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STRUCTURAL DRIVERS, INTERVENTIONS AND APPROACHES FOR PREVENTION OF SEXUALLY TRANSMITTED HIV IN GENERAL POPULATIONS

DEFINITIONS AND AN OPERATIONAL APPROACH

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STRIVE

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INTRODUCTION: IMPROVING THE SCIENCE OF HIV PREVENTION

The HIV prevention field has seen remarkable progress in recent years on the biomedical front, with the promise of drug- and surgery-based prevention strategies such as male circumcision, pre-exposure prophylaxis, and early initiation of widespread antiretroviral therapy ('test and treat') [1–5]. Unfortunately, there have been fewer clear examples of behavioural interventions which have been shown to sustainably bring about reductions in HIV incidence [6, 7]. After 30 years of the fight against the HIV/AIDS epidemic, a number of clear lessons, however, have been learned.

First, there is understanding that the patterning of human sexual behaviours is deeply embedded in, and shaped by, underlying social, economic, and legal-political structures [8–13]. Reducing HIV risk, therefore, will typically require changes in broader structural elements (be they economic opportunities, social norms and gender roles, legal freedoms, or combinations of these factors), not just information provision alone [12, 14–18]. Second, it is recognised that much HIV prevention activity has occurred without sufficient conceptualisation of why or how a particular approach should actually bring about a sustained change in behaviour in a given setting [19–21], with current calls by the Joint United Nations Programme on HIV/AIDS (UNAIDS) and others to tailor HIV responses to the factors shaping risk and vulnerability in specific contexts [13, 18, 21–23]. Third, human behaviours are not determined by single causal factors, but rather by multiple elements in combination, which influence patterning of risk behavior. (See Heise and Watts in this series for a discussion of how multiple risk-increasing practices may often cluster together, and therefore may need to be addressed in combination—for example, how violent behavior towards female partners is commonly linked with excessive alcohol consumption and frequenting of sex workers).

Some recent works have found that single-component or "one-off" interventions can indeed reduce behavioural risks for individuals, at least in the short term [24] (with the Zomba cash-transfer trial providing some of the most impressive results to date [25]), but single behavioural interventions cannot alter social structures that generate patterning of risk over generations—long-term, sustained alteration of these patterns requires a more comprehensive approach to structural change [12, 14, 18, 20, 26–33]. Wellings et al., from a review of sexual behaviour data from 59 countries, conclude: "Evidence from behavioural interventions shows that no general approach to sexual-health promotion will work everywhere and no single-component intervention is likely to work anywhere" [33, p. 1724].

These insights have supported current calls for 'combination HIV prevention' approaches, defined by UNAIDS as "simultaneous use of complementary behavioural, biomedical and structural prevention strategies" [21, p. 5]. Yet these insights are in no way new. The need for more than information (including HIV knowledge) to affect HIV risk behaviour has been known since at least the late 1980s [16, 31, 34, 35]. The importance of tailored HIV prevention strategies was also clearly stated two decades ago in reviews of both African [28] and American [36] HIV prevention experiences. Similarly, the importance of addressing broader structures was the subject an entire supplement of the journal AIDS in 2000 [37], part of a Lancet series released in June 2012 [12], and is a thematic area of the aids2031 programme [38].

Despite countless journal articles making the points above, national AIDS responses cling determinedly to information, education, and communication (IEC) programmes, while the biomedical research community has maintained a hope that a single (decontextualised), predefined intervention targeting behaviour can be tested in an experimental trial that might lead to significant and sustained changes in risk practices [6, 18, 39]. Such thinking flies in the face of all that has been learned about factors influencing patterns of sexual behaviours in populations [18, 27, 40]. The lessons of the past have pointed to three key objectives that future behaviour change–based prevention efforts must therefore work to achieve:

- To address broader structures shaping behavioural risk and vulnerability
- To tailor responses to the factors influencing risk and vulnerability understood to affect the target population
- To ensure multiple factors can be addressed when needed.

