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DISCUSSION PAPER

Discussion
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INTERROGATING A STATISTIC: HIV PREVALENCE RATES IN PNG[1]

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INTRODUCTION

This discussion paper interrogates recent estimates of HIV prevalence in PNG and explores the relevance of international conceptualisations of HIV epidemics to the situation in PNG. It contributes to the quest to 'Know your epidemic, know your response', in particular in PNG contexts (UNAIDS 2007a: 10). The global endeavour to better 'know your epidemic, know your response' constitutes recognition that there are many diverse HIV epidemics and many different ways of responding to them. No single account captures their diversity. No single response keeps them at bay. Our understanding of an epidemic needs to guide us towards effective responses. So far this has not happened to any great extent. In 2007 globally some 2.5 million people became newly infected (UNAIDS 2007b: 1).

HIV prevalence rates are widely used as one way of knowing an epidemic, of measuring the extent of its spread in a population or group. It is also one way measuring progress in responding to an HIV epidemic. This paper will ask whether the HIV epidemic in PNG can be understood through its official prevalence data and whether international conceptualisations of the epidemic capture its particular transmission dynamics.

HIV PREVALENCE RATES IN PNG

In 2005, the estimated HIV prevalence for PNG was 2.00 per cent of the adult population aged 15 to 49. In the 2007 Estimation Report on the HIV Epidemic in PNG the estimate for 2005 was halved to 1.02 per cent. The estimate for 2006 was revised downwards to 1.28 per cent. For 2007, the HIV prevalence rate was estimated to be 1.61 per cent (NDOH and NACS 2007a: 25). These downwardly revised figures seem counter-intuitive in a context where other HIV prevalence estimates have ranged from 2 to 3 per cent up to 5 or 10 per cent and where Australian Government and other papers have talked of the HIV epidemic in PNG as an emergency and a crisis (for example, Tobias 2007).

The first thing to note about the figures for HIV prevalence in PNG is the implicit

claim for accuracy in the citation of the two decimal places and in the specification of the estimated number of people infected. The rates for 2005, 2006, 2007 are 1.02, 1.28 and 1.61 per cent of adults aged 15 to 49, respectively. The number of people estimated to be living with HIV in 2006 was 46,275. The number of children orphaned by the epidemic in 2007 was estimated to be 3,730. However, HIV data collection and analysis systems in PNG are seriously flawed and do not support claims for accuracy to two decimal points or unrounded absolute numbers.

According to the 2007 Estimation Report, an international assessment made by UNAIDS, using criteria of frequency and timeliness, consistency, appropriateness, and coverage, classified the PNG surveillance system as poor and non-functioning (NDOH and NACS 2007a: 24). The Report states that improved data and better methodologies were used for the 2007 estimates (NDOH and NACS 2007a: 27). It, however, also reports that data reporting forms are inadequately filled in. Thus, for 2006, age was not noted on one-third of the reporting forms (NDOH and NACS 2007a: iv), gender reporting was similarly inadequate, and the mode of HIV transmission was not recorded on two-thirds of the forms (NDOH and NACS 2007a: 9).

These inadequacies have serious consequences for those concerned to know the HIV epidemic in PNG. David Wilson has argued that the relevant question for knowing an epidemic is: Where did the last 1,000 cases of HIV infection come from? He points our that the answer in Uganda might be that 65 per cent of adult HIV infections are estimated to take place in marriage, whilst in Ghana 76 per cent of adult male infections were linked to commercial sex workers (Wilson 2007: 1). Different epidemics; different responses. For PNG, the flaws in data collection prevent the possibility of adequately knowing the epidemic in this way.

There are also serious problems in the analysis of the data sets. To take only one example, the Report states that “starting in 2007, the prevalence among the rural population will become higher than the urban population” (NDOH and NACS 2007a: iv). It is not clear whether this conclusion arises from reading the data as if it were country or whether it is an evidence based conclusion. Before 2005, there were only a small handful of rural sentinel surveillance sites and even for 2005 and 2006 there were only 9, compared with up to 19 urban sites. Yet, eighty five per cent of the population lives in rural areas.

We have no grounds here for determining whether, as from 2007, the prevalence in rural areas is becoming higher than that in urban areas, or whether prevalence levels were previously higher than urban areas but not picked up in the surveillance coverage. The changes in prevalence rates could be a statistical artefact and the analysts have read the data as if they were reading the country. Further, HIV data is collected in a setting where data systems for making sense of them through triangulation are themselves inadequate. For example, civil registration data is not systematically collected. Only a small proportion of the births in the population are registered, although this is now increasing where birth registration has been made a condition for school enrolment. The figure is lower for deaths and marriages. Thus civil registration data on the number of deaths or the cause of deaths are not available. Patterns of illness and death - who is dying and from what - are not recorded and so cannot be used to make sense of HIV surveillance data.

There is no national research data specific to HIV prevalence and incidence and the few local studies that have been carried out have methodological limitations. Hence, given the acknowledged and serious limitations of the data collection systems, it would have been more honest, and professional, to round these figures. Further, given the concerns about the quality of the data, it might be better to give rounded national ranges rather than point measures, rounded or otherwise.

