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The Social Determinants of HIV: A Review^a

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Background

The Human Immunodeficiency Virus (HIV) has a global distribution. There are approximately 33.2 million people (adults and children) living with HIV/AIDS – a prevalence of around 0.6% (1). This figure is substantially (16%) lower than the estimated 39.5 million PLWHA from a year ago (2). The drop is attributable to improvements in the estimation techniques rather than any radical developments associated with the epidemiology of the virus itself. The technical improvements particularly affected estimates from India and sub-Saharan Africa (1). Although the burden of HIV is lower than it was thought to be, it still represents a significant health burden with great potential to spread in the absence of control measures.

The distribution of HIV is not uniform. Around two-thirds of prevalent cases of HIV (~68%) and around three quarters of deaths from HIV (~76%) occur in sub-Saharan Africa (1). Even within sub-Saharan Africa, the distribution is not uniform. “Southern Africa alone accounted for almost one third (32%) of all new HIV infections and AIDS deaths globally in 2007” (1)(p.8).

The pattern of incident cases is somewhat different. Globally there was an estimated annual 2.5 million new cases of HIV, 84% of which occurred in adults. The region with the fastest growing number of cases is Eastern Europe and Central Asia; nonetheless, in absolute numbers most incident cases occur in sub-Saharan Africa (~68%), where the majority of new cases are associated with heterosexual transmission.(1). In a 'grey literature' report, David Wilson of the World Bank, made the observation that the HIV/AIDS appears to have four distinct clusters in sub-Saharan Africa (3).

Southern Africa is characterized by highly generalized epidemics, with HIV prevalence ranging from 15- 35%. East Africa's epidemics, for many years grouped with Southern Africa's, are far lower, ranging from 2-7%. Prevalence in West Africa, Africa's most populous region, ranges from 1-5%. In North Africa, HIV prevalence seldom exceeds 0.1%.

To an even greater extent than previously believed, Southern Africa is the epicentre of the global HIV epidemic. The hyper-epidemics of Southern Africa are a continental – and a global - exception, which are unlikely to occur elsewhere. HIV epidemics elsewhere in Africa are less generalized than previously believed. (p.3)

In some SSA countries, such as Ghana, the evidence points to commercial sex work (CSW) driving the new HIV infections (4). Elsewhere, commercial sex work may have driven the epidemic initially, but in its more generalised form, this is no longer a sufficient explanation. Not only is the risk of HIV not homogeneously distributed across the continent, there may be dangers in only focussing on the most obvious risk of heterosexual transmission if sight is lost of potential new epidemics in groups such as men who have sex with men (MSM) or injection drug users (IDU) (5-7). Deciding on the appropriate balance point of effort between groups is, however, necessarily a trade-off between cost, risk, and impact.

There is also a heterogeneous pattern of risk within and between other global regions associated with different risk activities, principally IDU, MSM, and CSW. Most prevalent cases of HIV in Eastern Europe and Central Asia are associated with IDU with relatively few cases associated with CSW or MSM (1,2,8). In Latin America the profile is more balanced across risk activities with around 25% prevalent cases associated with MSM, 20% with IDU, and 17% with commercial sex work (2). In South and South East Asia, the dominant risk is associated with CSW (~50%); 22% of

cases are associated with IDU, and 5% with MSM (Fig. 1). Approximately 62% of HIV cases in the region occur in India and most of these are estimated to be heterosexually transmitted (9,10). In China around half of the HIV cases are accounted for by IDUs; whereas in Thailand and Cambodia the HIV infections are associated with CSW (9).

In the United States the highest risk group are MSM accounting for 43% of incident cases, and IDU accounting for 17%. (11). There are also important ethnicity/race issues with the greatest burden borne by the Black and Hispanic communities (69%) (11) with 74% of MSM testing positive to HIV coming from those communities (12).

Data Source: (2)

Fig 1: The HIV risk profile of three broad global regions

The clear message following any analysis of the distribution of HIV between (and often within) populations is one of heterogeneity; that is, a heterogeneity of distribution, and a heterogeneity of risk group. As the pattern of risk changes within a setting, over time, or between settings, so one should anticipate that the social determinants may vary by setting and change over time. This changing pattern of risk and distribution is well captured in the very idea of the HIV epidemic “maturing” (i.e., having a particular dynamic), and well illustrated in, for instance, the discussions about the epidemiology of the epidemic in East and South East Asia (13).

There are a handful of social determinants that are classically associated with HIV, including poverty and gender (and their associated inequalities), stigma and discrimination, as well as what one might broadly discuss under the rubric of 'governance', (see for instance, (14-16)). These determinants often interact and overlap and will form the primary focus of the review. Before reviewing the social determinants, there is value, in separately considering the three well recognised “risk groups” associated with the transmission of HIV (namely commercial sex workers and their clients, injecting drug users, and men who have sex with men) (1)). The division between risk groups and social determinants is somewhat arbitrary because group membership (at least for IDU and CSW) is itself socially determined and membership of one group may also associated with membership of another (e.g., (17)). Following the review of risk groups and social determinants,

brief consideration will also be given to some of the behavioural and programmatic interventions that have dominated the HIV area. These include variations on the abstinence, monogamy, and condom (ABC) programmes (18), school based interventions (19), and mass media campaigns (20).

Ideally a review of risk groups, the social determinants of risk in those groups, the broader review of the social determinants of HIV, and a review of behavioural and programmatic interventions would systematically examine the entire literary corpus. The HIV literature, however, is vast and realistically any review needs to balance thoroughness with tractability. *Pubmed* which excludes many of the social science journals, monographs and grey literature records in excess of 180,000 HIV publications, Elsevier's *Scopus* records in excess of 200,000 publications and 3.5 million web-sites. This problem of volume is increasingly common for reviews and the challenge is to extract meaningful and relevant studies within the constraints of time and resources. There is, indeed, some evidence to suggest that generic computerised searching invited by modern databases may not be as effective as more focussed approaches ((21) cited in (22)).

The issue is further complicated by at least two additional issues. First, the HIV epidemic is dynamic in nature. The pattern of infection changes over time and “matures” (13). This means that knowing the historical determinants of infection that held 10 or more years ago, may not have currency. The second complication is that the language of the social determinants of health is not a language that is readily recognised in the HIV/AIDS literature. That is not to say that issues of social vulnerability or the effect of social factors on the transmission and impact of HIV/AIDS are not understood. The phrase “social determinants”, however, is not used. As an illustration, a search was conducted of *Scopus* database (which includes 100% of Medline and an additional 2,800 social science titles) against the Titles, Abstracts, and Key-Words fields:

“social determinants” OR “social determinant” AND “HIV”

Only thirty-two citations were retrieved. Twenty three (23) of these citations related to “articles” as opposed to essays, errata, etc.. Following an examination of the abstracts, 9 of the remaining articles were discarded, because they did not relate to empirical research. This left 14 research papers that were abstracted as relevant to the social determinants of HIV. Three of the papers related to injection drug-use in Canada, three were focussed on children, and the focus of the remaining 8 papers was scattered.

Taking these issues into account the following strategy was adopted for this review:

- The search was for reviews of original empirical papers, rather than the papers themselves. The focus on existing reviews meant that this paper was based on a meta-review (e.g.,(23)).
- Only post 2000 literature was examined. However, because it was reviews that were extracted from the literature, most of those included current and older literature;
- The search was conducted against the Pubmed and Scopus databases
- The search was supplemented with a search of an extensive personal library on the social determinants of HIV/AIDS in excess of 1,500 papers, many from the grey literature.
- Reference lists of papers were also examined for additional reviews.
- Separate searches were conducted of the tables of content of issues in key journals including *International Journal of Drug Policy*, particularly for their focus on IDU (rather than HIV) and journals including *Sexually Transmitted Infections* for their focus on sex workers (rather than HIV).

