

Addressing the HIV/AIDS–food insecurity syndemic in sub-Saharan Africa

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Recently a few vocal health experts have suggested that some of the billions of dollars currently used to prevent and treat HIV and AIDS be reallocated to address more basic problems such as malnutrition, tuberculosis, malaria, and enteric and diarrheal disease caused by lack of access to clean water. While not universally agreed upon, this reassessment of policy priorities acknowledges that there are multiple other health problems that deserve renewed attention from the international community. It also highlights the fact that the impacts of the HIV pandemic are exacerbated by widespread poverty, food insecurity and malnutrition, and gender inequality. Nowhere is this more evident than in sub-Saharan Africa, where multiple epidemics conflate and seriously compromise the survival of individuals and communities. Given the widespread occurrence of famine in sub-Saharan Africa, issues of food and economic security become of paramount importance in efforts to address the region's HIV epidemics. This paper examines the historical, political-economic, and cultural dimensions of the HIV epidemic in the context of the growing problem of food and economic insecurity. Furthermore, using theoretical frameworks that emphasize the dynamic interrelation between HIV/AIDS and food insecurity, we present suggestions for combining traditional HIV-prevention strategies with food production and nutrition-education programming. In light of the complex interactions between HIV/AIDS and food insecurity and the lack of accessible treatment modalities, such programming could potentially reduce the risk for transmission of HIV through behavioural changes and improved nutritional and immune status, and increase the life expectancy of people living with HIV or AIDS.

Keywords: history, interventions, Lesotho, resource-poor settings, sub-Saharan Africa, sustainable agriculture

Introduction

A debate has been stirring over how to best use the billions of dollars spent annually on the prevention and treatment of HIV and AIDS. With a revised downsizing of the number of people living with HIV or AIDS (PLHIV) worldwide (UNAIDS, 2007), the lack of a promising vaccine, discouraging results from a recent microbicide trial (Levine, 2007), and an overemphasis on treatment and abstinence-only programmes, a few vocal health experts have suggested that some of the billions of dollars spent on these efforts should be reallocated to address basic problems such as malnutrition, tuberculosis, inadequate access to reproductive health services, malaria, and enteric and diarrheal disease caused by lack of access to clean water. For example, in a *New York Times* op-ed piece on 1 January 2008, Daniel Halperin, an internationally known expert on global health, stated that "the current \$15 billion in spending represents an unprecedented amount of money aimed mainly at a single disease. Meanwhile, many other public

health needs in developing countries are being ignored" (Halperin, 2008, p. 19). Like AIDS, these other problems contribute to high morbidity and mortality rates in developing countries. For instance, maternal and child malnutrition accounts for more than one-third of child deaths and 11% of the total disease burden globally (Black, Allen, Bhutta, Caulfield, De Onis, Ezzati *et al.*, 2008; Victoria, Adair, Fall, Hallal, Martorell, Richter & Sachdev, 2008). Similarly, more than one billion people lack clean water and about two billion have inadequate sanitation (Cheng, 2008). However, there is 100-times less funding available for alleviating these problems than there is for AIDS (Cheng, 2008). There are also concerns that the global food crisis, economic downturn, and discontent with progress in responding to the HIV pandemic threaten to restrict international and national funding allocations and may increase the competition for resources between efforts to achieve universal access to HIV/AIDS-treatment and prevention services and other approaches (Gordon, 2008). While not universally agreed upon, this reassessment of policy priorities is important

because it increases general recognition that the HIV pandemic is exacerbated by widespread poverty, gender inequality, and malnutrition (see Figure 1).

The article has several aims: first, we use syndemic theory and the new variant famine theory to examine why HIV and AIDS is having such a devastating impact in sub-Saharan Africa. Here, the focus is on the ways in which HIV infection, AIDS illness, and malnutrition interact and magnify negative health outcomes for millions of people in the region. Second, we examine the historical, political-economic, and cultural dimensions of the interaction between HIV/AIDS and food insecurity in the southern African nation of Lesotho — which currently has one of the highest HIV prevalence levels in the world. Finally, we provide suggestions for combining more traditional HIV-prevention strategies with food production and nutrition education. In light of the complex interactions between HIV/AIDS and food insecurity and the lack of accessible treatment modalities, such programming could potentially reduce the risk for transmission of HIV through behavioural changes and improved nutritional and immune status, and also increase the life expectancy of people living with HIV or AIDS.

Theoretical and practical considerations

The term syndemic, coined by Singer (1994 and 2006), refers to the interaction among multiple diseases or health problems under conditions of poverty, health disparities, and structural violence, which results in an amplification of negative health outcomes. First postulated to examine the mutually reinforcing interaction among substance abuse, violence, and HIV incidence in inner-city settings in the United States, the syndemic approach offers a useful framework for understanding the complexities of the spread of HIV around the world. As the Centers for Disease Control and Prevention (2008) states: "The conceptualization of a syndemic is significant because it expands the boundaries of public health science and action.... This perspective complements single-issue prevention strategies that may be effective in controlling discrete problems but often are mismatched to the goal of protecting the public's health in its widest sense." Nowhere is the example of a syndemic more evident than in sub-Saharan Africa (SSA), where multiple

epidemics conflate and seriously compromise the survival of individuals and communities. Given the widespread occurrence of famine in SSA, issues of food and economic security become of paramount importance in efforts to address the region's HIV epidemics.

Inadequate access to food compromises the immune function of individuals, making them more vulnerable to HIV infection and hastening the progression of HIV disease for those already HIV-positive (Suttmann, Ockenga, Selberg, Hoogstraat, Deicher & Muller, 1995; Tang, 2003); moreover, in resource-poor settings, there is an increased risk for the transmission of HIV among individuals who engage in transactional sex for survival (see Figure 1). For example, in their study on the relationship between 'food insufficiency' and higher-risk sexual behaviours among women in Botswana and Swaziland, Weiser, Leiter, Bangsberg, Butler, Percy-de Korte, Hlanze *et al.* (2007) found that participants who had experienced food insecurity were twice as likely as those who were food-secure to exhibit inconsistent use of condoms with non-regular partners, to engage in the sale of sex, and to have sex with older males, who are more likely to be infected with the virus. Likewise, in their analysis of the impact of famine on HIV and AIDS in Malawi, Bryceson & Fonseca (2006) report the involvement of women in transactional sex as a mechanism to ensure access to much needed food for their families. Similar patterns were found by Shah, Osborne, Mbilizi & Viilli (2002), also in Malawi, where women reported that poverty led them to involvement with men other than their husbands or permanent partners.

Overlapping with the syndemic theory, the new variant famine theory (De Waal & Whiteside, 2003; Naysmith, De Waal & Whiteside, 2009) provides a useful framework for understanding the interaction between HIV/AIDS and food insecurity as it increases the vulnerability of rural communities. According to this theory — in places where there are already profound inequalities and marginalisation — HIV/AIDS-related morbidity and mortality, among other factors, have created household labour shortages, a reduction of household assets and the loss of critical skills, and an increased burden of care for HIV-affected adults and orphaned children. As the food-insecurity situation worsens because of reduced food production or loss of income, the synergism between malnutrition and compromised immunity contributes to the rise of co-morbid health conditions. In time, not only are the quality and quantity of household assets undermined, but social networks become frayed and the capacity of communities to respond to crises is severely compromised. Although the deleterious effects of HIV and AIDS have been documented in micro-level studies using the new variant famine theory (i.e. De Waal, 2004; Naysmith, De Waal, & Whiteside, 2009), its use to measure the impact of HIV/AIDS on food security at a national or regional level where indicators such as gross domestic product (GDP) are used as outcome measures has been more difficult (McDonald, Roberts & Dixon, 2001). Notwithstanding this criticism, others argue that the effects of HIV and AIDS cannot be reduced to a number such as GDP (Negin, 2005), and that other variables associated with production may create 'noise' in the system and