When we have seen success stories in particular population groups—such as sex workers in Kolkata [41, 42], or gay men in the West [26]—these have typically not been achieved through predefined 'interventions' but rather by responding to local needs in a tailored, bottom-up direction [26]. It is tempting to look to these successes and attempt to copy the activities conducted, but *activities* applied from other settings do not achieve the above three objectives on their own. Instead, what is critical is to copy is the *approach* taken.

What the science of HIV prevention has yet to develop are generalisable strategies to provide what target groups need in tailored ways, ways which respond to the specific set of multiple structural factors influencing the groups' risk and vulnerability. We have yet to see randomised trials or operational research evaluating *processes* rather than predefined *interventions*. The failure of three decades of HIV prevention efforts to develop top-down 'interventions' which can achieve significant and sustained changes in behaviour, and the failure, seemingly, to incorporate the lessons that repeated reviews of behaviour change have shown, should be a clear wake-up call for the need to approach HIV behaviour change differently. Achieving this would be nothing short of revolutionary, but defining a structural *approach* to HIV as one which incorporates the three objectives above would be an important first step.

DEFINITIONS AND CONCEPTS

Often, the term 'structural' is taken to mean in effect anything more than the individual. In this conceptualisation everything has structural influences—from human behaviour, to health systems functioning, to the determinants of biomedical research funding priorities. Such a broad conceptualisation, however, inherently reduces the operational usefulness of the term. The insights presented above are strongly rooted in sociological theory about how human actions and choices are related to broader influences. Understanding this complex linkage has never been easy—it has been termed one of the 'central problems in social theory' [43] and has been the subject of theorising for more than a hundred years

(as seen in the development of such bodies of theory as structuralism, functionalisim, structural-functionalism, structuration, and post-structuralism) [44]—but this provides a conceptual starting point from which to consider critical elements and processes with which a structural approach to HIV prevention might engage.

Within this broad, social science–informed approach, there are two basic ways in which authors discuss structural HIV prevention. The first body of work conceptualises structural factors as those which fundamentally shape patterns of risk behaviour—the drivers [12, 14, 21, 38, 39, 45], while the second group conceptualises structures as *environmental factors* which facilitate or hinder (that is, mediate) how people can avoid HIV within a given context [8, 37, 45, 46]. Conceptualising structural factors in these two ways (as risk drivers or as *environmental barriers/facilitators*) provides an important first step to guide locally tailored intervention strategies.

DRIVERS AND MEDIATORS

Conceptualising structural factors as either drivers of behaviour or mediators of risk is a first step in moving beyond the oversimplified HIV prevention strategies of the past—to ensure broader structures are considered, responses are tailored, and multiple interacting factors are considered. The language of 'drivers' particularly appeals within the public health community, whose members are accustomed to looking for causal determinants of illness. A risk with this language is that it can lead to an oversimplified view of causality. Abundant research has shown that linear causality from single determinants almost never exists for patterns of behaviour, and the direction or magnitude of effect can vary over place and time [39]. To address the risk of oversimplification, it is critical to use the language of structural *drivers* only in context-specific ways. Structural *factors* can be seen as a broader concept, encompassing the multitude of potential elements which might shape risk and vulnerability for different populations, while structural *drivers* would encompass an identified set of factors *empirically shown* to influence risk for a given target group. By emphasising the need to empirically validate a driver before intervening, we can help to ensuring local tailoring in HIV responses.

