

Breaking out of silos - the need for critical paradigm reflection in HIV prevention

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**Abstract**

The (re-)emergence of structural approaches on the global HIV-prevention agenda provides a potential window of opportunity to steer the direction of national and international HIV-prevention strategies to better incorporate lessons learned from the past three decades. Indeed, many historical HIV-prevention strategies have been criticised for failing to best incorporate all available knowledge or understanding of the realities of the African HIV epidemics, illustrating a failure of learning as much as a lack of knowledge. This paper hypothesises why this failure to incorporate full and relevant knowledge has persisted, so as to work towards ensuring it does not recur. We identify both institutional and ideational factors that construct 'silos of thinking' which limit the development of genuinely structural approaches to HIV prevention. Institutional barriers include incentive structures built into the funding system supporting the HIV response - particularly the misalignment between donor and NGO needs and HIV-prevention realities; while ideational barriers involve both the disciplinary traditions in which global HIV actors are trained and operate, and the underlying value systems that bias our understanding of relevant evidence. Social scientists have for decades challenged the medicalization and individualisation of the HIV response, and the current calls for improved structural responses arises at a time when anti-retroviral treatment and medical interventions are taking centre stage in the HIV-prevention effort. Public health officials trained in clinical medicine or epidemiology may struggle to understand or recognise the limitations of individualistic and medical interventions to address an epidemic so deeply shaped by social factors, as they have been trained primarily to search for universal solutions rather than to take into account contextual complexity. However, the disciplinary barriers to comprehensive learning work both ways. Social scientists similarly risk reductionism of HIV prevention to behaviour and behavioural determinants, paying inadequate attention to the non-behavioural factors that shape susceptibility, infectiousness, and thus risk of transmission. Finally, the deeper core values of the individuals working in the HIV field risk perpetuating (often in an unconscious way) biased understandings of evidence which can undermine effective HIV programmes. We provide a set of examples which, in combination, establishes the need for a self-reflective paradigm shift in the HIV-prevention community – a shift that allows identification (and denunciation) of the silo-based thinking that can lead to barriers to comprehensive and holistic structural HIV-prevention approaches which need to incorporate social, medical and non-behavioural elements alike.

## 1 Introduction

Since its very beginning, HIV/AIDS has been subject to uniquely intense scientific controversy and political struggles over the origin of the disease, and the causes of its epidemic spread in sub-Saharan Africa (Epstein 1996). HIV has also been unique amongst many health problems in its rapid growth, high level of politicisation and unprecedented level of financing, with global resources dedicated to AIDS control rising to over US \$19 billion in 2013 (Henry J Kaiser Family Foundation and UNAIDS 2014). HIV quickly became enmeshed in ideologically derived debates of human rights, morality, race and development (c.f. Wachter 1992, Tarantola and Mann 1995).

In this landscape of HIV, the multiple values of concern and the enormous diversity of agencies involved in HIV-prevention work, as well as the complexity of a health issue often linked to stigmatized behaviours, has challenged consensus building and left ample room for competing narratives about the appropriate design of HIV-prevention policies. The different modes of transmission and the variety and heterogeneity of contributing factors (or 'drivers') of HIV transmission further make allocative decisions in the field of AIDS control particularly complex.

And yet, despite this complexity, there have been dominant trends in the HIV-prevention response – many of which have through the years been critiqued for being too simplistic or too narrow in their approach. One of the most well-known examples of such thinking has been the dominance of, and continued reliance on, programmes based on information provision (or IEC – Information, Education and Communication) within African epidemics, despite early recognitions that knowledge levels are not correlated with lower HIV prevalence rates (Cleland and Ferry 1995) and that the classic 'Health Belief Model' is limited in addressing HIV/AIDS (Montgomery, Joseph et al. 1989). 'Information' may be a potentially necessary, but not a sufficient, factor in bringing about shifts in population practices that reduce HIV risk. Moreover, and as discussed below, IEC programmes are often based on a narrowly behaviour-centred causal narrative that overestimates the importance of sexual practices as a driver of HIV in Africa. Despite these well-established limitations to information provision, IEC efforts have continued to dominate HIV-prevention efforts, with a veritable cottage industry of evaluation research that measures programme outcomes in terms of 'awareness' raised, rather than infections averted.