NUMBERS AND PERCENTAGES

HIV figures are often given in absolute numbers, the numbers of people recorded as being infected or estimated to be so. Thus, the PNG Report states that 18,484 people were recorded as HIV infected by the end of 2006 and 46,275 people were estimated to be living with HIV for the same period. However, the HIV epidemic cannot be understood in absolute numbers, in PNG or elsewhere. Until recent revisions of the HIV prevalence rate in India, it was thought that

South Africa and India had roughly the same number of people HIV infected. In India, this number constituted about 1 per cent of the adult population; in South Africa it is about 20 per cent or more of the adult population. Absolute numbers of HIV infected only make sense if the bottom denominator is known.

It is prevalence data, the percentage of the adult population infected with HIV, that are critical for understanding the HIV epidemic in a particular context, for HIV service planning and for economic and developmental risk analysis. What is needed in PNG is a figure for the HIV prevalence rate in the population which is grounded in reality. Is the 2007 estimate of 1.61 per cent of adults in the age group 15 to 49 such a figure?

THE NATURAL HISTORY OF HIV EPIDEMICS

The first recorded cases of HIV in PNG, one man, one woman, were in 1987. The NACS/NDOH 2007 prevalence estimate is a shorthand way of saying that, in 20 years since then, the epidemic has expanded to directly affect a cumulative total of 1.6 per cent of the adult population.

Epidemics, like the virus when it enters a person's body, have what might be called a natural history. Once the epidemic enters a population, it expands, sometimes slowly, sometimes quickly. It may plateau for a while or longer. It may slow down. It may not. It may slow down and then start increasing again. It may reach saturation as it did early in the epidemic in the Castro in San Francisco, where it was estimated that prevalence reached about seventy per cent of the gay population.

The prevalence estimate for PNG would indicate a slow rate of spread. To understand this claim, one could look at other generalised HIV epidemics, for example, in sub-Saharan Africa. In sub-Saharan Africa, almost all countries with generalised epidemics have prevalence rates higher than PNG, some as high as 20 or 25 per cent or more of their adult populations. The first recorded case of HIV in sub-Saharan Africa was diagnosed in 1982 in Uganda. In an African setting, the first recorded date would not define the epidemic's starting point. For example, the virus had been found in blood samples stored in hospital settings in the Democratic Republic of Congo as early as 1959. It is not clear what the relationship might be in the PNG context between the first recorded date and the arrival of the virus.

What Africa does show us is that the rate of spread and the patterns of dispersal of the virus can vary significantly. In some countries in sub-Saharan Africa, the epidemic spread very quickly at the start of the known epidemic. Uganda, Zambia, Malawi, and the Democratic Republic of the Congo are examples. In other countries, like South Africa, Swaziland, Botswana and Lesotho, the initial spread was slower. In these countries, the spread was measured until reaching a critical point when it erupted. By now, in most cases, infection rates in the slower starting countries are higher than in the countries of rapid initial spread. Infection rates reached 20 per cent or more in some of these slower starting countries, whilst 10 per cent is the approximate average for the countries of more rapid spread.

Why choose Africa as a comparator? The estimated prevalence rate in PNG is higher than that of other Pacific Island countries, and higher also than India. Let us consider India. The first reported case in India was in 1986. Until recently, the national HIV prevalence rate, based on the sentinel surveillance of antenatal centres, was estimated at 0.9 per cent. In 2007, the National AIDS Control Office (NACO) revised this estimation to 0.36 per cent. Some months later the results of the first community based household bio-survey carried out by the National Family Health Survey 3 (sample size: 102,000) concluded: "HIV prevalence in the general population aged 15 to 49 is approximately 0.3 per cent and cannot be higher than 0.4 per cent under any reasonable assumptions" (Government of India 2007a).

TWO DIFFERENT SURVEYS, TWO DIFFERENT METHODOLOGIES, TWO DIFFERENT RESULTS

Competing estimates of national prevalence rates have become standard since USAID began finding small bio-surveys

within the population-based Demographic and Health Surveys (DHS). Some countries, like Ethiopia for example, reconcile the two estimates to establish one single point estimate (Federal HIV/AIDS Prevention and Control Office 2008: 16-18). Others choose one estimate or the other although there seems to be a trend towards choosing the DHS estimate. This estimate is usually lower than that obtained from sentinel surveillance.

Whichever figure one chooses for India, India may provide an example of a generalised epidemic of similar duration to that in PNG with a lower national prevalence rate. However, not all agree that the epidemic in India is a generalised epidemic, not just because the national prevalence is below the definitional requirement of 1 per cent of the adult population, but because, it is claimed, it is a 'risk group' driven epidemic, rather than a generalised epidemic.

What then is a generalised epidemic? And what determines how quickly an epidemic diffuses through a population?

A GENERALISED EPIDEMIC

Generalised epidemics are contrasted with concentrated epidemics. These are quite different epidemics but they may occur in the same spaces (Wilson and Halperin 2008: 423). Concentrated epidemics are concentrated in certain places or among certain groups. The claim that an epidemic is generalised can be understood in a number of ways. Firstly, the term can be understood geographically, that is, that an epidemic has spread throughout a geographic area, rather than being limited to certain groups or areas within it.

Secondly, generalised epidemics, like contained epidemics, can be understood through the social norms, values and practices that drive or constrain the epidemic. In contained epidemics, the sexual (or drug using) networks are relatively impermeable. The virus passes predominantly between and amongst the people within the group. In the case of generalised epidemics, the network of sexual connections is open, reaching beyond an area or group. The network usually involves both women and men. Open sexual networks disperse the epidemic in swirls and flows across topologies of relationships and movement.

