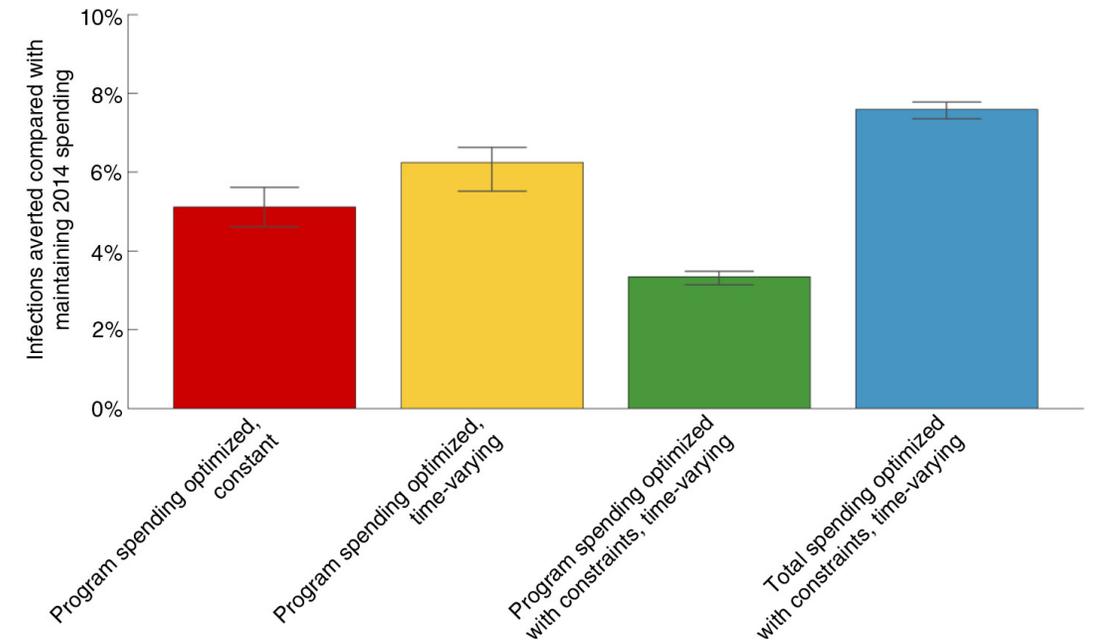
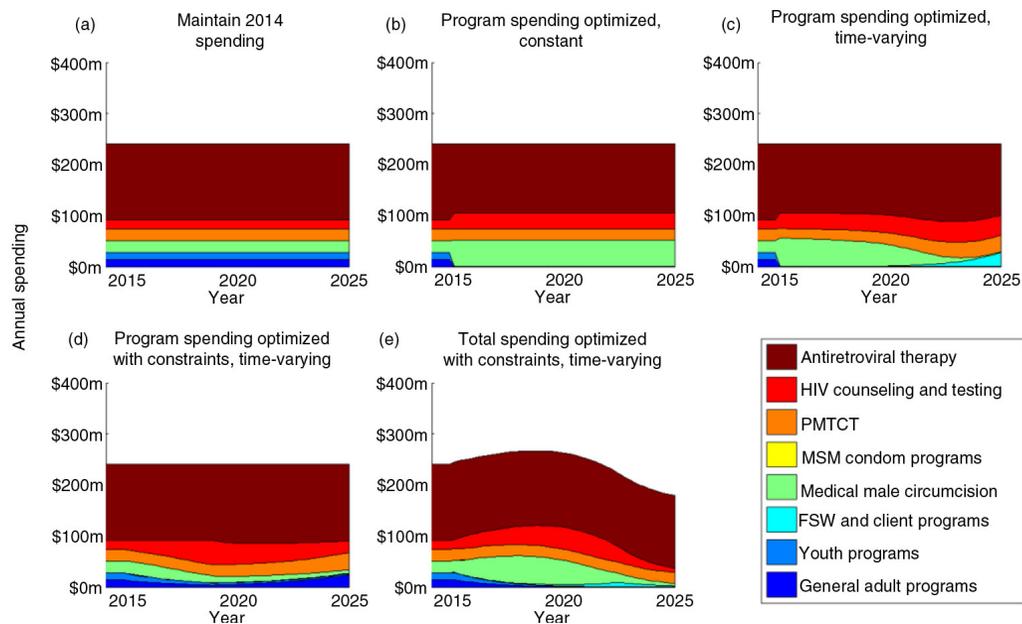
Zambia: Optimising VL sample-collection network to increase test coverage from 80% to 100% of patient volumes increases cost by 2.6 due to increased reliance on decentralised transport system (Nichols et al., 2019)



Source: Nichols et al. 2019.