Other examples exist of common responses to HIV that became dominant, or attracted high levels of attention and resources, despite established limitations or problems. The enormous spending on general population prevention even in areas of highly concentrated epidemic spread (leading to vastly different ranges of dollars spent per HIV infection in country) (Berkley 1994, Pisani 2008), the efforts made to develop multi-sectoral programmes with little concern for how they would address known challenges (Putzel 2004), or the often narrow focus on condom promotion when evidence was mounting that this was having little effect alone (Shelton 2006), represent other cases where the HIV-prevention response has been critiqued for failing to take up existing knowledge to optimise use of resources. We term these criticised approaches as 'silos of thinking'. These structured but (often unconsciously) limited ways of considering an issue lead to the exclusion of relevant alternative or, more often, complementary approaches.

We argue that the formation of silos is an inherently political-economic phenomenon that concerns both the dynamics of scientific research and the selective uptake of its results in prevention policies. Silos originate from ideological, disciplinary and institutional roots. These are normal parts of human thinking and human organised functioning. Yet silos can lead to bias – bias in understanding, barriers

to new knowledge creation and bias in the priorities set for intervention – all of which continue to hamper HIV prevention.

For an issue as clinically and socially complex as HIV, any tendency to simplify HIV-prevention thinking should be approached with great caution. We see the current discussions and critical thinking about structural approaches to HIV prevention to provide an opportunity to challenge and overcome silo thinking, particularly due to the complex and holistic approach that much structural thinking requires.

## 2 Silo thinking in HIV prevention: 3 examples

This section presents three cases of silo thinking, where exclusive reasoning appears to hinder the open discussion and engagement that would, otherwise, be expected as a norm of good scientific practice. Our examples point to seemingly opposed or debated approaches, but our use of the term ‘silos’ does not necessarily imply that *both* sides of the debate adopt a silo perspective. Nor does it suggest that all players have equal power to deny the validity of the others’ claims. So, for example, the disciplinary silo thinking discussed in section 2.2, is arguably reciprocal – we describe two parallel silos – biomedical and social sciences – which coexist, even though the biomedical approach clearly remains dominant in the field. The silos described in sections 2.1 and 2.3, however, are in many ways single silos: one centred around a dominant sexual transmission paradigm that appears to exclude possible medical transmission, the other focussing on nearly exclusive sexual-behaviour-related issues, without attention to biological variables that may influence the efficiency of sexual transmission.

It is worth noting upfront that our discussion of silos of thinking does not intend to argue for or against a given position. In most cases, the alternatives presented to dominant silos are seeking to expand – not replace – the dominant paradigms of HIV transmission in Africa. We do not set out to *solve* any of these individual questions in the science of HIV (important efforts, but beyond the scope of a single paper). Rather our goal is to reflect on the marginalisation of potentially helpful ideas, and the persistency of problematic approaches to the realities of AIDS in Africa that can arise from adherence to overly narrow institutional, disciplinary, or ideologically inspired ways of thinking. Our choice of examples are ones where the removal of silos might realistically lead to progress in HIV prevention as there is already a contrasting set of thinking which could be brought together to improve the rigour and breadth of operational knowledge.