As an example of the database search, the following terms used in Scopus retrieved a total of 291 articles (most of which were ultimately not relevant to a review of the social determinants of HIV):

(TITLE-ABS-KEY(hiv) AND TITLE-ABS-KEY("systematic review")) AND
DOCTYPE(ar OR re) AND PUBYEAR AFT 1999

Analagous searches were conducted for papers on commercial sex work, injecting drug use, and MSM. Starting with the risk groups, the results are presented in the following sections.

Risk Groups

Commercial Sex Work

Commercial sex work (CSW) is regarded as one of the significant drivers of HIV (24,25), which makes an examination of the social determinants of sex work and the social determinants of high risk behaviour during sex work pertinent to this review. Notwithstanding the general recognition of the role that CSW has played in the global epidemiology of HIV there are no good general estimates of the number of commercial sex workers, and where estimates do exist they are likely to be highly labile because the numbers of sex worker is itself a function of changing economic and social circumstance(26).

For an individual sex worker, the risk of HIV infection from work related activities will be a function of the frequency of paid penetrative sex, the probability of the transaction being with an HIV positive client and the client's viral load, and the conditional probability of using a condom. The partner of a sex worker is also an important source of infection for sex workers, and there is evidence from both developed and developing county settings to suggest that unprotected sex with partners and regular clients is one of the greatest risks for sex workers (27). In addition, in a number of countries there is a significant relationship between sex work and injecting drug use (17,28,29). HIV risk associated with CSW is, thus, highly contextually dependent, and this is well illustrated by a recent Vietnamese study which sampled sex workers from four border provinces. The prevalence of HIV among the sex workers ranged from 0% in a sample of 216 sex workers in one province, to 24% in a sample of 400 sex workers in another province (30)

Notwithstanding the importance of sex work in the development of the HIV epidemic, there have been surprisingly few reviews of the determinants of sex work; exceptions include (28,29,31,32).

It is principally the two most recent reviews that inform this section (29,32). They both draw very similar conclusions, although they approach the issue from slightly different perspectives. Harcourt and Donovan (32) focus on a review of *Medline* abstracted papers. Vanwesenbeeck (29) focuses on (in this context) the more appropriate *Psychological Abstracts* and *Sociological Abstracts* for her review. Both reviews, however, note the enormous variation in motivations for entering sex work, the powerful effect of the context of the work, and the variation in outcomes for the workers.

The western literature often identifies childhood abuse, or some psychopathological basis as factors predicting the decision to become a sex worker. In sub-Saharan Africa, Asia, and Latin America, economic factors are most cited as a motivation for becoming sex workers (29,32). In keeping with the economic basis of CSW, health outcomes were generally also better where sex workers had a higher status – as measured by their ability to earn a good income, be selective about their clients and their services, and be supported by adequately resourced health services and community based organisations (p.205).

Further complicating any analysis is that “sex work” is not one thing. It occurs in a variety of setting, including “on the street”, in brothels, in bars, as an escort service, or in hotels, and may include a variety of services – some of which do not include penetrative sex (26,32). Each form of service carries different risks, and even these risks are not constant across context. Brothel-based workers in Amsterdam are considered at lower risk than street workers because of the street workers “relatively quick working routine” (p.253)(29). In contrast, in Indonesia the opposite held true. It was the brothel-based workers who were at greater risk than street-based workers because they had less control over who their clients were or whether a condom would be used (29).

Injection Drug Use

The illicit use of injected drugs using shared equipment is the most direct non-medical cause of HIV infection. There is, however, no single social determinant of injection drug use (33).

A general finding is that IDU tends to be associated with being male – a gender effect. One of the few studies explicitly to study male-female differences in IDU found that in the US, males were more likely to inject drugs than females, and this was associated with a greater opportunity to try drugs. The conditional probability of becoming an IDU, having tried drugs, was however similar for males and females (34). Similarly, in Pakistan males appeared to have opportunities to engage in drug use where females did not (35). Although the reason for the disparity was not specifically discussed, it also existed among IDU in Yunan (36). The gender variation was also highly dependent on context. In Yunan, for instance, in the border region, only 4% of IDUs were female, but in urban Yunan it rose to 30% of IDUs. The gender effect is not necessarily constant, however, and one study of new IDUs in New York found that females were more likely to initiate drug use than males (37). Also counter intuitively, in that study new injectors were more likely to be white, female and older with a median age of 27. Older injectors had a median age of initiation of around 17. The risks of HIV infection however did not follow the trend of drug use and among the new injectors it was the African Americans, Hispanics, females, and MSM who were more likely to be HIV positive.

In a review of social determinants, the extent to which IDU can be characterised as personal choice is central. One US study examined the extent to which personal networks and neighbourhood poverty was associated with heroin and cocaine use (38). Living in a poor neighbourhood was significantly associated with drug use. Having social support and ties to employed people protected against drug use, but not if the social network contained drug users. There is thus contextual and interpersonal factors affecting drug use associated with socio-economics. This parallels the finding from Helsinki that HIV infections in IDU were associated with personal poverty and living in a deprived area (39).

Belonging to a minority racial/ethnic group also appears to be a risk factor for drug use, at least in some contexts. In China for instance, non-Han groups make up around 8.1% of the population, but are disproportionately associated with IDU and account for 30% of HIV cases (40). Needle sharing is the predominant source of HIV infection (36). In Malaysia, however, it was the minority ethnic Chinese IDU who had one third the risk of HIV than the ethnic Malays (41). The difference in Malay and Chinese risk was explained in terms of different drug subcultures (p. S41).

One of the gender effects associated with IDU is indirect sex work associated with “sex for drugs” -- a particularly high risk activity (32,42). Indeed there is good evidence that it is often the injecting behaviour that is the predominant risk for HIV among CSW who are also IDU (29). A recent study of HIV risk among IDU in Sichuan, for instance, found distinct gender variations in risk describing

women as carrying the double jeopardy of sharing needles with their partner and sex work (17).

A US based 'meta synthesis' of US based qualitative studies indicated that the diagnosis of HIV could in fact be a positive force for change in the lives of HIV-positive women, because many of them were also IDU and the diagnosis of HIV lead them to enter recovery programmes for drug users. (43).

There has been one systematic review of IDU in six countries in Africa (Egypt, Kenya, Mauritius, Nigeria, South Africa and Tanzania) (33). A total of 21 studies were found: two each from Egypt and Mauritius, three each from South Africa and Tanzania, four from Kenya and seven from Nigeria. The data suggest that where IDU is occurring, needle sharing is relatively common. Some of the studies are small and the sampling strategies weak, limiting the extent to which the estimates could be made of the prevalence of IDU. The authors conclude that The available information contradicts the view that IDU in Africa is rare, and the general consensus is that IDU is a growing problem on the continent.

Men who have sex with men

A recent review of HIV prevalence in low and middle income countries shows that men who have sex with men have odds (pooled estimate) of being HIV positive 19 time greater than the general population (44). In a number of Latin American countries the odds ratios often exceed 100. In sub-Saharan Africa, where in absolute numbers HIV is associated with heterosexual transmission, MSM have odds of being HIV positive significantly greater than the general population (1.6 time higher in Kenya, and 27 times higher in Senegal). When the analysis is stratified by region, country level wealth, population prevalence, or whether the epidemic in the general population is IDU driven, the odds of infection are always significantly worse for MSM. The risk factors associated with MSM are directly analogous to the risk factors for men who have sex with women; i.e., the number of partners, the frequency of sex, and whether a condom is used. See, as an example, a recent review by Frankis and Flowers (45)

A search of the literature suggest social networks, a social determinant, may hold part of the key. Kelly and colleagues have conducted a series of studies on social networks and HIV risk with MSM groups in Eastern Europe(46-49). The consistent finding is that networks have their own norms associated with sexual behaviour and these social norms such as those related to unprotected sex can be influenced. A study was also conducted recently in China which found that the nature of the social network and whether it overlapped with the sexual network was also associated with risk behaviours (50). Whether these results generalise is not clear. A recent US review of behavioural interventions indicates that they can reduce levels of unprotected sex, but there was heterogeneity in the outcome data (51).