TEMPORAL OPTIMISATION

Zambia: Allowing annual HIV budgets to vary over time within the same overall 10-year budget envelope results in a 7.6% decrease in new HIV infections compared with a constant baseline budget (Shattock et al., 2016)



Source: Shattock et al., 2016.

COMBINING DIFFERENT OPTIMANDS

Tensions arise if additional optimands are in juxtaposition with the main aim of allocative efficiency (eg, international targets; earmarking for novel interventions; equitable coverage)

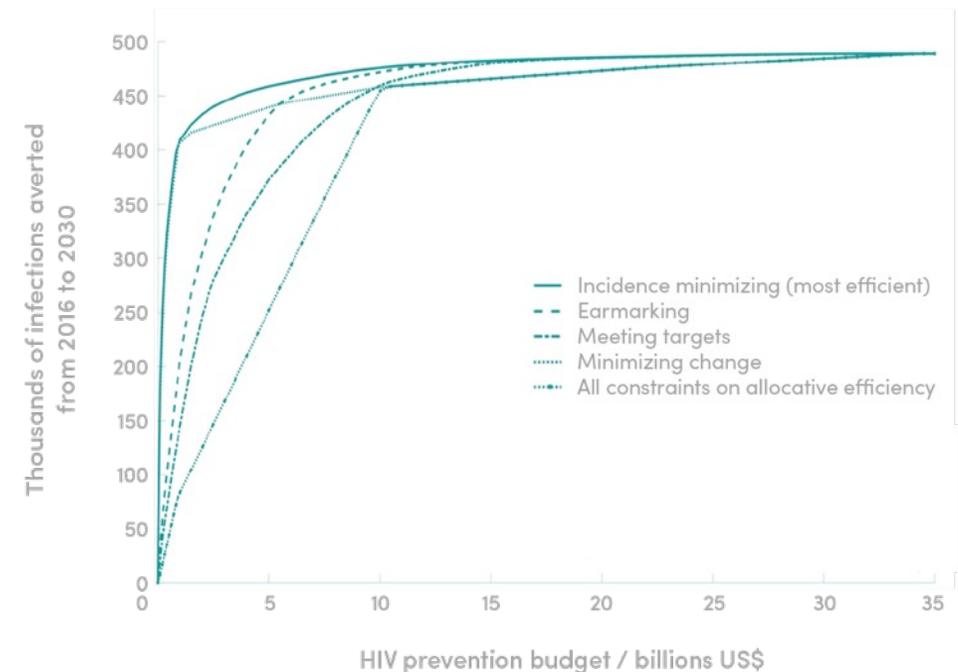
Benin/Tanzania/South Africa: Impact of prevention programmes under constant budget reduced by

- earmarking of funding to novel interventions
- the attainment of the UNAIDS 90-90-90 targets
- the stickiness of local planning processes,

BUT only under lower-than-current budgets

- Under higher budgets, impact of technical inefficiencies became negligible

Figure 16.3: Changes in HIV prevention efficiency under different scenarios and budget levels



Source: Stopard et al., 2019.