Generalised epidemics also have an epidemiological definition as epidemics where over 1 per cent of the adult populations is infected. Other conceptualisations of a generalised epidemic link them to 'risk-group' based analyses. In these accounts, generalised epidemics are often described as epidemics where "HIV is mostly in the general population" (Green 2007).

EPIDEMIOLOGICAL CONCEPTIONS OF RISK GROUP DRIVEN GENERALISED EPIDEMICS

Locutions such as 'being mainly in the general population' arise from an epidemiological conceptualisation of the epidemic as having its origins in what have been variously described as 'risk groups'. Thus a description of epidemic dynamics drawn from this conceptualisation might go:

> 'The dynamic of the epidemic follows a predictable course. A rapid increase occurs in the most vulnerable group eg. the FSWs [female sex workers] and IDUs [intravenous drug users] as the first step. It spreads via the 'bridge population' of the clients of female sex workers (such as truck drivers, labour migrants, the uniformed services, business men, students, and partners of injecting drug users). HIV/AIDS spreads from this bridge population to the general population including the wives and partners of the clients.' (UNDP Nepal 2005)

In this model of epidemic dynamics, generalised epidemics begin in risk groups, sometimes called vulnerable groups, and result in generalised epidemics if they are not contained in the generating groups. This is a transnational conceptualisation of the epidemic in that it permeates the discourses of international HIV-related institutions and of the global response to the epidemic.

THE IMPACT ON MEMBERS OF RISK GROUPS

While epidemiologists may be comfortable with such analyses, the social and personal consequences can be quite serious. Here I am not challenging the accuracy as descriptions of the dynamics of certain epidemics. Rather, I am saying that their use can have repercussions that are harmful in themselves and which may contribute to further spread of the epidemic. Locutions such as "mostly in the general population" and "the general population and groups at higher risk" imply that the members of these groups are not in the 'general population'.

Further they bring with them assumptions about the members of these groups. The most harmful assumption is that the members of these groups are the 'core transmitters', the drivers of the epidemic: it is they and those with whom they interact, referred to as 'bridging populations', who bring the epidemic into the 'general population'. This contributes to the further censuring and condemnation of already marginalised and stigmatised groups. It locates the responsibility for an epidemic within a risk group. Through such analyses, women especially are named and blamed as spreaders of the epidemic.

Risk group labelling also dehumanises, reducing complex human beings to a feature of interest to an epidemiologist: sex worker, drug user, etc. It denies to those concerned the humanity of people in the general population. Risk group analyses have also instilled a paralysing fear into the hearts of the wives and families of the truck drivers, uniformed services, fishermen and other categories that have featured in the risk group based bill boards, advertisements and other promotional material.

These conceptualisations of the epidemic have been accompanied by the assumption that if such groups are the drivers of the epidemic, interventions that target them, that single them out for attention, are the best way of slowing down the epidemic. They have become the 'target groups' for prevention strategies, in particular, for 'targeted interventions'.

SOCIAL CONSEQUENCES OF USING RISK GROUP ANALYSES

One of the most serious social consequences of using a risk group analysis is the displacement of the immediacy of the epidemic. For as long as an epidemic is described as centred in such groups, the epidemic can be seen by those who do not see themselves as occupying these categories as something that does not affect them. It is a problem for someone else, for *Them*, not us. This is a form of denial and a repudiation of responsible behaviour. It is also a psychological condition that feeds the epidemic.

In these conceptualisations, sexuality is constructed in polarities: extra-marital rather than intra-marital, homosexual or heterosexual and so on. This gives a transgressive tinge to sex within the epidemic. Risk-group sex is constructed as extra-marital and considered by many as morally lax or worse. The epidemic is understood to be about what men, or women, do outside of marriage rather than about what men, or women, do within marriage. Or what they do wherever. As a direct consequence, transmission within marriage has been neglected, in the discourse of the epidemic and in prevention strategies, since it is sex outside of marriage rather than marital sex that is conceptually identified as driving the epidemic. Because of this, many men, and women, find it difficult to admit, or even to realise, that their actions pose a threat to their spouses. This in turn has resulted in the infection of many wives, in particular. UNAIDS and others estimate that an overwhelming majority of women with HIV were infected by their husbands or steady partners. In turn, its consequences are seen in the increasing numbers of children left without parents by the epidemic and in the terrible trauma that children with infected parents suffer.

EVIDENCE FOR RISK GROUP ANALYSES OF GENERALISED EPIDEMICS

What evidence do we have that it is these people who are the drivers of the epidemic?

In generalised epidemics, the 'risk groups' named include sex workers, truck drivers, fishermen, the uniformed services, mobile men with money, and more. It should be noted that most of these are occupational categories, categories constructed to capture a set of epidemiological assumptions about the behaviour that fuels the epidemic and who practices that behaviour. The reasoning might go thus: people who move around have sex when they are away from home. The categories of mobile people include truck drivers, fishermen and politicians. Hence, it is concluded that truck drivers, fishermen and politicians are risk groups for the epidemic.