Social Determinants of HIV

Poverty

The concept of poverty goes beyond the size of the income or expenditure of an individual or household and can indeed be conceived as something beyond the purely economic (52,53). The complexity of measurement is revealed in a recent review of “vulnerability” to HIV, in which the researchers suggest that poverty increases vulnerability to HIV infection, and that poverty is “a complex experience involving a lack of key capital assets (natural, financial, physical, human, and social)” (54) (p.271). The review goes on to suggest that poverty is simplistically viewed in

economic terms using income as a proxy, and that ideally “poverty should be disaggregated into several indicators of deprivation such as income, food, housing, *knowledge, power, and access*”¹ (p.271).

While increasing individuals' “knowledge, power, and access” may be desirable social outcomes, to bundle the presence of all such social goods under the banner of wealth, and lack of such goods under the banner of poverty seriously increases the complexity of measurement and reduces the value of poverty in an analysis of the social determinants. The value of the concept of poverty in an analysis of the social determinants of HIV ultimately lies in the capacity for intervention. If the definition is too diffuse, there is a danger of reducing many social determinants to a single *blanc mange* concept of “poverty”.

Most research on poverty and health would take a narrower economic view for the purposes of measurement, but acknowledge that wealth can provide advantages over a range of domains while poverty reduces opportunities across domains (53,55). Economic wealth can, thus, increase capability, but capability is not the same as wealth (56). In the studies reviewed here, wealth is generally based on aggregate measure of household assets or a measure of income, which is consistent with a view of poverty as material deprivation (53).

The relationship between poverty and HIV infection

It has long been held that poverty is a significant driver of HIV and that poverty reduction is a necessary intervention to prevent HIV (57). There are two ways in which one might consider poverty to be social determinant of HIV. The first way is to consider poverty not as an attribute of individuals, but as an attribute of communities or countries. One could imagine that less wealthy countries and less wealthy communities would be less able to offer the infrastructure to support either appropriate prevention efforts or provide appropriate care and support (e.g., (58,59)). Globally the relationship between country level wealth and HIV can be classically observed in a graph of the relationship between per capita GDP and HIV prevalence (Fig 2)(60). The graph is less dramatic than might be expected, but nonetheless shows a clear average decline in HIV prevalence from around 8% in the poorest countries to less than 1% in the richest. The relationship between poverty and HIV prevalence would largely vanish if one first controlled for a sub-Saharan Africa effect. It is not clear, however, that this kind of analytic control makes sense in this context.

More dramatic than the relationship between country level wealth and HIV prevalence is the relationship between country level wealth and variability in HIV prevalence. As per capita GDP rises above around USD\$10,000, so the variability in HIV prevalence reduces dramatically with only two of the wealthier countries shown to have an HIV prevalence greater or equal to 1%.

Care needs to be taken here, because the ecological relationship that is apparent in the data does not necessarily hold within each of the countries at an individual level – the “ecological fallacy” (62). Furthermore, the data do not support an inference of causation, only association. This is, indeed a problem for any cross-sectional data. There are, however, plausible arguments to be made about the capacity of resource poor settings to mount effective prevention campaigns (58); but, it is also known that HIV has an impact on the economic capacity of countries and this uncertainty in the direction of causation interferes with any direct inference (60,63,64).

The second way in which to consider the effect of poverty on HIV is when economic capacity is an attribute of individuals. Being individually poor may affect choices that are available to a person

1 Our emphasis

and lead to higher risk behaviours (65-67). The idea that individual poverty is a cause of HIV is widely subscribed to (14-16,57,66); but the data are in fact mixed (68).

Based on a Figure in (61)

Fig 2: The relationship between countries' wealth (GDP per capita) and HIV prevalence

Janet Wojcicki conducted one of the few systematic reviews of the relationship between poverty and HIV infection (67). The focus of the review was on studies of HIV infection in women in central, eastern, and southern Africa. Thirty-six relevant studies were identified, including 30 cross-sectional studies, five prospective cohort or nested case-control studies, and one case-control study.

Out of the 36 studies that met the inclusion criteria, fifteen found no association between a woman's SES status and HIV infection, twelve found a positive association, eight found a negative association and one was mixed. (p.10)

Among the prospective cohort studies, three found no wealth association with HIV incidence, one found a positive association, and one found a negative association.

A recent HIV indicator survey from Tanzania also has a bearing on this question (59). The survey, conducted in 2003-04 was the first nationally representative survey of its kind in Tanzania, drawing a probability sample of 6,900 households. The results show a monotonically increasing HIV prevalence with increasing levels of wealth. Those in the poorest quintile had an HIV prevalence of 3.4%. This rose monotonically with increasing wealth: 4.5%, 5.6%, 9.4%, and then 10.5% in the wealthiest quintile.

We conducted a multivariate (design based) re-analysis of the 2003-04 Tanzania HIV/AIDS

Indicator Survey data (59) to determine whether the relationship between wealth and HIV held after controlling for sex, age and place of residence (large city, small city, town, or countryside). The wealthiest quintiles had a significantly higher HIV prevalence than the poorest quintile. People in the wealthiest quintiles were around 2.8 times more likely to test positive for HIV than people in the poorest quintiles ($p < .001$). The effect across the quintiles, however, was not the strictly monotonically increasing pattern identified in original analysis that did not control for sex, age and place of residence (59).

A result similar to Tanzania's counter-intuitive (though more mixed) findings can be found in the recent analysis of the data from the Demographic and Health Survey carried out in Burkina Faso in 2003 (69). The author concluded that...

to apprehend the spread of HIV exclusively as the consequence of under-development, constitutes a dangerous assumption in terms of optimizing policies of the fight against the epidemic. The fight against poverty is not necessarily a means of reducing simultaneously and drastically the prevalence of HIV. (pp. 501-2)

Similarly inconsistent results can be found in other countries (e.g., (70-72)).

Because the surveys are cross sectional, it is not clear the extent to which the results showing higher prevalence in wealthier groups simply reflect better survival rates in that group (73). It seems unlikely that this would be a complete explanation, but some data do point to such a possibility. One US study, for instance, found that after appropriate adjustment, PLWHA without financial assets were 1.89 times more likely to die than their counterparts, and this effect did not disappear even after adjusting for service utilisation (74). Similarly, in a Spanish study, HIV mortality in lower SES groups was consistently higher than for people in high SES groups (75). PLWHA from low SES groups in better off neighbourhoods had a 4 time greater risk of death; while for PLWHA in more deprived neighbourhoods the risk rose to 20 times.

Factoring in the results from the prospective cohort studies (67), however, doubts nonetheless remain about (a) a strict graduated risk between quintiles of wealth and HIV, or (b) the poorest in a society having a greater risk of infection than the wealthiest. Just as it would be wrong, however, to conclude that poverty is always a significant social determinant of HIV, so it would be wrong to conclude that it is never a significant social determinant. Social, cultural and economic context seems to be central to the variation in the prevalence and incidence of HIV, and the importance of money, either as a facilitator of risk or as a moderator should not be dismissed.