COMPLEXITIES IN ALLOCATIVE EFFICIENCY MODELLING

Interaction effects between interventions (at higher coverage)

Relationship between marginal cost and intervention coverage is non-linear, and **returns to investment diminish at higher coverage levels**

- if this is taken into account, ICERs can decrease (as programme-wide impacts are incorporated) as well as increase (diminishing returns)

Some interventions (enablers, packages) hard to incorporate as **effectiveness data is missing**

Figure 16.4: Comparison of conventional league table and optimisation routine in South African HIV investment case

Conventional league table		Optimisation routine	
Rank	ICER (\$/LYS)	Rank	ICER (\$/LYS)
Condom availability	Cost saving	Condom availability	Cost saving
Male medical circumcision	Cost saving	Male medical circumcision	Cost saving
SBCC 1 (HCT in adolescents, reduction in MSP)	46	ART (Eligibility at 500 CD4 cells/microl)	109
ART (Eligibility at 500 CD4 cells/microl)	96	PMTCT	142
PMTCT	132	Infant testing at 6 weeks	248
Universal ART	186	Universal ART	249
Infant testing at 6 weeks	208	SBCC 1 (HCT in adolescents, reduction in MSP)	749
HCT for sex workers	366	SBCC 2 (condoms)	1 200
SBCC 2 (condoms)	566	General population HCT	1 236
SBCC 3 (condoms, HCT, MMC)	697	SBCC 3 (condoms, HCT, MMC)	1 816
PrEP for sex workers	926	HCT for sex workers	2 643
General population HCT	1 273	Infant testing at birth	2 937
Infant testing at birth	1 349	PrEP for sex workers	9 947
HCT for adolescents	1 772	HCT for adolescents	19 540
PrEP for young women	3 703	PrEP for young women Max	26 375
Early infant male circumcision	8 712 984	Early infant male circumcision	89 642 731

Source: Chiu et al. 2017.

PRACTICAL AND POLITICAL LIMITATIONS TO OPTIMISATION

Political issues associated with focussing resources on certain areas (Anderson et al., 2014; Meyer-Rath et al., 2018) or ignoring district boundaries in planning and budgeting (Nichols et al., 2019)

Non-fungibility of resources that does not allow for quick “switching on and off” of interventions over time (Shattock et al., 2016)

Influence of donors’ and international organisations’ targets (Avanceña & Hutton, 2020)

Constraints on the supply and demand side that are unknown or hard to quantify at the time of analysis (Vassall et al., 2016)

Ethical imperative for keeping people on treatment or striving towards equitable coverage

**THE
ECONOMIC
IMPACT OF
HIV**



POLICY BRIEF #17

**ECONOMICS OF HIV AND OF
HIV PROGRAMMES IN THE ERA
OF COVID-19**

For the full brief, please go to

<https://hivecon.co.za/17-the-economics-of-hiv-and-of-hiv-programmes-in-the-era-of-covid-19/>

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PURPOSE OF BRIEF #17

This project was conceptualized, and many briefs drafted, before Covid-19 hit.

Covid-19 potentially has important implications for economics of HIV and HIV policies, through

- health consequences, and
- economic repercussions.

The brief is an attempt to step back and comprehensively think through the consequences of Covid-19 for HIV programs, and in particular for economic aspects of HIV and HIV policies. (Note that the brief represents the state of the Covid-19 pandemic in

HIV PROGRAMS EXPOSED TO ECONOMIC SHOCKS IN ADVANCED ECONOMIES AND IN COUNTRIES HIGHLY AFFECTED BY HIV

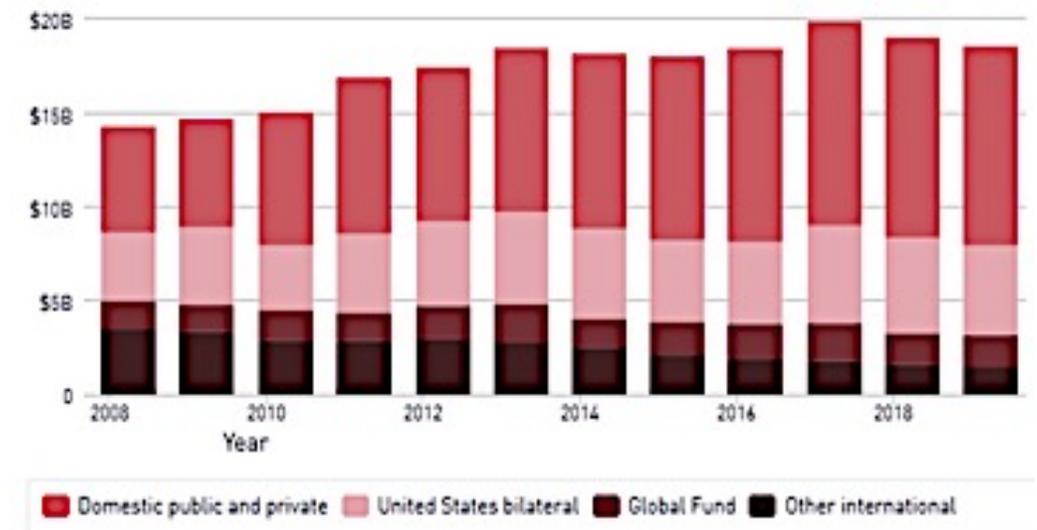
Global HIV funding broadly stagnant since 2013, at about US\$ 19bn (UNAIDS, see figure).

