

Establishing Risk Elimination and Improving Harm Reduction in AIDS Prevention

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Abstract

This commentary reviews the best evidence for what seems to work, and not work, in reducing HIV infection rates in generalized epidemics, and it makes evidence-based recommendations for more effective interventions in concentrated epidemics. Interventions aimed at reducing the risk of HIV infection (called risk reduction, harm reduction) have been emphasized far more than interventions aimed at avoiding the risk altogether (risk elimination), in both generalized and concentrated HIV epidemics. Risk reduction, which relies on technology to reduce risk of infection but does not address, or "interfere" with, underlying risk behaviors, has been especially ineffective in impacting HIV prevalence in generalized epidemics. This commentary explores three additional questions: 1) how well has risk reduction worked with MARPS (most at risk populations) in concentrated epidemics? 2) what is the evidence for risk elimination *not* working with MARPS? 3) could we do better in AIDS prevention interventions targeting MARPS, especially injecting drug users? The essay also suggests that political and ideological concerns and agendas have arisen as distractions that interfere with an evidence-based approach to AIDS prevention.

Keywords: harm reduction, HIV infection, AIDS, [DU, MSM, sex business, epidemiology, public health

Introduction

Until recently, there was rarely debate about what constitutes effective AIDS prevention. Professionals in the HIV/AIDS field would claim to know what works: condom promotion (especially through social marketing), voluntary counseling and testing, and treatment of the curable sexually transmitted infection (STIs). Ever-higher levels of funding are simply needed to scale these interventions up to have real impact, as the appeal for funds usually goes. The first challenge to this formula came with emergence of evidence from Uganda, which suggested that mutual fidelity (or reduction in numbers of sexual partners) and delay of sexual debut, backed up by condom promotion (but not resting upon it) brought down national HIV prevalence by an unprecedented two-thirds. This was startling to the vast network of AIDS donors and program implementers, not to mention all the ancillary, supportive organizations, because virtually no major player among global AIDS donors was promoting fidelity, monogamy or reduction in numbers of partners. And few were promoting delay of sexual debut, or abstinence.

Uganda's early, original and largely indigenous approach was later labeled ABC (Abstain, Be faithful, use a Condom), a term that unfortunately has become a casualty of the intense debate that resulted from the first challenge to what might be called the Western AIDS prevention paradigm. "ABC" has become associated with the policies of a highly unpopular US president, George W. Bush, and with conspiracy theories that prevention will become "abstinence-only," once condoms are no longer available, or "withheld" from populations said to be desperate for them. Therefore a new name that carries

less baggage may have to be introduced. However, ABC language will be used in this paper for the sake of convenience and brevity; moreover Africans both in government and in NGOs, and faith-based organizations everywhere, are very comfortable with these terms, and with the interventions that go with them.

The United States' \$15 billion global AIDS initiative (PEPFAR) adopted Uganda's ABC model, Abstain, Be faithful, or use Condoms- as the policy for generalized epidemics in December 2002. Since then, there has been a passionate debate about the first two components of ABC, abstinence and fidelity. The commonly used measures for these two behaviors are the proportion of unmarried youth ages 15-19 who report sexual intercourse in the past year (for "A"), and the proportion of men and women ages 15-49 who report two or more partners in the past year (for "B"). Until the mid-1990s, the standard US-funded Demographic and Health Surveys did not even collect data on these behaviors, in its HIV/AIDS module. This indicates the lack of interest in the US government and in the NGOs implementing prevention program.

Underlying and exacerbating this debate is confusion over two basic types of HIV epidemics, concentrated and generalized. World Bank AIDS expert David Wilson has urged that we move forward from a conventional threshold-based definition (in which an epidemic is considered generalized if prevalence is over 1 %, an arbitrary cut-off) as this obscures real understanding of HIV transmission patterns. He suggests alternative, *transmission-based* definitions, namely: "Epidemics are concentrated if transmission occurs mostly among vulnerable groups and if protecting

Two basic tVDeS of orevention: risk elimination and risk reduction

	Sexually transmitted	IDU-transmitted
Risk elimination	Abstinence, mutual monogamy, & fidelity	Not injecting, stopping IDU
Risk (or harm) reduction	Condoms, STI treatment, * Partner reduction*	Syringe provision or exchange, Bleach for sterilization

Found by most RCTs to not impact HIV incidence or prevalence **

vulnerable groups would protect wider society. Conversely, epidemics are generalized if transmission occurs mainly outside vulnerable groups and would continue despite effective vulnerable group interventions.¹

The use of these definitions along with recognition that most HIV epidemics are concentrated reminds us that interventions for what have been called the universally vulnerable groups—sex workers (usually female), injecting drug users, and men who have sex with men—remain an essential part of AIDS prevention. They are also called MARPS (most at risk populations)? (most at risk populations). Yet in generalized epidemics, most infections are not found among MARPS but among seemingly low-risk, sexually active people. The predominant mode of transmission is heterosexual vaginal intercourse, there are more women infected than men, and perinatal transmission is relatively common. This is in contrast to concentrated epidemics, where far more men than women are infected and heterosexual vaginal intercourse is not the predominant mode of transmission. The WHO Global Programme on AIDS used to refer to Patten II, to distinguish African epidemics from Euro-American epidemics, which were formerly called Pattern I. There were two additional patterns of HIV transmission: Pattern III for newly emerging and/or "imported infections" or low prevalence epidemics, and Pattern IV for Southeast Asian epidemics.² This typology was abandoned during the 1990s, in part because it was believed that differences between transmission patterns would diminish and there would only be one predominant pattern in the world. Yet these patterns have persisted to a large extent, and so the terms generalized and concentrated have come into use to distinguish Pattern II from Pattern I, respectively. Recognition of the basic differences between the so-called hyper-epidemics of east and southern Africa and the rest of the world would in itself clear up a lot of the highly emotional, often bitter, debates over how best to prevent AIDS.

A full analysis of the missteps in the global response to AIDS would involve discussion of corporate financial self-interests, not-so-hidden political and ideological agendas, professional reputations, ethnocentrism and Eurocentrism, the medicalization of social and behavioral issues, and more. At the risk of oversimplifying, perhaps the first problem to arise was that the early American and European responses to AIDS were, not surprisingly, developed for the type of epidemic found in America and Europe. The Euro-American approach to concentrated epidemics became the global model for all epidemics, including the generalized

epidemics of southern and eastern Africa.