Unfortunately, comparative data from outside sub-Saharan Africa is not as readily available. With data from the US, for instance, one is often reduced to drawing inferences on the basis of ecological data. One study reported findings based on administrative data for HIV diagnosis and census data to divide the US counties into quartiles of wealth, which found 40% of new infections coming from the poorest quartile of counties and 14% coming from the wealthiest (76). In the US (and elsewhere (77)) there is also a covariation of HIV, poverty, and racial/ethnic minority status (78,79). One should also anticipate that the demographic profile of HIV may vary with time, and what is so in a context at one point in time can shift as the epidemic 'matures'. In Brazil, where HIV had been regarded as a disease of a wealthier, better educated MSM population, this has shifted to a view that it is a disease concentrating in an economically marginalised population (80).

The relationship of poverty to treatment and care

Just as poverty can be studied as a social determinant of HIV, its role as a social determinant of treatment, care and support for PLWHA is also important. To understand that relationship, one also needs to understand the overall impact of HIV on the economy of a household. The overall economic impact will affect the level and quality of services that PLWHA can afford.

There have been two recent reviews of the economic impact of HIV on households in low and middle income countries (64,81). As might be anticipated, any serious illness such as HIV or TB will have substantial negative consequences for the economy of a household (81). The impact of HIV can be devastating, accounting for up to 100% of annual income for households with a person in the terminal stages of the disease (81). The economic impact lies in the cost of treatment and care and the loss of income, with households having to rely on borrowing, the sale of assets, and the utilisation of savings in the absence of income (64). Cost will increase with disease progression, and the *relative cost* for a poor household will be markedly greater than the cost for a wealthier household. In one study in India, for instance, it was found that as a proportion of household income, poorer households were spending 82% of income on treatment, while wealthier households were spending about a third of that (28%) (82).

The macro-economic and political environment will also have a significant impact on the relationship between poverty and treatment. In a recent analysis of cross-country factors affecting antiretroviral (ARV) coverage in low and middle income countries, looked at GDP per capita as “an obvious proxy for the level of social resources available for providing and facilitating access to HAART [ARVs]” (83) (p.326). The study found that increases in GDP per capita were linearly associated with increases in ARV availability. The modelling indicated that a 10% increase in GDP per capita was associated with a 9% increase in ARV coverage.

Economics is not however the only factor, and political will remains essential. In Brazil the government has mandated the availability of ARVs to everyone in need (84,85), and it is estimated that 83% of those people in need are currently accessing treatment (9). In contrast, in the US only 55% of people in need of treatment are currently accessing it (9). The less universal the availability of treatment and care, the greater the likelihood that poverty will be a social determinant of access (e.g., (86)).

Income Inequality

The obverse of the poverty coin is income inequality. Crudely, this is the gap between the highest and the lowest earners in a society. Because it is an inequality, it can never be an attribute attached to an individual, but is an attribute of the social environment in which the population lives. Whether income inequality can have a health effect has been a contentious issue in the literature (87); nonetheless in one of the few HIV related studies, the magnitude of the gap between a society's richest and its poorest members has been shown to have an ecological relationship with country level HIV prevalence, with less egalitarian societies tending to have higher levels of HIV (88). The relationship between HIV and income inequality is shown in Fig 3, where those countries with lower levels of income inequality (as measured by the Gini Coefficient), on the left side of the graph also have lower average levels of HIV prevalence than those countries with higher levels of income inequality towards the right side of the graph. Again it is the variability in the prevalence that

increases dramatically as one moves from low to high income inequality countries. The fitted line nonetheless confirms the broad, average relationship between income inequality at a country level and HIV prevalence.

There have been few studies to consider the effect of income inequality within a country. One such study found a correlation between US state level HIV rates and income inequality (measured as the ratio between the mean income of the top and bottom quintiles in each state) (89). This accounted for 22% of the variance in an unadjusted model and 8% in an adjusted model.

Fig 3: The relationship between a country's level of income inequality and HIV prevalence

With so few empirical studies in the area, but the general view that inequality, including wealth inequality, is an important social determinant of HIV, the actual mechanism by which income inequality could act as a determinant of HIV is open to speculation, but broadly centres around the psychosocial effects of inequality on health, and the material deprivation arising from inequality and its effect on health (90).

The cross-country analysis of factors affecting ARV availability in low and middle income countries described earlier showed no significant relationship between ARV availability and the Gini coefficient (83). “A negative relationship may be expected in highly unequal societies where HIV affects the poor disproportionately and where elite-dominated governments may be less motivated to divert resources towards [drug therapies]” (p.332). Conversely, a positive association between ARV availability and income inequality is likely to hold where the “inequality is driven primarily by the gap between the incomes of the rich and the rest of society, and where the rich have access to

private health insurance” (p.332).

Gender

“Gender” as distinct from biological sex, captures “the socially and culturally constructed aspects of being 'male' or 'female', reflecting both the relations between individuals at a personal level and the values and norms permeating the broader social structure” (91)(p.3). With the increasing consideration of gender as a social determinant in the health literature, so there has been a tendency to conflate “gender” with “women” and “gender and health” with “women's health” (p4). This conflation can be seen in the HIV literature as much as in other health literature. Since the late 1990's, gender has been identified as an important social determinant of HIV infection, with women regarded as being “particularly vulnerable” (92-94).

Globally the distribution of HIV affects approximately equal numbers of males and females (Fig 4) (1). In sub-Saharan Africa among adults, females bear a disproportionate burden of HIV infection. In Western Europe, much of Asia, Latin America, North America, and Oceania it is males who bear the disproportionate burden(2). The data do support the general thesis that there is a social patterning of HIV infection on the basis of gender, but the effect of gender is not uniform.

Data Source: (2)

Fig 4: The global variation in HIV prevalence among adult females.

There are nonetheless some clear gender associated risks; with the obvious risk being associated with CSW and the other associated with MSM. The probability of HIV transmission increases with the number of sexual partners that one has (59,70,72). Sex work, by its very nature, requires having multiple partners, and as an occupation, sex work is a predominantly (although not exclusively) a female endeavour (32). Within that industry, therefore, women will be over-represented in the HIV statistics.

Where the literature has been very clear on a distinction between wealth effects and wealth inequality effects, there has been a tendency to make no such distinction between gender as a social determinant of HIV and gender inequality as a separate though related social determinant (e.g., (95,96)). The focus of the gender literature in HIV is, in fact, typically a focus on gender inequality.

Gender Inequality

The relationship with infection

Although being female may not represent a particular risk – at least on a global scale – it has been argued that it is the inequality between the genders that is one of the principle social determinants of HIV risk for women (66,92-94,94,97). Gender inequalities “are manifest in the responsibilities [that] each [of the sexes] are assigned, in the activities they undertake, in their access to and control over resources and in decision-making opportunities”(98) (p. 3).

Where women have low status and [low] financial autonomy [compared to men], and depend on their partners for support, abstaining from sex or negotiating use of condoms are simply not realistic options. (96) (p.769)

At its heart, this is a crisis of gender inequality, with women less able than men to exercise control over their bodies and lives. Nearly universally, cultural expectations have encouraged men to have multiple partners, while women are expected to abstain or be faithful. There is also a culture of silence around sexual and reproductive health. Simply by fulfilling their expected gender roles, men and women are likely to increase their risk of HIV infection. (95) (p.7)

On the basis of this kind of argument, one might expect that in more gender unequal societies a greater proportion the HIV prevalent cases would be female than in less gender unequal societies. Using HIV prevalence data published by UNAIDS (2) and gender inequality data published by the World Economic Forum as a “gender gap” score (98), this ecological relationship can be examined (Fig 5). The gender gap score takes account of gender differences in (i) economic participation and opportunity, (ii) educational attainment, (iii) political empowerment, and (iv) health and survival. On the graph, the lower the “gender gap” score, the more gender unequal the society. It is apparent that globally there is no significant ecological relationship between gender inequality and women's comparative risk of being HIV positive. One can see, for instance that Canada (shown as CAN in the Figure) which has a relatively positive gender gap scores (~ .7) has the same proportion of HIV positive females as Nepal (NPL) and Pakistan (PAK) – both of which perform relatively poorly on the measure of gender equality (gender gap score, ~.55).