The evidence is mounting that these 'groups' are not the drivers of generalised epidemics, or not the only drivers. The behaviours that spread the epidemic are either not particular to these groups or else occur just as much or more elsewhere. For example, in data gathered in Lesotho in 2004-2005, where about 25 per cent of the adult population is estimated to be HIV infected, less than 2 per cent of men reported paying for sex in the previous year. On the other hand, 29 per cent reported having had multiple partners during that time (Government of Lesotho 2007). Data from the Indian 2005-2006 National Family Health Survey 3 (Government of India 2007b) indicate that men who never leave their homes for long periods of time are just as likely to have multiple sexual partners as men who are mobile. In the Lesotho study, much more sexual activity was taking place outside of the 'risk group' and in the Indian study, men outside of the 'risk group' had the same patterns of mobility.

It cannot be assumed, as we will see in the case of PNG, that women who work as sex workers have more sexual partners on average than other women. HIV infection rates can be higher among women who are not sex workers than among women in sex work. There have been examples of this from the start of the global epidemic, from Mexico City and Connecticut, for example. Support also comes from studies in Sydney which show that the rate of STI infection among women in sex work is lower than for other women (Murray 2001). Findings such as these question the accuracy as well as the explanatory usefulness of 'risk group' conceptualisations of the epidemic.

'RISK GROUPS' AND THE EPIDEMIC IN PNG

There is not evidence to support a conceptualisation of the epidemic in PNG as driven by risk groups, that is, to support claims that the epidemic started in, or has been significantly driven by, these groups or settings.

Early HIV-related contact tracing data, particularly that collected by Sr. Rose Bernard Groth SND, indicated open sexual networks, involving a range of actors, rural and urban, and various forms of transactional, survival, commercial, occasional and marital sex. The findings, available nationally[2], showed quite dense and geographically dispersed sexual networks. They were gendered connections with both men and women involved in the diffusion of the epidemic. The tangle of the network so created spread back and forth through towns, villages and mining areas, from the highlands to the coast and back, and across differences of ethnicity, of locality, of gender, and of status. The nodes of these networks do not in themselves constitute risk groups or risk settings as those terms are used in 'risk group' analyses of the epidemic. They are just the intersections of people's daily lives, some more dense than others. Furthermore, sexual transactions in PNG are resistant to simple, binary classifications, for example, commercial or non-commercial. Commercial sex work is often further divided into street-based, brothel-based, hotel-based, home-based, etc. sex work. More recently, the programmatically interesting categories of open, partially open and hidden sex work have been developed (Samraksha 2008).

These categories do not seem to capture the complex reality of sexual interactions in the PNG context. Lawrence Hammar has repeatedly shown this in his work. He argues that "Many dubious and highly medicalized distinctions construct the AIDS epidemic in Papua New Guinea as caused by abnormal sex engaged in by members of risk groups defined along loosely affiliative and occupational lines" (Hammar 2008).

To argue that the HIV epidemic in PNG is not driven by risk-groups is not to claim that women do not engage in commercial or transactional sex for a living or as a part of

their coping strategies, nor that men do not desire, be attracted to, form relationship with or engage in commercial or transactional sex with other men in PNG.

Wilson and Halperin describe epidemics as generalised if 'transmission is sustained by sexual behaviour in the general population and would persist despite effective programmes for vulnerable groups' (2008: 423). This is an important definition in that it makes clear that responding to generalised epidemics may still importantly involve developing effective programmes for particular populations. PNG has some very effective HIV prevention programmes in place working with such groups. Interventions for such groups that promote sexual health, empowerment and respect for their rights have been shown to work. The Save the Children in PNG Porot Sapot Project is an important example (Fairbairn-Douglas et al 2009). These need to be continued.

The natural history of the epidemic in PNG would suggest that the epidemic would exist even if effective programs for vulnerable/risk groups and high risk settings had been put in place early in the epidemic.

THE DISCOURSE OF 'RISK GROUPS' IN PNG

Risk groups and risk settings may not be the drivers of the epidemic in PNG but they feature significantly in the discourse in PNG about the epidemic.

At the very start of the epidemic, the locutions used were drawn from the international discourse on the epidemic. This was inevitable given that national departments of health drew extensively on technical advice from the World Health Organisation. WHO, UNAIDS, and other international organisations and bilateral donors developed their understanding of generalised epidemics from contained epidemics. In this way, 'risk group' conceptualisations of generalised epidemics emerged.

The 1987 PNG National Department of Health Circular reporting the first cases of HIV infection identified the woman as a "prostitute" from Madang (NDOH 1987). Its leading recommendation was to avoid having "sex with people who have AIDS or might have AIDS, such as promiscuous people in urban areas."

These locutions of prostitution and promiscuity were picked up by some of the few organisations who were then responding to the epidemic. The HIV materials of one of the active church organisations referred to '*pamuk meris*' or prostitutes, and used the verb '*pamuk*', the activity of being sexually loose, which applies to both men and women (Lepani 2008). However these references were soon removed from their literature as people reflected on actual experience on the ground. They did not ring true to the realities of PNG. However, at no stage has a discourse about HIV in stable relationships and in particular in marriage been developed, used or interrogated.