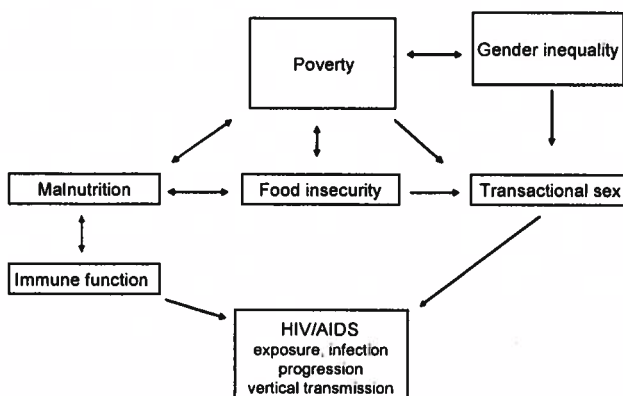


Figure 1: The HIV/AIDS–food insecurity syndemic

mask the larger impact of HIV and AIDS at a macro-level (De Waal, 2004). The new variant famine theory has also been criticised as over-emphasizing the impact that HIV may have, and distracting from other social and political structural factors at the national and international levels, and as deflecting responsibility for famine from national governments (Bolton, 2003; Cromwell & Chintedza, 2005; Ansell, Robson, Hadju, Van Blerk & Chipeta, 2009). Rather than ignoring the role of broader political, social, and structural factors, proponents of new variant famine theory have re-conceptualised their theory to account for such forces, as they state the theory "emphasiz[es] the ways that HIV/AIDS exacerbates pre-existing social, political and economic pathologies in a society" (Naysmith *et al.*, 2009, p. 258). Considering the political-economic situation of Lesotho, the high prevalence of HIV and AIDS in the country, the large number of rural residents, and the serious problem of food insecurity, the new variant famine theory provides a strong base for the development of interventions for improving food security and reducing HIV and AIDS.

In conceptualising hunger and food insecurity, Amartya Sen's entitlement theory provides a useful framework that complements those of the two previous theories. Sen's (1982) seminal book *Poverty and Famines* provided the impetus for a concerted effort by researchers to re-conceptualise food insecurity in a way that emphasizes the constraints that limit access to food, rather than the availability of food per se. Thus, food insecurity occurs because people cannot access food as a result of social and economic factors (e.g. poverty), irrespective of food availability (Devereux, 2001). Under this conceptualisation, "[F]ood insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable food in socially acceptable ways is limited or uncertain" (Anderson, 1990, p. 1560). Based on research dating back to the early 1990s (Radimer, Olson, Greene & Campbell, 1990; Radimer, Olson, Greene, Campbell & Habicht, 1992; Wehler, Scott & Anderson, 1992), four domains have been identified which describe how people experience food insecurity. They are: "1) [there is] *uncertainty* or worry over food; 2) food is of inadequate *quality*; 3) food is of inadequate *quantity*; or 4) food [is] acquired through *socially unacceptable means*" (Coates, Wilde, Webb, Rogers & Houser, 2006, p. S1429).

The perfect storm for the making of an epidemic

The shape and form of an HIV epidemic reflect the intersection of economic, political, and cultural characteristics of the larger society (Barnett & Whiteside, 2000 and 2006; Poku & Whiteside, 2004; Whiteside, 2004; Masanjala, 2007). Poverty, gender inequality, inadequate healthcare, lack of education, and cultural attitudes toward sexuality and reproduction are intertwined and increase vulnerability to HIV and AIDS. As Stillwaggon (2002, p. 1) states, "Living conditions in Africa [or other places in the developing world] provide a very different terrain from that of the United States for the propagation of infectious disease." During the 1970s and 1980s, when the HIV epidemic might have first appeared in Africa, SSA experienced worsening poverty, drought and malnutrition (Stillwaggon, 2006 and 2009). Of

the 19 famines registered globally between 1975 and 1998, 18 were in Africa (Shoma, 2003). As conditions worsened, millions of hungry people started to migrate internally or into neighbouring countries where burgeoning refugee camps sprang up along the borders. In time, as the numbers of relocated people increased, food shortages and unsanitary conditions made these settings ripe for the rapid spread of infectious diseases, including HIV (Von Braun, Tesfaye & Webb, 1999; Shoma, 2003).

The multifaceted nature of the HIV pandemic is illustrated by the reinforcing interactions between HIV and other diseases. For example, in her analysis of the epidemic in SSA, Stillwaggon (2006 and 2009) traces the link between HIV and tuberculosis, a disease that has become the leading cause of death for HIV-positive people in Africa. TB increases the likelihood of acquiring HIV and exacerbates the impact of the infection. Similarly, some parasitic diseases, such as schistosomiasis, increase susceptibility to HIV infection. Urinary schistosomiasis often results in genital inflammation and lesions that provide an easy entry way for HIV (Bentwich, 2006; Stillwaggon, 2006 and 2009). The dynamic interaction between malaria and HIV has been documented in the medical literature (e.g. Abu-Raddah, Patnaik & Kublin, 2006; Laufer & Plowe, 2007; Reithinger, Kanya, Whitty, Dorsey & Vermund, 2009). In areas where malaria is endemic, individuals who are HIV-positive are more likely to contract malaria and to experience more severe effects from it. Co-infection with malaria is especially detrimental for HIV-positive pregnant women and their unborn children. Malaria has been shown to increase viral load, decrease CD4 cell counts, and increase the risk for adverse birth outcomes, such as preterm birth, low birth weight, and neonatal death (Reithinger *et al.*, 2009). The impact of these biological interactions becomes even more detrimental in settings such as SSA where poverty is widespread, and where basic necessities such as clean water, sanitation and access to primary healthcare are absent or inadequate.

Likewise, it has been postulated that practices such as female genital mutilation may increase the risk for HIV infection through several mechanisms (Brady, 1999; Brewer, Potterat, Roberts & Brody, 2007). For example, in places where blood supplies are not safe, women and girls who require transfusions as a result of haemorrhaging due to complications related to the procedure itself or to difficult childbirth after infibulations may be at heightened risk for HIV infection through contaminated blood (Brady, 1999). Similarly, in the most extreme cases of female genital mutilation, where only a small opening is left for the passing of urine and menstrual blood, intercourse can often result in tissue tearing, which can provide a favourable environment for the transmission of HIV (Brady, 1999; Brewer *et al.*, 2007).

In Africa, as in most of the developing world, HIV is predominantly transmitted through heterosexual sex and vertical transmission from mother to child. While at the global level the numbers of males and females infected with HIV are roughly equal or skewed towards males, in SSA women and girls account for 57% of all PLHIV and 76% of all new HIV infections in people aged 15 to 24 years