Given the strength of opinion favouring gender inequality as a social determinant of HIV infection in women, the lack of an ecological relationship warrants some consideration. One explanation of no association may lie in the cross-sectional data of this kind – if, for instance, the snapshot of HIV prevalence mask the HIV incidence data. More recently, however, others have begun to question whether gender inequality is necessarily a social determinant of HIV infection. One suggestion has been that gender inequality may in some contexts actually confer protection on women. This could occur in those societies in which less power is associated with being hidden from the world and as a consequence less often in a position to engage in unprotected sex with multiple partners (99,100).

The HIV poverty literature discussed earlier, particularly where sex disaggregated data are available, provides some data suitable for inquiring into the role of gender inequality as a social determinant of HIV. Recall the results from the Tanzanian 2003/4 HIV indicator survey which showed a monotonically increasing prevalence of HIV with increasing wealth(59). In that analysis the relationship continued to hold even when disaggregated by sex. Women in the wealthiest quintile had a HIV prevalence of 11.4%, a four-fold increase over the HIV prevalence among women in the poorest quintile – 2.8%. A similar, monotonic relationship held for men, although the differential

was slightly more attenuated: 10.5% in the richest quintile and 4.1% in the poorest quintile – a three-fold increase. With one exception, women have a higher prevalence of HIV than men across the wealth gradient. The exception was in the poorest quintile, the quintile in which one would expect women to be to be at greatest risk. And yet, amongst the poorest, it was males who had a highest HIV prevalence – 1.5 times higher than females. Similarly in the Cameroon Demographic Health Survey (DHS) data, amongst the poorest, it was males who had the highest HIV prevalence – 2 times higher than females (72) (p.303).

Fig 5: The global relationship between gender inequality and the percentage of a country's HIV cases who are female.

We conducted a second re-analysis of the 2003-04 Tanzania HIV/AIDS Indicator Survey data (59). On this occasion stratified analyses were conducted for males and females controlling for age and place of residence (large city, small city, town, or countryside). Again, the wealthiest quintiles had a significantly higher HIV prevalence than the poorest quintile. Females in the two wealthiest quintiles were around 3.8 times more likely to test positive for HIV than females in the poorest quintiles ($p < .001$). Males in the two wealthiest quintiles were around twice as likely to test positive for HIV than males in the poorest quintiles ($p < .05$). The effect across the quintiles, however, was not monotonically increasing (59)

In a recent re-analysis of DHS data from five countries (Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania), an interesting approach to thinking about gender inequality was proposed (101). The focus on sub-Saharan Africa is important, because that is the region where women are principally over-represented in the HIV data; and it is also the region for which the gender equity argument is often used. By looking at HIV sero-discordance in couples (i.e., when one partner in a cohabiting couple is HIV positive and one partner is HIV negative), one has a possible proxy indicator for the gender power dynamic and its place as a social determinant of HIV. If women do have far less

control over their bodies (95), and “simply by fulfilling their expected gender roles, men and women are likely to increase their risk of HIV infection” (p.7), then one might anticipate that couples (i) will usually be sero-concordant, and (ii) if a couple is sero-discordant, then it will be the man who will be HIV positive and it is the woman who will be HIV negative. This follows naturally from a view that the spread of HIV in the general population in sub-Saharan Africa and into the female population in particular is a consequence of male infidelity bringing the infection into the household. “Faithfulness offers little protection to wives whose husbands have several partners or were infected before they were married” (95) (p. 16).

Data Source: (101: Table 1)

Fig 6: Discordance in HIV status among cohabiting couples.

There are a number of socially significant findings from the reanalysis of the DHS data (101). The first is that in an HIV positive household (i.e., a household in which at least one of the partners among a cohabiting couple is HIV positive), discordance is the norm. In all five countries for which household data were available, more than two-thirds of HIV positive households are discordant households. In an HIV discordant household, it is more likely that it is the male who is HIV positive. The second finding of note, however, is that in a sero-discordant household, between 26% (Cameroon) and 40% (Kenya) of the time it is the female who is HIV positive when the male is not (Fig 6). What is more, the essential direction of these results hold even under various adjustments including an examination of (i) non-polygynous households, (ii) households in which the union was the women's first, and (iii) households in which the union was the women's first and the union has lasted at least 10 years.

Without making too much of the gender gap score, it is interesting to note that of the five countries included in the analysis, Cameroon and Burkina Faso had the worst (and almost identical) gender gap scores, and yet the pattern of discordance within the two countries is very different. Concordance is much more likely in Cameroon than Burkina Faso; female discordance is approximately the same in both countries; and male discordance is much higher in Burkina Faso. Interestingly, female discordance is higher than male discordance in both Cameroon and Kenya. The

relatively high level of female discordance (26% – 40%) and the overall pattern of results points to a kind of gender dynamic not anticipated in the much of the literature focussing on female vulnerability. Again, they do not show that gender inequality is not a social determinant of HIV, but they do bring into question the generality of that claim.

A study based on Indian state household surveys (Kerala, Karnataka, and Uttar Pradesh) with a total sample of around 16,000 looked explicitly at the relationship between female autonomy and AIDS knowledge and awareness and reported condom usage (102). Autonomy was based on four indices: (i) “permissiveness” (i.e., whether the women required permission to visit friends or go to the market), (ii) independent access to money, (iii) independence of decision making, and (iv) attitudes towards wife-beating. Reported condom use was universally low (2% in Karnataka, 9% in Uttar Pradesh, and 14% in Kerala). Given the direct relationship between condom use and HIV risk, this is the focus here. After controlling for sociodemographic characteristics, neither independence of decision making nor attitudes towards wife-beating were significantly associated with condom use. In Kerala and Uttar Pradesh, permissiveness was positively associated with condom use (OR 1.33 and 1.29 respectively). In Uttar Pradesh independent access to money was also associated with condom use.

These mixed results and relatively weak associations do not give strong support for gender inequality as an universal social determinant of HIV. Unfortunately, neither HIV independence nor prevalence data were available to indicate the relationship between the autonomy indices and HIV risk.

The relationship with treatment and care

The research on access to treatment and care have important gender and gender inequality related results. It is known that across different diseases there are gender effects associated with seeking treatment, accessing services, the quality of the services received, and the long term outcome (e.g., (91,103-105)). The effects are not consistently in one direction, and there is significant cultural variation associated with it. In the US women have to wait longer to receive new HIV treatments than men, and this is so even under the auspices of US legislation directing treatment to the most disadvantaged (86,106)). One recent systematic review of 21 studies of PLWHA in southern Africa (Botswana, Malawi, Mozambique, South Africa, Swaziland, Tanzania, and Zambia) examined gender differences in the distribution of ARVs and found a different pattern of results (107). In five of the 21 studies, a disproportionate number of males received ARVs, in one study there was insufficient information, and in the remaining 15 studies a disproportionate number of females received ARVs. A number of the studies, however, had quite small sample sizes. The results from studies with largest sample ($n > 1,000$) came from Malawi, South Africa, Swaziland, and Zambia (Table 1). The ratio of (female to male) HIV cases is contrasted with the ratio of (female to male) patients receiving ARVs. If there were no gender effect, one would anticipate that the ratio of cases and the ratio patients in receiving ARVs would be equal.

Table 1 shows that a disproportionate number of males received treatment in Swaziland, the results are mixed in Zambia, and in Malawi and South Africa a disproportionate number of females receive treatment.

