

treatment with antiretrovirals was low, and the proportion that achieved viral suppression was even lower. Although rates of both of these factors improved over time, only 56.3% of the releases during 2013–14 had an undetectable viral load before release. Notably, this finding suggests access and utilisation of HIV therapy in correctional settings remains suboptimal, particularly because of the reported association between subsequent linkage to care and the receipt of HIV therapy during incarceration.

The authors, like others, suggest ways to solve the inadequacy of post-release care, including real-time use of public health surveillance data to identify and intervene with those out of care (ie, Data to Care)<sup>10</sup> and broader use of case management type services. Data to Care is an important public health tool; however, it primarily acts as a safety net designed to catch those who fall out of care. Case management is a pragmatic and attractive upstream intervention but, its effectiveness in linking people with HIV to care and promoting viral suppression is unclear, and even in studies with positive findings, effects have been modest.<sup>11,12</sup>

The intransigence of the break in the continuum of HIV care when inmates transition from incarceration to the community—despite approaches such as case management and motivational interventions—shows that structural barriers hinder successful community reintegration after release from prison or jail. Poverty and food insecurity, untreated substance use and mental health disorders, racial and ethnic discrimination, and other prevalent social factors, are inadequately addressed by even the most thoughtfully designed individual-level interventions. Recognition of these social

factors, including mass incarceration itself, as being toxic and unacceptable will spur on the policy changes that are needed to bridge this tragic gap in HIV care.

\*David Alain Wohl, David Loren Rosen

Institute of Global Health and Infectious Diseases, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27514, USA  
wohl@med.unc.edu

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## Identifying HIV care continuum gaps with verbal autopsy



UNAIDS estimates that there are over 36 million people infected with HIV globally, with disproportionate burdens in eastern and southern Africa where major treatment programmes have been introduced.<sup>1,2</sup> Better understanding of the causes of HIV-related mortality is needed to fill major knowledge gaps and to enable improvement of the impact of HIV treatment programmes. Most deaths (including AIDS-related ones) in low-income and middle-income countries occur at home and without medical attention at the time of

death.<sup>3,5</sup> In these settings, and in the absence of robust vital registration and death certification systems, WHO recommends the use of verbal autopsies as an acceptable approach to assign the underlying cause of death. The WHO standard verbal autopsy was updated in 2016 and is used in several settings.<sup>6</sup> We have designed a verbal autopsy approach, the AIDS Treatment Module (ATM), to identify and remedy gaps in the HIV care continuum at local, regional, and national levels to improve the quality of care provided by HIV treatment programmes.

The ATM is freely available at [www.cgpr.org/HIV](http://www.cgpr.org/HIV)

	Likely to be determined with ATM	Likely to be determined with WHO verbal autopsy	Likely to be accounted for with combined ATM and WHO verbal autopsy
Does not seek care and never diagnosed with HIV	Unlikely	Potentially	Potentially
Receives HIV diagnosis but not ART and no follow-up care	Potentially	Highly probable	Highly probable
Receives HIV diagnosis, initiates ART but dies within 1 year	Potentially	Highly probable	Highly probable
Receives HIV diagnosis, initiates ART, does not follow-up to clinic	Highly probable	Potentially	Highly probable
Receives HIV diagnosis, initiates ART, not adherent to medications	Highly probable	Potentially	Highly probable
Receives HIV diagnosis, initiates ART, adherent to medications	Unlikely	Highly probable	Highly probable

ATM=AIDS Treatment Module.

**Table: Projected likelihood of the ATM, WHO verbal autopsy tool, or both to account for major contributing causes of death related to different scenarios along the HIV treatment failure cascade**

