

**Forty years of pandemic HIV prevention provides three urgent lessons for the COVID-19 response**

James	Hargreaves	LSHTM	UK	James.hargreaves@lshtm.ac.uk
Calum	Davey	LSHTM	UK	Calum.Davey@lshtm.ac.uk
Judith	Auerbach	UCSF	USA	judith.auerbach@ucsf.edu
Jamie	Blanchard	U.Manitoba	Canada	James_Blanchard@umanitoba.ca
Virginia	Bond	LSHTM&Zambart	Zambia	Virginia.Bond@lshtm.ac.uk
Chris	Bonell	LSHTM	UK	chris.bonell@lshtm.ac.uk
Rochelle	Burgess	UCL	UK/South Africa	r.burgess@ucl.ac.uk
Joanna	Busza	LSHTM	UK	joanna.busza@lshtm.ac.uk
Tim	Colbourn	UCL	UK	t.colbourn@ucl.ac.uk
Frances	Cowan	LSTM and CeSHHAR Zimbabwe	UK/Zimbabwe	frances.cowan@lstmed.ac.uk
Aoife	Doyle	LSHTM	UK	aoife.doyle@lshtm.ac.uk
James	Hakim	University of Zimbabwe	Zimbabwe	jhakim@mweb.co.zw
Bernadette	Hensen	LSHTM	UK	berndette.hensen@lshtm.ac.uk
Mina	Hosseiniipour	UNC	Malawi/US	mina_hosseiniipour@med.unc.edu
Leesa	Lin	LSHTM	UK	leesa.lin@lshtm.ac.uk
Nyasha	Masuka	Independent	Zimbabwe	docnyasha@gmail.com
Webster	Mavhu	CeSHHAR Zimbabwe and LSTM	Zimbabwe	webster@ceshhar.co.zw
Solomon	Mukungunugwa	Ministry of Health and Child Care	Zimbabwe	shuruva@yahoo.co.uk
Angela	Mushavi	Ministry of Health and Child Care	Zimbabwe	mushavia@yahoo.co.uk
Andrew	Phillips	UCL	UK	andrew.phillips@ucl.ac.uk
Lucy	Platt	LSHTM	UK	lucy.platt@lshtm.ac.uk
Audrey	Prost	UCL	UK	audrey.prost@ucl.ac.uk
Eugene	Ruzagira	MRC/UVRI and LSHTM	Uganda	eugene.ruzagira@mrcuganda.org
Janet	Seeley	LSHTM	UK	janet.seeley@lshtm.ac.uk
Isaac	Taramusi	National AIDS Council Zimbabwe	Zimbabwe	itaramusi@nac.org.zw
Charlotte	Watts	DFID	UK	charlotte.watts@lshtm.ac.uk
Raymond	Yekeye	National AIDS Council Zimbabwe	Zimbabwe	ryekeye@nac.org.zw
Saul	Johnson	Genesis Analytics	South Africa	saulj@genesis-analytics.com

Corresponding author: james.hargreaves@lshtm.ac.uk

The HIV pandemic provides lessons for controlling pandemic SARS-CoV-2<sup>1</sup>. No vaccine is available for either infection and there are no licensed pharmaceuticals for COVID-19, just as there was not for HIV infection in the early years. However, population behaviour will determine the pandemic trajectory of SARS-CoV-2<sup>2</sup>, just as it did for HIV.

SARS-CoV-2 and HIV are, of course, different. First: untreated HIV infection usually causes death; SARS-CoV-2 kills a minority. Second: the behavior changes that will slow transmission are different; sexual behavior and needle sharing for HIV, physical proximity and hand washing for SARS-CoV-2. Third: speed. Early HIV cases doubled over six months to a year<sup>3</sup>; for SARS-CoV-2 it is two to four days<sup>4</sup>.

A severe SARS-CoV-2 epidemic in low- and middle-income countries (LMIC) with weak health systems is a sobering prospect. In many ways, the history of HIV prevention is of a failure of global health. Some 32 million have died with sub-Saharan Africa worst affected<sup>5</sup>. But critical lessons have been learnt: three stand out.

