

The social structural production of HIV risk among injecting drug users

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Abstract

There is increasing appreciation of the need to understand how social and structural factors shape HIV risk. Drawing on a review of recently published literature, we seek to describe the social structural production of HIV risk associated with injecting drug use. We adopt an inclusive definition of the HIV ‘risk environment’ as the space, whether social or physical, in which a variety of factors exogenous to the individual interact to increase vulnerability to HIV. We identify the following factors as critical in the social structural production of HIV risk associated with drug injecting: cross-border trade and transport links; population movement and mixing; urban or neighbourhood deprivation and disadvantage; specific injecting environments (including shooting galleries and prisons); the role of peer groups and social networks; the relevance of ‘social capital’ at the level of networks, communities and neighbourhoods; the role of macro-social change and political or economic transition; political, social and economic inequities in relation to ethnicity, gender and sexuality; the role of social stigma and discrimination in reproducing inequity and vulnerability; the role of policies, laws and policing; and the role of complex emergencies such as armed conflict and natural disasters. We argue that the HIV risk environment is a product of interplay in which social and structural factors intermingle but where political-economic factors may play a predominant role. We therefore emphasise that much of the most needed ‘structural HIV prevention’ is unavoidably political in that it calls for community actions and structural changes within a broad framework concerned to alleviate inequity in health, welfare and human rights.

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Introduction

There is now over two decades of global experience in researching HIV risk among injecting drug users

(IDUs). This has led to a recent acknowledgement that among the most important determinants influencing HIV transmission and HIV prevention are the ‘risk environments’ in which risk is produced (Barnett & Whiteside, 1999; Rhodes, 2002; Burris et al., 2005; Friedman & Reid, 2002; Singer, Jia, Schensul, Weeks, & Page, 1992). HIV infection is a behavioural disease

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subject to environmental influence. HIV associated with IDU does not progress within IDU networks or communities in uniform or random ways, but is subject to the relativity of risk and to variations in population behaviour in different social, cultural, economic, policy and political environments (Rhodes et al., 1999a; Singer, 2001).

A synthesis of global evidence over the past decade emphasises that HIV prevention interventions among IDUs which focus solely on individual behaviour change are likely to result in only a partial reduction of HIV transmission risk, perhaps in the order of 25% to a maximum of 40% (Heimer, Bray, Burris, Khoshnood, & Blankenship, 2002; Coyle, Needle, & Normand, 1998). A combination of individually oriented interventions may reduce HIV incidence among IDUs but not to zero (Van Ameijden & Coutinho, 1998). HIV testing and counselling, for example, does not necessarily eliminate continued HIV transmission behaviour among IDUs, including among those newly diagnosed HIV positive (Strathdee et al., 1997a, b; Avants, Warburton, Hawkins, & Margolin, 2000). Effective HIV prevention not only comprises targeted interventions fostering changes in individual behaviour, but also interventions creating local environments conducive to, and supportive of, individual and community-level behaviour change. This inevitably necessitates a focus in bringing about changes in the physical, social, economic, legal and policy environments influencing HIV risk and HIV prevention (Rhodes, 2002; Singer & Clair, 2003). Such an approach has been variously termed an ‘enabling environment’ approach to HIV prevention (Tawil, Verster, & O’Reilly, 1997) and ‘structural HIV prevention’ (Des Jarlais, 2000; Blankenship, Bray, & Merson, 2000; Sumartojo, 2000).

There have been few attempts to synthesise evidence on how the environment influences the risk of HIV transmission, whether among IDUs or among other populations at risk (Parker, Easton, & Klein, 2000; Singer, 2001; Aral, 2002; Galea & Vlahov, 2002; Friedman & Reid, 2002; Poundstone, Strathdee, & Celetano, 2004; Burris et al., 2005). There remains a dearth of evidence which in part reflects the historical immediacy of international interest in the role of environmental interventions in HIV prevention, but also reflects the predominance of ‘individualistic’ models of research and intervention, both in HIV prevention specifically and public health approaches generally (Susser & Susser, 1996; Rhodes, 1997; Fee & Krieger, 1993; Friedman, Des Jarlais, & Ward, 1994; Poundstone et al., 2004).

The risk environment

In its broadest sense, the ‘risk environment’ comprises all risk factors exogenous to the individual. An

orientation towards an understanding of risk environment encourages a focus on the *social situations, structures and places* in which risk is produced rather than a reliance on a conception of risk as endogenous to individuals’ cognitive decision-making and immediacy of interpersonal relations. For our purposes here, we define the risk environment as the space—whether social or physical—in which a variety of factors exogenous to the individual interact to increase the chances of HIV transmission (Rhodes, 2002; Singer, 1994; Barnett & Whiteside, 1999).

At its most rudimentary level, a model of the risk environment may comprise two key dimensions: the *type* and *level* of environmental influence. HIV prevention research among IDUs emphasises four ideal types of environmental influence—physical; social; economic; and policy—in the context of three ideal levels of environmental influence—micro, meso and macro. This usage of ‘environment’ does not narrowly define the term as denoting physical space as is the case in some interpretations of ‘environmental intervention’ in HIV prevention (Wohlfelder, 2000). Moreover, we make no assumptions that the physical environment is natural or given, since it is almost always socially constructed in two senses: human actions shape the physical environment, and human conceptions filter the experience of it.

Environmental factors are direct or indirect barriers to, as well as facilitators of, an individual’s HIV risk and prevention behaviours. These environmental factors operate at the micro-level of interpersonal relationships among IDUs—such as negotiations about the use of injecting equipment between IDUs, and at the meso-level of social and group interactions—such as when perceived group ‘norms’ influence what is considered acceptable injecting behaviour (Latkin, Forman, Knowlton, & Sherman, 2003), and institutional or organisational responses—such as when local policing initiatives disrupt patterns of syringe exchange use and syringe accessibility (Rhodes, Judd, & Mikhailova, 2003a; Blumenthal, Kral, Lorvick, & Watters, 1997; Burris et al., 2005; Wood et al., 2004):

At the intermediate or more proximal level, barriers [to risk reduction] are more closely linked to specific behaviours, such as when they influence the availability of legal and accessible prevention services or products to reduce the likelihood of infection. (Sumartojo, 2000, p. S6)

In addition, environmental factors operate at the macro-level wherein structural factors, such as laws, military actions, policies, economic conditions, social inequalities, and wider cultural beliefs, interplay with micro-level environmental factors (Burris, 1999; Singer, 1997, 2001; Parker, Easton, & Klein, 2000; Bourgois, 1998). Also operative at this level are illicit operations,

such as the international drug trade or commercial sex trafficking, structures that intertwine at many points with but are also partially outside of formal state processes. The macro-risk environment can therefore be viewed as comprising large-scale social, physical, economic, organisational and policy systems which combine with micro-level factors to ‘structure’ the risk environments in which HIV risk and harm is produced and reproduced:

At the macro-level, the vulnerability of persons to HIV is influenced by broad social structural characteristics. These ‘core’ or distal causes may be far removed from individuals’ control, but impact their lives through economic inequalities, racism, sexism, discrimination and stigmatisation directed towards groups at high risk. (Sumartojo, 2000, p. S6)

Interplay

Evidence, especially from ethnographic and qualitative research, highlights the *inseparability* of micro-, meso- and macro-level factors (Singer, 1997; Bourgois, Lettiere, & Quesada, 1997). The risk environment is a product of *interplay*. We emphasise that the simple model of risk environment outlined above cannot serve to capture the numerous permutations in how various environmental factors interconnect in a given context. The inseparability of environmental factors cautions against an over-determinacy of approach emphasising structural change in HIV prevention. We cannot expect structural factors to be associated with HIV infection in a linear fashion. HIV risk due to structural factors is often an unintended outcome emerging out of larger social forces which operate on multiple levels and which often have contradictory or synergistic effects on infection rates (Bastos & Strathdee, 2000). An environmental approach thus emphasises that effective HIV prevention is *locally produced*. By this we indicate that environmental approaches to change cannot necessarily be generalised from one local neighbourhood, community or environment to another. Even policy interventions—which have the potential for bringing about social change at the community-level—can differ on account of the local, regional and national settings in which they are produced.

Social and structural factors in risk production

Evidence from HIV epidemics occurring among IDUs in parts of south and south-east Asia over the last two decades, and in the former Soviet Union countries of eastern Europe more recently, points to an interplay of factors which may generally ‘condition’ an environment which seeds and facilitates an epidemic (Rhodes et al.,

1999a). These factors cut across the macro-, meso- and micro-dimensions of physical, social, economic and policy environment outlined above. Considering these factors roughly in that order (from physical to social to economic to policy environment), they include, among others: licit and illicit cross-border trade and transport links; population movement and mixing; urban or neighbourhood deprivation and disadvantage; specific injecting environments (including shooting galleries and prisons); the role of peer groups and social networks; the relevance of ‘social capital’ at the level of networks, communities and neighbourhoods; the role of macro-social change and political or economic transition; political, social and economic inequities in relation to ethnicity, gender and sexuality; the role of social stigma and discrimination in reproducing inequity and vulnerability; the role of policies, laws and policing; and the role of complex emergencies such as armed conflict and natural disasters.

Trade and population movement

Borders and major trade routes are physical structural determinants of heightened HIV vulnerability given that they facilitate population movement and mixing (Lytleton & Amarapibal, 2002; Soskolne & Shtarkshall, 2002; Decosas et al., 1995). As with HIV transmission associated with trade routes in Africa (Decosas et al., 1995; Lacerda et al., 1997; Nzyuko et al., 1997), drug-related trade and transport networks can impact on HIV transmission among IDUs (Beyrer et al., 2000). In Brazil, IDU-associated HIV transmission was associated with the main cocaine trans-shipment routes from the western border to the coastal main ports in the south-east (Barcellos & Bastos, 1996), with HIV rates increasing dramatically among IDUs when cocaine became the drug of choice. Data from Brazil also associate co-infection of malaria and HIV among IDUs, and in particular, a recent outbreak of malaria in Sao Paulo state, with IDU along the main cocaine trafficking routes (Bastos, Barcellos, Lowndes, & Friedman, 1999). In Manipur, the distribution of IDUs and HIV was associated with its main trading road from Myanmar (Sarkar et al., 1994), with subsequent research in rural areas linking the prevalence of drug injecting with the presence of drug trafficking routes (Sarkar, Panda, Das, & Sarkar, 1997). In Nigeria and Kenya, the diffusion of injecting drug use has been associated with international drug trafficking routes (Adelekan & Stimson, 1997; Beckerleg, 2004). In Mexico, HIV prevalence among IDUs is higher in cities along the US-Mexico border (Bucardo et al., *in press*).

The macro-diffusion of IDU and HIV within the geographically proximal countries of China, Burma, Thailand and Viet Nam has been associated with cross-border migration and drug distribution, itself linked to

the relaxation of economic policies and the opening-up of trade routes (Beyrer et al., 2000; Crofts, Reid, & Deany, 1998). In China, for example, the construction of the Mandalay-Muse Highway in 1997, which links Mandalay via Lashio and Muse to Yunnan in China, was linked with increases in HIV among IDUs, as was the completion of the highway linking Kunming (Yunnan) to Nanning (Guangxi) in Guangxi which encouraged population mixing (UNDP, 2001). In Viet Nam also, improvements to National Highway One were associated with increased HIV prevalence among IDUs in Hanoi and Hai Phong in the North as a consequence of developing better transport links with Ho Chi Minh City where HIV prevalence was originally higher. HIV transmission has also been associated with the heroin trafficking routes along Highway Seven in Nghe An Province in Viet Nam (Griffiths, 2000). Similarly, in Russia and other countries of eastern Europe, the rapid diffusion of IDU and associated HIV has been related to the globalisation of trade and transport links as well as to migration and tourism (Dehne, Khodakevich, Hamers, & Schwartlander, 1999; Rhodes et al., 1999b).