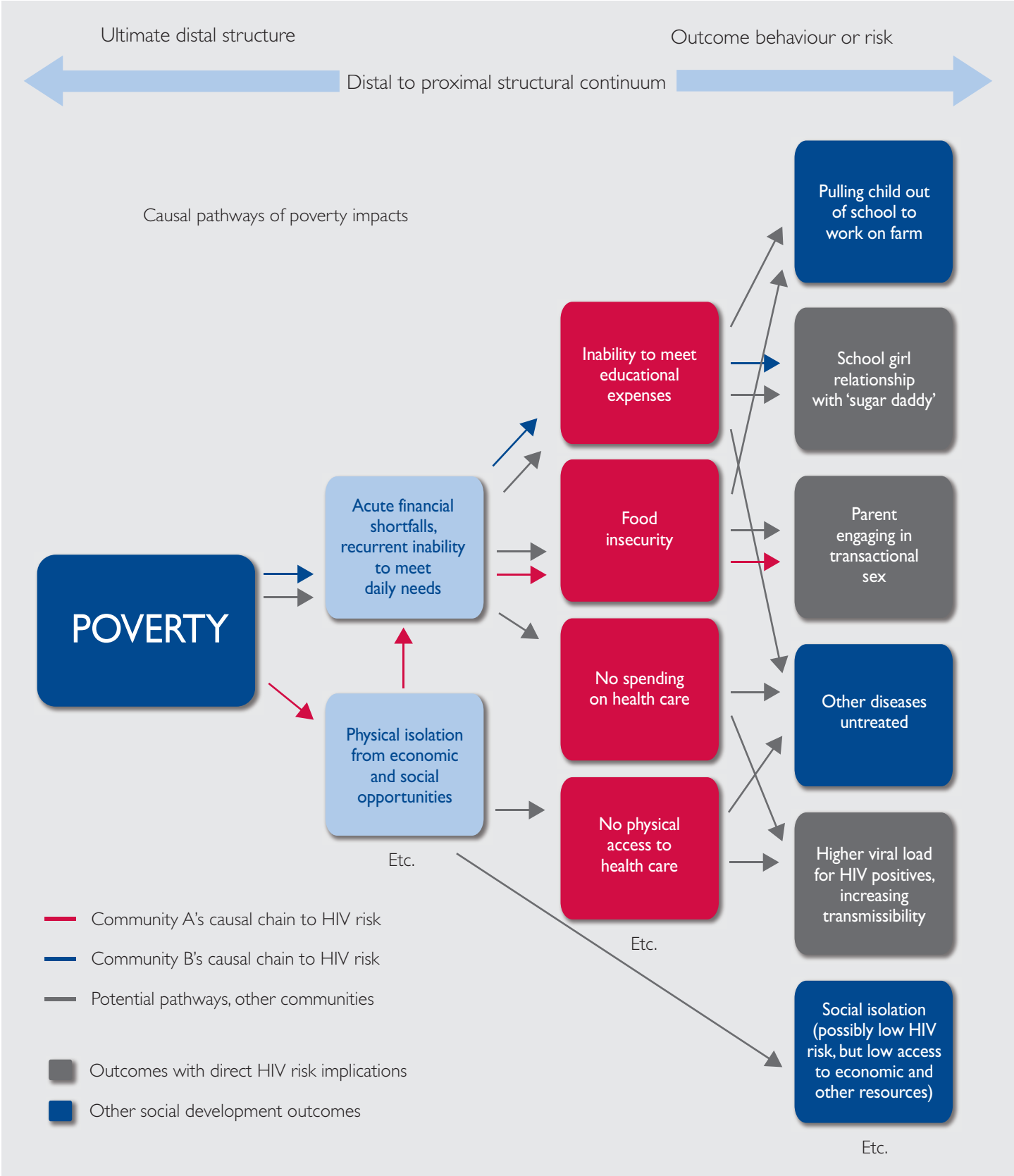
The alternative conceptualisation has been to see structures as environmental factors that affect which safe behaviours can be chosen. Sumartojo et al. (2000), for instance, defines "HIV related structural factors … as barriers to, or facilitators of, an individual's HIV prevention behaviours" [37, p. 3]. The aids2031 Social Drivers Working Group has alternatively defined a structural approach as one which builds 'AIDS resilience'—achieved when individuals possess the ability to resist HIV, and their environment is conducive to HIV prevention. As with the risk driver approach, an environmental conceptualisation again requires tailoring, as there will not be a single environment that supports HIV prevention, and the elements which facilitate or hinder safe behaviours need to be addressed locally.