HIV-specific verbal autopsies have been validated as a reliable method for evaluating deaths related to HIV infection in resource-constrained settings, and newer versions were recently used to track AIDS-related deaths and explore aspects of HIV care, such as antiretroviral therapy initiation and adherence.<sup>4,5,7</sup> The ALPHA Network (Analysing Longitudinal Population-based HIV/AIDS data on Africa) has developed various HIV-specific verbal autopsy tools to catalogue issues such as HIV-related mortality in several African countries and among different cohorts, such as maternal mortality during the perinatal period.<sup>8,9</sup> These HIV-specific verbal autopsy approaches classify AIDS-related deaths, as defined by the International Classification of Diseases (ICD-10), with high sensitivity and specificity of the verbal autopsy results as compared to the diagnosis of AIDS in routine clinical settings. The high sensitivity and specificity result from an ability to elicit relevant histories of patients from respondents (relatives), such as positive HIV tests, severe and rapid weight loss, and the diagnosis or management of opportunistic infections.<sup>4,5</sup> Existing HIV-specific verbal autopsies can robustly diagnose biomedical causes of HIV-related death, but do not fully explore the HIV care continuum or deeper issues driving access and adherence to HIV care. To further understand the strengths and limitations of HIV-specific autopsy approaches, a reviewed of research revealed that current methods are reasonably able to discriminate HIV deaths and other infectious diseases.<sup>4,5,8-11</sup> We further sought a detailed expert review of dimensions of the treatment cascade that could be captured reliably from respondents who lived with the deceased. We held meetings and consultations with HIV clinicians, frontline health-care workers in high-prevalence African settings,

national and multilateral public health providers from around the world, immunologists, epidemiologists, biostatisticians, and experts in verbal autopsy. We sought specific input on questions that address gaps in global evidence. Based on this expert consultation, we created an AIDS Treatment Module with targeted questions that focus on issues related to the HIV care continuum and programmatic weaknesses. We included additional questions on psychosocial, economic, and programmatic factors that may contribute to AIDS-related mortality. This holistic approach enabled us to examine psychosocial determinants of health and probe their interaction with access to care, adherence to ART and clinic appointments, ART-related efficacy, side-effects, and treatment failures.

After expert consultation and assessment of the compatibility of the questionnaire with an HIV clinical patient tracking system in a sub-Saharan African setting, the final module (appendix) consists of 57 questions divided into four sections that evaluate HIV diagnosis, access to HIV care, adherence to antiretroviral therapy, and presence and treatment of tuberculosis. Although our AIDS treatment module is a stand-alone instrument, it is designed to be used in conjunction with existing WHO verbal autopsy tools, as these collect targeted information related to the onset, acuity, and chronicity of symptoms, and explore the severity and impact an illness has on the pathway leading to death. When such syndromic data are placed in the context of a patient's approximate age, HIV status, and regional disease epidemiology, the combined AIDS Treatment Module and WHO verbal autopsy tools could provide a robust understanding of infectious and non-infectious pathologies of AIDS-related deaths, including opportunistic infections (eg, tuberculosis) and malignancies (table).

See Online for appendix

The AIDS Treatment Module collects data on factors contributing to AIDS-related mortality in resource-constrained settings, most notably potential programmatic gaps in the cascade of care. The next steps include introduction of the tool in larger field studies. The combined module and WHO verbal autopsy tools can provide broad insight into gaps in the HIV care cascade that give rise to AIDS-related mortality. The AIDS Treatment Module could improve the quality and outcomes of ART programmes.

*\*Isaac I Bogoch, Mireille Gomes, Laura Fuente-Soro, Rosauro Varo, Denise Naniche, Charfudin Sacoor, Raquel González, Nico Nagelkerke, Quique Bassat, Prabhat Jha*  
Divisions of General Internal Medicine and Infectious Diseases, University Health Network, Toronto, ON, Canada (IIB); Department of Medicine, University of Toronto, Toronto, ON, Canada (IIB); Centre for Global Health Research, St Michael's Hospital and Dalla Lana School of Public Health, University of Toronto, Toronto, Canada (MG, PJ); Centro de Investigação em Saúde de Manhiça (CISM), Maputo, Mozambique (LF-S, RV, DN, CS, RG, QB); ISGlobal, Barcelona Institute for Global Health, Hospital Clínic - Universitat de Barcelona, Barcelona, Spain (LF-S, RV, DN, RG, QB); Department of Medical Microbiology, University of Manitoba, Winnipeg, MB, Canada (NN); ICREA, Pg. Lluís Companys 23, 08010 Barcelona, Spain (QB); Pediatric Infectious Diseases Unit, Pediatrics Department, Hospital Sant Joan de Déu (University of Barcelona), Barcelona, Spain (QB); Universidad Europea de Madrid, Spain (QB)  
isaac.bogoch@uhn.ca

IIB, MG, and LF-S contributed equally to the manuscript.

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