A combination of qualitative and molecular data has helped map associations between the diffusion of HIV genotype and overland drug trafficking and trade routes. Focusing on trade routes connecting Burma and Manipur, and linking Burma and Yunnan province, such research highlights that HIV among IDUs in Manipur was facilitated by the tendency for users to travel to Mandalay, a prevalence city in Burma in order to meet dealers where the drug was cheaper, and once there, to self-test the drug, often sharing or using previously used injecting equipment (Beyrer et al., 2000). Similarly, molecular studies in Russia indicated identical viral sub-types among Kaliningrad and Ukrainian IDUs, and among southern Russian IDUs having travelled in the Ukraine (Liitsola, Tashinova, & Korovina, 1998), which in turn supported previously unsubstantiated claims that the Black Sea Coast (a popular holiday destination) formed a geographical nexus of HIV diffusion between Ukraine and Russia (Dehne et al., 1999).

Importantly, borders and economic growth points constitute social locations of heightened HIV vulnerability not only via an interplay of population movement, sex and drug trade and transfer of technology and knowledge (such as IDU), but also because of the *social disruption* created, especially in the context of social and political transition. Borders especially may be characterised by social unease related to fears of deportation, violence, exploitation and language difficulty, as well as by the coming together of socially and economically vulnerable populations including IDUs (Lyttleton & Amarapibal, 2002; Porter & Bennoun, 1997). It is therefore not only population mobility per se which is

important in terms of HIV prevention, but the ways in which *social interactions* at these geographic points of population mixing are socially and economically structured (Skeldon, 2000). Few interventions have been developed to take into account the complex interplay that contributes to HIV vulnerability at international borders (Hammett et al., 2003).

Population movement is thus structurally connected with both economic disadvantage and social inequity (Soskolne & Shtarkshall, 2002; Gillies, Tolley, & Wollstenholme, 2000). For example, in many poor countries poverty is the primary force driving the migration of women from rural to urban areas where they are often enticed or absorbed into the sex trade. Lacking near-by supportive kin or friends, often illegally smuggled into a foreign country where they lack documentation, having limited knowledge of HIV prevention, and possessing little capacity to negotiate risk reduction with clients, these women daily risk exposure to HIV transmission, often including involvement in IDU (Singer, Salaheen, & He, 2004; Beyrer, 2004).

This reminds us that a number of environmental factors combine to produce geographic effects in HIV associated with IDU. A recent multi-method analysis of the geographic distribution of HIV associated with IDU in the United States by Ciccarone and Bourgois (2003) provides an example. Exploring the higher HIV prevalence among IDUs in the north-eastern metropolitan states compared to elsewhere in the United States, they note that geographical location has 'emerged as a proxy variable for behavioural, environmental, historical and/or structural factors' (2003, 2050), which on further investigation may relate, in part, to the type of heroin used by IDUs in different locations. Combining epidemiological, ethnographic and laboratory data, they suggest that IDUs using black tar heroin may reduce HIV risk on account of rinsing their syringes with water to prevent clogging, heating cookers to promote dissolution, and being more likely to shift from intravenous to (less transmittable) intramuscular injection (because of an increased risk of venous sclerosis). The study concludes that geographic differences in the diffusion of HIV associated with IDU between the north-eastern cities and elsewhere in the United States may be structured by the type of heroin available which in turn shapes injecting practices. This in turn suggests that organised crime smuggling and heroin distribution patterns in the United States may have inadvertently shaped patterns of HIV spread among IDUs.

Neighbourhood disadvantage and transition

Evidence in industrialised countries highlights how structural factors associated with neighbourhood disadvantage and urban development can influence HIV

vulnerability, especially among disadvantaged populations (Singer, 1994). Two studies warrant mention here. In a study exploring the health consequences of population shrinkage associated with urban development in Harlem, United States, McCord and Freeman (1990) note that the destruction of housing and population social networks was not only accompanied by increased drug use but was causally associated with HIV outbreaks, with elevated risks for minority ethnic populations. In a similar study in the Bronx, New York, Wallace (1990) shows how urban ‘planned shrinkage’ directed against African-American and Hispanic communities was implemented through the systematic denial of municipal services and was also associated with increased incidence of drug use and HIV. The social disintegration of social networks associated with urban gentrification can be a structural driver in HIV transmission (Friedman, Curtis, Neaigus, Jose, & Des Jarlais, 1999a).

These examples illustrate that city population planning (including gentrification and residential development) may not only be associated with elevated HIV infection rates among ethnic minority populations—including among ethnic minority drug users (Battjes, Pickens, Haverkos, & Sloboda, 1994), but may also be an example of a ‘higher order’ ‘metropolitan pattern of institutionalised racism’ (Friedman & Reid, 2002, p. 180). Socially and economically deprived areas have been described elsewhere as ‘clusters of disadvantage’ emphasising how multiple features of risk and inequality intersect to produce geographical vulnerability (Chambers, 1983).

A related structural feature of geographical vulnerability, including in urban areas and in poor and often subordinated-minority neighbourhoods, is the inequitable distribution of HIV prevention, treatment and other health services (Wallace, Fullilove, Fullilove, Gould, & Wallace, 1994; Takahashi, Wiebe, & Rodriguez, 2001). HIV prevention service availability, including syringe distribution, is not simply a function of individual need, or the proportion of a population at risk having ‘coverage’ (Bastos & Strathdee, 2000), but of physical location as well as how a lack of *access* is influenced by travel times, cost and ease of contact (Rockwell, Des Jarlais, Friedman, Perlis, & Paone, 1999; Takahashi et al., 2001; Blankenship et al., 2000). One of the strongest factors associated with persistent syringe sharing among IDUs in Vancouver and Montreal in Canada, during their HIV outbreaks, was difficulties in *accessing* needles and syringes at night in the face of a persistent cocaine epidemic, even despite relatively good city-wide coverage (Strathdee, Patrick, & Archibald et al., 1997; Strathdee, Patrick, & Currie et al., 1997; Wood et al., 2002). This provoked consideration of the ‘unintended consequences’ of specific institutional rules at syringe exchange schemes, such as limits placed on the

number of needles distributed and an emphasis in some programmes on exchange rather than distribution per se (Bourgeois & Bruneau, 2000).

Homelessness, strongly linked with social-economic inequities more generally (see below), is also a feature of urban deprivation and disadvantaged neighbourhoods affecting IDUs (Galea & Vlahov, 2002). A review of the literature on homelessness provides estimates that between 26% and 67% of homeless people in the United States are chronic alcohol and/or drug users (Shinn, Weitzman, & Hopper, 1998). Homelessness is associated with elevated levels of HIV and related risk behaviour among IDUs, influenced by living conditions and lack of socio-economic resources (Song, Safaeian, Strathdee, Vlahov, & Celetano, 2000; Magura, Nwakeze, Rosenblum, & Joseph, 2000; Susser et al., 1996; Schechter, Strathdee, & Cornelisse, 1999).

Shooting galleries and public injecting environments

The physical environments in which drug injecting occurs can determine access to clean injecting equipment as well as the capacity of IDUs to maintain safer injecting routines without disruption (Rhodes, Fitch, Kumar, Rigley, & Daniels, 2003a, 2005; Singer et al., 2000; Carlson, 2000). Epidemiological research identifies ‘shooting galleries’ as physical environments in which injectors gather to inject drugs and associates such places with an elevated risk of HIV transmission, particularly in galleries in which injecting equipment is rented or stored for re-use (Carlson, 2000; Celentano et al., 1991; Des Jarlais & Friedman, 1990; Chitwood et al., 1990; Page, 1990). Cross-sectional surveys associate having injected in a shooting gallery with an increased likelihood of syringe sharing (Neaigus, Friedman, & Curtis, 1994) as well as increased odds of HCV transmission (Thorpe, Ouellet, Levy, Williams, & Monterroso, 2000). Additionally, research suggests that the presence of a ‘hit doctor’ in public injecting environments may be an important determinant of HIV risk (Kral, Blumenthal, Erringer, Lorvick, & Edlin, 1999; Ouellet, Jimenez, & Johnson, 1991). In Ho Chi Minh City, for example, much drug injecting takes place in off-street shooting galleries (*lo chich*) with professional injectors (*chu*) administering injections, often drawing the solution from a common pot (Ball, Rana, & Dehne, 1998). Other studies associate injecting in outdoor settings or abandoned buildings with HIV transmission (Friedman, Jose, Deren, Des Jarlais, & Neaigus, 1995; Weeks et al., 2001), and injecting in semi-public settings with reduced control over safer injection routines (Latkin, Mandell, Vlahov, Oziemkowska, & Celentano, 1996).

Injecting in public or semi-public places has in turn been associated with urban disadvantage, homelessness and a fear of police arrest resulting from high-profile

policing practices (Bourgois, 1998; Celentano et al., 1991; Maher & Dixon, 1999). In Madras, India, for example, a qualitative study of public injecting environments (abandoned buildings, secluded public spaces, public toilets, slum areas, grave yards) illustrates HIV risks associated with the sharing of injecting equipment stored directly at the shooting place for re-use, noting that seclusion from police, privacy from family and friends, and lack of private housing combine to maintain a public injecting scene (Rhodes et al., 2005). Aside from increased HIV risks, the selection of public injecting places secluded from police surveillance or public gaze has been associated with an increased risk of fatal overdose in some areas (Dovey, Fitzgerald, & Vhoi, 2001).

Prisons and the criminal justice system

The prison risk environment has been well documented (Galea & Vlahov, 2002; Rothon, Mathias, & Schechter, 1994; Edwards, Curtis, & Sherrard, 1999; Hammett, Harmon, & Rhodes, 2002). While the frequency of drug injecting may decrease among injectors in prison, the likelihood of syringe sharing may increase markedly as a consequence of limited syringe availability. Prison is a key structural factor fuelling outbreaks of HIV and tuberculosis in a number of countries in eastern Europe, including Russia, Ukraine and Lithuania (Burgermeister, 2003; Grange & Zumla, 2002). Epidemiological and molecular studies have substantiated evidence of HIV outbreaks occurring among IDUs while in prison (Taylor et al., 1995; Dolan, Wodak, & Penny, 1995). The first HIV outbreak in Thailand occurred among IDUs in the prison system in 1988 (Wright, Vanichsem, Akarasewi, Wasi, & Choopanya, 1994). Large cohort studies among IDUs early in the history of the Thai epidemic note a history of having been in prison as one of few independent risk factors for HIV (Choopanya et al., 1991). More recent Thai studies continue to emphasise the prison as a risk environment, including recent evidence of HIV transmission occurring during time spent in prison (Choopanya, Des Jarlais, & Vanichseni, 2002; Beyrer et al., 2003) or in holding cells prior to incarceration (Buavirat et al., 2003).

In many countries, there are a disproportionate number of people in prisons from minority ethnic populations—clearly evident in the United States (Lemelle, 2002)—and this may serve as an additional structural factor elevating HIV risk among minority populations who are already subject to multiple forms of subordination (Friedman, Jose, & Stepherson, 1998). For example, there are currently approximately seven million people ensnared in one or another sector of the criminal justice system in the United States. It has been estimated that every 20 s someone in the United States is arrested for a drug violation and, at the rate of one per

week, a new prison is completed, in what is the world's most populous penal system (Singer, 2003). Whereas 15% of the nation's cocaine users are African American, they account for approximately 40% of those charged with powder cocaine violations and 90% of those convicted on crack cocaine charges. Overall, African Americans, who comprise 12% of the population in the United States, make up 55% of those convicted for illicit drug possession. Consequently, one in 15 African American males currently is incarcerated (Singer, 2003). Estimates suggest that 13% of African American men in their twenties are incarcerated, compared to 3.7% of Hispanic and 1.6% of white men (Harrison & Karberg, 2004). Furthermore, the cumulative AIDS incidence rate among those in prison in the United States is four times the rate of the general population, with AIDS being the current largest cause of death among African American men aged between 25 and 44 years (Singer, 2003).