THE PROGRAMMATIC RESPONSE IN PNG

In 2003 a High Risk Setting Strategy (HRSS) was introduced as the central prevention strategy of the PNG national response to the epidemic. The goal of the HRSS is "to facilitate and sustain behaviour change to minimize HIV/AIDS and STI transmission and increase awareness in high risk settings in PNG". The HRSS is described as an emergency response designed to focus efforts on bringing about behaviour change in settings throughout the country where HIV transmission is known to be high or likely to be high.

The HRSS identifies the following five prioritized high risk settings:

- Settings where people negotiate for sex: young women engaging in unsafe sex, young men engaging in unsafe sex, priority settings (nightclubs)
- Highlands Highway and ports of Lae and Madang
- Disciplinary Forces: police, defence, CIS, and security firms
- Private Industries: mining and petroleum sites, fisheries and canneries sites, construction sites, palm oil sites

- Youth at Risk in the National Capital District: unemployed youth in settlements, in-school youth, youth in uniform, youth involved in sex trade.

A number of observations can be made about the strategy. Firstly, there **are** sites where there is more sexual activity than at others. A prevention portfolio must include a focus on these. Our analysis so far has pointed out that the networks of transmission are open and extended and that there is clustering as well as dispersion. It is cost effective to include sites of clustering in a portfolio of prevention strategies. There does however remain a question of how best to work in these sites. The range of options includes, but is not limited to, targeted interventions. Secondly the discourse of 'high-risk settings' can lead to stigmatisation and blaming of people in those settings, in particular, female sex workers, settlement dwellers, and unemployed youth. It can also cause a backlash amongst those living in areas identified for interventions under the strategy as they resist being called a high-risk setting or, by inference, a high-risk group, as has happened in Port Moresby. However, the key criticism of this approach is that there are many drivers of the epidemic that are not caught up in this conceptualisation. It reflects a limited understanding of the epidemic dynamics in PNG. The problem lies in reliance on this strategy as the basic prevention strategy.

The assumption behind the HRSS and other risk group/setting based analyses is that people sexually active in these groups/ settings need to be targeted for prevention messages and technology. The effectiveness of these strategies, in PNG and elsewhere, has yet to be documented.

UNDERSTANDING GENERALISED EPIDEMICS

There are other ways of conceptualising HIV epidemics that may fit generalised epidemics better. A growing literature is now addressing this challenge. Three recent papers attempt to clear away some of the dead wood of the dominant understandings (Wilson and Halperin 2008, Shelton 2007, Wilson 2007).

Shelton sets out to dispel ten myths about generalised epidemics. The myths he names consist of five problems: HIV spreads like wildfire; sex work is the problem; men are the problem; adolescents are the problem; poverty and discrimination are the problem. The remaining myths consist of five answers: condoms are the answer; HIV testing is the answer; treatment is the answer; new technology is the answer; sexual behaviour will not change. Whilst he musters arguments in support of the repudiation of each of these claims, a less doctrinaire stance might welcome the interrogation of these oft accepted claims while acknowledging that there may nevertheless be some substance to grapple with in each as well.

Wilson and colleagues argue that the challenge in responding to generalised epidemics is that the globally invoked and advocated prevention interventions are "at best unproven, and at worst disproven, for reducing HIV incidence" (Wilson and Halperin 2008: 424). The interventions named are testing and counselling, condom promotion, school and youth (including abstinence) programmes, and treatment of sexually transmitted infections. Each of these interventions, they acknowledge, may have other proven health benefits but the evidence of their effectiveness in achieving HIV prevention objectives is wanting. Each of these named interventions forms part of the portfolio of interventions being advocated for PNG.

Wilson (2007: 1-2) sets to one side epidemiological and medical paradigms in terms of percentages of populations or of the sexual behaviour of individuals to begin the development of an understanding in terms of the social environment in which such epidemics flourish. Using data from southern Africa, Wilson identifies intergenerational sex, cultures of coercive sexuality, cultures of alcohol abuse, concurrent sexual partners and the vulnerability of couples as contributory factors. He argues from this data that by knowing generalised epidemics in this way, we can come to know that their response must entail fundamental community change and safer sexual environments.

Other social and economic factors are associated with high rates of HIV infection in generalised epidemics. These include

significant violence towards women, whatever forms the violence takes. Research has shown that women who are the victims of violence, any form of violence, have a significantly higher likelihood of being HIV infected than other women. Significant socio-economic stratification, which is an indicator of inequitable development, is another feature. Societies in which there are significant disparities between the rich and the poor have high rates of HIV infection amongst both the rich and the poor, commonly even higher in the rich and educated than among the poor. Weak social capital is a further factor. Effective response to the epidemic and its driving forces require collective rather than individual action. This in turn requires trust and mutual respect, the basic components of social capital.

These factors may be referred to as the driving forces of the epidemic. They are interrelated. Equitable development requires trust and a sense of the common good, what is often referred to as strong social capital. Trust and respect between men and women moderate tendencies to indifference, exploitation and violence. Not all of these driving forces apply to all high prevalence countries. However their identification constitutes a beginning of an understanding of the epidemic in terms of the socio-cultural structures that shape and constrain forms of individual and collective agency. This, however, poses further challenges for little is known about how social environments change or can be supported to change so that these epidemics can be held at bay.

These insights provide a justification for developing an understanding of the generalised epidemic(s) in PNG in terms of these social factors or driving forces.