### 2.1 Missing synergies: opposing sexual and iatrogenic HIV transmission

From early in the AIDS response it was recognised that HIV infections can occur through sexual contact or through the exposure to infected blood, essentially via blood transfusions, the reuse of syringes, or the exposure to non-sterilized medical equipment (Vachon, Coulaud and Katlama 1985; Mann et al. 1986). While the importance of sexual transmission has become the mainstream focus of the vast majority of HIV-prevention work, various researchers have voiced concern about a possible underestimation of transmission via unsafe medical practices (what is termed ‘iatrogenic’ HIV transmission) (e.g. Gisselquist 2008; Reid 2009b; Peters et al. 2009). These scholars point to identified cases of HIV infection unexplained by sex, such as HIV-positive children born to uninfected mothers, or they underline statistical correlations between HIV infection and certain medical interventions (such as surgery or vaccination) while excluding reverse causation. The WHO estimated that, in 2000, 2.5% of HIV infections in sub-Saharan Africa were due to the re-use of contaminated syringes for medical care, although a re-evaluation of the model with more realistic variable inputs estimated this was more likely to be 12-17% (Reid 2009a).

Although sexual and iatrogenic transmission obviously coexist, many international agencies and African governments appear to dismiss or ignore iatrogenic HIV transmission. For example, the epidemiological estimates that inform Tanzanian prevention policies (Sando et al. 2014) attribute 2.1% to injection drug use, and 0.0% to iatrogenic transmission (with all remaining infections attributed to sexual transmission). Admittedly, donors such as PEPFAR have invested heavily in blood safety in several African countries over the last decade, and the situation does appear to have improved recently (Pépin et al. 2014). Nevertheless, in a country with well-documented routine failures in infection control and in which 30% of health facilities (and 15% of hospitals) still have no capacity to diagnose HIV (MOHSW 2013: 13), claims of zero iatrogenic transmissions should require strong justification. The fact that these claims continue to go unquestioned illustrates the apparent self-confinement of the leading international AIDS institutions within a silo of sexual explanations of HIV spread.

Epidemiologic reasoning suggests that iatrogenic transmission could be important, even if only representing a small percentage of infections as it could serve as a link between otherwise separate sexual networks. Although this potential trans-network or ‘turbo effect’ (Vachon, Coulaud and Katlama 1985) of iatrogenic HIV transmission has been pointed to since the first years of the epidemic, the possible impact of the *interaction* between modes of transmission on the dynamics of sexual HIV transmission remains to be rigorously analysed. Efforts to model one mode of transmission ‘against’ the other (e.g. French, Riley and Garnett 2006) risk reinforcing silo thinking that makes little sense in the formulation of prevention strategies.

## 2.2 Social vs. medical silos

A second example of silos in the HIV-prevention response can be seen in the repeated claims of an over-medicalisation of the AIDS response, and the continuing struggle of social science to stake its claim around the importance of a social and political perspective on HIV epidemics. The calls and efforts to address structural drivers of HIV is, itself, a manifestation of this dynamic. In carving out their own corpus of knowledge for HIV prevention, social scientists have also critiqued the implications of exclusively medicalised approaches to social issues. For example the over-reliance on clinical-epidemiological thinking has at times led to assumptions that experimental trials provide evidence of ‘what works’ for HIV prevention, potentially to the exclusion of all other knowledge sources. Yet an experimental trial is designed to show if what was done had an effect, not whether it will work in the same way elsewhere (Cartwright and Hardie 2012). Human biological similarities that allow generalisation from clinical trials are not necessarily repeated for the social and political factors shaping behavioural intervention effectiveness or the willingness to take up biomedical interventions.

The biomedical response to HIV has also been criticised for a ‘political myopia’ that fails to engage with the social and political meanings embedded within HIV interventions (such as male circumcision) (Parkhurst, Chilongozi et al. 2015 (in press)), which abstracts from the structural inequalities that condition access to treatment and prevention. As Nguyen et al. (2011) explain: “in the rush to paradigm shift, game-change, rollout and scale-up [...] local epidemiological, political and socio-historical context is once again being ignored, surely only to resurface later as ‘culture’ once much-heralded interventions fail to deliver. Holding out for a magic bullet – unlikely to ever come – diminishes interest in the hard, messy work required to enable social change and address the social inequalities and structural violence that drive this epidemic”(pp. 292). Or as Le Marcis (2013) underlines, although biomedical interventions bear great hopes, “critical analysis is more than ever necessary when a medical response appears set to provide a simple solution to a complex social problem” (our translation).