Social norms and networks

Social networks influence pathways into drug injecting as well as patterns of injecting risk behaviour. Drug injecting consequences are shaped by shared social and group norms (Hawkins, Latkin, Mandell, & Oziemkowska, 1999; Friedman et al., 1999a; Broadhead, Heckathorn, & Weakhern, 1998) as well as by the structure of social and IDU networks (Friedman & Aral, 2001; Friedman et al., 1997; Neaigus, 1998; Galea & Vlahov, 2002; Latkin et al., 1996, 2003; Rothenberg et al., 1995). Social and IDU networks have a role in shaping and reproducing normative risk perceptions and behaviour among IDUs (Latkin et al., 2003; Friedman & Aral, 2001). For example, one study associates continued low HIV prevalence among IDUs in a neighbourhood characterised by the presence of many HIV positive IDUs and by high levels of sexual risk behaviour, with peer and network norms protective against IDU (Friedman et al., 2002). Other studies have shown that syringe sharing is influenced by the size and density of IDU networks (Latkin et al., 1996) and that HIV transmission may diffuse more readily once HIV has entered the 'core' of large IDU networks (Friedman et al., 1997). Research suggests that the patterns of topological network connection within IDU risk networks may serve to limit HIV transmission once prevalence reaches 20% or more (Friedman et al., 2000; Friedman & Aral, 2001).

Structural factors intersect with the socialisation of IDU networks and behavioural norms. One example concerns the historical structuring of drug preferences at a community level (Agar, 2003; Agar & Reisinger, 2001). Bourgois has noted how historical patterning of drug use norms intersects with wider patterns of social and economic marginalisation, particularly in relation to

crack use and ethnicity (Bourgois, 2003a). He notes a 'de facto US inner city apartheid' in the persistence of macro-determined patterns with respect to preferences in drug of choice and mode of administration, with patterned consequences also for HIV risk (Bourgois, 2003b, 2004).

A second example concerns how elites in some African American minority communities initially spear-headed resistance to the introduction of syringe exchange through a combination of moral and religious opposition, an acute awareness of the elevated social and economic costs of drug use at the community level, and a profound mistrust in government initiatives based on historical experience (Watters, 1996; Cohen, 1999; Quimby & Friedman, 1989). Such resistance may be viewed as a feature of wider structural forces contributing to ethnic subordination in common with a 'racialised social system' which also contributes to elevated levels of drug injecting and HIV among ethnic communities (Lemelle, 2002, p. 136). The social and economic marginalisation of IDU populations which combines to produce a shared sense of social suffering may in turn reinforce close social bonds within networks which 'act as the conveyor belts of drug injection technical knowledge and encouragement' (Singer, 2001, p. 205; Bourgois, 1998). Additionally, micro- and meso-environmental factors—such as changes in policing practices and policies—may disrupt the structure, and consequently the risk and mixing patterns within and between IDU networks, thereby creating new opportunities for HIV spread (Friedman et al., 2000). As a result, the 'War on Drugs', as a force of social disruption in minority communities, may play a significant role in heightening HIV risk among minority drug users (Singer, 2004).

Social capital

A focus on how HIV risk is structured by IDU social networks, leads to a consideration of 'social capital'. Social capital is usually measured in terms of the social, collective, economic and cultural resources available to a network, neighbourhood or community and may be defined as 'features of social life such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit' (Putnam, 1995, p. 67). It therefore seeks to provide an ecological measure of network or community differences in risk or health, and of how networks and communities respond in the face of risk. Research suggests that socially cohesive groups or communities have greater social capital, and are thus, more likely to have the social resources to respond in the face of risk and less likely to suffer ill health or harm as a consequence (Lomas, 1998).

In industrialised countries, socio-economic inequalities have been found to reduce social cohesion and

integration and increase social isolation (Kawachi & Kennedy, 1997). The more socio-economically deprived an area, the poorer is the access to social capital and provision of health services, and in addition, the poorest tend to live in inner-city areas lacking in social resources and marked by social disintegration (Hefferman, 2002). As we noted above, the stock of social capital may be further disrupted or depleted by urban transition, especially gentrification, resulting in entrenched social disintegration and the break-up of informal networks of support. Such social disintegration has been linked in a number of studies with not only growing economic disparity and health inequality among urban disadvantaged populations but also to conditions of drug use, injecting drug use, multiple sexual encounters and violence (Sterk-Elifson & Elifson, 1992; Wallace, 1990; McCord & Freeman, 1990; Gillies et al., 2000). Two recent studies suggest the potential relevance of social capital in understanding the social production of HIV risk (Holtgrave & Crosby, 2003; Campbell, Williams, & Gilgen, 2002; Poundstone et al., 2004). One additional study found that perceptions of neighbourhood characteristics (for example, vandalism, litter, vacant housing, burglary) predicted depressive symptoms at follow-up, suggesting some support for theories of social disorganisation and social stress (Latkin & Curry, 2003). However, few studies have directly assessed relationships between social capital and HIV risk, and the methodological and theoretical scope of the construct remains under debate (Muntaner, Lynch, & Davey Smith, 2000). The concept of social capital is multivalent and in dispute, since it includes aspects of social networks, trust and consensus that may well not all be related to HIV risk or to drug use.

While recognising an increased interest in the notion of social capital, the primary forces at play appear political-economic (see also below), hence the close association between measures of social capital and political-economic condition. For example, macro-social change and political instability—especially when combined with economic uncertainty or decline—may interplay with the breakdown of civil society as well as fragmentation of social cohesion in community response in the face of upheaval or risk, as has been witnessed to varying extent in Russia and eastern Europe (Rhodes et al., 1999b; Laetitia, Carael, Brunet, Frasca, & Chaika, 2000). Generalised instability and uncertainty brought about by social change, civil or armed conflict and political transition may at once feed a loss of social trust and shared identity among individuals and communities and an increase in anxiety and stress, conditions which have been shown to be ripe for transitions towards injecting drug use and which may maximise vulnerability in HIV risk reduction response (Pederson, 2002; Hankins, Friedman, Zafar, & Strathdee, 2000; Delor & Hubert, 2000; Quam, 1994).

Social suffering and socio-political economy

Poverty and relative deprivation emerge as key structural factors influencing HIV transmission in poorer nations as well as in the inner-city communities of industrialised nations (Nicoll & Gill, 1999; Quam, 1994; Krieger et al., 2000; Zierler, Krieger, & Tang, 2000; Sikkema et al., 1996; Parker et al., 2000; Singer, 1994). Studies indicate that HIV transmission can disproportionately affect the economically disadvantaged who also suffer social and welfare inequalities more generally (Hefferman, 2002; Krieger et al., 2000). It has been noted that in Western societies, the diffusion of HIV is shaped by ‘vectors of disadvantage’ (Haan & Kaplan, 1985), that HIV risk is a relative danger among other forms of social and economic suffering (Bourgois et al., 1997; Bourgois, 1998), and consequently that the HIV epidemic is one of a ‘synergism of plagues’ experienced by economically and socially marginalised populations (Wallace, 1990; Bourgois & Moss, 2005; Singer & Clair, 2003). Evidence points to disproportionate levels of drug use and injection among the urban poor (Galea, Nandi, & Vlahov, 2004; Galea & Vlahov, 2002; Latkin et al., 2003; Rhodes, Lilly, & Fernandez, 2003b; Waterson, 1993; Pearson, 1987), and elevated levels of HIV prevalence and risk behaviour among IDUs in situations of comparative economic disadvantage (Friedman, Perlis, & Des Jarlais, 2001). An analysis of metropolitan areas in the United States, for example, shows that areas where income inequality is highest also have significantly more IDUs per capita, higher rates of HIV prevalence and higher rates of HIV incidence among uninfected IDUs (Friedman et al., 2001).

The concepts of ‘*social suffering*’ and ‘*structural violence*’ emerge as especially useful in recognising how the social–political economy of risk is a product of multiple forms of structural subordination (Bourgois, 2003b). Kleinman, Das, and Lock (1997) note that: ‘Social suffering results from what political, economic and institutional power does to people and, reciprocally, from how these forms of power themselves influence responses to social problems’. In turn, Pederson (2002, p. 187) notes: ‘Social suffering evokes an assemblage of human problems that have their origins and consequences in the devastating injuries that the existing social order of the world inflicts, in variable degrees according to local situations, on the experience of individuals up to entire communities and nations’. Farmer, Connors, and Simmons (1996, p. 369) define structural violence as: ‘large-scale forces—ranging from gender inequality and racism to poverty—which structure unequal access to goods and services’, which in turn create the social, emotional and physical conditions producing HIV risk (Baer, Singer, & Susser, 2003). They critique public health approaches that over-emphasise

individual agency which is constrained by social structural forces related to poverty and social inequality.

Importantly, such structurally determined inequalities find their expression in the micro-social environment and in patterns of individual and community risk behaviour. Cultures of stigmatisation, discrimination and other forms of social or physical violence, may become internalised as everyday features of lived experience (Bourgois, Prince, & Moss, 2004), in turn finding their expression at the individual level in terms of psychological or emotional harms, such as fatalism, self-hatred or powerlessness (Singer, 2001; Farmer et al., 1996; Pederson, 2002). Singer and Toledo (1995) use the term ‘*oppression illness*’ to refer to this interplay of the chronic traumatic effects of experiencing stigma (for example, racism) over long periods of time and the acceptance of such prevailing negative social stereotypes manifested as self-blame.

Building on the concepts of social suffering and structural violence while also borrowing from Bourdieu’s notion of ‘symbolic violence’ (Bourdieu, 2001), the recent ethnographic work of Bourgois and colleagues provides an example of an ecological approach serving to unpack how structural forces are reproduced in the everyday lives of drug users and IDUs. In a study among heroin and amphetamine users in San Francisco, they show how extreme levels of violence are normalised in the common sense of street-youth drug culture, thereby naturalising a community-wide status quo or norm of violence and subordination which finds its underlying causes in wider political and economic forces (Bourgois & Moss, 2005). This study also illustrates how such violence runs along gender lines, with portrayals of violence closely associated with male identity and expressions of power, which are in turn reinforced by the pragmatics of income generation and resource sharing which place women in ‘economically parasitical’ relationships with older men. At the same time, epidemiological research shows 50% higher HCV seroconversion among women in San Francisco, with the strongest predictors of HCV positivity being an injecting partner who is also a sexual partner and syringe sharing with a sexual partner who is hepatitis C positive (Evans, Hahn, & Page-Shafer, 2003). As others have noted (Farmer, Connors, & Simmons, 1996; Farmer et al., 1996; Miller & Neaigus, 2001), female IDUs face multiple forms of stigmatisation and inequity, including elevated HIV risks associated with what Bourgois and colleagues term the ‘male control over the logistics of injection as a natural fact of gender relations’ (Bourgois & Moss, 2005). In practical terms, this often leads female IDUs to be ‘second on the needle’, heightening their HIV transmission risk (Harvey et al., 1998).

The extensive and multiple forms of structural violence in the lives of drug users—often beginning at an early age in their lives and continuing throughout

their drug careers—poses important challenges for structural intervention (Singer, Simmons, Duke, & Broomhall, 2001). Importantly, the notion of social suffering highlights the importance of *social and cultural factors*—and not only political or economic ones—as structural forces in the reproduction of ethnic, gender and other forms of discrimination (Williams, 1999). This in turn highlights the effect of stigma and discrimination against IDUs (and other vulnerable populations) in reproducing dominant relations of power by quashing social difference (Parker & Aggleton, 2003). Stigmatising practices against IDUs—whether at the level of individuals, communities, institutions or policies—can be viewed as instances of structural violence contributing toward a collective experience of social suffering. Importantly, it is also useful to note that conditions of structural violence and social suffering often lead to the development of ‘survival cultures’ and/or social struggles that help to mitigate HIV risk (Farmer, 1992; Friedman et al., 1999b; Friedman & Reid, 2002).