(UNAIDS, 2004). The ratio of HIV-infected women to men rose from 12:10 in 2001 to 13:10 in 2003 (Gender Team, AFTPM, 2005). In the southern African sub-region, females between 15 and 24 years old are three- to six-times more likely to be HIV infected than their male counterparts (Buve, Bishikwabo-Nsarhaza & Mutangdura, 2002). Several factors have contributed to the so-called feminisation of HIV and AIDS in SSA. For example, biological differences allow easier passage of the virus through the mucous membranes of female genitalia than male genitalia (Kovacs, Chan, Chen, Meyer, Muderspach, Young *et al.*, 1999). More importantly, poverty and gender inequality contribute greatly to the HIV-infection differences between men and women. Specifically, for women and girls, the risk of exposure to HIV increases due to unequal access to healthcare, physical and sexual violence, and the limited capacity to negotiate safer-sex practices. In addition, lack of adult legal status often prevents women from accessing credit, loans or land, and thus fosters economic dependence (Romero-Daza & Himmelgreen, 1998; Ackerman & De Klerk, 2002; Jewkes & Abrahams, 2002; Dunkle, Jewkes, Brown, Gray, McIntyre & Harlow, 2004; Schoepf, 2004). Some scholars argue that some cultural practices, such as genital mutilation and 'dry sex,' taboos regarding the open discussion of sex, beliefs that sex with a virgin will cure AIDS, and the patrilineal inheritance of land, further increase vulnerability and susceptibility (Shah *et al.*, 2002). Moreover, "Social inequalities, layered atop widespread impoverishment and the social distortions wrought by migrant labour systems, and coupled with a burgeoning culture of consumerism" (UNAIDS, 2004, p. 10), have contributed to the practice of transactional 'survival' sex as an economic alternative in resource-depleted environments — where productive land is scarce, job opportunities are limited, and/or wages are not sufficient to meet basic needs (Romero-Daza, 1994; Lurie, 1997; Lurie, Harrison, Wilkinson & Abdool Karim, 1997; Romero-Daza & Himmelgreen, 1998; Bryceson, Fonseca & Kadzandira, 2004; Hallman, 2004; Halperin & Epstein, 2004; Bryceson & Fonseca, 2006; Weiser *et al.*, 2007).

The HIV/AIDS–food insecurity syndemic

Food insecurity implies lack of physical and/or economic access to food of sufficient quality or quantity (Kendall, Olson & Frongillo, 1996; Hamelin, Habicht & Beaudry, 1999; Coates *et al.*, 2006; Frongillo & Nanama, 2006). "Food and nutrition security is achieved if adequate food (quantity, quality, safety, socio-cultural acceptability) is available and accessible for and satisfactorily used and utilised by all individuals at all times to live a healthy and active life" (Weingärtner, 2004, p. 1-6). However, food security does not guarantee nutrition security; the latter is "achieved...when sure access to food is coupled with a sanitary environment, adequate health services, and adequate care to ensure a healthy life" (Gillespie & Kadiyala, 2005, p. 3).

The theoretical framework for understanding the synergy of HIV/AIDS and food and nutrition insecurity has been recently and extensively reviewed elsewhere (e.g. Gillespie, 2008; Ivers, Cullen, Freedberg, Block, Coates & Webb, 2009). On one hand, food insecurity is a risk factor for both HIV transmission and worse HIV clinical outcomes

among PLHIV. Widespread gender inequity means that this negative synergism is particularly pernicious and devastating among women. On the other hand, HIV increases the risk and severity of food insecurity for HIV-infected individuals and the members of their households. The empirical evidence accumulates to support this framework and can be understood at various levels, including the level of the individual and household.

Food insecurity at the individual level

The interdependency between malnutrition and infectious disease was recognised more than 40 years ago with the discovery of the 'nutritionally acquired immunodeficiency syndrome' (Scrimshaw, Taylor & Gordon, 1968). Later on, the process whereby malnutrition compromises the immune system at the cellular level was described and is now referred to as the nutrition–infection complex (Chandra, 1997). It has been shown that HIV has the potential to affect nutritional status adversely (Scrimshaw & SanGiovanni, 1997; Stillwaggon, 2006 and 2009) through reduced absorption of nutrients in the intestinal tract, altered nutrient storage, and insufficient food intake (Beisel, 1996; Semba, 1998). Likewise, malnutrition, be it mild under nutrition, severe protein energy malnutrition (PEM) or micronutrient deficiencies, can heighten the risk of infection, including increased susceptibility to HIV viral strains, through immune suppression and increased oxidative stress (Semba & Tang, 1999). There is increasing evidence that protein-energy malnutrition and micronutrient deficiencies (e.g. vitamin A and zinc) play a role in the earlier onset of AIDS-related illnesses in PLHIV, increase susceptibility to the disease among non-HIV-infected people, and facilitate vertical HIV transmission (Sanders & Sambo, 1991; Suttman *et al.*, 1995; Kottler, Rosenbaum, Wang & Pierson, 1998). For example, Wheeler, Gibert, Launer, Muurahainen, Elion, Abrams *et al.* (1998) found an increased risk for death among PLHIV who lost 5% of their body weight over a four-month period. Tang (2003) documented that losses in body weight, fat-free mass, fat mass, and body cell mass are associated with increased mortality rates and opportunistic infections. Berhane, Bagenda, Marum, Aceng, Ndugwa, Bosch & Olness (1997) found that in Uganda, HIV-positive children whose weight-for-age z-scores were less than -1.5 were almost five-times more likely to die before 25 months of age than were their counterparts with higher z-scores. Micronutrient deficiencies may contribute to a weakening of the immune system among PLHIV, resulting in faster manifestation of AIDS-related illnesses (Piwoz & Preble, 2000; Fawzi, 2003). Micronutrient deficiencies that may accelerate disease progression, the onset of AIDS illness, and death include deficiencies in vitamins A, E, B6 and B12, and selenium and zinc (Tang, Graham, Chandra & Saah, 1997; Tang, Graham, Semba & Saah, 1997; Baum, 2000). The risk for vertical transmission may also increase with inadequate nutritional status (Gillespie & Kadiyala, 2005). In Africa, vertical transmission has been found to be lower in women with higher CD4 cell counts (≥ 500 cells/ μ L) than in women with lower CD4 cell counts (< 500 cells/ μ L) (Fawzi, Msamanga, Spiegelman, Renjifo, Bang, Kapiga *et al.*, 2002; Leroy, Karon, Alioum, Ekpini, Meda, Greenberg *et al.*, 2002).

Food insecurity at the household level

Definitions of households affected by HIV or AIDS vary, and the characteristics of such households are highly diverse (Wieggers, Curry, Garbero & Hourihan, 2006), but a common pattern of increased food insecurity emerges from a growing number of recent empirical studies. Food insecurity is more prevalent in HIV/AIDS-affected households in both urban and rural areas (Bukusuba, Kikafunda & Whitehead, 2007). The impact of HIV and AIDS on agricultural households can include an increase in widow- and orphan-headed households, labour shortages due to illness and care giving, loss of household resources from health-related expenses (including subsidised ART), loss of land tenure and assets following deaths (especially for widows and orphans), and changes in agricultural practices and productivity (such as a shift from growing labour-intensive cash crops to producing food crops, or a reduction in capacity to exploit fall-back wild foods) (Kaschula, 2008; Nguthi & Niehof, 2008; Gwatirisa & Manderson, 2009; Heymann & Kidman, 2009; Onwujekwe, Dike, Chukwukad, Uzochukwube, Onyedumd, Onokaabe & Ichokuf, 2009; Parker, Jacobsen & Komwa, 2009). Food insecurity is prevalent among volunteer HIV caregivers, and therefore affects the sustainability of community health programmes that are reliant on volunteerism in SSA (Maes, Hadley, Tesfaye, Shifferaw & Tesfaye, 2009). In sum, HIV and AIDS diminishes household livelihoods and renders more them vulnerable to future collapse through the erosion of household assets and the reduced capacity to employ sustainable livelihood strategies to escape poverty (Masanjala, 2007). Over time, the number of impoverished households rises, and poverty among those who are already poor intensifies (Loewenson & Whiteside, 2001).

The above discussion underscores the fact that there is a confluence of factors that explain the devastating impact that HIV and AIDS is having in SSA, including those that are biological, social, cultural, economic and political in nature. In light of the complex and dynamic interaction of these multiple factors, multi-dimensional approaches are needed that combine prevention and treatment of HIV and AIDS with sustainable and culturally meaningful development programmes that build food and nutrition security while reducing economic and gender inequalities.