#### *One: anticipate health inequalities*

Pandemic HIV transmission accelerated among mobile, well-connected networks, but the burden shifted to poorer people and countries, young women and marginalised groups<sup>6</sup>. The global burden of Sars-Cov-2 will likely fall hardest among older people and vulnerable groups in low- and middle-income countries.<sup>7</sup> We must track the socioeconomic status and gender of those affected by Sars-Cov-2 and extend this effort to track the economic impacts. UN Member States have pledged that “no one will be left behind”. The global response to SARS-CoV-2 must honor this pledge.

Social conditions make it difficult for the vulnerable to change behaviours. Encouragement to “Abstain, Be Faithful and Use Condoms” could not prevent HIV where gender inequalities and stigma were the norm. Similarly, following instructions to wash hands and ensure physical distancing will be hardest for those living in poverty. Public-health initiatives must overcome barriers to reach poor people, even if they appear less affected by the virus now.

New advances often most rapidly benefit the better off, worsening inequalities<sup>10</sup>. Rich countries may seek to prioritise limited vaccine doses for their own people. Millions of less-well-off people died because of inequitable access to life-saving antiretrovirals<sup>7</sup>, and the same trend may occur with SARS-CoV-2<sup>11</sup>. Global policy must prioritise access to innovations for those in greatest need. COVID-19 will not affect everyone equally. Our efforts should acknowledge this inequality, not increase it.

#### *Two: create an enabling environment*

Fast, decisive political leadership is critical. School closures and quarantine measures are powerful tools. But the lesson of HIV is that supporting safer behaviors means addressing structures that constrain or enable people’s choices. Just as gender-based violence hindered safer sexual behavior choices for women, so lack of clean water will limit handwashing. In the short term, pragmatic responses such as rapid mass distribution of soap and/or sanitiser for SARS-CoV-2 will be needed (just as female condom distribution was essential for HIV control).

Creating an enabling environment to support behaviour change is essential. Modern approaches to HIV prevention are driven by a social-ecological framework<sup>12,13</sup>. Meaningful involvement of communities can shape social norms. Building social capital, trust and community cohesion catalyses

the impact of health messages, and can be fostered by supporting local leadership<sup>14</sup>. These dynamics accelerated control of HIV among gay men in the US, sex workers in India and Thailand, and other communities. The design of the SARS-CoV-2 response will need to include older people, those with comorbidities and those already living at the margin.

Unintended social consequences must be avoided. Laws that contribute to ‘blaming’ in society lead to prejudice, which hampered efforts to control HIV. If people infected with SARS-CoV-2 become stigmatized, others may be less likely to self-quarantine. Similarly, the unfolding global economic upheaval will have resounding impacts on low- and middle-income countries that may exacerbate the conditions that will spread SARS-CoV-2 in LMICs, for example leading to social upheaval. We must be attentive to these dynamics from the start.

### *Three: harness multidisciplinary science*

Epidemiological models can predict the dynamics of the SARS-CoV-2 epidemic. But the HIV response shows how a multidisciplinary effort is essential to design, characterize, and evaluate interventions that can shape behaviour. Innovative elements of the HIV response include structured community mobilisation, targeted social protection, and differentiated healthcare delivery<sup>4</sup>. More recently implementation science approaches have allowed timely study of novel healthcare and social delivery models.

LMICs must gain access to protective and sanitation equipment before their epidemics grow. Testing programmes must start urgently, and contact tracing will be essential. But, innovation and adaptation will be needed to make these efforts effective in new settings. To facilitate this it is important to specify a “theory of change”, describing how “inputs” — e.g. government messaging — should lead to “activities” — e.g. people adjusting to working alone — that will lead to “outcomes” — e.g. fewer physical contacts — that may reduce the spread of the virus. Social and behavioural theory is relevant here, to complement the epidemiological theory in the models.

