



# “Know your epidemic, know your response”: a useful approach, if we get it right

Led by UNAIDS, *Know your epidemic, know your response* has become a rallying cry for an intensified focus on HIV prevention, spurred by the sobering realisation that for every person enrolled on antiretroviral treatment, many more become newly infected.<sup>1</sup> The quest to better understand epidemics reflects growing recognition that there is no single global HIV epidemic, but rather a multitude of diverse epidemics. No single prescription can apply to countries as diverse as South Africa, Egypt, Russia, Thailand, or Papua New Guinea. The era of standard global prevention guidance is over.

However, there is a globally useful distinction between concentrated and generalised epidemics, which are fundamentally different—not because of arbitrary prevalence thresholds, but about who gets infected and how. Epidemics are concentrated if transmission occurs largely in defined vulnerable groups—typically sex workers, men who have sex with men, and injecting drug users, and their sexual partners—and if protecting them would protect wider society. Conversely, epidemics are generalised if transmission is sustained by sexual behaviour in the general population and would persist despite effective programmes for vulnerable groups. For too long, the global HIV-prevention community has pursued generalised responses in concentrated epidemics, concentrated approaches in generalised epidemics, or hedged their bets and done a bit of everything.<sup>2-7</sup>

At the extremes, the differences between concentrated and generalised epidemics are stark. Those in Latin America, the Middle East, Europe, and Asia—ie, most of the world—are and undoubtedly will remain concentrated, while most of southern and parts of eastern Africa are generalised.<sup>2-9</sup> Between these extremes, it is less clear whether some epidemics of the Caribbean, central and west Africa, and parts of the Pacific are concentrated, low-grade generalised, or mixed (table).

While the global quest to know your epidemic is welcome, there are pitfalls to avoid. First, we must understand, but not overcomplicate. Broad rapid brush-strokes are sufficient for action. We can build our ships as we sail, guided by an overarching question: are our epidemics essentially concentrated, generalised, or (in some cases) substantially mixed? And where, in broad

categories, are most new infections occurring: in sex workers, men who have sex with men, or injecting drug users (and their sexual partners), or through multiple concurrent partnerships in the general population?

Second, although mathematical modelling of incident infections may be helpful, such models are in their infancy, make several major assumptions, and require better data than are generally available. Therefore the seductively precise graphs produced by such models must be carefully triangulated against other sources, including empirical risk-factor and incidence studies and rigorously grounded epidemiological syntheses.

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Factor	Concentrated epidemics	Generalised epidemics	Potentially mixed epidemics
Geographic areas	North, Central and South America, Europe, Middle East, Asia, Australasia	Most of southern Africa and parts of east Africa	Parts of the Caribbean, west Africa, horn of Africa, and the Pacific region
Priorities needed for surveillance, monitoring, and evaluation	Far greater emphasis on biological and behavioural surveillance of vulnerable groups (sex workers, men who have sex with men, injecting drug users)	Antenatal and episodic population-based surveillance	Both vulnerable group and antenatal/general population surveillance
Analysis	HIV prevalence, mapping, population-size estimation, behavioural interactions within vulnerable groups and between vulnerable groups, and their sexual or injecting partners	Greater focus on understanding how to fundamentally change societal norms of sexual behaviour	Greater focus on understanding transmission dynamics, including behavioural interactions between vulnerable groups and general population
Investments	Invest in surveillance, targeted interventions for vulnerable groups, and stigma-reduction campaigns for general population	Investments should focus on promoting normative and social change to reduce multiple and concurrent partnerships, and to greatly increase availability of safe and affordable male circumcision services	Investments should be matched to sources of transmission, which may vary across subnational regions and over time
Interventions	Goal is saturation coverage of vulnerable groups	Goal is to help change community norms, values, and sexual behaviour at population level, and to frame male circumcision within broader rubric of male reproductive health and HIV prevention/behaviour change	Goal is to relate interventions to transmission sources and maintain objective balance between targeted and general population activities
Key research questions	How to reach vulnerable groups with high coverage of high-quality targeted interventions	How to change fundamental community norms and to de-norm multiple and concurrent partnerships at population level	How to more accurately estimate relative proportion of infections from different transmission sources, and how to combine vulnerable group and general population interventions to reflect transmission patterns

