Correspondence

GBD 2015 and HIV estimates from the Optima model

The 2015 Global Burden of Disease (GBD) study reported new estimates of HIV incidence by country.[1] In support of the Comment from the same issue of *The Lancet HIV*,[2] as well as 2015 *Lancet* correspondence,[3] we also emphasise the strong evidence that GBD estimates systematically underestimate HIV transmission, particularly in high-income countries. The methods used in the GBD study, with additional details in press do not rely on strong epidemiological surveillance data of new diagnoses of HIV cases in high-income countries, but rather uses modelling on the basis of mortality data. The authors claim that "HIV cause-specific deaths from vital registration systems and sample registration systems are among the most reliable sources for estimation of the burden of HIV/AIDS"; however, it is well recognised that vital registration data underestimate the number of deaths caused by HIV/AIDS.[4] In the current era of effective antiretroviral therapy, mortality due to HIV/AIDS is extremely rare in high-income settings, and therefore inference of current trends in incidence cannot be accurately made from the numbers of deaths.[2]

Of note, in the appendix of the article in *The Lancet HIV* the GBD study made a comparison of its estimates of the numbers of new HIV infections, people living with HIV, and AIDS-related deaths with HIV epidemiological models used for country programme planning (Optima[5] and AEM[6]). This comparison reveals that country level GBD estimates are generally not aligned with calculations from other models. Although Optima and AEM estimates were not referenced, these models are dynamic, population-based, and informed by various sources of data (such as demographic, HIV prevalence, reported diagnoses, and programmatic information including testing and treatment numbers) and are generally applied in substantial consultation with country teams of experts.[5,6] Additional estimates of the burden of HIV are encouraged and can be useful for country policy makers and programme planners,[7] but it is essential that the estimates are generated with the best sources of surveillance data, ideally verified by country teams, and validated for plausibility. Despite the differences between the GBD estimates and those from other models and seeming inconsistency with certain types of data, Wang and colleagues have confirmed general trends, which are aligned with other sources, showing that the global HIV epidemic has been in decline over several years. This trend is likely a result of substantial global scale-up of antiretroviral therapy (ART), which must continue to increase. Wang and colleagues also confirm that the number of new infections is still unacceptably high, and therefore other forms of prevention are required to supplement ART programs. Country and global level estimates of HIV burden are extremely important to assess progress towards the goal of ending AIDS. The GBD study estimates will be an important reference towards this goal. We look forward to the next iteration of GBD estimates, including methodological refinements, and hopefully also revealing global impact of efforts towards ending AIDS.

We declare no competing interests.

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Authors' reply

The Global Burden of Disease Study (GBD) provides the most comprehensive (covering 195 countries) and internally consistent estimates of incidence, prevalence, and mortality for HIV.[1] We adapted and improved upon the most widely used model for HIV/AIDS burden estimation as used by UNAIDS. For GBD2015, we made important improvements to the estimation process by using consistent draw level HIV-free background mortality that intrinsically linked all-cause mortality and HIV mortality estimations, by using a cohort incidence bias adjustment process that make the incidence estimates consistent with observed HIV mortality from vital registration systems given the assumed mortality rates while on or off antiretroviral therapy (ART), and by improving on-ART mortality accuracy by use of data from cohorts in developed countries through close collaboration with the Antiretroviral Cohort Collaboration.[2] In addition, as we pointed out, HIV specific mortality from vital registration systems is the most reliable source of information on HIV/AIDS. GBD has made significant efforts in improving the data quality of HIV specific mortality from vital registration systems by accounting