A critical perspective, however, need not be an oppositional one. The authors making such critiques are not necessarily dismissive of the medical enterprise itself, nor of its importance in the response to HIV prevention. Instead the goals are to delineate the appropriateness of different methods, tools and knowledge to questions surrounding a disease whose spread is deeply embedded in both social, as well as medical, realities. That being said, as the next section shows, the disciplinary barriers to comprehensive learning work both ways.

### 2.3 Not quite 'structural' yet: biological vs. behavioural drivers

Our final example brings us back to the structural focus of this special issue. In theory, the recent (re-)emergence of consideration of the structural drivers of HIV transmission provides a window of opportunity to help establish practices that avoid silo-based thinking. Structural approaches are particularly suited to do this because they are complex and multifaceted in their causal functions, with 'structural approaches' addressing the broader legal, socio-economic and cultural contexts in which HIV risk develops (Parker, Easton and Klein 2000; Gupta et al. 2008). Nevertheless, structural approaches risk establishing their own form of silo if the only downstream outcome of interest is seen to be a reduction in unprotected sexual contacts. As for any infectious disease, the dynamic of sexual HIV transmission depends on two variables: 1) the number of times uninfected people are exposed to the virus, and 2) the risk of infection per exposure. While the first variable depends to a great extent on individual behaviour, equating the prevention of sexual HIV transmission with behaviour change deprives it of its second key pillar – transmission efficiency.

The reduction of *infectivity* via a reduction of viral load is the underlying rationale of 'treatment-as-prevention' (TasP) strategies, while reduction in *susceptibility* drive current efforts to scale up male circumcision. Despite the acknowledgement of the relevance of transmission efficiency in these biomedical interventions, there has been decidedly less attention paid to the control of several parasitic or infectious diseases common in Africa (for which the prevalence has clear structural origins). Malaria, tuberculosis, lymphatic filariasis, soil-transmitted helminths, leishmaniasis, genital schistosomiasis, as well as certain micronutrient deficiencies, have all been shown to increase infectiousness of an HIV positive individual and/or susceptibility of the HIV negative individual (cf. Stillwaggon 2006; Kaul et al. 2011). Many of these conditions are highly co-endemic in sub-Saharan Africa, and their geographic distribution is correlated with HIV prevalence (Sawers and Stillwaggon 2010) – potentially explaining why HIV viral loads in treatment-naïve individuals have been measured to be 3 to 5 times higher in Africa than in high-income countries (Dyer et al. 1998; Modjarrad and Vermund 2010), or why the per-act transmission risk within sero-discordant heterosexual couples has been estimated to be between 3.75 (male-to-female) and 9.5 (female-to-male) times higher in low-income countries than in high-income countries (Boily et al. 2009).

Yet, most national HIV-prevention programmes in Africa fail to incorporate the effect of various infectious and parasitic diseases (so-called 'cofactors') on HIV transmission efficiency and continue to draw on a nearly exclusive sexual-behaviour-centred causal narrative (Hunsmann 2013). Too often the debates over the importance of any one or another element leads to opposition, with advocates for co-infection control being erroneously, and absurdly, accused of denying the role of sexual behaviour – as if addressing the cofactors that increase the efficiency of sexual HIV transmission somehow excludes efforts to reduce sexual exposures overall as well. The fact that considerations related to transmission efficiency are at the very heart of the increasingly dominant biomedical approach (TasP and male circumcision) makes this selectiveness all the more paradoxical.