Additionally, it is useful to note that any one of the above structural factors—inequalities in economic, social, ethnic and gender position—may not singularly be independently or causally associated with elevated HIV transmission among IDUs but that they cluster together, perhaps as features of other more distal and ‘higher order’ structural determinants such as ideologies of individualism in industrialised society, how social systems or cultures respond to risk and vulnerability, the impact of globalisation on behavioural patterns, or the role of corporate power in reproducing inequalities (Douglas, 1992; Bourgois, 1998; Friedman & Reid, 2002; Baer et al., 2003).

Law enforcement and policing

Law enforcement and policing practices may have adverse effects on the efficacy and reach of HIV prevention, as well as on the capacity of IDUs to enact risk reduction (Bluthenthal et al., 1997; Aitken, Moore, Higgs, Kelsall, & Kerger, 2005; Rhodes et al., 2003a; Burris, 1999; Burris et al., 2005; Maher & Dixon, 1999; Drucker, 1999; Case, Meehan, & Jones, 1998; Koester, 1994; Grund, Stern, Kaplan, Adriaans, & Drucker, 1992; Sarkar et al., 1994; Strathdee, Zafar, Brahmhatt, Baksh, & ul Hassan, 2003). Macro-analyses of legal and policy environment emphasise national and state laws regulating syringe distribution as structural determinants of HIV (Hurley, Jolley, & Kaldor, 1997; Des Jarlais, 2000; Taussig, Weinstein, Burris, & Jones, 2000; Friedman et al., 2001). Ecological studies show higher levels of syringe sharing, as well as higher levels of HIV infection in some cases, among IDUs in areas where there exist legal restrictions on needle and syringe distribution compared to areas where no such restrictions exist (Hurley et al., 1997; Friedman et al., 2001;

Calsyn, Saxon, Freeman, & Whittaker, 1991). In the United States, the ongoing Congressional ban on the use of federal funds to support syringe exchange dramatically affects syringe distribution coverage (Paone, Clark, Shi, Purchase, & Des Jarlais, 1999), and prior to around 1999 it was even illegal to use federal funding to study syringe exchange (Vlahov et al., 2001). Policies restricting the volume or number of needles and syringes exchanged also limit syringe distribution coverage (Heimer, Blumenthal, Singer, & Khoshnood, 1996; Bray, Lawson, & Heimer, 2001; Lurie & Drucker, 1997).

Furthermore, laws pertaining to syringe possession and distribution are themselves often situated within a broader approach to drug use in which criminal justice plays a key role, often with the consequence that IDUs live day-to-day in the context of police surveillance, mistrust and suspicion (Burris et al., 2005; Bourgois, 1998; Grund et al., 1992; Bastos & Strathdee, 2000). In Russia, for example, the interpretation at city or Oblast (regional) level of federal narcotic laws governing the ‘promotion’ of drug use, potentially restricts the introduction or expansion of syringe exchange in some cities even despite syringe exchange being technically operable within federal laws (Poloubinskaya, 2002; Rhodes et al., 2003a). Some deem the Russian legislative system an obstacle to the introduction and expansion of harm reduction unless legal changes are promoted (Butler, 2003). Anecdotal reports suggested an increase in police activity targeting IDUs attending syringe exchanges, including reported harassment, in a number of cities following the passing of new federal narcotics law in 1998 (Mokienko & Mokienko, 2001), as well as the temporary closure, or attempted closure, of some projects for fear that they may be interpreted as abetting drug use (Grund et al., 2001).

Additionally, micro-analyses indicate the potential for local laws and policing strategies to work against HIV prevention. There is evidence from many countries linking reluctance among IDUs to carry and exchange needles and syringes with high-profile policing practices (Rhodes et al., 2003a; Maher & Dixon, 1999; Case et al., 1998; Rich, Dickinson, & Case, 1998; Bluthenthal et al., 1997; Strathdee et al., 1997a, b; Koester, 1994). In Russia, for example, a five city study of IDUs attending syringe exchanges showed that 44% reported being stopped by the police in the month prior to the study, and of these, 67% reported that their injecting equipment was confiscated, of whom 44% had their injecting equipment destroyed in situ (Grund et al., 2001). In this study, 40% of IDUs said that they did not routinely carry injecting equipment, in part to avoid attracting attention from the police. In qualitative studies of injecting drug use in Russia, a reluctance to carry needles and syringes for fear of detainment or arrest if stopped or searched was associated by IDUs with an

increased risk of needle and syringe sharing, especially at the place of drug sale, invariably a dealer's house (Rhodes et al., 2003a, 2004). A concomitant fear of the carriage of used needles and syringes as constituting evidence of possession or providing rationale for increased police interest also discouraged IDUs' from using local pharmacies for the purchase of clean injecting equipment. Similarly, research in Guangdong Province, China, shows that while drug users have access to sterile syringes at pharmacies, many IDUs fear that the police monitor pharmacies to identify illicit drug users who have heretofore escaped their attention (Singer, Li, & Duke 2003).

In North America, while the repeal of laws restricting IDUs' access to clean injecting equipment has contributed towards significant reductions in syringe sharing (Taussig et al., 2000; Singer, Weeks, & Himmelgreen, 1995), in some cities, even despite changes in paraphernalia or prescription laws, a combination of policing strategies and fear of arrest hampers IDUs' access to syringes (Bray et al., 2001; Weinstein, Toce, Katz, & Ryan, 1998; Metzger et al., 1991; Des Jarlais, 2000). In California, for example, police actions contributed to IDUs' decisions not to use local syringe exchanges through fear of arrest, with the consequence that IDUs fearing arrest were 1.5 times more likely to share needles and syringes used by others (Bluthenthal et al., 1997).

Changes in laws governing syringe distribution alone may not create an environment supportive of risk reduction. This emphasises the importance of distinguishing 'law on the books' from 'law in practice' (Koester, 1994; Burris et al., 2005). For example, in Sydney, Australia—as elsewhere (Wood et al., 2004; Cooper, Moore, Gruskin, & Krieger, 2005)—qualitative research highlights that despite policy commitments to harm reduction, law enforcement and saturation policing strategies assumed greater prominence in practice, leading to reluctance among IDUs to carry needles and syringes as well as more opportunistic and hurried injecting in public environments (Maher & Dixon, 1999). A similar study in Melbourne associated high-profile and saturation policing in a drug dealing and using area with a reduction in the number of visits made by IDUs to the local syringe exchange and increased risk behaviour consequent on the need to inject quickly without being seen.

Armed conflict and complex emergencies

Complex emergencies are usually defined as situations affecting large civilian populations which combine war and civil strife or natural disasters with food shortages and population displacement (Hankins et al., 2002; Toole, 1999). There is some evidence identifying population displacement brought about by armed

conflicts as a mechanism in the diffusion of new outbreaks of HIV (Hankins et al., 2002; Spiegel, 2004), including for example, in Angola (Santos-Ferreira et al., 1990), El Salvador (Wollants et al., 1995), Uganda (Smallman-Raynor & Cliff, 1991), and Sierra Leone (Salama, Laurence, & Nolan, 1999). Sometimes this is connected with increased sexual transmission risks associated with sex for money or food exchanges (sometimes termed 'survival sex'), rape (often involving military personnel), and sexual abuse, wherein the distribution of risk is clearly structured unequally between men and women (Hankins et al., 2002; Amowitz, Reis, & Lyons, 2002). In Rwanda, for example, it is said that virtually all adolescent women who survived the genocide of 1994 had experienced rape (Pederson, 2002). Refugee camps and holding centres for displaced persons in particular have been linked with increased sexual risk behaviour and have the potential to act as points for epidemic dispersal (Akwir, Arkangel, Moluma, Idro, & Homsey, 1998; Pederson, 2002), while levels of sexual partner change and drug use may increase per se under conditions of conflict, emergency and social instability, as witnessed in some of the Balkan countries (Carballo, Puvacic, & Zeric, 1998).

The evidence base linking complex emergency situations with HIV transmission associated with IDU is weaker. It is well known that local heroin refining in parts of south-east Asia was initially prompted not only by the success of enforcement against refiners in the Mediterranean but also by the demand for heroin from US servicemen in Viet Nam (Robins, Helzer, & Davis, 1975; Stimson, 1993). Afghanistan provides a recent case example (Hankins et al., 2002). Prior to a Taliban enforced ban on poppy cultivation in early 2001, Afghanistan provided the majority—perhaps 75%—of the global heroin supply (UNODCCP, 2000). Fluctuations in heroin supply were marked between Taliban controlled and non-Taliban controlled areas within Afghanistan (Reid & Crofts, 2002), as well as outside Afghanistan as a result of market impact in availability, price and purity, including reportedly in Russia. For example, interruptions in heroin supply as a result of increased policing and interdiction activity along the Pakistan-Afghanistan border were associated with reduced heroin quality in Quetta (Zafar & ul Hasan, 2002), and increased rates of needle sharing in Lahore (Strathdee et al., 2003). More recently, perceived increases in the price of heroin led to transitions from heroin smoking to injection of liquid buprenorphine in Lahore, but not in Quetta, which exemplifies the extent to which heterogeneity in local conditions can influence HIV vulnerability (Kuo et al., 2004). Conditions of conflict in both Afghanistan, Pakistan and India are such that the development of harm reduction interventions are interrupted and the availability of sterile

needles and syringes often limited (Zafar & ul Hasan, 2002). As witnessed elsewhere in conditions of complex emergency—such as in some countries of the Balkans—sustained armed and regional conflict can stall the development of national policy or strategic responses to HIV/AIDS for many years given the intensity of other welfare pressures vying for political attention and limited funding.

Discussion

If HIV risk is socially produced then so too are public health solutions. An increased interest in depicting the ‘risk environments’ of HIV risk has led to calls for the creation of ‘enabling environments’ for individual and community change brought about by ‘structural HIV prevention’ (Tawil et al., 1997; Blankenship et al., 2000; Sumartojo, 2000; Des Jarlais, 2000). Additionally, shifts towards understanding the social determinants of HIV connect with wider calls for a paradigm shift in public health from biomedical and behavioural approaches to ecological approaches associated with a revitalised social epidemiology (Friedman et al., 1994; Susser & Susser, 1996; Diez-Roux, 1998; Rhodes et al., 1999a; Kaplan, 2004; Poundstone et al., 2004). An understanding of social determinants and an embracement of social change in HIV prevention also seeks to connect HIV risk reduction within the context of human rights and vulnerability more broadly, thereby encouraging a shift in understanding *responsibility for harm* and the *focus for change* as a product of individuals to a product of the social situations and structures in which individuals find themselves (Rhodes, 2002; Ezard, 2001; Baer et al., 2003).

Structural HIV prevention

Structural HIV prevention is a recent concept and variably defined (Sweat & Denison, 1995; Parker et al., 2000). The ‘broad-school’ adopts an inclusive definition of structural HIV prevention which incorporates all forms of social intervention which can arguably be viewed as ‘extra-individual’ (Heimer et al., 2002). A definition proffered by Blankenship et al. (2000, p. S11) summarises this approach: ‘We use the term ‘structural’ to refer to interventions that work by altering the context within which health is produced or reproduced’. They go on to indicate that structural interventions identify factors in the social, economic and political environment that influence risk and harm at the levels of the individual, community and society. The unit of interest, analysis and change becomes the structure or system. Structural interventions are obviously distinct from individual interventions in that they seek to modify the environment:

The environment to be modified may be the social, legal, policy or cultural environment. Structural interventions do not attempt to modify the knowledge, attitudes and motives of individual IDUs, but rather structural interventions can ‘free’ individual IDUs to act upon already existing motives to practice risk reduction, or can ‘restrict’ individual IDUs from acting on existing motives to engage in HIV risk behaviours. (Des Jarlais, 2000, p. S42)

Of significance is that such broad definitions of structural HIV prevention associate intervention not only with efforts oriented to structural change but also community change. As recently noted in relation to structural interventions targeting IDUs: ‘We apply the label ‘structural’ to the entire range of interventions that share the common goal of changing context to promote health’, and such interventions require ‘changing laws, standards, or administrative procedures using strategies that include advocacy, community organising, legislation, and litigation’, which can be ‘applied at the community, municipal, regional or national level’ (Heimer et al., 2002). As we noted above, HIV risk associated with IDU is a product of *interplay*, with social and structural factors intermingling in the production of risk.