SEX AND THE EPIDEMICS

In PNG, various arrangements of cultural practices, social relationships and historical processes move people to act. Personhood and agency follow cultural logics and values and social action comes about in specific socio-cultural contexts. Traditionally in PNG there was a multiplicity of forms of sexual exchange. These included hospitality sex, sex in exchange for food, ritual sex, sex for protection, coercive sex, sex for trade goods, sex in warfare, sex in exchange for labour in gardens, and others[3].

This diversity of transactional and survival sexual exchanges has passed into modern living, along with occasional sex, sex for pleasure and consensual and non-consensual marital sex. Coerced sex has increased. Women have a significant lifetime chance of being raped or pack raped.

Commercial sexual transactions, as understood in locutions such as “commercial sex workers”, are relatively recent phenomena in PNG. Forms of commercial sex include payday sex on the fringes of mines, plantations and businesses, and ‘wet lunch’ or lunch-time sex near offices and businesses. Women in wage employment may sell sex to supplement their low wages or at times of need, for school fees or medical bills. Unemployed young women in the settlements may sell sex for similar reasons. Brothel-based commercial sex is a relatively recent occurrence and its establishment, initially in Port Moresby and Mount Hagan, and later expansion has been linked to money laundering by the logging and other industries.

This multiplicity of sexual exchanges occurs throughout the country. Certain forms may be localised, *pasinja meris*, passenger women, amongst the Huli of Southern Highlands Province (Wardlow 2004), for example, but the phenomenon of sexual exchanges is ubiquitous, rather than a predominantly urban or risk setting occurrence. Furthermore, the ADB study shows that women involved in transactional or survival sex may have as many partners as women who identify as full time commercial sex workers (Jenkins 2007: 53).

Thus, the claim that the epidemic is generalised in PNG is a geographic claim about it being diffused throughout the country. But it is also a social claim, a claim that it spreads through extensive and diverse sexual networks that involve a multiplicity of forms of sexual interactions. These may be consensual or involuntary, acts of necessity or desire or coercion, and predominantly but not solely between men and women.

How does understanding what is known about sexuality and sexual interactions in

PNG throw light on the interrogation of the HIV prevalence estimate? Importantly, it shows the potential for widespread and rapid diffusion of the epidemic exists if protected or safe sex is not practiced in these sexual networks. However, it does not shed light on how far the epidemic has already spread into the networks. What other factors or driving forces might be present?

MULTIPLE AND CONCURRENT PARTNERS AND GENERALISED EPIDEMICS

The dominance of conceptualisations of the epidemic in terms of risk groups or settings, and as essentially transgressive or extra-marital, has left as a heritage the assumption that the sexual encounters which drive the epidemic are mainly transient encounters with multiple and different partners: one client after another; one truck stop after another. The model is that of serial monogamy in fast forward. This assumption is now being questioned. Data from Africa does indicate that the epidemic diffuses quickly where people have multiple partners. However, more rapid spread occurs where these partners are regular or concurrent sexual partners, as distinct from multiple partners which are seriatim.

To understand this, we need to understand the dynamics of viral presence or action in the body. There is a short period of time after a person first becomes infected, probably two weeks or more, during which the virus quickly replicates in the body as the immune system struggles to respond. During this period, when viral load is high, HIV transmission is highly likely to occur (AIDS.org 2007). The probability that a person will infect another person sexually, or perinatally, including through breast feeding, during this period is very high. The likelihood of infection during this period increases where sexually transmitted infections are endemic and/or if sex is non-consensual or brutal.

Where there are concurrent sexual partners, many or all could be infected in a relatively short period of time. Where these partners have other steady partners, they in turn are highly likely to infect them in turn during their period of high infectivity. Where the sexual partners are sequential, only the partner(s) who is involved sexually during this short period of high infectivity has a significant chance of being infected. On average, Africans have no more sexual partners over a life time than people elsewhere, but they are more likely to have a small number of long-term partners at the same time (Epstein 2007b). Many people in PNG, both rural and urban, have a plurality of sexual partners.

What is not clear is the extent to which these partners are seriatim or concurrent. Research on rural men's extramarital sexuality indicates two patterns: sex while away from home (Wardlow 2007), which could approximate seriatim partnership, and sex with single, divorced or separated women in their own or nearby villages (ADB 2007) which could be closer to concurrent partnership. Certain cultural practices increase the likelihood of concurrent infection. For example, both rural and urban men engage in group sex and group rape, practices which put men at risk from each other when one or more men in the group are newly infected.

There is a critical need for greater knowledge of patterns of sexual partnering in PNG.

A CLUSTERING EPIDEMIC

The claim that an epidemic is generalised is not a claim for evenness of distribution. A marked feature of generalised HIV epidemics has been their propensity to cluster, in families, in geographic areas, in occupations, by age and gender, etc.

This is as true at the national level as it is locally. Thus in surveillance data in India, the prevalence estimates range from 0.07 per cent in Uttar Pradesh to 1.13 in Manipur, with four states (Andhra Pradesh, Karnataka, Maharashtra and Nagaland) around 1 per cent of the adult population.

The clustering may mirror patterns of economic activity or wealth accumulation, in villages or in towns. For example, in September 2006, at a WHO meeting, the then Minister for Health and Minister assisting the

Prime Minister on HIV/AIDS, Sir Peter Barter, reported as confirmed that, at Porgera gold mine, HIV infection rates of 12 per cent of the workforce had been recorded and that and in other areas rates as high as 15 percent had been recorded (Lilley 2006). Recent data from Porgera indicate that the infection rate in people coming to be tested in the hospital in Porgera is about 10 per cent (Gibbs 2008).