PATHWAYS AND LEVELS

The understanding of structural factors as risk drivers has also led to consideration of the causal pathways through which structural factors may manifest in HIV transmission events, and the levels at which organisations might look to respond. A hypothetical example adapted from Gupta et al. [12] is presented below (Figure 1) to illustrate the causal pathways through which poverty might manifest in risk differently (or not at all) in different settings.

Figure 1 maps out causal pathways as moving from upstream, 'distal' influences to more downstream, 'proximal' determinants [47]. An organisation concerned with addressing poverty to reduce HIV risk could consider

Figure 1. Example of causal pathways from poverty to HIV risk. (Adapted from Gupta et al. [12].)



multiple points of intervention. But in doing so, it must take a tailored approach which empirically establishes how poverty actually manifests in HIV risk in the target population [48].

In addition to the causal pathway, a related concept is to consider the various levels at which structures exist, to help identify where an organisation might look to intervene. *Macro* factors, for example, can be seen as those that affect entire nations or regions (such as national economic policies or legal frameworks). *Meso*-level factors, alternatively, are those that shape group- and community-level elements (such as gender and behavioural norms, or religious beliefs). Finally, *micro*-level structures are those that influence individuals or family units (such as economic vulnerability or lack of education) [38, 49, 50]. Frameworks which consider levels of influence are often described using so-called 'ecological' models that present individuals sitting in nested layers of influence (illustrated as concentric circles [51, 52] or as resembling the layers of an onion [13]).

The importance of proximity and level of influence have particular relevance to implementation of structural strategies. Proximal interventions typically have more direct cause-effect relationships, and may see more immediate results. They may be limited, however, in the number of risk-shaping factors that they can target, and they may not be sufficient to achieve significant or sustained changes in patterns of risk behaviour on their own. Upstream, distal changes may lead to long-term shifts in patterns of behaviour, or may affect multiple factors, but tend to do so in very indirect ways, and may require long periods of time to realise their effects [38, 39]. These realities may prove particularly challenging to implementing organisations. A recent article by Hunnsmann (2012), for example, illustrates how the existing HIV response structures of many donor and government organisations are not conducive to actually engaging with the more distal, less immediate influences shaping HIV risk, nor are they designed to be able to address multiple causal

Box 1.
Key definitions of structural HIV concepts from an operational perspective

- **Structural *factors*** – the components beyond individual knowledge or awareness which influence individual and group risk and vulnerability
  - **Structural *risk drivers*** – a population-specific subset of structural factors empirically identified to influence individual and/or group risk practices
    - **Causal pathways** – the mechanisms through which distal structural drivers lead to proximal influences on the patterning of risk behaviour in particular settings
  - **Structural *environmental mediators*** – a setting- and population-specific set of environmental factors which hinder or facilitate individuals' and groups' ability to avoid HIV infection
    - **AIDS resilience** – a situation in which individuals possess the capabilities to resist HIV in their given behavioural and risk setting

- **Levels of influence** – an operational concept to guide implementing agencies to consider what areas are within their ability to influence. One can look for structural factors influencing the following:
  - **Micro** – the individual or household level
  - **Meso** – the community or group level
  - **Macro** – the broader environment or regional/national level

- **Structural *interventions*** – the activities used to address structural drivers in a given setting
  a) **For structural risk drivers** – those activities which target the structural drivers and their causal pathways for a particular target group
  b) ***For structural environmental mediators*** – those activities which build resilience by addressing the environmental factors known to facilitate or hinder individual's ability to resist HIV in their particular context

- **Structural *approach* -** the process undertaken to decide upon an appropriate set of structural interventions

elements [53]. These insights help explain why much of what is needed to move HIV prevention forward—addressing broader structures, using tailored interventions, and addressing multiple causal elements—has been known for decades, yet has not been taken up. Hunsmann shows that the problem may lie as much or even moreso in the institutional structures of the agencies responding, rather than in any lack of evidence or knowledge of what is needed.