Sowing the seeds of health in Lesotho: a case study***Poverty and inequality and the development of a syndemic***

The Kingdom of Lesotho is a small land-locked mountainous nation located entirely within South Africa. With an area of approximately 30 300 km², it is about the size of Belgium. The entire country is at an altitude above 1 000 m, giving Lesotho the distinction of having the highest low point in the world. The eastern three quarters are covered by the Maluti Mountains (Ambrose, 1976). While the soil in the highland regions of the country is fertile, it is thin and subject to erosion due to steep slopes, heavy deforestation, and overgrazing. Moreover, the highly seasonal temperate climate makes agriculture risky, especially in the higher mountainous areas.

There are over 2.1 million people living in Lesotho, and while the population's annual growth rate averaged 2.2% from 1970 to 1990, it has dropped to 1.4% since that time. It is estimated that life expectancy will fall to 45 years by 2010: 21 years less than what it would have been without the presence of AIDS (Hassan, 2002). These figures, along with other demographic data, point to the role that HIV and other infectious diseases (e.g. tuberculosis) are having on morbidity and mortality. The ethnic make-up of Lesotho is highly homogenous, with the vast majority of people identifying themselves as Basotho. Nearly 20% of the population is from Nguni origin (primarily Xhosa), while smaller groups of the San, Griqua, Asian Indians, and Europeans have become naturalised Basotho (Ambrose, 1976). Many of the traditional clans share similar cultural values and beliefs, as well as a national vernacular language, Sesotho (English is the second official language). These factors make identification with a single national identity strong in Lesotho.

Lesotho's history is marked by colonial rule, geographic and economic dependence, internal instability, and South African aggression. The migration of the Afrikaners from the Cape Colony into the Orange Free State during the 19th century put the Basotho in direct conflict with white farmers over land. In 1869, with support of the British government, the Treaty of Aliwal was signed, forcing the Basotho to cede much of their most fertile farmland (Murray, 1981). The Basotho prospered after the discovery of diamonds in what is now South Africa, throughout the 1870s. However, this prosperity was double-edged as it eventually gave rise to almost complete economic dependence on South Africa through a system of labour migration. While the British formed an alliance with the Basotho through the annexation of Basutoland during the 19th century, and up until the establishment of the independent nation of Lesotho in 1966, the South African government continued to enmesh the Basotho people through economic exploitation and racism. The South African Land Act of 1913, the Aliens Control Act (No. 30) and Black Laws Amendment Act (No. 76) of 1963, and the massacre in Maseru, Lesotho, in the early 1980s, are but a few examples of ways in which the South African government sought to control both the economy and the politics of the Basotho nation. It has only been during the last decade and a half, with the advent of democracy in South Africa, that Lesotho is now extricating itself from the impact of the apartheid system.

Lesotho is one of the poorest nations in the world, and in 2005 it ranked 149 out of 177 countries on the United Nations Development Programme's (2005) Human Development Index. Over 85% of its 2.3 million inhabitants live in rural areas; more than 50% of rural people live in poverty, and over one quarter of them are extremely poor (Rural Poverty Portal, 2007). The vast majority of rural people are mainly involved in agriculture and informal-sector activities (Food and Agricultural Organization of the United Nations, 2004). While the grain harvest for 2006 increased by 24%, there is widespread risk of food insecurity among the country's poorest people (World Food Programme, 2006). Lesotho is a net importer of food, with only 13% of its land suitable for agriculture. Today, agriculture accounts for only 17% of Lesotho's GDP,

while industry and services contribute 43% and 40%, respectively.

During the 1980s and 1990s, the infrastructure development associated with the Lesotho Highlands Water Project (LHWP), which diverts water from the country's rivers for export to South Africa, with self-sufficiency in hydro-generated electricity as a major byproduct, led to significant economic growth (Foulo, 1995). Additionally, with changes in international trading policies, garment manufacturing has flourished in Lesotho since the late 1990s and is now the largest employer in Lesotho, with 46 000 workers, 80% of whom are women (Department for International Development, 2008; Turkon, 2008). At the same time, since the early 1990s, there has been a dramatic decline in migrant labour and a corresponding increase in unemployment among repatriated migrant workers (Rural Poverty Portal, 2007). While there is a growing middle class in Lesotho, the lack of investment in agriculture, declining agricultural yields, degradation of natural resources, and the limited availability of jobs are contributing to increasing poverty in some sectors of the population. For example, with the construction of the Katse Dam as part of the LHWP, there has been an increase in the training of professionals in technical careers and a rise in employment opportunities. Likewise, the income generated by the project (an estimated \$44 million per year) is expected to contribute to improvements in urban and rural living conditions. All this has resulted in the emergence of a group of economically powerful elite in the urban and peri-urban areas of the country. However, the displacement of peasants from agricultural lands and the deterioration of the environment have increased poverty and resulted in a downward spiral in health, especially in the rural areas (Keketso, 2003).

Women are especially vulnerable to the ill effects of the deteriorating conditions found in Lesotho. While women contribute significantly to the household and national economy, their legal status poses major barriers for their economic and social success. Under customary law, women are considered minors under the guardianship of their fathers, husbands, or sons (Ambrose, 1976). As minors, they require authorisation from their guardians to participate in civil and economic life (e.g. to open a bank account, apply for loans, file civil suits, or open a business). These restrictions still apply despite recent legislation to allow women more economic freedom (Van Hook & Ngwenya, 1996). Moreover, until the Sexual Offense Act was passed in 2003, Basotho women did not have the right to refuse sex or to demand the use of condoms. In discussing the feminisation of HIV in Lesotho, the Ambassador of the Kingdom of Lesotho to the United States in 2004 stated that "this status [as minors] subjects women to violence and unsafe sex. Women cannot own property so that they are more often than not socially and economically deprived and have to engage in other risky and unsafe means of survival such as prostitution, early marriage or sex for favors with older men" (Rapolaki, 2004).

A dramatic rise in HIV and AIDS

Since the first case of AIDS illness in Lesotho was recorded in 1986, in the windswept mountain district of Mokhotlong,

the disease has spread rapidly throughout the country. While at first HIV infection was more common among foreigners and commercial sex workers and their clients, today the majority of those infected have no easily identifiable risk behaviour (Tabi & Frimpong, 2003; World Bank, 2004). Adult HIV prevalence rose from 4% in 1993, to 9.8% in 1998, to 31% in 2002 (World Bank, 2004). With advances in methodology for estimations and an expanded range of country data, UNAIDS recently downsized the estimates for PLHIV globally. As a result, estimated adult HIV prevalence in Lesotho is now 23.2%, placing it among the top five countries in the world in terms of level of HIV infections (UNAIDS, 2007). Nearly half the women receiving antenatal care in Maseru, the capital city, are infected with HIV, and a person in Lesotho who turns 15 years old today has a 74% chance of becoming infected before age 50 (Stanecki, 2004). At least 15% of babies born each year are HIV-positive, and there are more than 97 000 children orphaned by AIDS, most of whom are of unknown serostatus (UNAIDS, 2006). Before the onset of the epidemic, life expectancy had been projected to increase to 60 years by 2003; now it has drastically declined to 44 years for women and 39 years for men (UNAIDS, 2006). In addressing the impact of the epidemic at the national level, the Prime Minister of Lesotho, Pakalitha Mosisili, stated that "today, alone, seventy people will die from AIDS. That is one person every 20 minutes. We have to act *now* if we are to avert potential annihilation of our nation" (quoted in Kimaryo, Okpaku, Githuku-Shongwe & Feeney, 2003, p. xxiv).