Community and structural change

This leads to considering the practical importance of distinguishing community and structural change. While appreciating risk as a product of interplay it is practically important from an applied perspective not to simply collapse community and structural change into the residual term ‘context’ (for example, Blankenship et al., 2000). For both practical utility and conceptual clarity, we distinguish interventions which seek to foster community change from those attempting to promote structural change (Des Jarlais, 2000). Whereas interventions fostering community change view the agent of change as social groups or networks, usually within a defined geographic area, and the process of change as being governed by a combination of social influence or diffusion within these groups and within the particular social and physical environments in which risk behaviour occurs, interventions targeting structural change seek to remove environmental obstacles to community-level behaviour change as well as strengthen aspects in the environment conducive to realising community-level change (Des Jarlais, 2000). Structural change focuses on the macro-social dynamics and infrastructures that are not necessarily consciously understood by either policy-makers or by IDUs as related to HIV risk. As we have noted, the HIV outcomes promoted by structural forces are a product of the interface of multiple complex

processes which are by no means necessarily linear in their effects on infectious disease.

Interventions encouraging structural change attempt to remove structural impediments which exist in the economic, social, legal or policy environment that prevent community change or community change interventions from taking place. Structural change, by necessity, is commonly targeted to barriers to risk reduction and risk promoters that reside or are generated in locations beyond the community level, which none the less impact life and risk within communities. For example, efforts to rescind the current federal ban on national funding for syringe exchange in the United States constitute an as yet unsuccessful structural intervention, while efforts to develop a local syringe exchange programme and gear this initiative to the needs and characteristics of the local setting and population comprise a community intervention. Structural intervention often links geographically dispersed groups and advocates who share a common understanding of the wider social structural drivers in HIV transmission. While accepting the difficulty in disentangling social from structural factors in the production of HIV risk, we nonetheless consider that such an attempt is necessary if community and structural change interventions are to be applied and evaluated effectively.

Human rights and HIV prevention

Socio-political and political-economic approaches (Bourgois, 2004; Kleinman et al., 1997; Farmer et al., 1996; Singer, 2005), and to an increasing extent the revitalisation of social epidemiology in the context of HIV prevention (Poundstone et al., 2004), emphasise the parallels in how context influences HIV-related risk specifically as well as health, rights and vulnerability in general. This highlights the importance of what might be described as ‘non-drug’ and ‘non-HIV’ structural HIV prevention for IDUs. We have noted above how vulnerability to drug-related harm is closely associated with social, material and health inequalities more generally. Because structural HIV prevention necessarily seeks to alleviate the situational and structural conditions of risk it may be configured as a contribution to the alleviation of health and social vulnerability more generally. This, in turn, offers a broader vision for intervention than that conventionally constituted ‘HIV prevention’ or ‘harm reduction’, in that it locates community actions and structural changes within a broader framework concerned to alleviate inequity in health, welfare and human rights (Mann, Gostin, & Gruskin, 1999). In its focus on understanding and reducing structural violence and social suffering in relation to HIV transmission, structural HIV prevention is unavoidably political.

Conclusion

There is growing appreciation and evidence of community action and public policy interventions as a means of HIV prevention (Sumartojo, 2000; Blankenship et al., 2000; Poundstone et al., 2004). The cities or countries with most success in controlling, averting or reversing HIV epidemics among IDUs have adopted interventions in keeping with World Health Organization (WHO) endorsed principles of effective public health (Ball, 1998). These intervention approaches are well-established and include responses which are *rapid* and *pragmatic, community-based* and *community-level*, and which develop *user-friendly* and *low-threshold* services (Ball, 1998). Importantly, structural HIV prevention reflects the principles of internationally accepted effective public health practice, including the WHO endorsed principles contained within the *Ottawa Charter for Health Promotion* (WHO, 1996). The future of HIV prevention among IDUs to a large extent depends upon the extent to which environmental change interventions are promoted. HIV prevention and harm reduction needs to be nested within programmes to alleviate social and economic inequality among this marginalised population more generally. Fostering social structural change is the critical next stage in the global fight against AIDS.

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References

- Adekan, M. L., & Stimson, G. V. (1997). Problems and prospects of implementing harm reduction for HIV and

- injecting drug use in high risk sub-Saharan African countries. *Journal of Drug Issues*, 27, 97–116.
- Agar, M. (2003). The story of crack: towards a theory of illicit drug trend. *Addiction Research and Theory*, 11, 3–29.
- Agar, M., & Reisinger, H. S. (2001). Using trend theory to explain heroin use trends. *Journal of Psychoactive Drugs*, 33, 203–211.
- Aitken, C., Moore, D., Higgs, P., Kelsall, J., & Kerger, M. (2002). The impact of a police crackdown on a street drug scene: evidence from the street. *International Journal of Drug Policy*, 13, 189–198.
- Akwir, M., Arkangel, A., Moluma, D., Idro, J. W., & Homsy, J. (1998). Vulnerability of refugee women to HIV/AIDS infection in refugee camps in northern Uganda. *Twelfth World AIDS Conference*, Durban [abstract WePeD4613].
- Amowitz, L., Reis, C., Lyons, K. H., et al. (2002). Prevalence of war-related sexual violence and other human rights abuses among internally displaced persons in Sierra Leone. *Journal of the American Medical Association*, 287, 513–521.
- Aral, S. O. (2002). Determinants of STD epidemics: implications for phase appropriate intervention strategies. *Sexually Transmitted Infections*, 78(Supplement 1), i3–13.
- Avants, S. K., Warburton, L. A., Hawkins, K. A., & Margolin, A. (2000). Continuation of high-risk behavior by HIV-Positive drug users. *Journal of Substance Abuse Treatment*, 19, 15–22.
- Baer, H., Singer, M., & Susser, I. (2003). *Medical anthropology and the world system* (2nd ed.). Westport, CT: Greenwood Publishing.
- Ball, A. (1998). Policies and interventions to stem HIV-1 epidemics associated with injecting drug use. In G. V. Stimson, D. C. Des Jarlais, & A. Ball (Eds.), *Drug injecting and HIV infection* (pp. 201–232). London: UCL Press.
- Ball, A., Rana, S., & Dehne, K. L. (1998). HIV prevention among injecting drug users: responses in developing and transitional countries. *Public Health Reports*, 113(Supp 1), 170–181.
- Barcellos, C., & Bastos, F. I. (1996). Redes sociais e difusão da AIDS no Brasil. *Boletim de la Oficina Sanitaria Panamericana*, 121, 11–24.
- Barnett, T., & Whiteside, A. (1999). HIV/AIDS and development: case studies and a conceptual framework. *European Journal of Development Research*, 11, 200–234.
- Bastos, F. I., Barcellos, C., Lowndes, M. C., & Friedman, S. R. (1999). Co-infection with malaria and HIV in injecting drug users in Brazil. *Addiction*, 94, 1165–1174.
- Bastos, F. I., & Strathdee, S. (2000). Evaluating effectiveness of syringe exchange programmes. *Social Science & Medicine*, 51, 1771–1782.
- Battjes, R. J., Pickens, R. W., Haverkos, H. W., & Sloboda, Z. (1994). HIV risk factors among injecting drug users in five US cities. *AIDS*, 8, 681–687.
- Beckerleg, S. (2004). Living with Heroin at the Kenya coast. In R. Coomber, & N. South (Eds.), *Drug use and cultural context 'Beyond the West'*. London: Free Association Books.
- Beyrer, C. (2004). Is trafficking a health issue? *Lancet*, 363, 564.
- Beyrer, C., Jittiwutikarn, J., Teokul, W., Razak, M. H., Suriyanon, V., Srirak, N., Vongchuk, T., Tovanabutra, S., Sripaipan, T., & Celentano, D. D. (2003). Drug use, increasing incarceration rates and prison-associated HIV risks in Thailand. *AIDS and Behavior*, 7, 153–161.
- Beyrer, C., Razak, M. H., Lisam, K., Chen, J., Lui, W., & Yu, X. F. (2000). Overland heroin trafficking routes and HIV-1 spread in south and south-east Asia. *AIDS*, 14, 75–84.
- Blankenship, K. M., Bray, S., & Merson, M. H. (2000). Structural interventions in public health. *AIDS*, 14(Supplement A), S11–S21.
- Bluthenthal, R. N., Kral, A., Lorrivick, J., & Watters, J. K. (1997). Impact of law enforcement on syringe exchange programs. *Medical Anthropology*, 18, 61–83.
- Bourdieu, P. (2001). *Masculine domination*. Stanford, California: Stanford University Press.
- Bourgois, P. (1998). The moral economies of homeless heroin addicts: confronting ethnography and HIV risk and everyday violence in San Francisco shooting encampments. *Substance Use and Misuse*, 33, 2323–2351.
- Bourgois, P. (2003a). US inner-city apartheid: the contours of structural and interpersonal violence. In N. Scheper-Hughes, & P. Bourgois (Eds.), *Violence in war and peace: an anthology* (pp. 297–303). Oxford: Blackwell Publishing.
- Bourgois, P. (2003b). Crack and the political economy of social suffering. *Addiction Research and Theory*, 11, 31–37.
- Bourgois, P. (2004). US inner city apartheid and the war on drugs: crack among homeless heroin addicts. In A. Castro, & M. Singer (Eds.), *Unhealthy health policy: a critical anthropological examination* (pp. 303–313). Walnut Creek, CA: Altamira Press.
- Bourgois, P., & Bruneau, J. (2000). Needle exchange, HIV Infection and the politics of science: confronting Canada's cocaine injection epidemic with participant observation. *Medical Anthropology*, 18, 325–350.
- Bourgois, P., Lettiere, M., & Quesada, J. (1997). Social misery and the sanctions of substance use: confronting HIV risk among homeless heroin addicts in San Francisco. *Social Problems*, 44, 155–173.
- Bourgois, P., Prince, B., & Moss, A. (2004). The everyday violence of hepatitis C among young women who inject drugs in San Francisco. *Human Organization*, 63, 253–264.
- Bray, S., Lawson, J., & Heimer, R. (2001). Doffing the cap: increasing syringe availability by law but not in practice. *International Journal of Drug Policy*, 12, 221–235.
- Broadhead, R., Heckathorn, D., Weakhern, D., et al. (1998). Harnessing peer education networks as an instrument for AIDS prevention. *Public Health Reports*, 113(Supplement 1), 42–57.
- Buavirat, A., Page-Shafer, K., van Griensven, G. J., Mandel, J. S., Evans, J., Chuaratanaphong, J., Chiamwongpat, S., Sacks, R., & Moss, A. (2003). Risk of prevalent HIV infection associated with incarceration among injecting drug users in Bangkok, Thailand: case-control study. *British Medical Journal*, 326, 308.
- Bucardo, J., Brouwer, K.C., Magis, C., Fraga, M.A., Perez, S.G., Patterson, T.L., & Strathdee, S.A. Historical trends in the production and consumption of illicit drugs in Mexico: Implications for the prevention of blood borne infections. *Drug and Alcohol Dependence*, in press.
- Burgermeister, J. (2003). Three quarters of Russia's prisoners have serious diseases. *British Medical Journal*, 327, 1066.
- Burris, S. (1999). Law as a structural factor in the spread of communicable disease. *Houston Law Review*, 36, 1755–1786.