Table: HIV epidemic characteristics and priorities

Third, while participatory consultative approaches to “know your epidemic, know your response” are laudable, these may compromise rigour if they are not grounded in evidence. For example, after three decades the global community is only beginning to accept that there is no simple direct association between income, education, gender inequality, and HIV. Population-based surveys show that wealthier African countries have the highest, not lowest, infection levels in Africa, and more educated, upper-income people are generally more likely to be infected with HIV.<sup>6,7,10</sup> And whilst it is clearly necessary to address gender inequality and age discordance in relationships, sexual coercion, and gender-based violence,<sup>11</sup> it is nonetheless striking that a comparison of gender equality<sup>12</sup> and HIV prevalence across African countries shows a strong positive, not negative, association. Participatory approaches that emphasise putative, largely unproven underlying structural or other social, economic, or political factors (although vital for other non-HIV reasons) can deflect emphasis from the major immediate cause of HIV infection: multiple sexual (and injecting) partnerships.<sup>2-9,13-18</sup>

Fourth, in southern Africa’s epidemics of exceptionally high prevalence, the greatest challenge is not knowing your epidemic—but knowing how to bring about profound social and normative changes to reduce multiple, and especially concurrent, sexual partnerships.<sup>5-8,11,14-18</sup>

Once we better understand our epidemics, can we respond with proven approaches? Experience to date is sobering. If we face concentrated epidemics fuelled by sex work, we know what to do. Targeted interventions that promote education, condoms, sexual health, solidarity, empowerment, and rights for sex workers do work and have contained HIV in Asia’s three main sexually ignited epidemics in Thailand, Cambodia, and south India.<sup>2-9,13-16</sup> Targeted interventions have also worked in several other developing-country epidemics where sex work contributes significantly to HIV transmission, such as the Dominican Republic.<sup>19</sup>

Where transmission in men who have sex with men fuels HIV epidemics, the real-world picture is less encouraging. However, there is greater room for optimism in contexts that are increasingly open to homosexuality, such as India, where the national AIDS authority recently petitioned the high court to legalise same-sex practices<sup>20</sup> or in Nepal, where the third gender—transgender—is a legal classification. Effective

action is much more difficult in coercive contexts; in Egypt, a recent ground-breaking serosurvey hastened the imprisonment of homosexual men.<sup>21</sup>

And for injecting drug users, can we keep saying that harm reduction works in, for example, the former Soviet Union or Asia, when we still cannot convince the authorities that this is preferable to coercive approaches? We have only made limited progress towards the vital goal of large-scale harm-reduction programmes in Asia, with the partial exception of substitution therapy in China.

Turning to generalised epidemics, we face three overarching challenges. First, our most trusted prevention interventions—testing and counselling, condom promotion, school and youth (including abstinence) programmes, and treatment of other sexually transmitted infections (each of which may have other important public-health benefits)—are at best unproven, and at worst disproven, for reducing HIV incidence.<sup>6-8,11,14,16,22-28</sup>

Second, the most solidly proven preventive intervention to date, male circumcision, is barely advancing.<sup>6,29,30</sup> Since three randomised trials were terminated early nearly 2 years ago, due to highly preventive effect, lamentably few additional men have received this remarkable protective intervention. Yet the potential is immense. Seven of the eight countries with the highest HIV prevalence (with less than 2% of global population yet over a third of HIV infections) have male circumcision rates below 20%, and expansion of safe circumcision services in these countries could ultimately prevent many deaths.<sup>6,29-31</sup> In countries such as Zambia, with 15% adult HIV prevalence and nearly US\$1 billion in aid annually for AIDS, much less than 1% of this funding goes for male circumcision services, and waiting lists for the procedure continue, as in other parts of Africa,<sup>6,8,29,30</sup> to grow at public facilities.<sup>32</sup> Even more disappointing is the fact that the countries where the trials were done (South Africa, Uganda, and Kenya) have yet to implement large-scale programmes. Under the Belmont principles of distributive justice, there is an ethical obligation to provide beneficial interventions to the populations in which studies were done.

Third, the major contributor to reduced HIV transmission in generalised epidemics has been reduction in multiple sexual partnerships.<sup>5-9,11,14-18</sup> Compelling evidence of this association has emerged in a growing number of African countries, such as Kenya,<sup>6,7,33</sup> Zimbabwe,<sup>34</sup> and Ethiopia.<sup>6,35</sup> Additionally, partner reduction seems to have contributed to HIV declines in Haiti and the Dominican Republic.<sup>19</sup> Yet,

except for Uganda in the late 1980s, and more recently in Swaziland,<sup>8</sup> reductions in multiple partnerships seem to have mainly occurred despite, not because of, formal programmes.<sup>5,6,9,14</sup> Consequently, we know too little about how to effectively promote partner reduction. But this is no excuse not to immediately increase our commitment to well-evaluated programmes aimed at reducing multiple and concurrent sexual partnerships.