The clustering may be local, reflecting local flows of people, knowledge and practices, and/or more localised sexual networks. It can be rural clustering, where, for example, some villages or clans may be more seriously affected than others. Thus there are local narratives emerging around Lake Kopiago in Southern Highlands Province where people say of a village or clan: “HIV is full up over there” (Haley 2008). In so saying, they are acknowledging uneven distribution. There are similar narratives in Port Moresby: “Nine Mile is full up”.

Clustering occurs in certain occupations, including teachers (Kian 2004) and health care workers. Wealthy elites commonly have higher infection rates than other groups, including the poor. The clustering may occur in certain cultural settings or around certain cultural values or practices. For example, as traditionally happened in parts of PNG, if people in a village had sexual contact only with each other or with people in the locality, the epidemic would be clustered in the village and its surrounding area.

Chaos theory tells us to expect clustering to occur without easily predictable causal factors. We can witness chaos in the spread of epidemics as unpredictable and unregularised complexities or clusters occur. Hence in a generalised epidemic urban and rural clustering does occur. These clusters may be created out of chaos or they may be sites where the drivers of an epidemic converge. The drivers vary from place to place.

That the epidemic is clustered raises a critical programmatic question: how does one work most effectively in clustered epidemics?

A GENDERED EPIDEMIC

The HIV epidemic is always clustered in young women, for reasons that are both biological and social. In this respect, the epidemic in PNG reflects generalised epidemics in Africa and elsewhere: the data show a clustering in women in the 20 to 29 year old age group (NDOH and NACS 2007a: 8). For men, it occurs later in the 25 to 39 age group. An interesting exception to this is India where the prevalence in young women is as low as for young men. This is a rare phenomenon and needs a social explanation.

Physiological vulnerability occurs in all young women up to their mid-twenties when their genital tracts mature. It is this in particular which leads to infection rates up to six or more times higher in young women than in young men. Since the physiological vulnerability is constant, the extent of exposure to the possibility of infection must be lower in young women in India.

The 2007 Estimation Report on the HIV Epidemic in PNG indicates a significantly gendered epidemic (NDOH and NACS 2007a: 29). More women than men are estimated to be living with HIV infection: 58.5 per cent are women in 2007. Furthermore, more women than men are estimated to become newly infected in 2007: 59.7 per cent of new infections are in women.

The extent of feminisation of the epidemic claimed in these data is high. Interestingly this has been not been widely remarked on since the release of the report. It may, or may not, be a statistical artefact. The main source for sentinel surveillance is the testing of pregnant women in a limited number of health centres. This leads to a greater number of women being tested than men. Thus the feminised nature of the epidemic may also be a statistical artefact. This, unfortunately, reinforces the narratives of blame in which women figure so prominently. However, it is clear that infection rates in women in PNG have the potential to be high.

Lawrence Hammar, and others, argue that “the epidemic is caused by the severely imbalanced state of gender relations in Papua New Guinea. By “gender relations”, I mean the relations of power that exist between men and women, especially in marriage but

also generally. The troublingly poor status of women has ill effects on many aspects of life and very markedly on sexual relations" (Hammar 2008).

TEMPORAL CLUSTERING AND ELECTIONS

As outlined above, data indicates that the rate of HIV infection in communities varies according to whether people tend to have serial partners or a number of regular steady partners (Epstein 2007a). The situation in PNG during elections differs from either of these scenarios. Research shows that, in many places, especially in the Highlands, these are periods of significantly heightened sexual activity for both men and women.

There are increased flows of money in communities as votes are bought. Candidates set up campaign houses where social activity, including sexual intercourse, gambling, and drinking is heightened. Campaign workers enter into marriages in order to get whole family or clan lines to vote for a candidate. Married couples dissolve their marriages for the duration of the election period so that each can go their own way. The marriages are reformed after the elections without recrimination. One study conservatively estimates that men and women may have on average seven different sexual partners during this roughly two month period (Gibbs and Mondu 2008).

These factors could lead to a considerable amplification of the epidemic. If people were to become newly infected during this time period, they could pass the infection on to a number of their sexual partners who would themselves move into a period of increased infectiousness and so too in turn transmit the infection to their sexual partners. This would cause a temporal clustering in new infections which would continue during the course of infection, somewhat similar to a chicken being ingested by a python.

OTHER DRIVING FORCES

Violence and the threat of violence are ever present. The untrammelled and often socially accepted if not condoned use of alcohol and drugs is widespread. PNG has the greatest socio-economic disparity in the Asian and Pacific regions as measured by the Gini coefficient. This in itself weakens social capital. Binding or group social capital is present in PNG society in clan, house line and wantok groups. However, bridging social capital, social capital **between** different groups, is weak and stocks of trust and respect across differences low. There is not a strong sense of the common good beyond kin groups (Reid 2000).

These considerations reinforce the contention that the potential for extensive and rapid spread of the epidemic exist. Does this lead us to expect an HIV prevalence rate higher than the 1.61 per cent estimated?

WHAT DO I PERSONALLY THINK?