Table 1: The gender variation in the distribution of ARVs in 13 studies from southern Africa (107)

Country	Number of studies	Gender Ratio (F:M) of HIV	Gender Ratio (F:M) of ARVs
Malawi	6	1.3	1.9, 1.8, 1.7, 1.6, 1.6, 1.5
South Africa	3	1.2	1.9, 1.8, 1.5
Swaziland	1	1.3	0.8
Zambia	3	1.2	1.7, 1.4, 1.1

Receiving treatment, however, is not enough. One also has to receive the benefits of treatment. One Brazilian study, a retrospective cohort study of 1072 patients found that in a multivariate analysis, controlling for prescribed ART, females had a 86% higher risk of death from HIV. The study speculated on possible causes but could reach no firm conclusion on the basis of the data. The results are possibly even more disturbing given some research suggesting that ARVs are more clinically efficacious in women (108)

Stigma

The modern sociological notion of stigma has its origins in the work of Erving Goffman who generally described it in terms of a deeply discrediting attribute that globally devalues an individual (109) (p.12). There have been a number of attempts to rework the definition, generally focussing on socio-structural elements that give rise to stigma (110-112). In particular there has been a move to describe it in terms of a social process that results in and reinforces marginalisation.

The measurement of stigma is complex. Some of the complexity derives from the operationalisation of the concept. Goffmans definition refers to attributions about a person's value (109); which would then require some operational measure of value (112). In the area of HIV, some studies have attempted to measure this in terms of social distance (113), others have attempted to infer it on the basis of prejudicial attitudes (114). Yet another study used the experiences of PLWHA to assess the levels and effects of felt or perceived stigma (115). Other studies have used qualitative techniques to explore the extent of stigma through interviews, media analyses, and analysis of organisational policies (116,117).

The approach adopted particularly in the UNICEF Multiple Indicator Cluster Surveys (MICS) and the DHS surveys, which attempt to capture the extent to which HIV is stigmatised in a population, has been to aggregate a few indicator questions². This approach has at least two important weaknesses. The first is that some of the questions used in the indicator make assumptions about the sameness of societies. For example, one of the indicator questions asks whether the respondent would be prepared to buy fresh fresh vegetables from a vendor who is known to be HIV positive. The question assumes a certain kind of market economy and more importantly the same kind of market economy in all settings. There would, for instance, be no point in comparing the answers from one setting in which vegetable purchases were commonly made from a local vendor with answers from a setting in which purchases are always made in the anonymity of a supermarket. The second weakness is that some questions conflate issues. One of the questions asks for a response about a female teacher with HIV. Because the question specifically identifies the teacher's sex,

² http://www.measuredhs.com/hivdata/ind_detl.cfm?ind_id=6&prog_area_id=3

gender attitudes are necessarily mixed up with attitudes towards HIV.

Stigma has been a part of the history of HIV since it was observed in the early 1980's that AIDS was a "gay disease". As the virus has become associated with different socially marginalised practices such as IDU or CSW or specific minority ethnic groups, so the stigma of it has become deeply embedded (118,119).

There are at least three ways in which stigma is relevant to this review: first, if stigma affects the trajectory of the epidemic; second, if stigma affects access to treatment, care and support; and third, if stigma has an impact on psychosocial wellbeing.

The first of these, the impact of stigma on the trajectory of the epidemic is the most contentious (120). Stigma has been held to be the most significant determinant of new infections (121), and is still regarded by UNAIDS to be a major driver of the epidemic (14). It is easy to construct arguments about how stigma could result in new infections. It may, for instance, reduce the preparedness of those most at risk to engage in harm reduction activities for fear that the activity may identify them as being potentially HIV positive; and without harm reduction activities the virus has a greater likelihood of spreading (121). The data to show that stigma does reduce the likelihood of some groups engaging in harm reduction strategies (122). It is however unclear the extent to which the relationship between stigma and HIV generalises to other social contexts or the extent to which the argument scales up from a focus on high risk groups to a focus on whole populations. One could argue that stigma promotes the spread of the virus across the population and equally one could argue that it hinders the spread (120). One of the difficulties with these arguments is that the spread of infections in populations are dynamic, and knowing how stigma effects one part of the system does not necessarily generalise to the whole system. Unfortunately, there are presently no good data addressing this question, which is in no small part a consequence of poor population measures of HIV stigma.

The second and third area in which stigma has an effect is far less contentious, and that is the effect on treatment, care, support, and psychosocial wellbeing. There is substantial data from the perspective of PLWHA (115), from studies of institutions (40,123-125); and from studies of individuals (114) showing that HIV related stigma is a bad thing for PLWHA. Stigma can reduce access to health care services (125,126) and employment (127,128), it can isolate a person within his or her community (129) and even within the household (128). There is no data that we know of suggesting any benefits can flow to PLWHA from HIV related stigma.

The layering of the HIV related stigmas (for example) CSW, IDU, MSM with HIV is understudied, and has important implications for how one might intervene. The official position of the Vietnam government on HIV stigma was, for instance, quite nuanced (130). Broadly, stigmatising PLWHA was not permitted. It was, however, perfectly acceptable to exclude IDU and CSW from treatment and care, because both these groups engaged in criminal activities. Their criminality was regarded as a breach of the social contract, and therefore warranted no support from the community. CSW and IDU who explicitly repudiated their pasts were entitled to treatment.

There has been very little research that attempts to partition the various stigmas associated with HIV into their constituent parts, treating "HIV related stigma" as a singular entity. Because of the impact this may have on the provision of treatment knowing the constituent effects is important. In a series of experimental studies in which medical and nursing students responded to descriptions of people with HIV, Leukaemia, or no disease, who had either visited a sex worker, been an injecting drug user, or engaged in no high risk behaviour, Chan and colleagues were able to examine the way that a complex of HIV related stigmas could be layered (113,131,132). In combination with other sources

of stigma, the disease stigma of HIV itself was often less critical than the other sources of stigma. If these experimental results generalise then the discussion of HIV stigma or HIV related stigma is manifestly more complex. Dealing with “HIV stigma” may actually mean dealing with the stigma of injecting drug use, commercial sex work, MSM, ethnic minority status, etc. This will move the discussion of tackling HIV stigma into a discussion about the appropriateness of deeply held social and cultural values (and laws) related to sex work, drug use, homosexuality, etc.

Conflict & Governance

If governance is broadly conceived of as the management of the workings of the state, then conflict is associated with a break down of governance, often involving the mass movement of people and a loss of physical and organisational infrastructure, including health services. It was suggested that conflict is a social determinant of the spread of HIV (133)³. The argument essentially was that because population movement is associated with increased risk of HIV transmission, forced population movements in times of conflict will have a similar effect (134). Factors such as an increased sexual interaction between forced-migrant populations and the military, increased commercial sex work, and the loss of preventive and curative health services are all seen as potential factors increasing the risk of HIV transmission (134,135). The true effect of conflict on the spread of HIV has been questioned more recently (136).

The only systematic review to examine the relationship between conflict and HIV was published in 2007 (137). The review identified 65 relevant papers focussed on the seven countries in sub-Saharan Africa which had recently been affected by conflict. The conclusion of the review was that there was insufficient evidence to conclude that HIV rates of transmission rise in populations affected by conflict.

Furthermore, there are insufficient data to conclude that refugees fleeing conflict have a higher prevalence of HIV infection than do their surrounding host communities. In many circumstances, comparisons of HIV prevalence in both situations show the opposite result (137) (p.2192).