Lessons learned from the successes in reducing population-level HIV prevalence in countries such as Uganda may prove useful for prevention programming. It seems that the Ugandan response stimulated personalisation of risk in a way that fostered community mobilisation for behaviour change, without increasing stigma.<sup>5,8,11,13,17,18,37,38</sup> Second, the intensive use of a co-ordinated multilevel approach, involving clear and consistent risk-avoidance messaging at all levels, assisted in changing societal norms of behaviour.<sup>14,17,18</sup> And third, it seems that focusing such efforts for risk avoidance and partner reduction on adult men was key to reducing the sexual networks that fuel HIV transmission in high prevalence countries.<sup>5,8,11,13,15,17,18,37,38</sup>

Turning to the less clearly defined epidemics of parts of the Caribbean, central and west Africa, and the Pacific, we must resolve whether they are concentrated, low-intensity generalised, or mixed. If concentrated, we face the achievable goal of making sex work safe, and the more demanding task of reducing risk in men who have sex with men<sup>39-41</sup> (as well as addressing anal sex among heterosexuals, which also constitutes an under-recognised source of HIV transmission in Latin America and elsewhere<sup>42</sup>). If we determine that these are low-grade generalised epidemics, we face a perhaps greater challenge: how to convince countries with 1-3% adult HIV prevalence and numerous other competing health and social priorities, such as the Democratic Republic of the Congo or Sierra Leone, to invest in the fundamental normative and social change required for partner reduction.

Turning to a related question, what is a proportionate AIDS response? Global AIDS resources, while increasingly vast, are mainly concentrated in some 15-20 countries, mostly in southern and eastern Africa. In some of the eight most affected countries (all in southern Africa), where adult HIV prevalence is above 15%, the question may not be whether we are distorting efforts too much, but whether we are prioritising enough? In Francistown, Botswana, where 70% of pregnant women aged 30-34 years have HIV,

how can we possibly overemphasise AIDS? Yet, in much of east and west Africa, where HIV is lower than previously estimated, AIDS receives considerably more funding than much greater sources of disease burden, which highlights the need to re-position and integrate AIDS in support of other health challenges.<sup>43,44</sup> Conversely, in Thailand, AIDS accounts for over 10% of disease burden yet receives only 2% of recurrent health spending. In Indonesia, which faces Asia's fastest growing epidemic, fuelled by sexual transmission in the predominately non-circumcising island of Papua and by injecting drug use outside of Papua, HIV funding may fall, compromising vital programmes.

Furthermore, emerging research from around the world indicates that the growing availability of antiretroviral treatment—while a humanitarian godsend for millions of people—might also make behaviour change even more challenging, as AIDS is increasingly perceived as a chronic manageable disease.<sup>39-41,45</sup> Prevention efforts can backslide for other reasons. In Uganda, the intensive focus on zero grazing (ie, partner reduction) two decades ago, which helped lead to a dramatic reduction in multiple partnerships and a historically unprecedented decline in HIV prevalence, has in recent years been replaced by emphasis on other approaches, including social marketing of condoms and abstinence, and HIV incidence may now be increasing again, as are multiple partnerships.<sup>8,17,18,46,47</sup>

To conclude: first, the move to "know your epidemic, know your response" is welcome, but must not become overcomplicated—broad brushstrokes are sufficient for decisive, intelligent action. Second, concentrated epidemics driven by sex work are preventable, but protecting men who have sex with men and injecting drug users requires new and creative strategies and allies.<sup>41,48</sup> Third, in generalised epidemics, the core challenge is to begin reallocating resources from unproven or disproven approaches toward the two proven but admittedly sensitive approaches already at hand: male circumcision and partner reduction. Fourth, in the relatively few mixed epidemic settings, where there is significant transmission both from sex work and multiple partnerships in the general population (such as in Côte D'Ivoire and Haiti<sup>19</sup>) prevention must balance targeted and general population interventions according to transmission sources.

The challenge is clear. For too long, AIDS activists, academics, and national and international institutions have given insufficient emphasis to aligning prevention priorities with epidemic transmission dynamics,

compromising effective prevention with mismatched or unfocused responses. And the AIDS community in its entirety has been slow to implement genuinely proven approaches at adequate scale. With the knowledge we already have, far more should have been, and can still be, done to curb HIV transmission globally.

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