As countries take different approaches to controlling the pandemic, we must characterise what measures are working in practice, evaluate how people respond, and be alert to unintended effects. Just as modellers must defend their predictions, so policy makers should clarify the evidence and theory underlying their behavioural interventions<sup>11</sup>. Transparency facilitates evaluation and encourages scrutiny of assumptions, leads to better practice, and harnesses ideas from a range of scientific disciplines.

### *Conclusion*

Three lessons from the HIV response can help stop exponential transmission of SARS-CoV-2, reduce deaths, prevent future outbreaks, and support affected communities in low- and middle-income countries. Policies must create an enabling environment for physical distancing and health promotion interventions to work. These policies must have a theory of change and address inequalities. Decision makers from all sectors and at all levels should be supported to design, implement and evaluate a “combination prevention” approach to reducing SARS-CoV-2 transmission. Finally, LMICs will need to be supported to strengthen the entire health system as reflected in the sustainable development goal agenda. A wave of public health action and evaluation built on these principles should be launched immediately.

## References

- 1 Bedford J, Enria D, Giesecke J, *et al.* COVID-19: towards controlling of a pandemic. *Lancet* 2020; **395**: 1015–8.
- 2 Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet*. 2020; **395**: 931–4.
- 3 May RM, Anderson RM. The transmission dynamics of human immunodeficiency virus (HIV). *Philos. Trans. R. Soc. Lond. B. Biol. Sci.* 1988; **321**: 565–607.
- 4 Krishnaratne S, Hensen B, Cordes J, Enstone J, Hargreaves JR. Interventions to strengthen the HIV prevention cascade: a systematic review of reviews. *Lancet HIV* 2016; **3**. DOI:10.1016/S2352-3018(16)30038-8.
- 5 Joint United Nations Programme on HIV/AIDS. Miles To Go: Closing Gaps Breaking Barriers Righting Injustices. 2018 DOI:10.1111/j.1600-6143.2011.03542.x.
- 6 Hargreaves JR, Delany-Moretlwe S, Hallett TB, *et al.* The HIV prevention cascade: integrating theories of epidemiological, behavioural, and social science into programme design and monitoring. *Lancet HIV* 2016; **3**. DOI:10.1016/S2352-3018(16)30063-7.
- 7 Gilbert M, Pullano G, Pinotti F, *et al.* Preparedness and vulnerability of African countries against importations of COVID-19: a modelling study. *Lancet* 2020; **395**: 871–7.
- 8 Chang D, Xu H, Rebaza A, Sharma L, Dela Cruz CS. Protecting health-care workers from subclinical coronavirus infection. *Lancet Respir* 2020; **8**: e13.
- 9 Wenham C, Smith J, Morgan R. COVID-19: the gendered impacts of the outbreak. *Lancet*. 2020; **395**: 846–8.
- 10 Victora CG, Joseph G, Silva ICM, *et al.* The inverse equity hypothesis: Analyses of institutional deliveries in 286 national surveys. *Am. J. Public Health*. 2018; **108**: 464–71.
- 11 Will vaccines reach low-income countries during a global pandemic? | Devex. <https://www.devex.com/news/will-vaccines-reach-low-income-countries-during-a-global-pandemic-96635> (accessed April 1, 2020).
- 12 Iwelunmor J, Blackstone S, Veira D, *et al.* Toward the sustainability of health interventions implemented in sub-Saharan Africa: A systematic review and conceptual framework. *Implement. Sci.* 2016; **11**. DOI:10.1186/s13012-016-0392-8.
- 13 Ma PHX, Chan ZCY, Loke AY. The Socio-Ecological Model Approach to Understanding Barriers and Facilitators to the Accessing of Health Services by Sex Workers: A Systematic Review. *AIDS Behav.* 2017; **21**: 2412–38.
- 14 Parker RG, Perez-Brumer A, Garcia J, *et al.* Prevention literacy: Community-based advocacy for access and ownership of the HIV prevention toolkit. *J. Int. AIDS Soc.* 2016; **19**: 21092.