The fundamental problem with prevention strategies in generalized epidemics is that they have not been calibrated for where the HIV infections are primarily found—in general populations. The current approach of most donors—and of the United States prior to PEPFAR—is to treat everyone as if they are sexually active and already engaging in risk behaviors which are unlikely to change. Thus high-risk behaviors are assumed as immutable *givens* and the response therefore has been not disease prevention in the usual sense, but rather risk- or harm reduction. When we promote condoms or treat STIs but do not discourage sexual risk behaviors themselves, we call it risk reduction. When we provide syringes or bleach to reduce the risks of self-injection, we call it harm reduction. In neither case are the risk behaviors themselves targeted for change.

Whether we speak of reducing risk or harm, the underlying thinking is the same. Wikipedia defines harm reduction as "a *philosophy* of public health, intended to be a progressive *alternative* to the prohibition of certain lifestyle *choices*. The central idea of harm reduction is the recognition that some people always have and always will engage in behaviors which carry risks, such as casual sex, prostitution *and* drug use." In other words, it is seen as progressive to leave the risk behaviors alone—pass no judgment on them—and simply employ technologies intended to reduce risk or harm.

It is clear from the statements from the major Western donors that this has always been the position. Most recently, a Working Group convened at the recent global AIDS conference in Mexico City reported back that "Key elements of successful behavior-change programs" were identified as "scientifically proven risk reduction strategies."³ When the United States, alone among major donor organizations, added risk elimination strategies (fidelity and abstinence) to its mix of risk reduction interventions, there was strong negative reaction among HIV/AIDS activists and health professionals. This was probably inevitable, but with the policy coming from the unpopular Bush Administration, and with the initial program emphasis placed on abstinence (rather than faithfulness), the rejection of risk elimination (or genuine primary prevention) by the vast majority of Western AIDS professionals became categorical and nearly complete.

Regarding the most controversial element of the ABC policy, abstinence, the empirical evidence for the population-level impact of abstinence interventions and behaviors is far less robust than evidence for the impact of fidelity or partner reduction programs and (especially)

behaviors. Moreover, abstinence from sex measured as no penetrative sexual intercourse over the course of one year) involves only a relatively small percentage of the adult populations (typically ages 15-49) where infections and behaviors are tracked. Yet attacks against the new US policy have been overwhelmingly against *abstinence*, especially against "abstinence-only," rarely allowing any focus on that behavior which has most impact, fidelity or partner reduction. This mischaracterization of the argument has confused the debate even further. It would have been far wiser politically and more tenable epidemiologically to have emphasized "partner reduction" from the beginning of the new US policy. "Fidelity" is sometimes rejected as a value-laden, moralistic term, in spite of an article in the New York Times suggesting "the fidelity fix" as the answer to the problem of Africa's generalized epidemics) 4.

Part of the attacks against ABC, has been to argue that condoms and risk reduction generally are "proven interventions" and established best practices. Yet it has been difficult or impossible to demonstrate that *any* of the range of risk reduction interventions universally popular with donors has positive biological impact at the population level, when considering sexually transmitted HIV in generalized epidemics.⁵ This is true for various types of condom promotion programs, treatment of treatable STIs, voluntary counseling and testing, diaphragm use (as research supported by the Gates Foundation recently confirmed), use of various microbicides, "safer sex" counseling, and even income generation. In fact, some of these interventions seemed to be associated with somewhat *increased* HIV infection rates. Moreover, provision of antiretroviral drugs has not, in itself, been shown to lower HIV incidence or prevalence. And we seem no closer to a vaccine today than we were 20 years ago. In fact, the most recent vaccine joins the ranks of several the risk reduction interventions just mentioned, by (perversely) proving to actually facilitate HIV transmission.⁶ We see little or no impact not only when trying to measure impact from *individual* risk reduction interventions, but one recent randomized, controlled trial in Zimbabwe found that even possible synergies which might be achieved through "integrated implementation of synergistic community-based HIV-1 control strategies" had no biological impact at the population level.⁷ Thus, these interventions that have always called "best practices" simply do not seem to work in generalized epidemics. They are "best practices" based on premature consensus rather than on empirical evidence.

What *has* been shown to work in bringing down HIV infection rates in generalized epidemics? If we go strictly by the evidence, only male circumcision and reduction in number of sexual partners seem to impact HIV infection rates at the population level. Three randomized trials have demonstrated the effectiveness of male circumcision in reducing the incidence of HIV infection among men by more than 50%.⁸ Reduction in partners is now recognized as the primary factor explaining what happened in Uganda, which has experienced the greatest HIV prevalence decline in Africa

or anywhere.⁹ Partner reduction is associated with prevalence decline in 8-9 other countries in Africa as well as other intervention factor, including levels of condom use. is associated with all cases of HIV prevalence decline in generalized epidemics.¹¹

The large UNAIDS "Multicentre study" in four countries specifically found that condom user levels were unrelated to HIV prevalence, and when two of the researchers in this study later reanalyzed data and controlled for male circumcision, they concluded that lifetime number of sexual partners was itself an important determining factor¹² (Avert & Ferry, 2002). This finding was obscured earlier by the high rates of partners in Yaoundé, where HIV infection rates were kept relatively low by a 99 percent male circumcision rate.

The theoretical problem that arises with the second explanation, partner reduction, is that Americans, Britons and Western Europeans tend to have a greater lifetime number of sexual partners than Africans. Why then are HIV infection rates so much higher in (especially) east and southern Africa? It is theorized that concurrency or having ongoing sexual partnerships that overlap in time---is a special risk factor explaining some of the differences in HIV levels and that concurrent relationships are found far more often in southern and East Africa than in Europe, America or elsewhere. This explanation rests on the observation that HIV is not easily transmitted during penile-vaginal intercourse. HIV transmission usually requires either a great many acts of intercourse or fewer acts during acute infection, the roughly 3-week interval of extremely high viremia soon after initial infection. Empirical evidence and epidemiologic modeling exercises have shown that the probability of transmission per sex act during acute infection is increased eight- to ten- fold or more compared to the much longer asymptomatic later stage infection period.¹³ When many people are interlinked through sexual networks of multiple and concurrent partners, even though the average number of sexual partners might be 2, the chances of encountering a partner during the 3week period of high viremia are very high. Once one person in the interlinked network is HIV infected, the infection is efficiently transmitted through many in the network. In a situation of serial monogamy, the virus is "trapped" in dyadic relationships for months or years at a time,¹⁴ and no one is likely to get exposed during the critical acute infection period.