- Burris, S., Donoghoe, M., Sherman, S., Blankenship, K., Vernick, J. S., Case, P., Lazzarini, Z., & Koester, S. (2004). Addressing the 'risk environment' for injection drug users: the mysterious case of the missing cop. *Human Organization* (in press).
- Butler, W. (2003). *HIV/AIDS and drug misuse in Russia: harm reduction programmes and the russian legal system*. London: International Family Health.
- Calsyn, D. A. A., Saxon, A. J., Freeman, G., & Whittaker, S. (1991). Needle use practices among intravenous drug users in an area where needle purchase is legal. *AIDS*, 5, 187–193.
- Campbell, C., Williams, B., & Gilgen, D. (2002). Is social capital a useful conceptual tool for exploring community level influences on HIV infection? *AIDS Care*, 14, 41–54.
- Carballo, M., Puvacic, S., & Zeric, D. (1998). Implications of complex emergencies, uprooting and forced migration on risk of HIV/AIDS: the case of Bosnia and Herzegovina. *Twelfth World AIDS Conference*, Durban [abstract WePeD4613].
- Carlson, R. G. (2000). Shooting galleries, dope houses and injection doctors: examining the social ecology of HIV risk behaviours among drug injectors in Dayton, Ohio. *Human Organization*, 59, 325–333.
- Case, P., Meehan, T., & Jones, S. (1998). Arrests and incarceration of injection drug users for syringe possession in Massachusetts: implications for HIV prevention. *Journal of Acquired Immune Deficiency Syndromes and Human Retroviruses*, 18(Supplement 1), S71–S75.
- Celentano, D. D., Vlahov, D., Cohn, S., Anthony, J. C., Solomon, L., & Nelson, K. E. (1991). Risk factors for shooting gallery use and cessation among intravenous drug users. *American Journal of Public Health*, 81, 1291–1295.
- Chambers, R. (1983). *Rural development: putting the last first*. London: Longman.
- Chitwood, D. D., McCoy, C. B., Inciardi, J. A., McBride, D., Comerford, M., Trapido, E., et al. (1990). HIV seropositivity of needles from shooting galleries in south Florida. *American Journal of Public Health*, 80, 150–153.
- Choopanya, K., Des Jarlais, D. C., Vanichseni, S., et al. (2002). Incarceration and risk for HIV infection among injection drug users in Bangkok. *Journal of AIDS*, 29, 86–94.
- Choopanya, K., Vanichseni, S., Des Jarlais, D. C., Plangsringarm, K., Sonchai, W., Carballo, M., et al. (1991). Risk factors and HIV seropositivity among injecting drug users in Bangkok. *AIDS*, 5, 1509–1513.
- Ciccarone, D., & Bourgois, P. (2003). Explaining the geographical variation of HIV among injection drug users in the United States. *Substance Use and Misuse*, 38, 2049–2063.
- Cohen, C. J. (1999). *The boundaries of blackness: AIDS and the breakdown of Black politics*. Chicago, IL: University of Chicago Press.
- Cooper, H., Moore, L., Gruskin, S., & Krieger, N. (2004). The impact of a police drug crackdown on drug injector's ability to practice harm reduction: a qualitative study. *Social Science & Medicine* (in press).
- Coyle, S. L., Needle, R. H., & Normand, J. (1998). Outreach-based HIV prevention for injecting drug users: a review of published outcomes data. *Public Health Reports*, 113(Supplement 1), 19–30.
- Crofts, N., Reid, G., & Deany, P. (1998). Injecting drug use and HIV infection in Asia. *AIDS*, 12(Supplement B), S69–S78.
- Decosas, J., et al. (1995). Migration and AIDS. *Lancet*, 346, 826–828.
- Dehne, K. L., Khodakevich, L., Hamers, F. F., & Schwartlander, B. (1999). The HIV/AIDS epidemic in eastern Europe: Recent patterns and trends and their implication for policy-making. *AIDS*, 13, 741–749.
- Delor, F., & Hubert, M. (2000). Revisiting the concept of 'vulnerability'. *Social Science & Medicine*, 50, 1557–1570.
- Des Jarlais, D. (2000). Structural interventions to reduce HIV transmission among injecting drug users. *AIDS*, 14(Supplement 1), S41–S46.
- Des Jarlais, D. C., & Friedman, S. R. (1990). Shooting galleries and AIDS: infection probabilities and 'tough' policies. *American Journal of Public Health*, 80, 142–144.
- Diez-Roux, A. V. (1998). Bringing context back into epidemiology: variables and fallacies in multilevel analysis. *American Journal of Public Health*, 88, 216–222.
- Dolan, K., Wodak, A., & Penny, R. (1995). AIDS behind bars: preventing HIV among incarcerated drug injectors. *AIDS*, 9, 825–832.
- Douglas, M. (1992). *Risk and blame: essays in cultural theory*. London: Routledge.
- Dovey, K., Fitzgerald, J., & Choi, Y. (2001). Safety becomes danger: dilemmas of drug use in public space. *Health and Place*, 7, 319–331.
- Drucker, E. (1999). Drug prohibition and public health: 25 years of evidence. *Public Health Reports*, 114, 15–29.
- Edwards, A., Curtis, S., & Sherrard, J. (1999). Survey of risk behaviour and HIV prevalence in an English prison. *International Journal of STD and AIDS*, 10, 464–466.
- Evans, J. L., Hahn, J. A., Page-Shafer, K., et al. (2003). Gender differences in sexual and injection risk behaviour among active young injection drug users in San Francisco. *Journal of Urban Health*, 80, 137–146.
- Ezard, N. (2001). Public health, human rights and the harm reduction paradigm: from risk reduction to vulnerability reduction. *International Journal of Drug Policy*, 12, 207–209.
- Farmer, P. (1992). *AIDS and accusation: Haiti and the geography of blame*. Berkeley, CA: University of California Press.
- Farmer, P., Connors, M., & Simmons, J. (1996). *Women, poverty and AIDS: sex, drugs and structural violence*. Monroe, Maine: Common Courage Press.
- Fee, E., & Krieger, N. (1993). Understanding AIDS: historical interpretations and the limits of biomedical individualism. *American Journal of Public Health*, 83, 1477–1487.
- Friedman, S. R., & Aral, S. (2001). Social networks, risk-potential networks, health and disease. *Journal of Urban Health*, 78, 411–418.
- Friedman, S. R., Curtis, R., Neaigus, A., Jose, B., & Des Jarlais, D. C. (1999a). *Social networks, drug injectors' lives and HIV/AIDS*. New York: Kluwer/Plenum.
- Friedman, S. R., Des Jarlais, D. C., & Ward, T. P. (1994). Social models for changing health-relevant behavior. In R. DiClemente, & J. Peterson (Eds.), *Preventing AIDS: theories & methods of behavioral interventions* (pp. 95–116). New York: Plenum Press.
- Friedman, S. R., Flom, P. L., Kottiri, B. J., Sandoval, M., Neaigus, A., Maslow, C., et al. (2002). Networks, norms and HIV risk in New York City. In *The network paradigm on drug abuse, HIV and other blood-borne and*

- sexually transmitted infections. NIDA/CAMCODA Working Meeting.
- Friedman, S. R., Jose, B., Deren, S., Des Jarlais, D. C., & Neaigus, A. (1995). Risk factors for human immunodeficiency virus seroconversion among out-of-treatment drug injectors in high and low seroprevalence cities. *American Journal of Epidemiology*, *142*, 864–874.
- Friedman, S. R., Jose, B., Stepherson, B., et al. (1998). Multiple racial/ethnic subordination and HIV among drug injectors. In M. Singer (Ed.), *The political economy of AIDS* (pp. 131–148). New York: Baywood.
- Friedman, S. R., Kottiri, B. J., Neaigus, A., Curtis, R., Vermund, S. H., & Des Jarlais, D. C. (2000). Network related mechanisms may help explain long-term HIV-1 seroprevalence levels that remain high but do not approach population-group saturation. *American Journal of Epidemiology*, *152*, 912–922.
- Friedman, S. R., Neaigus, A., Jose, B., Curtis, R., Goldstein, M., Ildefonso, G., et al. (1997). Sociometric risk networks and HIV risk. *American Journal of Public Health*, *87*, 1289–1296.
- Friedman, S. R., Neaigus, A., Jose, B., Curtis, R., Ildefonso, G., Goldstein, M., & Des Jarlais, D. C. (1999b). Networks, norms, and solidaristic/altruistic action against AIDS among the demonized. *Sociological Focus*, *32*, 127–142.
- Friedman, S. R., Perlis, T., & Des Jarlais, D. C. (2001). Laws prohibiting over-the-counter syringe sales to injection drug users: relations to population density, HIV prevalence and HIV incidence. *American Journal of Public Health*, *91*, 791–793.
- Friedman, S. R., & Reid, G. (2002). The need for dialectical models as shown in the response to the HIV/AIDS epidemic. *International Journal of Sociology*, *22*, 177–200.
- Galea, S., Nandi, A., & Vlahov, D. (2004). The social epidemiology of drug use. *Epidemiologic Reviews*, *26*, 36–52.
- Galea, S., & Vlahov, D. (2002). Social determinants and the health of drug users: socioeconomic status, homelessness and incarceration. *Public Health Reports*, *117*, S115–S145.
- Gillies, P., Tolley, K., & Wollstenholme, J. (2000). Is AIDS a disease of poverty? In A. J. Lemelle, C. Harrington, & A. J. LeBlanc (Eds.), *Readings in the sociology of AIDS*. New Jersey: Prentice-Hall.
- Grange, J., & Zumla, A. (2002). The global emergency of tuberculosis: what is the cause? *Journal of the Royal Society of Health*, *122*, 78–81.
- Griffiths, P. (2000). An assessment of the HIV risk environment along heroin highway 7 in Nghe An Province, North-central Vietnam. *Twelfth International Conference on the Reduction of Drug Related Harm*, Delhi.
- Grund, J.-P., Kobzev, D., Melnikov, V., Zadoretzky, C., Zemlianova, E., Titus, S., et al. (2001). Drug use patterns and HIV risk behaviours of Russian syringe exchange participants. *Twelfth International Conference on the Reduction of Drug Related Harm*, New Delhi, India.
- Grund, J. P. C., Stern, L. S., Kaplan, C. D., Adriaans, N. F. P., & Drucker, E. (1992). Drug use contexts and HIV-consequences: the effect of drug policy on patterns of everyday drug use in Rotterdam and the Bronx. *British Journal of Addiction*, *87*, 41–52.
- Haan, M., & Kaplan, G. (1985). The contribution of socio-economic position to minority health. In *Report of the secretary's task force on Black and minority health*, Vol. 2. Washington, DC: US Department of Health and Human Sciences.
- Hammett, T. M., Des Jarlais, D., Liu, W., Ngu, D., Tung, N. D., Hoang, T. V., Van, L. K., & Dongua, M. (2003). Development and implementation of a cross-border HIV prevention intervention for injection drug users in Ning Ming County (Guangxi Province), China and Lang Son Province, Vietnam. *International Journal of Drug Policy*, *14*, 389–398.
- Hammett, T. M., Harmon, M. P., & Rhodes, W. (2002). The burden of infectious disease among inmates of and releases from US correctional facilities, 1997. *American Journal of Public Health*, *92*, 1789–1794.
- Hankins, C. A., Friedman, S. R., Zafar, T., & Strathdee, S. A. (2000). Transmission and prevention of HIV and sexually transmitted infections in war settings: implications for current and future armed conflicts. *AIDS*, *16*, 2245–2252.
- Harrison, P. M., & Karberg, J. C. (2004). *Prison and jail inmates at midyear 2003*. Washington, DC: Bureau of Justice Statistics, US Department of Justice.
- Harvey, E., Strathdee, S. A., Patrick, D. M., Ofner, M., Archibald, C. P., Eades, G., & O'Shaughnessy, M. V. (1998). A qualitative investigation into an HIV outbreak among injection drug users in Vancouver, British Columbia. *AIDS Care*, *10*, 313–21.
- Hawkins, W. E., Latkin, C., Mandell, W., & Oziemkowska, M. (1999). Do actions speak louder than words? Perceived peer influences on needle sharing and cleaning in a sample of injection drug users. *AIDS Education and Prevention*, *11*, 122–131.
- Hefferman, C. (2002). HIV, sexually transmitted infections and social inequalities: when the transmission is more social than sexual. *International Journal of Sociology and Social Policy*, *22*, 159–176.
- Heimer, R., Blumenthal, R. N., Singer, M., & Khoshnood, K. (1996). Structural impediments to operational syringe-exchange programs. *AIDS and Public Policy Journal*, *11*, 169–184.
- Heimer, R., Bray, S., Burreis, S., Khoshnood, K., & Blankenship, K. (2002). Structural interventions to improve opiate maintenance. *International Journal of Drug Policy*, *13*, 103–111.
- Holtgrave, D. R., & Crosby, R. A. (2003). Social capital, poverty and income inequality as predictors of gonorrhoea, syphilis, chlamydia and AIDS case rates in the United States. *Sexually Transmitted Infections*, *79*, 62–64.
- Hurley, S. F., Jolley, D. J., & Kaldor, J. M. (1997). Effectiveness of needle-exchange programmes for prevention of HIV infection. *Lancet*, *349*, 1797–1800.
- Kaplan, G. A. (2004). What's wrong with social epidemiology, and how can we make it better? *Epidemiologic Reviews*, *26*, 124–135.
- Kawachi, I., & Kennedy, B. P. (1997). Health and social cohesion: why care about income inequality? *British Medical Journal*, *314*, 1037–1040.
- Kleinman, A., Das, V., & Lock, M. (Eds.). (1997). *Social suffering*. Berkeley: University of California Press.
- Koester, S. (1994). Copping, running and paraphernalia laws: contextual variables and needle risk behaviour among