Advocating caution in the interpretation of the results they did suggest that the extreme consequences of conflict “mass killings, forced displacement, and hiding” could in fact work in concert to reduce the incidence of infection by removing the opportunities for consensual exposure and destroying social networks. In a recent presentation, Paul Spiegel, who co-authored the review suggested a danger in any “one size fits all” interpretation (138). The risk of HIV associated with conflict or displacement will be affected by the level of pre-existing risk at the point of origin, the level of risk in the host country, the rates in the surrounding community, and the level of interaction within and between the local and displaced communities. A more recent study from Luanda, Angola also found lower HIV prevalence than might be expected on the basis of the HIV rates in neighbouring countries and this may too have been as a consequence of the conflict (139). The point was also made, however, that in post-conflict setting once social interactions begin to normalise, if the structures supporting HIV prevention are not in place, the HIV rates may quickly approach those of neighbouring countries.

Although conflict may paradoxically reduce the risk of infection, any loss of health service infrastructure will have an adverse effect on PLWHA, particularly if the disease progresses without

3 See also http://www.unaids.org/en/Issues/Impact_HIV/HIV_and_conflict.asp, which supports the general notion that conflict increases the risk of HIV infection, but also acknowledges the lack of understanding in this area.

recourse to medical care. One study examined the effect of the conflict in Côte d'Ivoire on health systems (140). In the three regions studied in the north of the country (the West, Central, and Northern regions) the reduction in health staff numbers were calculated from 2001 levels (pre-conflict) to 2004 levels (during the conflict). there was a reduction in medical doctors of between a 91% and 98%, in nurses of between 68% and 86%, of midwives of between 86% and 93%. The consequence was a health work force of between 12% and 25% of its pre-conflict size. The international NGO response to the conflict was unevenly distributed with the Central region gaining three international NGOs implementing HIV prevention and care programmes. The dramatic decline in the capacity of the health services has very clear implications for the entire population, and in the context of this review for PLWHA.

An alternative approach to studying the question is to examine the effect of governance on HIV more directly.⁴ There are only two studies that have attempted this, looking at the ecological relationship between governance on the one hand and HIV and health on the other (61,141). The measure of governance was developed at the World Bank and covers six inter-related dimensions of (i) voice and accountability; (ii) political stability, (iii) government effectiveness, (iv) regulatory quality, (v) rule of law, and (vi) control of corruption. (142). Governance was found to have a moderate correlation with broad measures of population health (.72 for life expectancy and -.68 for the infant mortality rate) (61). However, there was only a weak correlation found between the HIV prevalence and governance – accounting for less than 4% of the variance (141).

Programmatic and Behavioural Interventions

The programmatic and behavioural interventions that are reviewed here include “ABC” programmes, school based programmes, and mass media campaigns. These programmes frequently overlap in their target audience and their approach. Mass media campaigns, for instance can often be used to support other behavioural interventions; school based programmes will usually include some aspects of ABC programmes.

ABC Studies

The ABC reviews discussed here include studies that examined the promotion of abstinence only, condom use, or “abstinence plus” programs. “Be faithful” programs were not reviewed. Abstinence only programmes promote abstinence as the exclusive strategy for lowering HIV risk and do not promote condom usage or any other safe-sex strategy. Condom promotion programmes are predicated on a view that people will be sexually active, and promote the use of condoms as the strategy for lowering HIV risk. Abstinence plus programmes advocate a range of strategies to lower HIV risk including abstinence, condoms, and other safe sex strategies.

Whichever strategy has been adopted, they have had their promoters and detractors (143,144). Abstinence only programs are regarded as unrealistic by their detractors, failing to provide alternative risk reduction strategies to those who do have sex (145,146). Those who favour abstinence see the alternatives as providing mixed or dangerous messages, potentially undermining a more direct abstinence message (18).

4 Governance has been formally defined as “...the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them.” This definition comes from the World Bank's governance indicators website (<http://info.worldbank.org/governance/wgi2007/>), and is informed by the work of Daniel Kaufmann and colleagues .

Abstinence

Underhill and colleagues conducted a series of related systematic reviews around abstinence and abstinence plus programmes in high income countries (18,147,148). Abstinence programs became widespread and were well-funded, drawing on support from the US President's Emergency Plan for AIDS Relief (18,148). They were not, however, necessarily evaluated.(142)

Thirteen relevant studies were identified by the review (all US based), involving around 16,000 youth. Seven of the studies were school-based (an example of the overlap between programmes), two of the studies were community-based, and one was delivered in family homes. "Compared to various controls, the evaluated programs consistently did not affect incidence of unprotected vaginal sex, frequency of vaginal sex, number of partners, sexual initiation, or condom use". (18,148)

The only systematic review of abstinence only programs in developing countries appeared as a presentation at a 2004 AIDS Conference, and is unfortunately unpublished (149). Only seven papers relating to five studies were identified by the reviewers. "Significant but mostly modest effects were found for knowledge, normative beliefs and intentions to delay sex or to use condoms if they engaged in sex." There was little or no evidence that the programmes had any effect on actual behaviour.

Heterogeneity of study designs and or weakness of designs makes it difficult to draw many positive conclusions about abstinence programs, and it would be difficult to generalise the findings (18,148,149).

Condom promotion

Any condom promotion program must be understood within the context of "disturbingly low" levels of condom use across many countries, including countries with high HIV risk (150). However, in the absence of a cure, and the apparent impracticalities of abstinence, condoms are seen as the best direct method of preventing the sexual transmission of HIV (151).

Two systematic review of the impact of condom promotion were identified. The first focussed on research from sub-Saharan Africa and Asia (152). Sixty-two studies were identified; 44 from sub-Saharan Africa and 18 from Asia. Forty two of the studies reported significant effects – only 6 were randomised controlled trials. Nineteen of the studies related to the promotion of condoms in sex work; 15 reported significant increases – 8 reported a doubling in condom use. The most successful of these interventions used some combination of education, condom provision and testing or treatment for STIs. Overall the studies, the best evidence for condom promotion was in sex work. The reviewer concluded:

There is substantial evidence of interventions targeted at sex workers and their clients, in both African and Asian contexts, achieving significant large increases in condom use... There is far less evidence about intervention impact on levels of condom use in casual sexual relationships... In primary partnerships, post intervention condom use was generally low unless one partner was knowingly HIV-infected or at high risk, or avoiding pregnancy. .. There was mixed evidence of the impact of condom promotion among youth. Compared with other target populations, interventions among youths recorded a lower increase in condom use (152)(p.514).

The heterogeneity of designs was problematic and interferes with any capacity to combine the data.

There was one systematic review of behavioural interventions, including condom promotion, to reduce HIV risk in Hispanic groups in the US and Puerto Rico (153). The reviewers identified 16 studies that promoted condom use and were able to derive a pooled estimate of effect. The

intervention group had 56% greater odds of using condoms during sexual intercourse than control group participants.

One of the characteristics of successful intervention was the use of professional (as opposed to peer) health educators. Another was the importance of tailoring the intervention. These characteristics are reinforced by a recent systematic review of 98 studies involving a condom promotion programme. The review was specifically interested in the effect of the agent of change, i.e., who delivered the message – peer educators or health professionals (154). The reviewers noted that the different target audiences for condom promotion interventions reacted differently to different agents of change. They identified as a critical finding, however, that:

if one must make a decision without having information about the characteristics of the target population or must deliver interventions to general population audiences, the wisest decision is probably to recruit qualified health professionals. Although the popularity of peer education programs may appear to contradict this conclusion, the analyses we conducted are much more precise and generalizable than prior reviews advocating peer education (154) (p.232)

Abstinence Plus

Abstinence plus intervention are interventions that promote a suite of strategies to lower HIV risk, from abstinence through to condom use and other safe sex methods. There was one systematic review of these programs, which included 39 trials and 37,724 North American youth (147). The interventions were divided across schools (10), community facilities (24), a combination of school and community facilities (2), health care centres (2), and within the family home (1). Twenty three of the 39 studies identified some positive programmatic effect either with respect to abstinence, condom use, or unprotected sex. “[The] review found no conclusive evidence that abstinence plus programs can affect STI incidence and found limited evidence suggesting that abstinence-plus programs can reduce pregnancy incidence; however, the direction of findings consistently favoured abstinence-plus programs over any controls” (p. 1479). Furthermore, there was no evidence that the “mixed message” of abstinence plus programmes caused harm or confused participants. The trials were, however, heterogeneous, and tended to focus on minority youth from poor areas, which will affect the degree to which the findings could be safely generalised.