The evidence for concurrency is derived mostly from modeling studies. We do know that in every case of HIV prevalence decline in Africa, the proportion of men and women who report > 1 sexual partner in the past year has declined significantly, a few years prior to significant prevalence decline. This refers to partners of any sort. Few major surveys of sexual behavior have measured concurrency, only number of partners per year, not distinguishing casual or one-time from enduring, ongoing partners. Until the theory of multiple, concurrent partners is proved or disproved, the implications for

prevention are to discourage multiple sex partnerships of *any* sort. In situations of mutual fidelity and exclusivity among HIV-uninfected partners, there is zero percent chance of sexually transmitted HIV infection; therefore we can speak of risk elimination. Additionally, male circumcision would be a form of risk reduction superior to what has already been promoted—judging by proven population-level impact.

Thus an AIDS prevention strategy that arises from evidence rather than only consensus places primary evidence on discouraging multiple partner sex of any sort: casual, concurrent, commercial or condom "protected." It also follows standard public health logic and practice by emphasizing primary prevention or risk elimination, instead of risk reduction, as has been the practice by most donors and HIV programs until now. Fortunately, there has been some movement in this direction. In 2006, a southern African regional conference convened in Lesotho by the UN, WHO, US AID and others concluded, "The two key drivers of the epidemic in the sub-region were identified as high levels of concurrent partnerships by men and women combining with low levels of male circumcision in a "lethal cocktail"¹⁵ AIDS prevention in this region should therefore emphasize mutual fidelity (reducing sexual partners) and voluntary male circumcision. At this writing, there have been a number of conferences in Africa, Europe and America focused on both of these interventions,¹⁶ and there has been a IO-country study of multiple and concurrent partners in southern Africa. ¹⁷ Nevertheless, as a group of AIDS researchers observed recently, "the largest donor investments are being made in interventions for which evidence of large-scale impact is increasingly weak, whereas much lower priority is given to interventions for which the evidence of potential impact is greatest."¹⁸

There is a clear disconnect between science and public policy, not in terms of too little spending on condoms (as most AIDS professionals would argue), in terms of too little funding for interventions that emphasize fundamental changes in sexual behavior, such as partner reduction and mutual fidelity.

Prevention Strategies in Concentrated Epidemics

What of prevention strategies in concentrated epidemics? Once again, risk or harm reduction has been the near-exclusive emphasis, rather than risk elimination. Such a strategy would seem to be more justified when targeting individuals in *chronic* (enduring, hard-to-change) high-risk situations, such as commercial sex and drug addiction. Who can expect a sex worker to abstain or be faithful to one partner? Yet according to public health principles, it is unjustified to dismiss risk elimination before investigating and determining the evidence for: 1) effectiveness of risk reduction with MARPS and 2) the ineffectiveness of risk elimination with MARPS? Let us consider these questions with the three main categories of MARPS, especially IDUs.

Sex Workers

One reason for the near-exclusive emphasis on risk reduction, when considering prevention experience in concentrated epidemics, is that *some* of the strategies developed for MARPS have worked for *some* of those groups. Condoms seem to have had significant impact in countries like Thailand and Cambodia, where enforced condom use policies were possible in certain environments, notably in brothels where enforcement is possible. Thailand in particular has been endlessly cited as justification for a primary focus on condom promotion, regardless of the type of HIV epidemic. What is forgotten is that it is possible to enforce a "100% condom" policy in an *accessible* population, and to some extent controllable situation, such as sex workers and their clients in brothels. Consistent condom use is very rarely achieved by anyone in *general populations*, where people cannot be "bribed or blackmailed" into condom use. ¹⁹ Furthermore, in both Thailand and Cambodia, the proportion of men reporting contact with sex workers also declined significantly and so it is difficult to know how much prevalence decline can be attributed to condom use and how much to less contact with sex workers. ²⁰ Moreover, the impact of condoms may not be sustainable. For one thing, sex work has drifted out of brothels, where enforcement of condom policies or rules is difficult or impossible. In any case, some data challenge the belief that when reported condom use reaches high levels among sex workers, HIV prevalence will decline significantly for sex workers and their clients. For example, condom use rose to about 95% among sex workers in Kampala by 2000 yet this did not prevent HIV prevalence from rising from 28.2% in 2001 to 47.2% by 2003. Likewise, a study of sex workers in Cambodia found that, "Despite the implementation of a nationwide 100% condom use policy, the prevalence of STIs among female sex workers in 2005 was comparable to 2001."²¹ There is substantial evidence that condoms work much better for protecting male clients than for protecting the FSWs themselves, probably because the men have far fewer exposures.

There are studies that suggest condoms provide some level of protection for FSWs and/or their clients their but these counter-examples suggest that we cannot assume these sub-populations are necessarily adequately protected even if most are reporting condom use.

There is a risk elimination versus reduction debate concerning prostitution: should AIDS prevention be limited to providing condoms and treating the curable STIs of sex workers (risk reduction) or does such a policy ignore the health, social and criminal problems associated with prostitution? In fact, might risk reduction actually work *against* protection of women and girls who are trafficked and prostituted because provision of risk reduction requires some sort of working relationship with those who control prostituted women and the business of prostitution, as well as "looking the other way" with criminal activities related to prostitution.²² Also, we can aim risk elimination at men by encouraging them not to participate in commercial sex. This protects not only the men and their noncommercial partners, but FSW by

reducing the demand for their services and ultimately reducing the number of FSW. A structural or "ecological" intervention aimed at the same objective is to charge and prosecute clients (more or rather than FSWs), such as been done in Sweden.

MSM

Harm reduction starts with the premise that addicts (all addicts, by implication) will engage in the most dangerous mode of drug ingestion, intravenous drug use (IDU), just as (all) MSM will likewise engage in by far the most dangerous form of sexual behavior, anal intercourse. It does not focus on or even consider the full *range* of risk behaviors available to the addict (alcoholic, MSM etc.) or try to promote less risky alternative behaviors. Harm reduction would potentially yield far more health benefits—with HR blending into risk elimination—if it would promote far safer forms of drug taking and MSM sexual behaviors, behaviors that may in fact have been the norm in recent periods of history.