STRUCTURAL 'INTERVENTIONS' AND 'APPROACHES'

Indeed, throughout the history of HIV prevention, donors, governments, and implementing agencies alike have typically tried to identify predetermined 'interventions' that include guidelines or clear steps for implementation. With recent calls to consider structural factors, there has equally been concern to identify a 'set' of structural interventions that might 'work' for HIV prevention. As discussed above, however, this search for decontextualised interventions has seriously limited HIV prevention in the past by failing to respond to broader structures in tailored ways, or by failing to address the multifaceted nature of risk and vulnerability.

Rather than a predefined, off-the-shelf application of interventions, what is needed is an approach to ensure that the best possible package of interventions is selected for the local target population. The intervention strategy, and choice of actual activities, will need to be the result of a *process* which identifies relevant structural drivers or influences, and which tailors the response to the multiple needs of the target population in a way that is feasible for the implementing agency (typically based on the level at which the agency is capable of intervening). A *structural approach* to HIV can therefore be defined as the process undertaken to decide upon an appropriate set of structural HIV prevention interventions: a *process* because it is impossible to define in advance what activities to undertake; *appropriate* because HIV prevention must be tailored to local realities; and a *set* of activities because risk is typically shaped by multiple factors. In this way, a structural approach can be conceptualised as a decision tree, where a series of questions is answered, or a series of steps is taken, to ultimately arrive at an intervention and evaluation strategy. Box 1 attempts to provide a summary of definitions of terms used that may help in the operationalisation of such an approach.

OPERATIONALISING A 'STRUCTURAL APPROACH'

In the preceding section, a structural *approach* was defined as a *process*. Operationalising a structural approach therefore requires following a series of steps and stages, rather than 'scaling up' single activities. This is not to say that no interventions from other areas can be useful. The approach proposed here does not say that all HIV prevention interventions must be created from scratch. Instead, interventions must be based on the best evidence of a) the target population and its risk dynamics and b) what is known to work for similar risk dynamics elsewhere. Auerbach et al. [54] have already presented a six-step approach which was developed in considering structural drivers and causal pathways to help inform a process of decision making in structural responses. This can be adapted slightly to include environmental facilitators and barriers as well as risk drivers, as shown in Figure 2.

This model does not predefine interventions (the interventions are not chosen until Step 4), but it does select interventions based on what is known from elsewhere, and explicit hypothesising about its applicability to the local context.

Figure 2. Steps and evidence needed to operationalise a structural approach (Adapted from Auerbach et al. 2009)

	Step	Information Needed	Evidence Sources or Tools
1	Identify the target populations and/or locations for intervention	Epidemiological data of key affected populations. (i.e. 'Know Your Epidemic')	Epidemiological surveys Surveillance data Social development data
2	Identify the key drivers of risk for the target population, and/or the barriers to resisting HIV in the community	Epidemiological and behavioural data for specific groups. In-depth understanding of behaviour patterns and determining factors Identification of causal chains leading from deeper structures to risk Knowledge of mediating context elements – barriers and facilitators to HIV resistance in the community (i.e. 'know your target population')	Survey data Surveillance data Focus group discussions In-depth interviews Observational methods (e.g. expert or 'peer' ethnography) Additional correlating data
3	Choose level of structural interventions	Knowledge of what factors (from step 2) are amenable to change Theory of change hypothesising how can be brought about Knowledge of what has worked in similar situations and why	Historical data/analysis of structural changes in similar contexts Evaluations of past structural intervention efforts. (i.e. the scientific 'knowledge base')
4	Describe planned and potential changes and outcomes	Potential outcomes – positive and negative arising from changes to broader structures changes	Modeling estimations and predictions; Comparison with other areas of similar context
5	Design the Intervention	Specific program resources, timing and scope	Project planning tools
6	Implement, monitor, evaluate, and feed back	Description and measurement of: - intervention mechanisms - contextual features affecting outcomes - mechanisms of social and structural change and - Process indicators to validate hypotheses in Step 3 - ultimate outcomes of interest	Multiple methods and tools depending on nature of intervention – process, operational, and outcome evaluation all critical