Scaling up responses to HIV and AIDS

Poor finances and inadequate infrastructure have limited the ability of the Lesotho government to respond to HIV and AIDS since the beginning of the pandemic. Early on, the National AIDS Prevention and Control Programme was initiated and sentinel surveys were conducted to monitor the spread of HIV. Because of limited resources and technical problems, these surveys were of limited use until 2000 when more reliable data began to be reported (Family Health International [FHI], The Lesotho Ministry of Health, Lesotho AIDS Programme Coordinating Authority [LAPCA], Sechaba Consultants & U.S. Agency for International Development [USAID], 2002; Government of Lesotho, 2006). In 2000, the Multisectoral National AIDS Strategic Plan was released with the overarching goals of reducing HIV prevalence by 5%, increasing annual condom use by 50%, and providing care to half of the children orphaned by AIDS by 2003. Furthermore, this initiative was supposed to be used to secure resources and coordinate the national response to HIV and AIDS on all fronts, including the dissemination of information and communication on HIV and AIDS and the improvement of sentinel surveillance (Government of Lesotho, 2000). In 2001, the Lesotho AIDS Programme Coordinating Authority (LAPCA) was established to implement the plan, but financial constraints and the lack of technical skills limited its capacity to carry out its mission (Government of Lesotho, 2006). More recently, LAPCA was replaced by the semi-autonomous National AIDS Commission (NAC) and the National AIDS Secretariat (NAS) in order to coordinate existing strategies

in responding to HIV and AIDS (USAID, 2005). Today, the National AIDS Policy and Strategic Plan for 2006–2011 is being carried out to reverse the effects of the epidemic by focusing on HIV prevention through condom promotion, prevention of mother-to-child transmission, and provision of ART (Government of Lesotho, 2006). As part of this plan, the government has encouraged involvement of all ministries, and has mandated the use of 2% of each ministry's budget for HIV-related programmes (Kimaryo *et al.*, 2003). At the local level, the ten districts in Lesotho have AIDS Task Forces that provide support for all HIV/AIDS-related activities. As of 2005, only 1% of Lesotho's population had been tested for HIV (Donnelly, 2005). Shortly thereafter, Lesotho became the first country to initiate the 'Know Your Status' campaign, a door-to-door HIV/AIDS universal voluntary testing programme targeting everyone over the age of 12 years. Prevention, counselling, support, and care-option services are also being integrated into the campaign. It is far too early to know whether these new policies and structural changes in programme administration will be effective in ameliorating HIV and AIDS in Lesotho.

Food insecurity in Lesotho

The ability of Lesotho households and communities to cope with food insecurity is severely limited in the face of HIV and AIDS, which disproportionately affects young adults, the most productive segment of the population. As adults become ill or die, vital skills and activities needed for production are lost. Through time, material and social assets become exhausted and it becomes much more difficult to recover from stresses and shocks in the environment. In the Katse catchment area in the Lesotho highlands, Mphale, Rwambali & Makoae (2002) found that in HIV/AIDS-affected households, there was a loss of income when HIV-infected wage-earners either decided to stop working or when migrant labourers were retrenched upon discovery of their illness. They also found that affected households did resort to sharecropping to avoid losing fallow fields, but that this was not always an effective coping strategy, especially in communities greatly impacted by HIV. Moreover, while some widows were able to retain the fields of a deceased husband for farming, others lost the land, which was returned to the husband's kin. The adoption of cultural practices regarding land inheritance and the care of orphans varied according to the level of understanding about HIV and AIDS and the level of stigma attached to the disease, according to the researchers.

It is our strong conviction that in Lesotho, as elsewhere in SSA, the impact of the HIV epidemic is exacerbated by widespread poverty, gender inequality, and food insecurity. Therefore, for interventions to be effective, it is imperative that they be multi-dimensional rather than focused on one single aspect such as behaviour change, which seeks the adoption of abstinence, faithfulness, or the use of condoms. Rather, interventions should address larger structural issues such as access to food, land and employment. Furthermore, while we believe that reducing risk for HIV infection (e.g. through male circumcision) and increasing access to treatment (e.g. via the provision of ARVs) are important in the response to the epidemic, more complex structural issues — such as economic and food insecurity — must be

addressed for interventions to be effective in the long term. This, obviously, does not imply that short-term initiatives should be abandoned. Rather, they should be evaluated and, when possible, integrated with similar projects to strengthen the provision of comprehensive services that target multiple factors simultaneously.

Discussion

Responding to HIV/AIDS and food insecurity in Lesotho

In direct response to the need for creating programmes that simultaneously address the mutually reinforcing epidemics of food insecurity and HIV/AIDS in Lesotho, and in other places in SSA, the following ideas and suggestions are offered for consideration.

1. Multidimensional programming: There are examples of programmes and interventions in SSA that focus on HIV prevention (e.g. 'ABC' programmes, male circumcision, vaccine and microbicide trials), treatment (e.g. ARVs), or sustainable development (e.g. agricultural, livestock, public works, and handicrafts projects). However, few programmes incorporate strategies to deal simultaneously with poverty, food insecurity, gender inequality, and HIV and AIDS. In fact, while there is growing recognition of the HIV/AIDS–food insecurity syndrome (Gillespie & Kadiyala, 2005), there is limited funding available to pay for programmes that address both issues. Additionally, there are policies in place that make it very difficult to fund programmes that build food security by using local food production techniques, since most funding is earmarked for international food assistance. Using Lesotho as a model, we recommend that interventions be tested that coherently combine sustainable agricultural and livestock production; nutrition education; social, physical and human capacity development; and HIV-prevention strategies. Special emphasis needs to be given to programmes that provide women with viable economic alternatives in order to reduce their vulnerability to poverty and HIV infection.

In a place such as Lesotho, where both HIV/AIDS and food insecurity are widespread problems, it is crucial to combine HIV-prevention education, nutrition education and counselling, and food-production support. The combination of nutrition and food-security-related services with those that address HIV and AIDS can provide the grounds for inter-agency collaboration and maximise the effectiveness of already existing programmes. In addition, given the strong stigma associated with HIV infection, the provision of non-HIV-related services might enhance participation of those reluctant to take part in HIV/AIDS-only programmes.

A potential scenario for implementation of this strategy would involve the following: 1) a food-production programme that aims at increasing household production of reliable sources of nutritional food items (e.g. green-leaf vegetables, legumes, and poultry) through sustainable agriculture and animal-raising techniques); 2) an HIV/AIDS-education component that includes the assessment of knowledge and provision of needed education at both the individual and group levels, including safe infant feeding practices; and 3) a nutrition-education component centred around the importance of adequate nutrition in the context of HIV

prevention and the management of AIDS illness. Catholic Relief Services (CRS), one of the main non-for-profit organisations in Lesotho has attempted such integration through its Household Urban Gardens (HUG) programme, which promotes the production of vitamin-rich vegetables through key hole and trench gardens, which maximise the use of limited land and water resources and minimise the physical work invested. The programme aims to increase food security, promote income-generation through the sale of surplus produce, and provide education on the importance of proper nutrition in the context of HIV and AIDS (Romero-Daza, Himmelgreen, Noble & Turkon, in press). This programme directly responds to the Lesotho government's call for the integration of HIV/AIDS-related efforts with food and economic-security initiatives to address the economic roots of the HIV pandemic. In addition, it builds on already existing social networks and provides opportunities for the development of agricultural and marketing and business skills among the participants.

2. Measurement and evaluation: One problem with making the argument for more funding for multidimensional programming is that there are few such programmes in place in SSA. A second problem is that while there are a multitude of on-going programmes aimed at reducing HIV and AIDS incidence, there is little evidence to support the programmes' efficacy because most are not evaluated over time. We suggest that programmes and interventions in Lesotho need to be evaluated and their efficacy measured by their ability to increase household assets and food security and to bring about improvements in individual nutritional and health status. This could be accomplished through the following steps:

- a) The collection of base-line and follow-up data on household assets and cooperative networks, household food security and vulnerability, adult and child nutritional and health status, and uptake of existing clinic-based interventions, if any, for antenatal care (ANC), voluntary counselling and testing (VCT), antiretroviral treatment (ART), counselling for safe infant feeding, and community support for people living with HIV or AIDS.
- b) The combination of longitudinal data on the above-mentioned aspects with data on agricultural productivity, water security, nutrition and HIV/AIDS-related knowledge and behaviours.
- c) The collection of extensive ethnographic data on gender relations and dynamics, with the aim of creating culturally appropriate training and employment opportunities for girls and women of all ages.