Considering prevention for MSM, anal sex is by far the principal and major mode of HIV transmission among MSM.²⁴ A prospective study of gay men in California showed little difference in risk between anal sex with a condom or without a condom. The authors note:

Many studies have demonstrated that receptive anal sex is most strongly associated with prevalent and incident HIV infection in MSM and carries the highest per-contact risk of acquiring HIV. This study found that that URA [unprotected receptive anal] sex with either HIV-positive or unknown serostatus partners explained one quarter of new infections in this cohort. Surprisingly, we also found an independent increase in the risk of HIV seroconversion among men reporting PRA [protected receptive anal] with an HIV-positive partner.²⁵

One explanation for this might be that condom effectiveness is lower in anal than in vaginal sex.²⁶ Moreover there is little evidence that consistent condom use is the norm, even among American gay men, who must be the most AIDS-educated and condom-accessible group in the world. After remaining constant in recent years, HIV prevalence among American MSM appears to be rising.²⁸ The U.S. syphilis rate increased for the seventh consecutive year by 2007, largely reflecting continued increases among MSM, according to the US Centers for Disease Control and Prevention.²⁹ Missing from prevention programs for MSM are any risk elimination -type interventions that seek to change basic patterns of high-risk sexual behavior, such as discouraging anal sex itself or discouraging multiple partners. Yet there is at least one well-documented risk elimination program that targeted Dutch MSM. After being presented with facts about the risk, a large proportion of Dutch men discontinued anal intercourse (which had a recent history in the Dutch gay community) and went back to sexual practices whose risk of HIV infection are several orders of magnitude lower. HIV incidence fell quickly and significantly.³⁰ The authors of a study of this program concluded:

The decline in transmission of HIV in the AIDS cohort from 1985 onwards was probably a result of the decrease in sexual activity in the studied population and more specifically the decrease in the number of partners with whom anogenital intercourse was performed. The alternative explanation, that the decline in transmission of HIV was a result of a so called saturation effect, is unlikely given that 60% of the participants were still not infected.³¹

This important example of a successful risk-elimination approach for MSM is not spoken of at AIDS conferences, or in the AIDS literature. Probably few AIDS experts and even fewer MSM have ever heard about this. By the 1990s, Dutch AIDS prevention was under increasing pressure to promote condoms (risk reduction) as an equally valuable AIDS prevention option for Dutch MSM.³²

IDU prevention

How has harm reduction fared among IDUs?

Current interventions of drug substitution, needle exchange, and other forms of harm reduction may have helped, in that a visit to a clinic or health center provides an opportunity to reach addicts and (at least theoretically) provide them access to an array of "comprehensive ancillary services." Yet it has been difficult or impossible to demonstrate through carefully designed studies any positive impact of harm reduction on HIV infection rates.³³ As with MSM and prostitute-related prevention, there are comparatively few risk elimination programs that provide primary prevention of drug addiction or programs to help addicts out of addiction altogether, although this seems to be the approach preferred by many Russian health and political authorities, as discussed below.³⁴

While the dominant approach is harm reduction, what do addicts themselves want? A few studies have looked at this and found strong support for getting off drugs, i.e., risk elimination. For example, in a study of addicts in Scotland: "Our research has identified widespread support for abstinence as a goal of treatment with 56.6% of drug users questioned identifying 'abstinence' as the only change they hoped to achieve on the basis of attending the drug treatment agency. By contrast relatively small proportions of drug users questioned identified harm reduction changes in terms of their aspiration from treatment, 7.1 % cited 'reduced drug use', and 7.4% cited 'stabilization' only. Less than 1 % of respondents identified 'safer drug use ...'"³⁵

And yet "safer drug use" (provision of needles, and/or bleach for sterilization of equipment) is the predominant prevention program with Western program funders.

A study of addicts in Baltimore (USA) likewise found that most addicts seeking services wanted to achieve abstinence, a goal that the researchers not the addicts decided was unrealistic. The Johns Hopkins researchers in Baltimore reflected the harm reduction philosophy of AIDS prevention in developing a "step" program that suggests abstinence as a goal set for some time in the indefinite future. Thus instead of building

upon a desire to "get clean" from drugs, an essential precondition for becoming drug-free, this program lowered the expectations from "get clean" to "practice and preach safer injection practices." The program also emphasized not feeling "hypocritical" about being in a recovery program—one that required addicts to outreach the program to other addicts while still using injecting drugs.³⁶

In fact, the most successful approach in the United States and elsewhere to both alcoholism and drug addiction has been the 12 Steps of Alcoholics Anonymous (AA) and Narcotics Anonymous (NA), both no-cost mutual support programs consisting simply of recovering alcoholics and addicts helping one another *achieve and maintain abstinence*. The great majority of recovery programs in the US are based nowadays on the 12 Steps approach. This approach *begins* with abstinence from drugs.

The Russian approach to treatment of IDUs has been criticized by Western drug experts because it emphasizes detoxification of addicts, not harm reduction. For example, a recent editorial in the journal *Harm Reduction* complains that Russian "narcological dispensaries ... are structured primarily to provide detoxification for opiate users and alcoholics, and most provide few or no harm reduction interventions to reduce HIV and hepatitis among users." The authors characterize this as an "implacable ideological stance" that amounts to a "rejection ... of the usual obligations of medicine (as expressed in the Hippocratic Oath.)" ³⁷ Yet this assumes that harm reduction in fact reduces HIV levels, which evidence to date does not support. Clearly drug addiction, like human sexual behavior, is an extremely complicated issue. This author believes that primary prevention and treatment are the best options the later particularly for those who wish to be free of drugs. But he is not opposed to also offering drug substitution or other harm reduction for those who will not or cannot undergo treatment. It should be emphasized that in the 12-step Narcotics Anonymous model, abstinence or detoxification only the first step. Without virtually unlimited and round-the-clock support from peer groups of recovering addicts, most addicts return to drug use. Therefore efforts should be made to encourage growth of these no-cost groups in former Soviet bloc countries

Avoiding Needles

According to older studies of IV addicts in the U.S., it seems that the transition From snorting and smoking heroin to use of needles occurred between 1930 and 1945, by which time injecting became the norm. ³⁸ In many parts of the world heroin is still often smoked or inhaled rather than, or in addition to, injecting it. In some parts of the world there has been a transition from smoking to injecting, just as HIV began to spread in the population. A review of drug abuse in Asia found: "Data suggest that about 50% of heroin users take to injecting once they get over the initial phase of consumption through smoking or inhalation."³⁹

In the AIDS era, the questions arise: how common

is such a transition from smoking to injecting and can anything be done to reverse the trend? A study of the diffusion of heroin smoking in The Netherlands found evidence to challenge the conventional view on heroin use which "assumes an (inescapable) sequence to more efficient self-administration rituals [injecting] as a result of the progressive process of addiction."⁴⁰ In the Netherlands it seems there was a transition from "chasing the dragon" (smoking) to injecting heroin, but then back to "chasing." Today, chasing heroin and 'freebasing' (smoking) rather than injecting cocaine are more common than injecting these drugs. This phenomenon ought to be studied carefully to assess the potential for campaigns designed to "at least" promote far safer forms of drug ingesting, for addicts who cannot or will not stop using drugs altogether. In the Dutch experiment, the researchers believed that the "transition back" to smoking might be partly explained by cultural factors, particularly a growing number of immigrations from Suriname, who made a substantial contribution of Surinamers to the overall Dutch addict population and (with another minority, Dutch of Chinese descent) allegedly were averse to injecting drugs. The purity of drugs available for inhalation might also have been a contributing factor explaining the trend away from injecting.