There are, however, a number of specific additional considerations that organisations undertaking structural HIV prevention efforts must bear in mind, including possible unintended consequences, the role of social values, the needed scope of the programme, and the role of generalising.

UNFORESEEN OR UNDESIRED CONSEQUENCES

If attempting to change upstream, distal, structures, it is critical to consider if different patterns of behaviour may arise which can lead to other negative outcomes. For a hypothesised Community A, poverty was isolating and eventually led to some women engaging in transactional sex. But poverty reduction may open up new HIV risks, as seen in cases where HIV rates are associated with mobility, and as seen in areas where higher HIV prevalence rates have been recorded among wealthier individuals [55].

As causal pathways are varied and can shift, a structural approach should not just hypothesise in advance about what might happen (in Step 4), but must further monitor the changing risk environment for the target group to mitigate any new risk situations (within Step 6).

SOCIAL CHANGE AND SOCIAL VALUES

A related concern for approaches targeting upstream, distal factors involves the implications that shifts in things like gender roles, economic opportunities, or laws and regulations will have for other social and political agendas. Poverty reduction may be a common social goal, but the same cannot be said for all changes in economic activities, gender roles, or drug laws—all of which can be deeply politicised. HIV prevention agencies may not wish to become political agents, but they need to recognise the implications of structural HIV activities for broader social issues [56].

DOES A SINGLE ORGANISATION NEED TO DO EVERYTHING?

Since a structural approach considers multiple determinants of sexual behaviour, a natural question arises when an organisation cannot develop a large-enough body of activities to significantly influence HIV incidence on its own. It may be that the activities conducted are instead seen to contribute to a broader state of AIDS resilience, or to provide one of several pieces needed to reduce vulnerability. Many may ask if activities 'work' when they cannot easily be shown to directly reduce HIV incidence. Hunsmann has noted that this pressure to show success is one reason that structural approaches to HIV may be neglected [53]. However, as long as there is an explicit and testable hypothesis stated for these interventions, they can be evaluated as to whether they are achieving their interim goals (changing opportunities, improving community resilience, reducing barriers, etc). The ultimate hypothesis about how these structural changes will lead to reduced risk can then be evaluated over time or in combination with other organisations' work.

GENERALISATION AND LESSON LEARNING

In the social sciences, theories are typically developed to help generalise. When similar *outcomes* are seen from interventions, and those outcomes can be explained by a plausible *mechanism* of effect, this is the basis for development of casual theory. A single positive experimental trial result does not establish generalisability, but trials along with other evidence of mechanisms together build the body of evidence from which to work [15, 57–59] This is why process evaluation is so essential in behaviour change interventions, and is included in Step 6, as shown in Figure 2.

Box 2.
Key considerations for a structural approach

A structural diagnostic HIV approach...

Must:

1 Establish which structural factors are shaping HIV risk for the intended beneficiaries
2 Hypothesise the causal chain between intervention and outcome
3 Be aware of possible unintended side effects of upstream changes.

***Should* if at all possible:**

1 Evaluate key outcomes of the intervention
2 Evaluate the processes by which the interventions did or did not lead to the outcomes seen
3 Monitor how causal pathways may be changing and if new HIV risks or vulnerability may be arising.

Must not:

1 Alter upstream 'structural factors' without consideration of how they function in the target community
2 Assume a 'structural intervention' that showed impact elsewhere will have a similar impact (without considering local similarity).