## 3 Political-economic origins of silo thinking

The above section provides three examples of cases where silo-based reasoning appears to prevent the unification of thinking and joint planning that can bring together multiple potentially useful efforts and ideas to slow the spread of HIV. We argue that political economic factors drive the formation and perpetuation of silos – particularly in terms of dominant disciplines, ideologies and institutional incentives and arrangements.

### 3.1 Political-Ideational origins

#### 3.1.1 Disciplines

Disciplines serve to train individuals in methods, theories and concepts to a high level of expertise. Many social scientists are trained as part of their discipline to be self-critical and reflective, challenging if their methods or ideas are appropriate to best understand the question at hand. Public health officials trained in clinical medicine or epidemiology may struggle to understand or recognise the limitations of individualistic and medical interventions to address an epidemic so deeply shaped by social factors, as they have been trained primarily to search for universal solutions rather than to take into account the contextual complexity of the social world (where the fundamental mechanisms by which cause and effect occur can vary over place and time (c.f. Pawson and Tilley 1997)). More fundamentally, and beyond the sole issue of contextual validity of public health knowledge, the formulation of HIV-prevention policies necessarily involves trade-offs between social values and policy objectives – among which the pursuit of population health is but one (Parkhurst 2012). As Brecht (1959) noted over half a century ago, such policy decisions represent choices of what a ‘good society’ looks like, questions that science alone cannot answer. As such HIV-prevention policy decisions cannot be exclusively based on a technocratic process that relies on public health specialists’ suggestions or epidemiological data. They are irreducibly *political* decisions in the sense that they imply an at least partially discretionary definition of collective preferences (Hunsmann 2012).

Yet while social scientists continue to challenge the neglect of the social world in HIV programming (induced by the predominance of the biomedical paradigm), the disciplinary barriers to comprehensive learning manifestly work both ways. Biomedical literacy among social scientists is often disconcertingly low and, being trained to analyse human behaviour, social scientists risk reductionism of HIV prevention to behavioural determinants – paying inadequate attention to the non-behavioural factors that shape susceptibility, infectiousness and thus risk of transmission.

#### 3.1.2 Values

Academics and scientists like to believe they are free of ideology. Yet for those working in HIV/AIDS, they most likely do so *specifically because* of their values. Research from the field of cognitive psychology has shown repeatedly that our existing morals and value positions will lead to simplification heuristics and biases in processing and understanding complex information (Gilovich, Griffin et al. 2002, Kahan 2013), an insight recently embraced by the World Bank to critically reflect on its own work in poverty reduction (World Bank 2015). Such biases affect the HIV-prevention community as well. Critical views or alternative hypotheses place those on the receiving end of the critique in a state of cognitive dissonance (Festinger 1957). In such states, humans naturally develop responses to oppose, ignore, or dismiss the dissonant ideas – supporting the building and maintenance of silo thinking. In this sense, the reaction against (or *non*-reaction to) scholars warning about iatrogenic HIV transmission could in part be explained by dissonance with the ‘doctors-as-

beneficent' belief system. Similarly, hostile feelings against those who note the failures of condom promotion could arise from dissonant values. No doubt some opposition to condoms has come from a moral agenda (e.g. religious leaders who see them as part of a 'social problem'). But some have critiqued condom promotion based on epidemiological data of its limited impact (c.f. Halperin, Steiner et al. 2004, Shelton 2006). The embrace of condom-promotion has been argued to be consonant with belief systems valuing control over reproduction and sexual freedom (Parkhurst 2011), yet these moral positions common to many in HIV prevention should not prohibit exploring valid scientific queries based on epidemiological data.

Humans also utilise representativeness and affective heuristics that can bias our judgements to assume things must go together because they are similar, or because they align with other things we value (Finucane, Alhakami et al. 2000). Several authors have argued that the uncontrolled transfer of the behavioural explanation of HIV epidemics from Western countries to Africa was facilitated by wide-spread, pre-existing, culturalist assumptions about sexual promiscuity in Africa (cf. Packard and Epstein 1991; Stillwaggon 2006). Similarly, Parkhurst (2013) has explored cases where ideological values seem to have perpetuated incorrect or oversimplified conclusions in the HIV field – such as poverty or gender inequality 'driving' HIV spread (oversimplifications), or Senegal's early political response being labelled as a 'success story,' (a spurious conclusion as it has historically had similar HIV prevalence to its non-proactive neighbours).