In addition to The Netherlands, increases in *non-injecting* drug use have been documented in the UK, Spain, Switzerland⁴¹ and even the United States. Yet the pattern is different in Asia and Africa. A review notes:

"South East Asia in particular, appears to be experiencing an explosion of injecting drug use ... Although smoking or sniffing opium and increasingly, heroin, remain significant modes of consumption in the Golden Crescent and some neighboring countries, in many parts of Asia there has been a sharp increase in injecting among populations who have traditionally used opiates by other means."⁴³ The mode of administration also seems to be shifting towards injection in eastern, western and southern Africa, and as recently noted by UNAIDS's former director Peter Piot and colleagues, "Southern and eastern Africa are now the regions with the world's second highest growth in opiate use."⁴⁴

There has been at least one program in Africa aimed at "rehabilitating" addicts, at a centre in Malindi, Kenya known as The Omari Project (TOP). Addicts were taught very clearly what the risk of HIV infection was from injecting and sharing needles. By 2004, "most IDUs had switched to smoking the cocktail (a mix of heroin, marijuana and tobacco) again The fear of HIV was, and remains really great."⁴⁵ One wonders why more programmatic emphasis is not given to this type harm reduction—strongly warning specifically about *injecting* behavior specifically—since success in this area would have far more impact on preventing HIV transmission and death From other causes than needle exchange or home-sterilization of needles.

In fact, we need to also consider the possibility that our prevention programs are inadvertently promoting the very risk behaviors that should be discouraged. When we offer condoms for MSM and prostitutes, and clean syringes for drug addicts, while making no mention

of *risk elimination* alternatives, it would not be surprising if the reaction of MSM who *don't* practice anal sex and drug addicts *don't* inject is to think perhaps they need to catch up with their counterparts in America and Europe and seemingly everywhere: anal intercourse for MSM and injecting for addicts.

Finally, a discussion of IDU would be incomplete without noting that apart from sharing syringes, IDUs may also engage in risky sexual behavior including trading or selling sex to support their habits. Some studies even suggest that more HIV infections among IDUs are from sexual transmission than usually assumed with this sub-population.⁴⁶ The best solution to both modes of HIV transmission is risk elimination. Failing that, risk! harm reduction should actively discourage the highest risk behaviors, such as injecting, rather than tepid responses that ignore behavior and relying on commodities transfer in the form of condoms and needles.

Discussion

Risk or harm reduction has been the preferred approach to both generalized and concentrated HIV epidemics. We see a similar weakness in prevention programs aimed at sexually transmitted and IDU-transmitted HIV infection, namely a heavy lopsidedness in favor of risk/harm reduction. Programs might be said to treat symptoms rather than underlying problems. They favor technology and medical solutions (drugs, condoms, syringes, Methadone) rather than any interventions that could be construed as "interfering" with sexual or drug use behavior, and defend peoples' alleged rights to engage in a variety of high-risk behaviors.

Risk reduction interventions and behaviors do not seem to have reduced HIV infection rates in generalized epidemics. Risk elimination *behaviors* (which are difficult to link to specific AIDS prevention *interventions* outside of Uganda in the period roughly between the mid-1980s to the mid-1990s) have been linked to reduced HIV infection rates in generalized epidemics. There has been little interest in trying to change sexual behavior in fundamental ways anywhere. With the rise of concurrency theory, there is now interest among major donors-at least in regional offices in southern Africa in finding ways to address multiple and concurrent partnerships, as well as possible ways to promote voluntary male circumcision. Yet to date few resources have been allocated to such approaches. Likewise, in IDU-driven HIV epidemics, there has been far less interest in trying to change injecting behavior in fundamental ways than in distributing sterile needles, methadone, bleach or other commodities or drugs. The evidence reviewed suggests that risk/harm reduction has not been successful in generalized epidemics, and has had only marginal success in concentrated epidemics.

Why do we persist in spending billions of dollars for programs with little or no impact? There are many possible reasons including financial self-interest: it is difficult to shut down or scale down a multi-billion dollar per year industry. There are also subtler reasons that take us to subject matter bordering on the taboo. Yet to

Reform AIDS prevention, we who comprise the Western AIDS industry must not be blind to our own ideological biases. especially since we are making billion dollar decisions (most of it public funds) that lead to life or death for millions of people. To Europeans or Americans, the words AIDS and ideology conjure up images of George Bush, abstinence only, and the religious right \\ng. But that line of thinking sheds little or no light on the most urgent and far-reaching questions surrounding AIDS: why have we ignored primary prevention? Why have we failed to warn people about the risk behaviors that drive the pandemic-to the point that South Africans were found to think that people in their country were getting AIDS primarily from blood transfusions rather than from having multiple and concurrent sex partners?⁴⁷

Working with marginalized, high-risk groups in any meaningful way involves accessing such people, gaining their trust and developing some level of sympathy for their plight. These groups are often looked down upon, perhaps despised, perhaps more openly in the tradition bound and/or religious societies in the less developed world. Those working on the public health or intervention side find themselves becoming involved with the *human rights* of these marginalized groups. In fact, the cause of human rights permeates our entire approach to AIDS prevention and becomes the rationale -or the "higher calling" or noble cause-that justifies the design and implementation of non-evidence-based programs that have little or no impact.