The term *sociological plausibility* has specifically been used to capture this concept [39]. On the one hand, it is essential to understand local context and to hypothesise why a particular intervention will work for a given population. At the same time, theories should be built to identify what may work across contexts—but, critically, that theorising must be based on both measures of outcomes and evaluations of causal mechanisms.

Based on the above discussion, a set of guidelines can be produced on what a structural approach to HIV must, should, and must not do in practice (Box 2).

DISCUSSION

For three decades, the HIV prevention community has struggled to reduce the spread of HIV through sexual risk behaviours. This is not to say no successes have been seen. Falling HIV incidence and prevalence in Uganda, in Thailand, and in the gay communities in a number of high-income countries, as seen in the 1990s, illustrate that prevention can and has worked. UNAIDS has furthermore reported falling global HIV incidence, with 20 percent fewer new infections in 2011 than in 2001, with the largest declines in the Caribbean and sub-Saharan African regions [60]. Yet where the HIV prevention community has particularly struggled has been in identifying intervention strategies which can replicate such successes.

Biomedical sciences have shown a number of recent breakthroughs in the field of prevention. But the science of behaviour change is a social science, and to move forward, the HIV prevention community must learn how to incorporate the social science lessons about behaviour which have been known for decades, but which have yet to change HIV planning. Future HIV prevention efforts must address the multiple structural factors shaping risk and vulnerability, and they must do so in ways tailored to particular settings.

Epidemiological studies have shown that, time and again, single, predefined behaviour change interventions, delivered in short time periods, typically are unable to achieve these things [6]. So far, the answer to this disconnect has effectively been 'keep looking'—a re-emphasis on the desire to find single, predefined interventions which can work, in the face of the theory and evidence that these types of interventions do not align with how human behaviour functions. The field of

HIV prevention is changing, however. There is greater understanding of the limitations of past approaches, greater acceptance of complexity, and more calls for combinations of strategies. This period of change provides a window of opportunity to define and establish best practices for structural approaches to ensure that they address the key social insights about HIV risk and vulnerability.

Implementers must consider a number of questions to guide their activities. Such questions may include:

- What target group(s) is the intervention trying to influence?
- At what level does your agency work?
- What is the range of potential ways your group can act?
- What time point are you working towards?
- What is your theory of change, and what can you feasibly contribute to achieve change?
- What can you measure and monitor as part of your activities?
- How important is it to show impact on HIV incidence (versus contributing a component to a larger response)?

There are already examples of structural interventions which appear to be based on a diagnosis of what is driving HIV risk in a target group. The Avahan project, which reduced the risk environment for sex workers in Kolkata, is often cited as a programme designed to respond to local needs, rather than imposing top-down interventions [42] (with attempts being made to try to emulate its success in scaled-up settings [61, 62]). In South Africa, recognition of the importance of alcohol use in influencing risky sex led to an HIV and alcohol linked-skills programme which achieved a 65 percent reduction in unprotected sex (compared to a control group receiving HIV education alone) [63]. Similarly, a number of cash-transfer programmes have arisen in settings where young women are known to engage in transactional intergenerational sexual relationships [64–66]. These programmes may not have followed all the steps recommended in this paper, but they do provide an indication that targeting structural factors in a tailored way is indeed feasible. What has been lacking, however, is a systematic or widely agreed-upon HIV prevention approach that ensures appropriate diagnosis and tailoring of interventions.

Hunsmann's work illustrates the institutional incompatibility of many organisations with taking up structural HIV prevention strategies [53]. Institutional change is not something that a donor-funded working paper, a journal special issue, or well-reasoned argument can bring about on its own. Instead, institutions change when new rules, norms, or binding expectations are established. There may be institutional pressure to continue HIV programming as usual—leading to short term, oversimplified, information-driven prevention strategies. This pressure can only be countered by establishing globally accepted best practice guidelines which point out how those approaches are insufficient, while providing clarity on alternatives for the future.

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