- injection drug users in Denver. *Human Organization*, 53, 287–295.
- Kral, A. H., Blumenthal, R. N., Erringer, E. A., Lorvick, J., & Edlin, B. R. (1999). Risk factors among IDUs who give injections to or receive injections from other drug users. *Addiction*, 94, 675–683.
- Krieger, N., Zierler, S., Tang, Y., Coady, W., Siegfried, E., DeMaria, E., & Auerbacj, J. (2000). Economic deprivation and AIDS incidence in Massachusetts. *American Journal of Public Health*, 90, 1064–1073.
- Kuo, S., Ul-Hasan, T., Zafar, N., Galai, N., Imam, G., Sherman, S. G., & Strathdee, S. A. (2004). Fluctuations in drug cost related to transition from non-injection to injection drug use among injection drug users in Pakistan. *XV International Conference on AIDS, Bangkok, Thailand*.
- Lacerda, R., et al. (1997). Truck drivers in Brazil: prevalence of HIV and other sexually transmitted diseases, risk behaviour and potential for spread of infection. *AIDS*, 11(Supplement 1), S15–S19.
- Laetitia, A., Carael, M., Brunet, J.-B., Frasca, T., & Chaika, N. (2000). Social change and HIV in the former USSR: the making of a new epidemic. *Social Science & Medicine*, 50, 1547–1556.
- Latkin, C. A., & Curry, A. D. (2003). Stressful neighborhoods and depression: a prospective study of the impact of neighborhood disorder. *Journal of Health and Social Behaviour*, 44, 34–44.
- Latkin, C. A., Forman, V., Knowlton, A., & Sherman, S. (2003). Norms, social networks and HIV-related risk behaviours among urban disadvantaged drug users. *Social Science & Medicine*, 56, 465–476.
- Latkin, C. A., Mandell, W., Vlahov, D., Oziemkowska, M., & Celentano, D. D. (1996). People and places: behavioural settings and personal network characteristics as correlates of needle sharing. *Journal of Acquired Immune Deficiency Syndromes*, 13, 273–280.
- Lemelle, A. J. (2002). Racialized social system and HIV infection: the case of African Americans. *International Journal of Sociology and Social Policy*, 22, 133–158.
- Liitsola, K., Tashinova, I., Korovina, G., et al. (1998). HIV-1 genetic subtype A/B recombinant strain causing an explosive IDU epidemic in Kaliningrad. *Twelfth World AIDS Conference*, Geneva [abstract 13190].
- Lomas, J. (1998). Social capital and health: implications for public health and epidemiology. *Social Science & Medicine*, 47, 1181–1188.
- Lurie, P., & Drucker, E. (1997). An opportunity lost: HIV infections associated with lack of national needle-exchange programme in the USA. *Lancet*, 349, 604–608.
- Lyttleton, C., & Amarapibal, A. (2002). Sister cities and easy passage: HIV, mobility and economies of desire in a Thai/Loa border zone. *Social Science & Medicine*, 54, 505–518.
- Magura, S., Nwakeze, P. C., Rosenblum, A., & Joseph, H. (2000). Substance misuse and related infectious diseases in a soup kitchen population. *Substance Use and Misuse*, 35, 551–583.
- Maher, L., & Dixon, D. (1999). Policing and public health: law enforcement and harm minimisation in a street-level drug market. *British Journal of Criminology*, 39, 488–511.
- Mann, J., Gostin, L., Gruskin, S., et al. (1999). Health and human rights. In J. Mann, L. Gostin, S. Gruskin, & G. Annas (Eds.), *A health and human rights reader*. New York: Routledge.
- McCord, C., & Freeman, H. P. (1990). Excess mortality in Harlem. *New England Journal of Medicine*, 322, 173.
- Metzger, D., Woody, G., De Philippis, D., McLellan, A. T., O'Brien, C. P., & Platt, J. J. (1991). Risk factors for needle sharing among methadone-treated patients. *American Journal of Psychiatry*, 148, 636–640.
- Miller, M., & Neaigus, A. (2001). Networks, resources and risk among women who use drugs. *Social Science & Medicine*, 52, 967–978.
- Mokienko, M., & Mokienko, I. (2001). Harm reduction programme in Sakhalin, Russia. *Twelfth International Conference on the Reduction of Drug Related Harm*, New Delhi, India.
- Muntaner, C., Lynch, J., & Davey Smith, G. (2000). Social capital and the third way in public health. *Critical Public Health*, 10, 108–121.
- Neaigus, A. (1998). The network approach and interventions to prevent HIV among injection drug users. *Public Health Reports*, 113(Supplement 1), 140–150.
- Neaigus, A., Freidman, S. R., Curtis, R., et al. (1994). The relevance of drug injectors' social and risk networks for understanding and preventing HIV infection. *Social Science & Medicine*, 38, 67–78.
- Nicoll, A., & Gill, O. N. (1999). The global impact of HIV infection and disease. *Communicable Disease and Public Health*, 2, 85–95.
- Nzyuko, S., et al. (1997). Adolescent sexual behaviour along the Trans-Africa Highway in Kenya. *AIDS*, 11(Supplement 1), S21–S26.
- Ouellet, J., Jimenez, A., & Johnson, W. (1991). Shooting galleries and HIV disease: variations in places for injecting drugs. *Crime and Delinquency*, 37, 64–85.
- Page, B. J. (1990). Shooting scenarios and risk of HIV-1 infection. *American Behavioral Scientist*, 33, 478–490.
- Paone, D., Clark, J., Shi, Q., Purchase, D., & Des Jarlais, D. C. (1999). Syringe exchange in the United States, 1996: a national profile. *American Journal of Public Health*, 89, 43–46.
- Parker, R., & Aggleton, P. (2003). HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. *Social Science & Medicine*, 57, 13–24.
- Parker, R. G., Easton, D., & Klein, C. H. (2000). Structural barriers and facilitators in HIV prevention: a review of international research. *AIDS*, 14(Supplement A), S22–S32.
- Pearson, G. (1987). Social deprivation, unemployment and patterns of heroin use. In N. Dorn, & N. South (Eds.), *A land fit for heroin*. London: Macmillan.
- Pederson, D. (2002). Political violence, ethnic conflict, and contemporary wars: broad implications for health and social well-being. *Social Science & Medicine*, 55, 175–190.
- Poloubinskaya, S. V. (2002). *Russian legislation and the prevention of HIV among intravenous drug users, (information booklet)*. Moscow: Open Society Institute.
- Porter, D., & Bennoun, R. (1997). On the borders of research, policy and practice. In G. Linge, & D. Porter (Eds.), *No place for borders* (pp. 149–163). Sydney: Allen and Unwin.
- Poundstone, K. E., Strathdee, S. A., & Celentano, D. D. (2004). The social epidemiology of human immunodeficiency

- virus/Acquired Immunodeficiency Syndrome. *Epidemiologic Reviews*, 26, 22–35.
- Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 65–78.
- Quam, M. (1994). AIDS policy and United States political economy. In D. Feldman (Ed.), *Global AIDS Policy: Political Economy* (pp. 142–159). Westport, CT: Bergin and Garvey.
- Quimby, E., & Friedman, S. R. (1989). Dynamics of Black mobilization against AIDS in New York City. *Social Problems*, 36(4), 403–415.
- Reid, G., & Crofts, N. (2002). *Revisiting the hidden epidemic: a situation assessment of drug use in Asia in the context of HIV/AIDS*. Melbourne: The Centre for Harm Reduction (pp. 20–26).
- Rhodes, T. (1997). Risk theory in epidemic times. *Sociology of Health and Illness*, 19, 208–227.
- Rhodes, T. (2002). The 'risk environment': a framework for understanding and reducing drug-related harm. *International Journal of Drug Policy*, 13, 85–94.
- Rhodes, T., Ball, A., Stimson, G. V., Kobyscha, Y., Fitch, C., Pokrovsky, V., et al. (1999b). HIV infection in the newly independent states, eastern Europe: the social and economic context of epidemics. *Addiction*, 94, 1323–1336.
- Rhodes, T., Fitch, C., Kumar, S., Rigley, C., & Daniels, D. (2005). *HIV risk reduction and production in the public injecting environments of Madras*, submitted for publication.
- Rhodes, T., Judd, A., Mikhailova, L., et al. (2004). Injecting equipment sharing among injecting drug users in Togliatti City, Russia: maximising the protective effects of syringe distribution. *Journal of Acquired Immune Deficiency Syndromes*, 35, 293–300.
- Rhodes, T., Lilly, R., Fernandez, C., et al. (2003b). Risk factors associated with drug use: the importance of risk environment. *Drugs: Education, Prevention and Policy*, 10, 303–329.
- Rhodes, T., Mikhailova, L., Sarang, A., Lowndes, C., Rylkov, A., Khutorskoy, M., et al. (2003a). Situational factors associated with drug injecting, risk reduction and syringe exchange practices in Togliatti City, Russian Federation: a qualitative study of micro risk environment. *Social Science & Medicine*, 57, 39–54.
- Rhodes, T., Stimson, G. V., Crofts, N., Ball, A., Dehne, K. L., & Khodakevich, L. (1999a). Drug injecting, rapid HIV spread and the 'risk environment'. *AIDS*, 13, S259–S269.
- Rich, J. D., Dickinson, B. P., Case, P., et al. (1998). Strict syringe laws in Rhode Island are associated with high rates of re-using syringes and HIV risks among IDUs (letter). *Journal of Acquired Immune Deficiency Syndromes and Human Retroviruses*, 18(Supplement 1), S140.
- Robins, L. N., Helzer, J. E., & Davis, D. H. (1975). Narcotic use in Southeast Asia and afterward. *Archives of General Psychiatry*, 32, 1593–1594.
- Rockwell, R., Des Jarlais, D. C., Friedman, S. R., Perlis, T. E., & Paone, D. (1999). Geographic proximity, policy and utilisation of syringe exchange programmes. *AIDS Care*, 11, 437–442.
- Rothenberg, R. B., Woodhouse, D. E., Potterat, J. J., Muth, S. Q., Darrow, W. W., & Klovdahl, A. S. (1995). Social networks in disease transmission: the Colorado Springs Study. *NIDA Research Monographs*, 3–19.
- Rothon, D. A., Mathias, R. G., & Schechter, M. T. (1994). Prevalence of HIV infection in provincial prisons in British Columbia. *Canadian Medical Association Journal*, 151, 781–787.
- Salama, P., Laurence, B., & Nolan, M. L. (1999). Health and human rights in contemporary humanitarian crises. *British Medical Journal*, 319, 1569–1571.
- Santos-Ferreira, M. O., Cohen, T., Lourenco, M. H., Matos Almeida, M. J., Charamaret, S., & Montagnier, L. (1990). A study of seroprevalence of HIV-1 and HIV-2 in six provinces of People's Republic of Angola. *Journal of Acquired Immune Deficiency Syndromes*, 3, 780–786.
- Sarkar, S., Das, N., Panda, S., Naik, T. K., Sarkar, K., Singh, B. C., Ralte, J. M., Aier, S. M., & Tripathy, S. P. (1994). Rapid spread of HIV among injecting drug users in north-eastern states of India. *Bulletin on Narcotics*, XLV, 1, 91–105.
- Sarkar, K., Panda, S., Das, N., & Sarkar, S. (1997). Relationship of national highway with injecting drug abuse and HIV in rural Manipur, India. *Indian Journal of Public Health*, 41, 49–51.
- Schechter, M. T., Strathdee, S. A., Cornelisse, P. G., et al. (1999). Do needle exchange programmes increase the spread of HIV among injection drug users? An investigation of the Vancouver outbreak. *AIDS*, 13, F45–F51.
- Shinn, M., Weitzman, B. C., & Hopper, K. (1998). *Homelessness*. *Encyclopedia of mental health*, Vol. 2. San Diego: Academic Press (pp. 393–402).
- Sikkema, K. J., Heckman, T. G., Kelly, J. A., Anderson, E. S., Winett, R. A., Solomon, L. J., et al. (1996). HIV risk behaviours among women living in low-income, inner-city housing developments. *American Journal of Public Health*, 86, 1123–1128.
- Singer, M. (1994). AIDS and the health crisis of the US urban poor: the perspective of critical medical anthropology. *Social Science & Medicine*, 39, 931–948.
- Singer, M. (1997). Forging a political economy of AIDS. In M. Singer (Ed.), *The political economy of AIDS* (pp. 131–148). New York: Baywood.
- Singer, M. (2001). Toward a biocultural and political economic integration of alcohol, tobacco and drug studies in the coming century. *Social Science & Medicine*, 53, 199–213.
- Singer, M. (2003). Imprisoning AIDS. *Newsletter of the AIDS and Anthropology Research Group*, 15, 1–2.
- Singer, M. (2004). Why is it easier to get drugs than drug treatment? In A. Castro, & M. Singer (Eds.), *Unhealthy health policy: a critical anthropological examination*. Walnut Creek, CA: Altamira Press.
- Singer, M. (2005). *Something dangerous: changing illicit drug use patterns and community health*. II: Waveland Press.
- Singer, M., & Clair, S. (2003). Syndemics and public health: reconceptualizing disease in bio-social context. *Medical Anthropology Quarterly*, 17(4), 423–441.
- Singer, M., Jia, Z., Schensul, J.J., Weeks, M., & Page, J.B. (1992). AIDS and the intravenous drug user: the local context in prevention efforts. *Medical Anthropology*, 14, 285–306.
- Singer, M., Li, J., & Duke, M. (2003). *Drug use patterns and AIDS risk in China*. Portland, Oregon: Society for Applied Anthropology.