A comment is required on the human rights and social justice rhetoric that permeates AIDS conferences, literature and press releases. We Western AIDS advocates and activists see ourselves as the protectors and defenders of the poor, the downtrodden, the socially outcast and of course long-suffering *women* in developing countries. The United Nations AIDS program UNAIDS typifies the advocacy, activist, human rights approach. It continues to promote a package of medical devices and services in the face of accumulating evidence that virtually none of these are effective in the African hyper-epidemics. Yet UNAIDS claims it *know* it is right because it seem itself on the morally right side of the debate, and therefore morally and ethically superior to those who do not advocate for minority rights in the same way, or who question the effectiveness of the standard risk reduction approach to prevention. Former UNAIDS Director Peter Piot has in recent years in fact switched from urging that AIDS prevention be evidence based to something he characterizes as evidence *informed*.⁴⁸ This seems to acknowledge departure from evidence-based planning and programming. It seems to say, we will do things our way, and we need only be informed by the evidence that supports what we are doing, and we can ignore the rest. Why? Because we *know* we are right because we fight for social justice. In spite of this overt activism, UNAIDS is considered "the most trusted source of scientific information on the global epidemic,"⁴⁹ yet in truth, this agency has become primarily an *advocacy* and not a science-led organization.⁵⁰ Perhaps under its new director, Michel Sidebe, an African who understands the special needs of AIDS prevention

in Africa, UNAIDS will support and promote evidence-based AIDS prevention.

The question we need always ask-but seldom do-is what impact, if any, would achieving social and political goals have on reducing HIV incidence or prevalence? If the true answer is little or none, then use of funds allocated to HIV/AIDS becomes hard to justify. Yet these socio-economic and political goals are routinely cheered and applauded at international AIDS conferences. Fidelity and abstinence, if these words are mentioned at all, are often shouted down.

As advocates for the downtrodden, we also find ourselves increasingly on the side of *legalizing* intrinsically high-risk behaviors-whatever our previous positions on these issues might have been before the AIDS pandemic. Because as liberals we have likely always been opposed to laws against homosexuality, does that mean we must oppose laws against trafficking of women and narcotics, since all the groups involved could be (and are) characterized as marginalized, discriminated against? Perhaps we come to do so inexorably if we attend enough AIDS conferences and read enough AIDS literature. This process of coming to present a united front against "those who would restrict and marginalize" is illustrated in the following plea from a drug addict, made at the global AIDS conference in Thailand (2004) shows how:

In Thailand, injecting drug users or "IDUs" are the only group whose 50% HIV prevalence has not changed in fifteen years. One third of all new HIV infections are IDU-related, and this number is increasing. Yet there has been no effective response from the government...Even though the Thai government says its current policy is to treat drug users as "patients," not "criminals," it is still illegal to be a drug user. We continue to be arrested and offered the choice of prison or military run rehabilitation centers.⁵¹

Perhaps the process of building a united front begins with the argument that all groups deserve *access to services*, something that UNAIDS and other major AIDS organizations promote tirelessly, to the exclusion of even warning about any forms of risk behaviors, let alone promoting any fundamental behavior change. Addicts need and deserve need access to survives.

The above article continues: We [heroin addicts] often do not enjoy even the most basic human rights. In Thailand, this is true for sex workers, men who have sex with men, migrant workers and undocumented citizens as well.

Notice the enlisting of what might be called *support in common cause*: if we support migrant workers then naturally we also support sex workers and drug addicts and support here often means making these and all "victims" of HIV infection legal and socially acceptable. This is because supporting "human rights- in the context of AIDS often translates into supporting the legal rights to engage in risk behaviors. whether be injecting drugs or prostitution. Support of any other position is tantamount to committing the worst transgression in the AIDS world: making *moral judgments*. Yet in what we might call our rush to non-judgmental we don't seem to

make a sober, objective assessment of the pros and cons of legitimizing and legalizing prostitution, heroin, crack cocaine, and methamphetamines. We don't ask whether legalization and social acceptability of the sex worker and the addict leads to the legalization and social acceptability of drug dealers, pimps, traffickers and brothel owners as well. ⁵²We seem to not even ask what is ultimately best for women in prostitution and drug addicts themselves-nor do we really ask these people themselves. We instead rely on self-proclaimed activists who claim they speak for all people in their situation. An individual rights-based approach doesn't help us to make tough decisions about resource allocation. Evidence suggests that resources go to the activists who call most stridently for their "rights," rather than to programs where it would promote the "maximum health benefits for the greatest number of people, at the lowest cost, in the most sustainable manner," which is a good operational definition of public health. We have chosen individual rights over public health, over the rights of family and friends of MARPS, indeed over the rights of society and the common good. If focusing solely on individual rights we can easily forget the social and family costs of, for example, drug addiction and prostitution.

With billions of dollars annually going to a single disease, perhaps it was inevitable that political agendas and ideologies would become involved. These agendas might be worthy, even noble, but not if they get in the way of science and if they constrain policies and programs that involve millions of human lives and billions of dollars. There is no logical, scientific or even moral-ethical justification for overlooking risk elimination approaches in the belief that: 1) since not everyone can change certain behaviors, no one should be expected to change any behaviors; and 2) everyone has a right to engage in whatever behaviors he or she wishes, whether it is having multiple and concurrent partners, selling sex for cash or drugs, or injecting drugs. What the author is arguing is not some version of the imposition of the Morals Police of Afghanistan under the Taliban. It is simply an intervention that teaches people very clearly the true risks involved in certain behaviors, along with suggestions or "directions" for how to avoid potentially fatal risks. Surely it is a violation of human rights to withhold life-saving information about how to prevent an incurable and usually fatal disease.

References

- 1 Wilson D. A. Monitoring and Evaluation Framework for Concentrated Epidemics and Vulnerable Populations. Washington, DC: The World Bank, 2005.
 - 2 Weniger B., Brown, T. (1996) The march of AIDS through Asia. *New England Journal of Medicine*, 335, 343-345.
 - 3 Setswe G. (2008) Social and behavioural intervention sessions at the XVII International AIDS conference. (paper presented at a report back session at the HSRC, 29 September).
- <http://152.112.128.77/research/outputoutputDocuments/>