Decline in bilateral ODA offset by increased domestic contributions.

- Most of this shift various middle-income countries with low HIV prevalence.
- Across sub-Saharan Africa, composition of funding broadly unchanged overall.

Role of external funding broadly in line with GDP per capita, from about 90 percent of total spending in some less developed countries to 20 percent (South Africa) and <1 percent (Brazil).

Figure 5.A.2: Consequences of a productivity shock



Source: Obtained from UNAIDS (<http://hivfinancial.unaids.org/hivfinancialdashboards.html>) on July 26, 2020.

SEVERE FISCAL CONSEQUENCES OF COVID-19

Large increases in fiscal deficits across countries, owing to:

- Lost revenues (large role especially in developing countries).
- Costs of mitigating economic impact: Highest among developed countries (6.5 percent of GDP).
- Increased health spending About 0.5 percent of GDP across countries.
- Longer-term risks from contingent liabilities in advanced economies.

Table 17.4: Fiscal costs of Covid-19 response, selected countries

	Expenditure and foregone revenue			Equity, loans & guarantees
	Total	Health	Other	
	(percent of GDP)			
37 Advanced Economies	8.4	0.8	7.6	9.7
Germany	8.3	0.7	7.7	30.8
Japan	11.3	1.0	10.3	23.7
United Kingdom	9.2	1.5	7.6	16.6
United States	11.8	1.5	10.3	2.5
87 Emerging Markets	3.9	0.3	3.4	2.2
China	4.6	0.1	4.5	1.3
Eswatini	2.8	0.4	2.5	n.a.
Namibia	1.1	0.6	0.6	1.3
South Africa	5.3	0.4	4.9	4.3
56 Low-Income Developing Coun-	1.6	0.3	1.3	0.3
Democratic Republic of the Con-	1.1	0.2	0.9	n.a.
Ethiopia	1.5	0.5	1.0	0.6
Malawi	0.2	0.2	0.0	n.a.
Mozambique	4.8	0.8	4.0	n.a.
Nigeria	1.5	0.3	1.2	n.a.
Zambia	2.1	0.3	1.8	0.3
Zimbabwe	4.8	0.1	4.7	n.a.

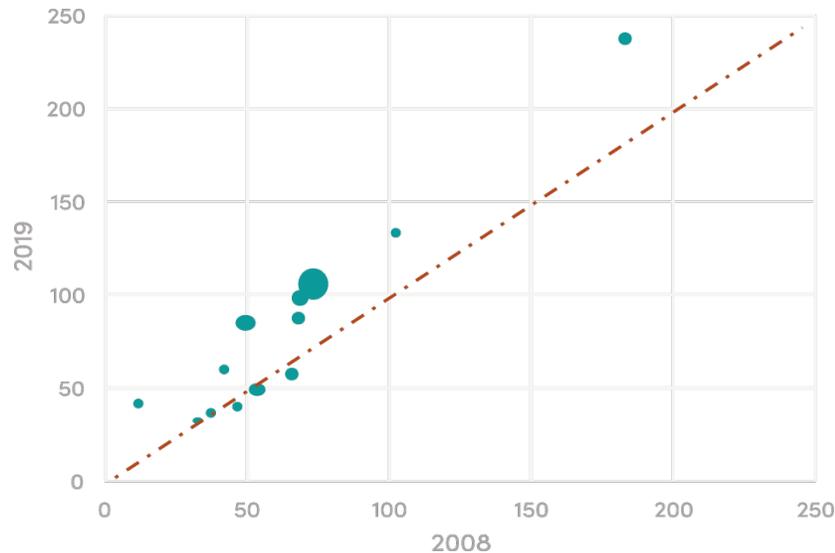
Sources: IMF (2020b), using IMF country classifications.