The methods used to estimate HIV prevalence in PNG are clearly inadequate. When I first thought about the 2007 official statistic, I felt it was counterintuitive. This may well have been because other national prevalence figures that get bandied around are so much higher and yet still seem, to me and others, to be in the realm of the possible.

This latter is the crux of the matter. We cannot see this epidemic. We can only see and study the psychological, cultural, social, economic, political and other factors that could be driving it. From this we can come to know the potential for spread. It is worryingly high in PNG. The conditions are in place for rapid and extensive spread, whether or not it has already occurred. I ask myself whether there are factors constraining the spread and here I suffer a failure of the imagination. One might speculate that the stricter chaperoning of young girls in India might contribute to the low rate of infections in young girls. India is unique in the HIV world for having prevalence peak in women in the same age range as for men, rather than 10 to 15 years earlier. But it is hard to identify such social, cultural or other constraining influences for PNG.

National data do not reflect local situations. The epidemic in PNG is clearly a clustering epidemic. Many people speculate that infection rates are high in Western

Highlands Province. This is no doubt so. One month recently 30 out of the 140 people who came to be tested in one centre in Mt Hagan were found to be infected: over 21 per cent of attendees. Nonetheless I suspect that there are other areas where infection rates are high. Lake Kopiago is one of the most isolated and cut off areas in PNG and yet people have worked out that some families and villages are seriously affected. Some testing results bear this out. In Mingende, just outside of Kundiawa in Chimbu Province, the figures at a counselling and testing centre for the same month as the Mt. Hagan data, were 20 out of 120: 17 per cent of attendees for that month (Hunhoff 2008).

I think that rates could also be high in Gulf Province, one of the most developmentally deprived parts of PNG. Gulf women, especially Kerema women, are known for their beauty. They are frequently raped, married early, abandoned, hassled, and more. But, more than that. The staff of an NGO health centre in Port Moresby, which cares for people living with HIV, have noticed that usually when a Highlands person is diagnosed, they are taken in and cared for by their families, either in Moresby or back in the Highlands. Gulf people, however, are often rejected by their families and left in Moresby to die. Only after death does the family turn up to claim the body for a traditional burial. The virus seems to spread in societies with values such as these. However, the ante-natal prevalence data for Kerema, the capital city of the province, was 0 per cent for 2006.

In Moresby, many families I talk to, settlers and villagers, as well as the elite, have someone in their family affected. I have seen this before in Africa in settings where surveillance systems were showing much higher prevalence levels. However, it is statistically possible that there could be quite high pockets of infection and still the national average be around 1.6 per cent. This is supported by the fact that the national HIV prevalence data for ante-natal centres collected in the surveillance system is 1.6 per cent. The range, however, is from 0 to 16 per cent for 2007.

The question needs to be asked, not only about the coverage of the surveillance sites, but also what proportion of women go to health centres during their pregnancy? I have tried to check this out but the various figures I have been given do not seem very robust. It is also possible that if we tested pregnant women in a greater number of sites we would find levels of infections similar to those found in the high infection pockets.

SO WHERE DO WE STAND?

I think that there is an ethical issue in releasing such data. The Report itself says that the “estimates should be considered with caution given the quality and quantity of the data used” (NDOH and NACS 2007a: 24). Despite this, it revised downwards its previous estimates and issued what to many is a counterintuitive prevalence estimate. In so doing, it could be said that it creates the conditions for complacency: the feeding of denial, the diminishing of already weak political support, the undermining of efforts of the donor community and others to scale up the response and more. This was recognised at its launch by the Minister of Health and HIV who stated: “The lower national HIV prevalence from previous years does not mean a decrease in the epidemic rather all projected HIV indicators show an increase” (NDOH and NACS 2007b).

The World Bank has been negotiating with the Government of PNG to carry out a bio-survey to determine HIV prevalence rates. This will give us a snapshot of what is happening and would be of greater value if it gives local prevalence levels as well as national averages. However, even if this comes to fruition, the results will be long in coming. In the meantime, we have only the official prevalence estimate, data which is not representative of the population, and our intuitions. Meanwhile, I work to find effective and culturally resonant pathways to the kinds of social change that might hold the epidemic at bay with a sense of urgency and a sense of foreboding.

AUTHOR NOTES

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on social development, in particular on the HIV epidemic and on gender, mostly in the developing world. Her practice is informed by the principles of feminism and social justice and oriented towards the strengthening of social and ethical capital. Her current work has a particular focus on PNG but also encompasses work in India, Africa and elsewhere. Her recent writings include reports, training materials and articles, most recent being 'Reading as a Women: Understanding generalised HIV epidemics', *South Pacific Journal of Philosophy and Culture* (forthcoming), and *Pacific Gender and Aid Effectiveness Case Study Report: Gender and the Paris Declaration* (co-author), NZAID/AusAID, February 2009.

ENDNOTES

1. Earlier versions of this paper were presented at the Statistical Leadership Seminar, Australian Bureau of Statistics, Canberra, 18 March 2008 and at the Australian Public Service Senior Executive Service Breakfast Series, Canberra, 7 December 2007.
2. For example, they were presented to the First National Medium Term Plan Strategies to Action Workshop, Port Moresby, 3-7 August 1998.
3. Research data on culture, modernity and sexuality is summarised in Jenkins 2007

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