- 5447_Setswe _ HIV prevention sessions. pdf
- 4 Epstein H., The Fidelity Fix. New York Times Magazine.
<http://query.nytimes.com/gst/fullpage.htm?sec=health&res=9A04EFD31F930A25755COA9629C8B63>
- 5 Padian N.S. et al. Diaphragm and lubricant gel for prevention of HIV acquisition in southern African women: a randomised controlled trial. *Lancet* (online edition), July 13th, 2007;
 Gray R.H. et al. Randomised trials for HIV prevention. *Lancet* (online edition), July 13th, 2007.
 UNAIDS (1999) Trends in HIV incidence and prevalence: Natural course of the epidemic or results of behaviour change? Geneva: UNAIDS. 36 p.;
 Stephenson J.M. and Obasi A. (2004) HIV risk reduction in adolescents. *Lancet* 363: 1177-1178;
 Kinsman J., Kamulegeya L., Nakiyingi J.S., et al. (2004) The impact of attending a behavioural intervention on HIV incidence in Masaka, Uganda. *AIDS* 18:2055-2063;
 Sherr L. et al. (2007) Voluntary HIV testing in rural Zimbabwe - what is the uptake, impact on sexual behaviour and HIV incidence 3 years later? Third South African AIDS Conference, Durban, abstract 46, ;
 Matovu J.K.B. et al. (2005) Voluntary HIV counselling and testing acceptance, sexual risk behaviour and HIV incidence in Rakai, Uganda. *AIDS* 19:503-511.
- 6 Padian N.S. et al. Diaphragm and lubricant gel for prevention of HIV acquisition in southern African women: a randomised controlled trial. *Lancet* (online edition), July 13th, 2007;
 Gray R.H. et al. Randomised trials for HIV prevention. *Lancet* (online edition), July 13th, 2007.
- 7 Gregson S., Adamson S., Papaya S., et al. (2007) Impact and process evaluation of integrated community and clinic-based HIV -I control: A cluster-randomised trial in eastern Zimbabwe *PLOS MED.* 4: 545-555.
- 8 Auvert B., Taljaard D., Lagarde E. et al. (2005). Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: The ANRS 1265 Trial." *PLoS Medicine* 2 (11):1112-1122;
 Bailey R.C. et al. (2007) Male circumcision for HIV prevention in young men in Kisumu, Kenya: A randomised controlled trial. *Lancet* 369 (9562):643-656;
 Gray R.H. et al. (2007) Male circumcision for HIV prevention in men in Rakai, Uganda: A randomized trial. *Lancet* 369 (9562):657-666.
- 9 Green E.C., Halperin D.H., Nantulya V., and Hogle J. What happened to reduce HIV prevalence in Uganda? *AIDS and Behavior*, May 2006;
 Green E.C., Rethinking AIDS Prevention. Westport, Ct.: Praeger (2003);
- Sheldon J.D., Halperin D.T., Nantulya V. et al. Partner reduction is crucial for balanced "ABC" approach to HIV prevention. *British Medical Journal* 328 (7444):891-94;
 Stoneburner R. 1. and Low-Beer D. (2004) Population-level HIV declines and behavioral risk avoidance in Uganda. *Science* 304: 714-18.
- 10 Shelton. J. (2007). Ten myths and one truth about generalised HIV epidemics. *Lancet* 370 (December I);
 Gregson S., Geoffrey P. Garnett C. et al. (2006). HIV Decline Associated with Behavior Change in Eastern Zimbabwe *Science* 311 :664;
 Cheluguet B., Baltazar G., Orege P. et al. (2006) Evidence for population level declines in adult HIV prevalence in Kenya. *Sex Transmitted Infections* ;82 (Suppl I):i21-i6;
 Hladik W., Shabir L., Jelaludin A. et al. (2006). HIV / AIDS in Ethiopia: where is the epidemic heading? *Sexually Transmitted Infections* 82(suppl.1): i32-i35.
- 11 Buve A., Carael M., Hayes R. et al. (2001) Multicentre study on factors determining differences in rate of spread of HIV in sub-Saharan Africa: methods and prevalence of HIV infection. *AIDS*, 15 (Suppl.), S5-S14.
 Carael, M. and Holmes, K. (2001). Dynamics of HIV epidemics in Sub-Saharan Africa: Introduction. *AIDS*, 15 (Suppl. 4), S1-S4;
 Shelton J.D., Halperin D.T., Nantulya V. et al. Partner reduction is crucial for balanced "ABC" approach to HIV prevention. *British Medical Journal* 328(7444):891-94;
 Green E.C. and Herling A. (2006) Controversies over the ABC Approach to AIDS Prevention. *Journal of Medicine and the Person*. 4(1): 24-33,
- 12 Auvert B. and Ferry B. (2002) Modeling the spread of HIV infections in four cities of Sub-Saharan Africa. Paper presented at the "ABC" Experts Technical Meeting, USAID, Washington D. C.
- 13 Pilcher C. D. et al. (2004) Brief but efficient: Acute HIV infection and the sexual transmission of HIV. *Journal of Infectious Diseases* 189 (10): 1785-1792;
 Pinkerton, S. D. (2007). Probability of HIV transmission during acute infection in Rakai, Uganda. *AIDS and Behavior* (published online).
- 14 Halperin D.H. and Epstein H. (2004) Concurrent sexual partnerships help to explain Africa's high HIV prevalence: implications for prevention. *Lancet* 364 (July 3) pp. 4-6.
- 15 Southern African Development Community (SDAC), Expert Think Tank Meeting on HIV Prevention in High Prevalence Countries in Southern Africa: Report, Maseru, Lesotho, 10 to 12 May 2006 (SADC, Botswana, 2006); www.sadc.int/downloads/news/SADCPprevReport.pdf
- 16 <http://www.unaidsrsta.org/files/mcp%20report.pdf>