The initial reaction to critical insights challenging consensus ideas is often one of disbelief, denial or anger. None of these *should* be the initial reaction of a scientific mind, but all of which are typical of a human mind – a mind designed to build protective silos around ideological positions, draw affective conclusions and avoid cognitive dissonance.

### 3.2 Institutional-economic origins

As noted in the introduction, the HIV response has grown to over US\$19 billion in recent years. While the resulting institutional pressure to spend funds has led to various inefficiencies and perverse outcomes in HIV-prevention programmes during the mid-2000s (Pisani 2008; Hunsmann 2013), the vertical structure of the international AIDS response – which was in part chosen to ensure accountability – has further entrenched silos of thinking and preventive action. In several African countries, over 90% of AIDS-related expenses are funded by PEPFAR and the Global Fund, both disease-specific programmes. However, vertical programmes are externality-prone: the restrictive definition of their targets, the fragmented funding structures and the narrowly HIV-centred reporting processes impel HIV-prevention players to only consider those effects that concern their project's closely circumscribed objectives (Stillwaggon 2006: 173-6; Hunsmann 2012).

Another source of silo-based practice lies in forms of institutional rigidity that derive from organizations' relative specialization. Organizations that specialize in behaviour-centred prevention measures, for instance, are unlikely to be suitable implementing agencies for prevention measures unrelated to sexual behaviour. In Tanzania, Hunsmann (2012) found that for \*\*\*\* the incomplete convertibility from one activity to another, combined with their desire to ensure their institutional survival, led them to act as a political constituency against policy change, hampering the adoption of cofactor-based measures (Hunsmann 2012). Finally, the perceived complexity of multi-factor interventions appears to be another important source of bias towards 'simple' single-intervention approaches (*ibid.*), and that irrespective of the degree to which the desired outcome is actually amenable to policy intervention.

## 4 Discussion

“Too many studies have taken an authoritative tone which is not warranted by the data available and in doing so have encouraged a premature closure of African AIDS research.”

(Packard and Epstein 1991: 782)

As the date on the quote above attests, we are not new in our concern over how silos of thinking may adversely affect the HIV/AIDS response in Africa. This paper has attempted to illustrate the continued presence of such silos, but also to explore the potential origins of silo thinking in an effort to consider ways to avoid it in the future. Overly reductionist thinking is always problematic in scientific exercises, and perhaps the greatest risk to silo thinking is when it gives rise to scientific exclusion or blacklisting. We can see instances of this in some of the examples described above. Those who warn against the risks of blood-borne HIV transmission and ask for better evidence to replace speculation have, for example, been accused of causing thousands of deaths by scaring Africans away from vaccination campaigns and health care (for illustrative examples, see: Hunsmann 2013: 78–81). Similarly, social science researchers who develop critical perspectives on biomedical approaches continue to be accused of putting “lives at stake” (Nguyen et al. 2011) or of having “blood on their hands” (Le Marcis 2013) by hampering the rapid roll out of interventions. Finally, researchers interested in non-behavioural drivers of sexual HIV transmission have at times been labelled HIV ‘denialists’ – grouping them with those who argue that HIV is not the cause of AIDS. Although this claim is obviously absurd, it continues to fuel researchers’ fear to be ‘pushed in the wrong corner’ by exploring unpopular or non-mainstream research questions about the spread of HIV (Hunsmann 2013: 80–81).