LONG-TERM FISCAL CONSEQUENCES THROUGH ACCUMULATION OF PUBLIC DEBT?

Current fiscal deficits result in increased public debt and constrain fiscal space in future.

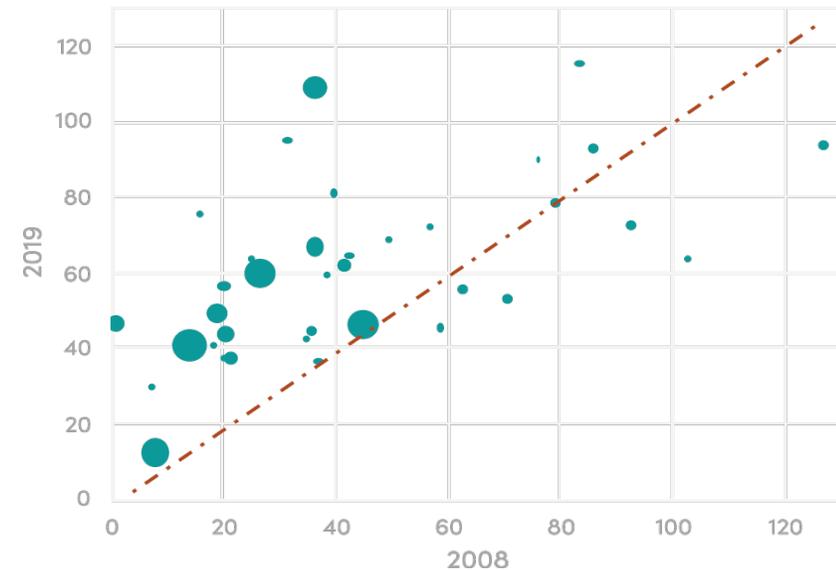
HIV donor countries and countries facing high HIV prevalence in worse position on public debt at beginning of current crisis, compared to global financial crisis of 2008/09.

Figure 17.4.a: Gross public debt in donor countries supporting HIV programs (percent of GDP)



Source: IMF 2020.

Figure 17.4.b: Gross public debt in countries with HIV prevalence (ages 15-49) exceeding 1 percent (percent of GDP)



Source: IMF 2020 for public debt; UNAIDS 2019 for HIV prevalence.

CONSEQUENCES OF COVID-19 FOR HIV POLICY PLANNING (I)

Less funding available for HIV or any other purpose – assumptions on what constitutes HIV programming that is politically and financially sustainable will have to be tested.

The **fiscal constraints are likely to persist**, beyond the immediate impact of the crisis, because of a build-up in public debt

- And higher levels of debt at outset, compared to global financial crisis of 2008/09.

The extreme uncertainty around the macroeconomic outlook is testing established models for HIV policy planning and advocacy (typically characterized by long time horizons).

CONSEQUENCES OF COVID-19 FOR HIV POLICY PLANNING (II)

Cost-effectiveness analysis:

- Covid-19 measures may kick HIV interventions down the “league table”
- More acute role of capacity constraints, standard CEA misleading

Need to take into consideration **health systems perspective** more explicitly

- **Capacity constraints shaping policy choices**
- **Policy choices shaping capacity constraints** (through policies expanding capacities or mitigating absorption of capacities by Covid-19)

Unprecedented direct role of macroeconomic factors (beyond financing) – need to comprehensively look at Covid-19-related policies and access to HIV and health care

- Economic repercussions of lockdowns etc. creating barriers in access to effective care
- Supply disruptions

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