- 17 <http://www.soukiry.com/multiple-and-coocut.html>
- 18 Potts M., Halperin J., et al. (1998) Public Health Reassessment of HIV Risk Reduction in Men who have sex with men in the United States. *J. Acquir. Immune Defic. Syndr*, 39(1), 125: 1 048-1 057,
- 19 Pisanis W., The Wisdom of Brothels and the Business of AIDS. *Journal of Law and Feminism* 18:109-144;
- 20 Phoolcharoen W. (1998) HIV/AIDS prevention in Thailand: success and challenges. *Science* 286(5311):1873-1874,
- 21 Sopheab H., Morineau G., Joyce J., et al (2008). *BMC Infectious Diseases* 8:167.
<http://www.biomedcentral.com/content/pdf/71471-2334-8-167.pdf>
- 22 Farley M. (2006) Prostitution, trafficking, and cultural amnesia: what we must not know in order to keep the business of sexual exploitation running smoothly. *Yale Journal of Law and Feminism* 18:109-144;
- Farley M. and Seo S. (2006) Prostitution and trafficking in Asia. *Harvard Asia Pacific Review* 8(2): 9-12,
- 23 Farley, M. (2004) "Bad for the body, bad for the heart": Prostitution harms women even if legalized or decriminalized, *Violence Against Women* 10(10): 1087-1125,
- 24 Buchbinder S.P., Douglas J.M., McKim D.J. et al (1996) Feasibility of human immunodeficiency virus vaccine trials in homosexual men in the United States: risk behavior, seroincidence, and willingness to participate. *J Infect Dis*, 174:954-961.
- 25 Buchbinder S.P et al, (1996), op. cit.
- 26 Halperin D.T, (1999) Heterosexual anal intercourse: prevalence, cultural factors, and HIV infection and other health risks, part 1. *AIDS Patient Care* 13(12):717-30.
- 27 Hearst and Chen, op. cit (2004);
Rotello G. (1997), *Sexual Ecology*, New York: Dutton,
- 28 <http://www.medicalnewstoday.com/articles/113407.php>
- 29 <http://www.cdc.gov/STDConference/2008/media/release-12march2008.htm>
- 30 Hospers H, and Blom C. HIV prevention activities for gay men in the Netherlands 1983-93, In Theo Sandfort (ed.) *The Dutch Response to HIV Pragmatism and Consensus*. New York: Routledge, 1998;
- van Griensven G.J.P., Tienhan R.A.P., Goudsmit J, et al (1987), Risk factors and prevalence of HIV antibodies in homosexual men in the Netherlands. *Am. J. Epidemiol* 125: 1 048-1 057,
- 31 Buchbinder et al, (2005). Sexual risk, nitrite inhalant use, and lack of circumcision associated with HIV seroconversion in men who have sex with men in the United States. *J. Acquir. Immune Defic. Syndr*, 39(1), 125: 1 048-1 057,
- 32 Hospers and Blom (1998) op. cit
- 33 10M (Institute of Medicine), 2006. Preventing HIV Infection among Injecting Drug Users in High Risk Countries: An Assessment of the Evidence Committee on the Prevention of HIV Infection among Injecting Drug Users in High-Risk Countries. ISBN: 0-309-66345-8. Washington: The National Academies Press. <http://www.nap.edu/catalog/11731.html>;
- Bruneau J., Lesotho F., Franco E" et al. (1997) High rates of HIV infection among injection drug users in needle exchange programs in Montreal: results of a cohort study. *Am. J. Epidemiol* 146:904-1002;
- Strathdee SA, Patrick D.M., Currie S.L. et al (1997) Needle exchange is not enough: lessons from the Vancouver injecting drug use study. *AIDS*. (8): F56-65;
- van Haastrecht HJ" van Ameijden E.S., van den Hoek JA, et al, (1996) Predictors of mortality in the Amsterdam cohort of human immunodeficiency virus (HIV)-positive and HIV-negative drug users. *Am. J. Epidemiol*; 143: 380-91;
- Langendam M.W., van Brussel G.H" Coutinho R.A., et al. (1999). Methadone maintenance treatment modalities in relation to incidence of HIV: results of the Amsterdam cohort study. *AIDS*. 13(13): 1711-1716;
- Van Den Berg C" Smit C" Van Brussel G" et al, (2007), Full participation in harm reduction programmes is associated with decreased risk for Human Immunodeficiency Virus and hepatitis C virus: evidence from the Amsterdam Cohort Studies among drug users. *Addiction* 102:1454-1462.
- 34 The Second International scientific-practical conference "HIV/AIDS in the developed countries" Moscow, Russian Federation, Dec 4-5, 2008.
- 35 McKeganey N" Morris Z" Neale I and Robertson M, (2004) What are drug users looking for when they contact drug services: abstinence or harm reduction? *Drugs: education, prevention and policy* 11(5):423--435.
- 36 Peterson J" Mitchell S, G" Hong Y, et al., (2006) Abstinence versus harm reduction: quest for complementary or complementary entre usuarios de drogas injetáveis. *Cad. Saude Publica* 22(4)
http://www.scielo.br/scielo.php?script=sci_arttext&pid=SO102-311X2006000400012
- 37 Elovich R" Drucker E. (2008), On drug treatment and social control: Russian narcology's great leap backwards, *Harm Reduction Journal* 5:23doi:10.1186/1477-7517-5-23,
- 38 Ball J.C, and Chambers CD. *The Epidemiology of Opiate Addiction in the United States*, Springfield, ill.: Charles C. Thomas, 1970, p, 147,

- 39 http://64.233.169.104/search?q=cacheDObOdopcunUww w . fh i. o r g / t r a i n i n g / e n / H I V A I D S / I D U M o d u l e s / p d f / M o d u l e _ O : _ T r e a t m e n t _ C a r e _ f o r _ H I V _ p o s i t i v e _ I D U s . p d f - , 2 2 s m o k i n g + h e r o i n % 2 2 + a s i a + i d u & h l = e n & c F c l n k & c d = 2 & g l = u s
- 40 <http://www.drugtext.org/library/books/grundichasdraS.htm>
- 41 Maher L. and Swift W. (1997) Heroin Use in Sydney Indo-Chinese Communities: A Review of NDARC Research. National Drug and Alcohol Research Centre, University of New South Wales. Monograph No.
33. [http://ndarc.med.unsw.edu.au/INDARCWEB/nslresources/Mono_4/\\$file/Mono.33.PDF](http://ndarc.med.unsw.edu.au/INDARCWEB/nslresources/Mono_4/$file/Mono.33.PDF)
- 42 Des Jarlais D., Casriel C., Friedman S.R. and Rosenblum A. (1992) AIDS and the transition to illicit drug injection - results of a randomized trial prevention program. *British Journal of Addiction* 87:493-498.
- 43 Maher, W. Swift op cit, 1997.
- 44 Piot M., Bartos H., Larson, D. and Mane P. (2008) Coming to terms with complexity: a call to action for HIV prevention. *Lancet* 372 (9641): 845-859.
- 45 IRIN plus.news.org Global HIV/AIDS news and analysis November 2007
- <http://www.irinnews.org/pdf/in-depth/PIUSNews-IDU-Nov-07.pdf>
- 46 Strathdee S. A., Galai N., Safaiean M. et al., (2001) Sex differences in risk factors for HIV seroconversion among injection drug users: A 10- Year Perspective. *Arch. Intern. Med.* 161:1281-1288.
- 47 South African National HIV Prevalence, HIV Incidence, Behavior and Communication Survey, 2005.
- 48 Piot P. (2006) AIDS: from crisis management to sustained strategic response. *Lancet* 368 (August 5): 528.
- 49 Epstein H. (2008) HIV and AIDS and the irrational. *BMJ* 337:a2638.
- 50 Chin I. (2007) *The AIDS Pandemic*. Oxford: Radcliffe.
- 51 Suwannawong P., *The Agony of Bangkok: Thai Activist Exhorts Conference Crowd to Stand Firm Against U.S. Patent Regime and "Masks of Fake Concern."* September 2004 <http://www.thebody.com/content/art1525.html>
- 52 Farley, M. op cit (2006).