25 years after Packard and Epstein’s words of caution noted above, our point is not to eternally call for more research. Potentially more useful is to enable collaborations across disciplines that can break down silos by exploring synergies between different factors and modes of transmission – and thus between different prevention interventions. Breaking out of institutional, disciplinary or ideologically based silos is easy to call for, but will require deliberate effort and strategies on the part of the Public Health and HIV-prevention community. A first step may be efforts making us more aware of our ideologies and perspectives, and how these bias or frame our thinking. The critical reflection that many social sciences include in their training derives from an identified need for such perspectives when studying social settings and problems. As the public health field turns to study such issues, it would be prudent to consider what skills and insights are needed for this new area of investigation. Public Health training would be wise to consider the ‘Public’ element as much as the ‘Health’ component of its name, reflecting on how dealing with the social world (in terms of behaviours, politics and choices) may differ from dealing with natural (clinical or biochemical) phenomena. A self-reflective approach further provides a starting point to identify our values and positions, considering if these bias our views of evidence or conclusions. When conflicting or dissenting views are presented, it is essential that HIV scientists reflect on the origins, source and merit of such critical perspectives, being willing to embrace those which expand and complement the goals of HIV prevention.

A second strategy that can be taken up within the contemporary efforts to define structural approaches to HIV prevention is to reconsider the dominant hierarchies and thinking about evidence. Some researchers have begun to undertake randomised controlled trials of single interventions purportedly addressing ‘structural determinants’. This is a natural response that emerges from disciplinary traditions which have embraced experimental trials as the best, and often the only, form of evidence to guide practice. Experimental trials can be incredibly useful at times, but any such efforts addressing social, political and economic factors need to be well justified in addressing questions about their generalizability. There should also be reflection as to how much can be learned from single



trials of social change phenomenon, as opposed to, for example, historical or ethnographic learning from real-life examples of successful population HIV-prevention efforts.

A final approach to HIV prevention that can help to avoid silo thinking, but is particularly suited to the structural approaches being proposed, is to start from a position that assumes HIV prevention is a complex endeavour. Many social scientists already have a healthy scepticism of simplistic solutions in HIV prevention, but the current efforts to define what a structural approach looks like can do more to explicitly establish that the starting point for HIV prevention should be one of complexity, holding that any attempt to intervene in a simple (single focused, short term, etc.) way needs clear justification. To date, the reverse has often been true - simple solutions have been the norm and that more complex, multi-faceted approaches required defending to HIV funding bodies and international donors. Treating HIV prevention as complex would further encourage, rather than discourage, attempts to synthesise and integrate knowledge on the *interactions* between modes of transmission, and between biological and social factors that condition infection risk and access to HIV services. Because of the broad and non-linear reasoning it adopts, a complexity focus also would lend itself more naturally to take account of synergistic effects between multiple prevention interventions, as well as of some interventions' positive 'externalities' (i.e. not immediately HIV-related effects) on population health (Stillwaggon 2009).

The above discussion and examples have meant to be illustrative of some of the challenges facing HIV prevention, and some of the possible means to think towards solutions. We believe that breaking away from silo thinking would help to ensure we answer questions in the most rigorous, scientific and efficient ways, and to ensure that our institutional responses align institutional incentives with good practice. The renewed emphasis on structural approaches to HIV prevention may provide a window of opportunity in this respect. However, while the language of 'combination' HIV prevention by UNAIDS (2010) is potentially useful, there is a risk that combination prevention becomes reduced to a narrow set of interventions that are believed to 'work' (e.g. circumcision + ART + condoms = combination approach). Such does not fit with the idea that HIV prevention requires comprehensive and locally informed approaches. A 'paradigm shift' requires disciplinary change and institutional change. Neither is easy, but the existing discussions about structural approaches to HIV provide an opportunity to press for such change. Windows of opportunity do not stay open long, however. There may be indications that the structural and combination approaches are already being co-opted into modalities that risk burying their useful insights within new silos of thinking. We hope that discussions such as this one can prevent this from happening.

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