In the end, this type of evaluation can provide a comprehensive picture of food security, social and economic wellbeing, and the nutritional and health situation of communities before and during a programme or intervention. Furthermore, such evaluation data can be used to fine-tune the particular intervention or programme as it progresses and to make recommendations for future programming.

Conclusions

The lessons learned from the previous discussion are quite simple. First, the HIV pandemic is made up of multiple

epidemics whose severity vary in time and space according to levels of poverty, gender inequality, and malnutrition. Second, the conceptual frameworks of syndemic theory, the new variant famine theory, and entitlement theory provide a useful tool to understand the mutually reinforcing effects of HIV/AIDS and food insecurity, which together, and through the nutrition-infection complex, amplify adverse health outcomes. Third, by studying historical, political-economic, and cultural dimensions of HIV and AIDS in Lesotho, one can better understand the rapid rise of the disease in the country. Economic dependence on South Africa — in particular, on labour migration — and its apartheid policies provided the conduits through which new HIV infections could spread rapidly over a relatively short period of time (Romero-Daza, 1994; Romero-Daza & Himmelgreen, 1998). Fourth, multidimensional programmes and interventions are likely to be more efficacious than one-dimensional ones that just emphasize HIV and AIDS prevention or treatment, or sustainable development. Fifth, before programming can take place in a community, there needs to be an acknowledgement of HIV and AIDS as an important problem and of its impact at the local level. Likewise, people must be willing to change the way they think about the disease and must be motivated to take action. More importantly, they need to be active agents in the identification and implementation of strategies to combat these multiple problems at the local level. Sixth, there must be an explicit understanding by all of the actors that by combining sustainable food production and income-generating activities with HIV prevention (and treatment), there is a real possibility of reducing HIV and AIDS and co-morbidities through the building of food security and economic security. Increased access to food and income will translate into improved nutritional status and immune function, and most importantly will activate livelihood strategies that are effective in ameliorating environmental shocks and stresses, and also reduce the likelihood that women and girls will engage in survival sex. Finally, while agriculture is a primary economic strategy in SSA, there is increasing emphasis on other types of production activities. Thus, programming should not only focus on food production, but on economic activities that generate income and that provide viable economic opportunities for both men and women in an increasingly globalised world. By tackling the syndemic of HIV/AIDS and food insecurity from diverse angles, such an integrated multi-dimensional approach can enhance the effectiveness of strategies that have, so far, been implemented in isolation. It can also contribute to more coordinated collaboration among agencies, to better use of limited resources, and to the involvement of communities in strategies that address their health and economic concerns while minimising the stigma often associated with HIV and AIDS.

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References

- Abu-Raddad, L.J., Patnaik, P. & Kublin, J.G. (2006) Dual infection with HIV and malaria fuels the spread of both diseases in sub-Saharan Africa. *Science* 314(5805), pp. 1603–1606.
- Ackermann, L. & De Klerk, G.W. (2002) Social factors that make South African women vulnerable to HIV infection. *Health Care for Women International* 23(2), pp. 163–172.
- Ambrose, D. (1976) *The Guide to Lesotho*. Johannesburg, South Africa, Winchester Press.
- Anderson, S.E. (1990) Core indicators of nutritional status for difficult-to-sample populations. *Journal of Nutrition* 120(11), pp. 1559–1599.
- Ansell, N., Robson, E., Hadju, F., Van Blerk, L. & Chipeta, L. (2009) The new variant famine hypothesis: moving beyond the household in exploring links between AIDS and food security in southern Africa. *Progress in Development Studies* 9(3), pp. 187–207.
- Barnett, A. & Whiteside, A. (2000) *Guidelines for Preparation and Execution of Studies of the Social and Economic Impact of HIV/AIDS*. Geneva, UNAIDS.
- Barnett, A. & Whiteside, A. (2006) *AIDS in the Twenty-First Century: Disease and Globalisation* (2nd edition). Hampshire, UK, and New York, Palgrave Macmillan.
- Baum, M.K. (2000) Role of micronutrients in HIV-infected intravenous drug users. *Journal of Acquired Immune Deficiency Syndromes* 25(supplement 1), pp. S49–S52.
- Beisel, W.R. (1996) Nutrition in pediatric HIV infection: setting the research agenda. Nutrition and immune function: Overview. *Journal of Nutrition* 126(supplement 10), pp. S2611–S2615.
- Bentwich, Z. (2006) HIV-helminth coinfection: Is deworming necessary? *Retrovirology* 3(supplement 1), p. S79.
- Berhane, R., Bagenda, D., Marum, L., Aceng, E., Ndugwa, C., Bosch, R.J. & Olness, K. (1997) Growth failure as a prognostic indicator of mortality in pediatric HIV infection. *Pediatrics* 100(1), pp. e7–10.
- Black, R.E., Allen, L.H., Bhutta, Z.A., Caulfield, L.E., De Onis, M., Ezzati, M., Mathers, C. & Rivera, J. (2008) Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet* 371(9608), pp. 243–260.
- Bolton, M. (2003) New variant famine or new variant nonsense? Exploring the HIV-hunger link in Zambia. *Food Forum* (Final Issue 2004), pp. 6–7.
- Brady, M. (1999) Female genital mutilation: complications and risk of HIV transmission. *AIDS Patient Care and STDs* 12(12), pp. 709–716.
- Brewer, D., Potterat, J.J., Roberts Jr, J.M. & Brody, S. (2007) Male and female circumcision associated with prevalent HIV infection in virgins and adolescents in Kenya, Lesotho and Tanzania. *Annals of Epidemiology* 17(3), pp. 217–226.
- Bryceson, D. & Fonseca, J. (2006) An enduring or dying peasantry? Interactive impact of famine and HIV/AIDS in rural Malawi. In: Gillespie, S. (ed.) *AIDS, Poverty, and Hunger: Challenges and Responses*. Washington, D.C., International Food Policy Research Institute.
- Bryceson, D., Fonseca, J. & Kadzandira, J. (2004) *Social Pathways from the HIV/AIDS Deadlock of Disease, Denial and Desperation in Rural Malawi*. Lilongwe, Malawi, RENEWAL (Regional Network on HIV/AIDS, Rural Livelihoods, and Food Security)/ CARE Malawi.
- Bukusuba, J., Kikafunda, J.K. & Whitehead, R.G. (2007) Food security status in households of people living with HIV/AIDS (PLWHA) in a Ugandan urban setting. *British Journal of Nutrition* 98(1), pp. 211–217.
- Buve, A., Bishikwabo-Nsarhaza, K. & Mutangdura, G. (2002) The spread and effect of HIV-1 infection in sub-Saharan Africa. *The Lancet* 359(9322), pp. 2011–2017.
- Centers for Disease Control and Prevention (CDC) (2008) 'Syndemics overview — History: What is a syndemic?' Atlanta, Georgia, CDC. Online at: <<http://www.cdc.gov/syndemics/overview-history.htm>>.
- Chandra, R.K. (1997) Nutrition and the immune system: an introduction. *American Journal of Clinical Nutrition* 66(2), pp. S460–S463.
- Cheng, M. (2008) 'Health news experts call for shift in AIDS policy.' Reproduced from *AOL News*, 18 January 2008. Online article: <<http://www.encyclopedia.com/doc/1A1-D8U8E95G0.html>>.
- Coates, J., Wilde, P.E., Webb, P., Rogers, B.L. & Houser, R.F. (2006) Comparison of a qualitative and a quantitative approach to developing a household food insecurity scale for Bangladesh. *The Journal of Nutrition* 136(5), pp. S1420–S1430.
- Cromwell, E. & Chintedza, A. (2005) Neo-patrimonialism and the policy process: lessons from the southern African food crisis. *IDS Bulletin* 36(2), pp. 103–108.
- Department for International Development (DFID) (2008) 'Helping Lesotho's factory workers to stitch up HIV and AIDS.' Selected web content archived by The National Archives, Washington, D.C. Available at: <<http://www.dfid.gov.uk/casestudies/files/africa/lesotho-factory.asp>>.
- Devereux, S. (2001) Sen's entitlement approach: critiques and counter-critiques. *Oxford Development Studies* 27(3), pp. 245–253.
- De Waal, A. (2004) AIDS-related famine in Africa: questioning assumptions and developing frameworks. In: Poku, N.K. & Whiteside, A. (eds.) *The Political Economy of AIDS in Africa*. Burlington, Vermont, Ashgate Publishing Company.
- De Waal, A. & Whiteside, A. (2003) New variant famine: AIDS and food crisis in southern Africa. *The Lancet* 362(9391), pp. 1234–1237.
- Donnelly, J. (2005) 'Dire situation, drastic measures: AIDS testing urged for all in ravaged nation.' *The Boston Globe*, 23 October 2005.
- Dunkle, K.L., Jewkes, R.K., Brown, H.C., Gray, G.E., McIntyre, J.A. & Harlow, S.D. (2004) Transactional sex among women in Soweto, South Africa: prevalence, risk factors, and association with HIV infection. *Social Science and Medicine* 59(8), pp. 1581–1592.
- Family Health International (FHI), The Lesotho Ministry of Health, Lesotho AIDS Programme Coordinating Authority (LAPCA), Sechaba Consultants & U.S. Agency for International Development (USAID) (2002) *HIV/AIDS Behavioural Surveillance*