- Singer, M., Salaheen, H., & He, Z. (2004). *The special HIV and related health vulnerabilities of sex workers caught in the international sex trade industry*. Dallas, TX: Society for Applied Anthropology.
- Singer, M., Simmons, J., Duke, M., & Broomhall, L. (2001). The challenges of street research on drug use, violence, and AIDS risk. *Addiction Research and Theory*, 9, 365–402.
- Singer, M., Stopka, T., Siano, C., Springer, K., Barton, G., Khoshnood, K., Gorry de Puga, A., & Heimer, R. (2000). The social geography of AIDS and hepatitis risk. *American Journal of Public Health*, 90, 1049–1056.
- Singer, M., & Toledo, E. (1995). *Oppression illness: critical theory and intervention with women at risk for AIDS*. Washington, DC: American Anthropology Association.
- Singer, M., Weeks, M., & Himmelgreen, D. (Eds.). (1995). Sale and exchange of syringes (letter to the editor). *Journal of Acquired Immunodeficiency Disease Syndromes and Human Retrovirology*, 10, 104.
- Skeldon, R. (2000). *Population mobility and HIV vulnerability in South East Asia*. Bangkok: UNDP.
- Smallman-Raynor, M. R., & Cliff, A. D. (1991). Civil war and the spread of AIDS in Central Africa. *Epidemiological Infections*, 107, 69–80.
- Song, J. Y., Safaeian, M., Strathdee, S. A., Vlahov, D., & Celetano, D. D. (2000). The prevalence of homelessness among injection drug users with and without HIV infection. *Journal of Urban Health*, 77, 678–687.
- Soskolne, V., & Shtarkshall, R. A. (2002). Migration and HIV prevention programmes: linking structural factors, culture and individual behaviour—an Israeli experience. *Social Science & Medicine*, 55, 1297–1307.
- Spiegel, P. B. (2004). HIV/AIDS among conflict-affected and displaced populations: dispelling myths and taking action. *Disasters*, 28, 322–339.
- Sterk-Elifson, C., & Elifson, K. W. (1992). Someone to count on: homeless, male drug users and their friendship relations. *Urban Anthropology*, 21, 235–251.
- Stimson, G. V. (1993). The global diffusion of injecting drug use: implications for human immunodeficiency virus infection. *Bulletin on Narcotics*, XLV, 1, 3–17.
- Strathdee, S. A., Patrick, D. M., Archibald, C. P., Ofner, M., Cornelisse, P. G., Rekart, M., Schechter, M. T., & O'Shaughnessy, M. V. (1997a). Social determinants predict needle sharing behaviour among injection drug users in Vancouver, Canada. *Addiction*, 92, 1339–1347.
- Strathdee, S. A., Patrick, D. M., Currie, S. L., Cornelisse, P. G., Rekart, M. L., Montaner, J. S., Schechter, M. T., & O'Shaughnessy, M. V. (1997b). Needle exchange is not enough: lessons from the Vancouver injecting drug use study. *AIDS*, 11, 59–65.
- Strathdee, S. A., Zafar, T., Brahmhatt, H., Baksh, A., & ul Hassan, S. (2003). Higher levels of needle sharing among injection drug users in Pakistan during the Afghanistan war. *Drug and Alcohol Dependence*, 71, 17–24.
- Sumartojo, E. (2000). Structural factors in HIV prevention: concepts, examples and implications for research. *AIDS*, 14, S3–S10.
- Susser, E., Miller, M., Valencia, E., Colson, P., Roche, B., & Conover, S. (1996). Injection drug use and risk of HIV transmission among homeless men with mental illness. *American Journal of Psychiatry*, 153, 794–798.
- Susser, M., & Susser, E. (1996). Choosing a future for epidemiology: from black box to Chinese boxes and eco-epidemiology. *American Journal of Public Health*, 86, 668–673.
- Sweat, M. D., & Denison, J. A. (1995). Reducing HIV incidence in developing countries with structural and environmental interventions. *AIDS*, 9(Supplement A), S251–S257.
- Takahashi, L. M., Wiebe, D., & Rodriguez, R. (2001). Navigating the time-space context of HIV and AIDS: daily routines and access to care. *Social Science & Medicine*, 53, 845–863.
- Taussig, J. A., Weinstein, B., Burris, S., & Jones, T. S. (2000). Syringe laws and pharmacy regulations are structural constraints on HIV prevention in the US. *AIDS*, 14(Supplement 1), S57–S63.
- Tawil, O., Verster, A., & O'Reilly, K. R. (1997). Enabling approaches for HIV/AIDS prevention: can we modify the environment and minimise the risk? *AIDS*, 9, 1299–1306.
- Taylor, A., Goldberg, D., Emslie, J., Wrench, J., Gruer, L., Cameron, S., Black, J., Davis, B., McGregor, J., & Follett, E. (1995). Outbreak of HIV infection in a Scottish prison. *British Medical Journal*, 310, 289–292.
- Thorpe, L. E., Ouellet, L. J., Levy, J. R., Williams, I. T., & Monterroso, E. R. (2000). Hepatitis C virus infection: prevalence, risk factors and prevention of opportunities among young injection drug users in Chicago, 1997–1999. *Journal of Infectious Diseases*, 182, 1588–1594.
- Toole, M. J. (1999). Complex emergencies: refugees and other populations. In E. Noji (Ed.), *The public health consequences of disasters*. New York: Oxford University Press.
- United Nations Development Program (UNDP). (2001). *Building an alliance with transport sector in HIV vulnerability reduction*. Bangkok: UNDP South East Asia HIV and Development Project.
- Van Ameijden, E. J. C., & Coutinho, R. A. (1998). Maximum impact of HIV prevention measures targeted at injecting drug users. *AIDS*, 12, 625.
- Vlahov, D., Des Jarlais, D. C., Goosby, E., Hollinger, P. C., Lurie, P. G., Shriver, M. D., & Strathdee, S. A. (2001). Needle exchange programs for the prevention of human immunodeficiency virus infection: epidemiology and policy. *American Journal of Epidemiology*, 154(Supplement), S70–S77.
- Wallace, R. (1990). Urban desertification, public health and public order: 'planned shrinkage', violent death, substance abuse and AIDS in the Bronx. *Social Science & Medicine*, 31, 801–813.
- Wallace, R., Fullilove, M., Fullilove, R., Gould, P., & Wallace, D. (1994). Will AIDS be contained within US minority urban populations? *Social Science & Medicine*, 39, 1051–1062.
- Waterson, A. (1993). *Street addicts in the political economy*. Philadelphia: Temple University Press.
- Watters, J. (1996). Americans and syringe exchange: roots of resistance. In T. Rhodes, & R. Hartnoll (Eds.), *AIDS, drugs and prevention: perspectives on individual and community action* (pp. 22–41). London: Routledge.
- Weeks, M., Clair, S., Singer, M., Radda, K., Schensul, J., Wilson, S., Martinez, M., Scott, G., & Knight, G. (2001). High risk drug use sites, meaning and practice. *Journal of Drug Issues*, 31, 781–808.

- Weinstein, B., Toce, P., Katz, D., & Ryan, L. L. (1998). Peer education of pharmacists and supplying pharmacists with IDU packets to increase injection drug users' access to sterile syringes in Connecticut (letter). *Journal of Acquired Immune Deficiency Syndromes and Human Retroviruses*, 18(Supplement 1), S146–S147.
- Williams, D. R. (1999). Race, socioeconomic status, and health: the added effects of racism and discrimination. *Annual New York Academy of Science*, 896, 173–188.
- Wohlfeiler, D. (2000). Structural and environmental HIV prevention for gay and bisexual men. *AIDS*, 14 (Supplement 1), S52–S56.
- Wollants, E., Schoenenberg, M., Figueroa, C., Shor-Posner, G., Klaskala, W., & Baum, M. K. (1995). Risk factors and patterns of HIV-1 transmission in the El Salvador military during war time. *AIDS*, 9, 1291–1292.
- Wood, E., Tyndall, M. W., Spittal, P. M., Li, K., Hogg, R. S., O'Shaughnessy, M. V., & Schechter, M. T. (2002). Needle exchange and difficulty with needle access during an ongoing HIV epidemic. *International Journal of Drug Policy*, 13, 95–102.
- Wood, E., Spittal, P., Small, W., Kerr, T., Li, K., Hogg, R. S., Tyndall, M. W., & Montaner, J. S. (2004). Displacement of Canada's largest public illicit drug market in response to a police crackdown. *Canadian Medical Association Journal*, 170, 1551–1556.
- Wright, N. H., Vanichsem, S., Akarasewi, P., Wasi, C., & Choopanya, K. (1994). Was the 1988 HIV epidemic among Bangkok's injecting drug users a common source outbreak? *AIDS*, 8, 529–532.
- Zafar, T., & ul Hasan, S. (2002). A sociodemographic and behavioural profile of heroin users and the risk environment in Quetta, Pakistan. *International Journal of Drug Policy*, 13, 121–125.
- Zierler, S., Krieger, N., Tang, Y., et al. (2000). Economic deprivation and AIDS incidence in Massachusetts. *American Journal of Public Health*, 90, 1064–1073.