School Based Programmes

Two systematic reviews were identified that examined school based programmes (19,155). There was a partial overlap between the reviews – they shared four studies.

The review by Paul-Ebhohimhen and colleagues Identified 9 papers (7 studies) from Southern Africa with relevant behavioural outcomes including multiple sexual partners, abstinence, condom use, and symptoms of STIs (19). None of the studies identified negative effects, and in most cases, the studies found no relevant significant positive effects; which raises issues about statistical power (see (155)). Most studies employed a suite of interventions and it was often difficult to isolate arms of any intervention. In addition, most of the studies did not measure pre-intervention sexual history.

One of the stronger studies, identified by both reviews was of a programme aimed at year 11 Namibian students (n=515) (156). It a longitudinal study (12 month post intervention follow-up) with individual random allocation to intervention and control groups. The study found no significant difference between the groups with respect to abstinence or condom use. However, when a sub-group analysis was conducted with students who were sexually inexperienced at the start of

the study, intervention youth were more likely to have remained sexually inexperienced 12 months later, and if they did have sex, were more likely to report using a condom.

The review by Kirby and colleagues looked at sex education and HIV education interventions in developing countries, not just limited to Southern Africa(155). They identified 22 intervention studies (17 curriculum based).

These studies present strong evidence that sex education and HIV education interventions do not increase sexual behaviour and that a substantial percentage of interventions significantly decrease one or more types of sexual activity; and the evidence (such as (156)) points to later initiation of sex following intervention. No single style of intervention was identifiable more effective, and most appeared to have an effect in some situations.

There was however limited evidence that the interventions had an impact on STI prevalence, perhaps indicating a future lack of effect for HIV. problems of power were apparent, and aggravated by sub-group analyses.

Mass media

Mass media includes print, radio, television, and the internet. As a controlled, commercial mechanism for influencing and changing behaviour it is without parallel; although competing interests frequently attempt to influence behaviour in competing directions.

There are two related reviews of mass media campaigns as HIV interventions in developing countries conducted contemporaneously with shared authors (20,157). We focus on the more general of the two reviews (20). Of the 500 papers initially identified, 24 were ultimately selected for inclusion in the review. To keep the discussion consistent with the previous behavioural reviews, we focus on abstinence, reduction in high risk sexual behaviour, and condom use. Of the studies that report behavioural outcomes, however, most report on condom usage.

Of the 24 identified studies 5 used television, 7 used radio, 12 used 'small media' including posters, pamphlets, and drama. There was a temporal effect, where pre-2000 studies tended to study 'small media', and post-2000 studies examined television and radio effects.

Three studies report on abstinence, 8 on reduced number of partners, and 17 on condom use. The study designs are generally weak, with no good mechanism for identifying a causal effect. The specific measures in each category were also quite variable. Two of the abstinence studies reported a significant effect, and one of the studies found that both intervention and control groups were more likely to abstain than at baseline. The majority of the 8 studies measuring partner reductions found significant effects. The 17 studies measuring condom use were more mixed in their outcomes; however, when analysed by media type, it appeared that television and radio were generally more successful than 'small media'. The real message, however, is one of weak designs, with heterogeneous measures from which it is difficult to draw inferences.

Discussion

The reviews of the social determinants of HIV highlight consistently the importance of contextual variation. Poverty is associated with the risk of HIV infection, but not in a consistent direction. In some contexts greater wealth appears to be associated with greater risk and in other contexts the reverse is true. After controlling for factors such age, sex, and place of residence, the gradient is often not even monotonic. Income inequality has a small but significant ecological association with HIV prevalence, but more research is required to make sense of this.

Gender has a strong ecological relationship with global distribution of HIV. In sub-Saharan Africa female rates of HIV are higher than male rates, but in the rest of the world the reverse is generally true. Although gender based social inequality has been put forward as a significant determinant of HIV infection, the data are very mixed. There was no ecological association between gender inequality and HIV, and one set of analyses of sero-discordance in cohabiting couples from five sub-Saharan African countries suggested a level of independent action by women that was not consistent with the arguments of gender-based powerlessness. Nor was it the case that gender inequality had a consistent effect on treatment and care. In some countries males received a disproportionate level of care and in other countries it was females.

The evidence on HIV stigma leaves little doubt that having HIV and being stigmatised has negative consequences for treatment, care, and support. The question about the role of stigma as a cause of a growing epidemic needs more evidence.

Governance at an ecological level is weakly associated with the prevalence of HIV. Similarly, conflict does not show the anticipated relationship with new HIV infections. Indeed, there are instances in which conflict appears to have hindered the spread of the virus. On the other hand, there is little doubt that conflict destroys the infrastructure necessary for the delivery of services for the treatment, care and support of PLWHA.

The risk of HIV for commercial sex workers, injecting drug users, and men who have sex with men is almost always higher than the risk in the general population. There are also important overlaps between members of these groups. This raises interesting issues for prevention campaigns in environments where the number of HIV positive members of one or more of these groups is much lower than the HIV prevalence in the general population or in another of the groups. It is the natural programmatic trade-off between the absolute and relative risk.

Evidence from behavioural and programmatic interventions is surprisingly weak. The weakness is almost always related to poor and under-powered designs. There were exceptions to this, but they are sparsely distributed, and too few to draw firm conclusion. The general direction, however, points to interventions not causing harm and probably having a benefit. This was particularly true of the abstinence plus, condom promotion interventions, and mass media advertising; i.e., they generally appear to cause no harm and may carry a benefit. The benefits of the intervention were generally most obvious in domains of knowledge and attitude. When behavioural outcomes were measured, it was often difficult to detect benefit.

The results of the review, while perhaps disheartening, point to some important insights, and some important directions for development.

- Contextual variation

There is enormous global and regional variation in epidemiology of HIV. “Vulnerability”, often associated with poverty, income inequality, gender, gender inequality, stigma, and governance do not translate into HIV risk in the fashion that is anticipated by a broader social determinants of health literature. The gradients of risk are sometimes absent, or appear to slope in the opposite direction.

This does not mean that social determinants are not an issue, but it does require a better universal theory, or an account that permits local variation. It also points to the dangers of universal policies that relate to the social determinants of HIV. Thinking about strategies for developing and targeting policies to contexts may be useful.

- High risk groups

Risk within the high risk groups has elements of social patterning. As with the general analysis of the social determinants, however, the direction of the social patterning is not necessarily universal. In one context one kind of sex work is at greatest risk, in another context it is another kind of sex work.

Nonetheless, “high risk” groups almost always do carry a higher risk than the general population, and even where their absolute numbers are small compared with the population of PLWHA, they may represent a cost-effective point of intervention.

- Measurement

Well operationalised measures of social factors are not widely used in the HIV research. This may arise because the measures do not actually exist. The difficulties will also be exacerbated by the cross-cultural nature of problem. A universal measure of gender equity can be a blunt instrument.

If the social determinants are seen as an important part of a long term strategy in the management of HIV, then considerably more resources will need to be put into issues of sociometrics.

- Behavioural and programmatic interventions

The reviews suggest that action is leading the evidence, rather than evidence leading the action. This may be completely understandable, but it lends a certain discomfort to statements of certainty. The reviews of the literature, however, identified surprisingly few studies on which to base a conclusion. Most of those had real methodological weaknesses.

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