- Survey: Lesotho 2002. Research Triangle Park, North Carolina, FHI. Available at: <<http://www.fhi.org/en/HIVAIDS/pub/survreports/bsslesotho2002.htm>>.
- Fawzi, W. (2003) Micronutrients and human immunodeficiency virus type-1 disease progression among adults and children. *Clinical Infectious Diseases* 37(supplement 2), pp. S113–S116.
- Fawzi, W., Msamanga, G., Spiegelman, D., Renjifo, B., Bang, H., Kapiga, S., Coley, J., Hertzmark, E., Essex, M. & Hunter, D. (2002) Transmission of HIV-1 through breastfeeding among women in Dar es Salaam, Tanzania. *Journal of Acquired Immune Deficiency Syndromes* 31(3), pp. 331–338.
- Food and Agriculture Organization of the United Nations (FAO) (2004) *The State of Food Insecurity in the World 2004* (6th edition). Rome, FAO.
- Foulo, T. (1995) *Survey of Basotho Migrant Mineworkers, April 1992–March 1993*. Maseru, Lesotho, Central Bank of Lesotho and the Bureau of Statistics.
- Frongillo, E.A. & Nanama, S. (2006) Development and validation of an experience-based measure of household food insecurity within and across seasons in northern Burkina Faso. *The Journal of Nutrition* 136(5), pp. S1409–S1419.
- Gender Team, AFTPM (2005) *Gender and HIV/AIDS in Sub-Saharan Africa: Putting Gender on the Map*. Briefing Notes on Critical Gender Issues in Sub-Saharan Africa 2005–2. Available at: <<http://siteresources.worldbank.org/EXTABOUTUS/Resources/GenderAIDS.pdf>>.
- Gillespie, S. (2008) Poverty, food insecurity, HIV vulnerability and the impacts of AIDS in sub-Saharan Africa. *IDS Bulletin* 39(5), pp. 10–18.
- Gillespie, S. & Kadiyala, S. (2005) *HIV/AIDS and Food and Nutrition Security: From Evidence to Action*. Washington, D.C., International Food Policy Research Institute.
- Gordon, J.G. (2008) A critique of the financial requirements to fight HIV/AIDS. *The Lancet* 372(9635), pp. 333–336.
- Government of Lesotho (2000) *National AIDS Strategic Plan, 2000/2001–2003/2004*. September 2000. Maseru, Lesotho, Government of Lesotho.
- Government of Lesotho (2006) *National HIV and AIDS Policy, Lesotho*. Maseru, Lesotho, National AIDS Commission.
- Gwatirisa, P. & Manderson, L. (2009) Food insecurity and HIV/AIDS in low-income households in urban Zimbabwe. *Human Organization* 68(1), pp. 103–112.
- Hallman, K. (2004) *Socio-economic disadvantage and unsafe sexual behaviors among young women and men in South Africa*. Policy Research Division Working Paper No. 190. New York, Population Council.
- Halperin, D.T. (2008) 'Putting a plague in perspective' [Op-ed piece]. *The New York Times*, 1 January 2008, p. 19.
- Halperin, D.T. & Epstein, H. (2004) Concurrent sexual partnerships help to explain Africa's high HIV prevalence: implications for prevention. *The Lancet* 364(9428), pp. 4–5.
- Hamelin, A.M., Habicht, J.-P. & Beaudry, M. (1999) Food insecurity: consequences for the household and broader social implications. *Journal of Nutrition* 129(2) (supplement), pp. S525–S528.
- Hassan, F. (2002) *Lesotho — Development in a Challenging Environment: A Joint World Bank-African Development Bank Evaluation*. Geneva, World Bank Publications.
- Heymann, J. & Kidman, R. (2009) HIV/AIDS, declining family resources and the community safety net. *AIDS Care* 21, pp. 34–42.
- Ivers, L.C., Cullen, K.A., Freedberg, K.A., Block, S., Coates, J. & Webb, P. (2009) HIV/AIDS, undernutrition, and food insecurity. *Clinical Infectious Diseases* 49(7), pp. 1096–1102.
- Jewkes, R. & Abrahams, N. (2002) The epidemiology of rape and sexual coercion in South Africa: an overview. *Social Science and Medicine* 55(7), pp. 1231–1244.
- Kaschula, S.A. (2008) Wild foods and household food security responses to AIDS: evidence from South Africa. *Population and Environment* 29(3–5), pp. 162–185.
- Keetso, L. (2003) The mixed blessings of the Lesotho Highlands Water Project. An assessment based on local perspectives. *Mountain Research and Development* 23(1), pp. 7–10.
- Kendall, A., Olson, C.M. & Frongillo, E.A. (1996) Relationship of hunger and food insecurity to food availability and consumption. *Journal of the American Dietetic Association* 96(10), pp. 1019–1024.
- Kimayo, S.S., Okpaku Sr, J.O., Githuku-Shongwe, A. & Feeney, J. (eds.) (2003) *Turning a Crisis into an Opportunity: Strategies for Scaling Up the National Response to the HIV Pandemic in Lesotho*. New York, Third Press Publishers.
- Kottler, D.P., Rosenbaum, K., Wang, J. & Pierson, R.N. (1998) Studies of body composition and fat distribution in HIV-infected and control subjects. *Journal of Acquired Immune Deficiency Syndromes* 20(3), pp. 228–237.
- Kovacs, A., Chan, L.S., Chen, Z.C., Meyer III, W.A., Munderspatch, L., Young, M., Anastos, K. & Levine, A.M. (1999) HIV-1 RNA in plasma and genital tract secretions in women infected with HIV-1. *Journal of Acquired Immune Deficiency Syndromes* 22(2), pp. 124–131.
- Laufer, M.K. & Plowe, C.V. (2007) The interaction between HIV and malaria in Africa. *Current Infectious Disease Reports* 9(1), pp. 47–54.
- Leroy, V., Karon, J.M., Alioum, A., Ekpini, E.R., Meda, N., Greenberg, A.E., Msellati, P., Hudgens, M., Dabis, F. & Wiktor, S.Z. (2002) Twenty-four-month efficacy of a maternal short-course zidovudine regimen to prevent mother-to-child transmission of HIV-1 in West Africa. *AIDS* 16(4), pp. 631–641.
- Levine, R. (2007) A reflection on the AIDS vaccine trial: What's the real failure? Washington, D.C., Center for Global Development, September 2007, online posting: <<http://blogs.cgdev.org/globalhealth/2007/09/a-reflection-on-the-aids-vacci.php>>.
- Loewenson, R. & Whiteside, A. (2001) *HIV/AIDS: Implications for Poverty Reduction*. New York, United Nations Development Programme (UNDP), Bureau for Development Policy (BDP), Special Initiative on HIV/AIDS.
- Lurie, M. (1997) Migrancy and HIV/STDs in South Africa — a rural perspective [Letter]. *South African Medical Journal* 87(7), pp. 908–909.
- Lurie, M., Harrison, A., Wilkinson, D. & Abdool Karim, S. (1997) Circular migration and sexual networking in rural South Africa: implications for the spread of HIV and other sexually transmitted diseases. *Health Transition Review* 7(supplement 3), pp. 15–24.
- Maes, K.C., Hadley, C., Tesfaye, F., Shifferaw, S. & Tesfaye, Y.A. (2009) Food insecurity among volunteer AIDS caregivers in Addis Ababa, Ethiopia, was highly prevalent but buffered from the 2008 food crisis. *Journal of Nutrition* 139(9), pp. 1758–1764.
- Masanjala, W. (2007) The poverty-HIV/AIDS nexus in Africa: a livelihood approach. *Social Science and Medicine* 64(5), pp. 1032–1041.
- McDonald, S., Roberts, J. & Dixon, S. (2001) AIDS and economic growth in Africa. *Journal of International Development* 13(4), pp. 411–426.
- Mphale, M.M., Rwambali, E.G. & Makoe, M.G. (2002) *HIV/AIDS and its Impacts on Land Tenure and Livelihoods in Lesotho*. Rome, Food and Agriculture Organization of the United Nations (FAO).
- Murray, C. (1981) *Families Divided: The Impact of Migrant Labor in Lesotho*. Cambridge, UK, Cambridge University Press.
- Naysmith, S., De Waal, A. & Whiteside, A. (2009) Revisiting new variant famine: the case of Swaziland. *Food Security* 1(3), pp. 251–260.
- Negin, J. (2005) Assessing the impact of HIV/AIDS on economic

- growth and rural agriculture in Africa. *Journal of International Affairs* 58(2), pp. 267–281.
- Nguthi, F.N. & Niehof, A. (2008) Effects of HIV/AIDS on the livelihood of banana-farming households in central Kenya. *Njas-Wageningen Journal of Life Sciences* 56(3), pp. 179–190.
- Onwujekwe, O., Dike, N., Chukwukad, C., Uzochukwube, B., Onyedumd, C., Onokaabe, C. & Ichokuf, H. (2009) Examining catastrophic costs and benefit incidence of subsidized antiretroviral treatment (ART) programme in south-east Nigeria. *Health Policy* 90(2–3), pp. 223–229.
- Parker, D.C., Jacobsen, K.H. & Komwa, M.K. (2009) A qualitative study of the impact of HIV/AIDS on agricultural households in south-eastern Uganda. *International Journal of Environmental Research and Public Health* 6(8), pp. 2113–2138.
- Piwoz, E.G. & Preble, E.A. (2000) *HIV/AIDS and Nutrition: A Review of the Literature and Recommendations for Nutritional Care and Support in Sub-Saharan Africa, Support for Analysis and Research in Africa (SARA) Project*. Washington, D.C., USAID.
- Poku, N.K. & Whiteside, A. (2004) Introduction: African's HIV/AIDS crisis. In: Poku, N.K. & Whiteside, A. (eds.) *The Political Economy of AIDS in Africa*. Burlington, Vermont, Ashgate Publishing Company.
- Radimer, K.L., Olson, C.M., Greene, J.C. & Campbell, C.C. (1990) Development of indicators to assess hunger. *The Journal of Nutrition* 120(supplement 11), pp. 1544–1548.
- Radimer, K.L., Olson, C.M., Greene, J.C., Campbell, C.C. & Habicht, J.-P. (1992) Understanding hunger and developing indicators to assess it in women and children. *Journal of Nutrition Education* 24(supplement 1), pp. S36–S44.
- Rapolaki, M.E. (2004) Speech of Ambassador Rapolaki in the panel discussion on the feminization of HIV/AIDS: Lesotho's experience, presented at the OIC International Fifth Annual African Women's and Children's Health Symposium, University of the District of Columbia, Washington, D.C., 10–11 November 2004.
- Reithinger, R., Kanya, M.R., Whitty, C.J.M., Dorsey, G. & Vermund, S.H. (2009) Interaction of malaria and HIV in Africa. *British Medical Journal* 338, p. b2141.
- Romero-Daza, N. (1994) Multiple sexual partners, migrant labor, and sexually transmitted diseases, and the makings for an epidemic: knowledge and beliefs about AIDS among women in highland Lesotho. *Human Organization* 53(2), pp. 192–205.
- Romero-Daza, N. & Himmelgreen, D. (1998) More than money for your labor: migration and the political economy of AIDS in Lesotho. In: Singer, M. (ed.) *The Political Economy of AIDS*. Amityville, New York, Baywood Publishing Company.
- Romero-Daza, N., Himmelgreen, D., Noble, C. & Turkon, D. (In press) Dealing with the global food crisis in local settings: non-intensive agriculture in Lesotho, southern Africa. In: Kedia, S. & Himmelgreen, D. (eds.) *The Global Food Crisis: Perspectives from Practicing and Applied Anthropologists*. NAPA Bulletin (Monograph Series) No. 32. Hoboken, New Jersey, Wiley-Blackwell.
- Rural Poverty Portal (2007) 'Rural poverty in Lesotho.' Rural Poverty Portal website powered by the International Fund for Agricultural Development (IFAD). Online posting: <<http://www.ruralpovertyportal.org/english/regions/africa/iso/index.htm>>.
- Sanders, D. & Sambo, A. (1991) AIDS in Africa: the implications of economic recession and structural adjustment. *Health Policy and Planning* 6(2), pp. 157–165.
- Schoepf, B.G. (2004) AIDS in Africa: structure, agency, and risk. In: Kalipeni, E., Craddock, S., Oppong, J.R. & Ghosh, J. (eds.) *AIDS in Africa: Beyond Epidemiology*. Malden, Massachusetts, Blackwell Publishing.
- Scrimshaw, N.S. & SanGiovanni, J.P. (1997) Synergism of nutrition, infection, and immunity: an overview. *American Journal of Clinical Nutrition* 66(2), pp. S464–S477.
- Scrimshaw, N.S., Taylor, C.E. & Gordon, J.E. (1968) *Interactions of Nutrition and Infection*. Monograph Serial No. 57. Geneva, World Health Organization.
- Semba, R.D. (1998) The role of vitamin A and related retinoids in immune function. *Nutrition Review* 56(1, part 2), pp. S38–S48.
- Semba, R.D. & Tang, A.M. (1999) Micronutrients and the pathogenesis of human immunodeficiency virus infection. *British Journal of Nutrition* 81(3), pp. 181–189.
- Sen, A. (1982) *Poverty and Famines: An Essay on Entitlements and Deprivation*. Oxford, Clarendon Press.
- Shah, M., Osborne, N., Mbilizi, T. & Villili, G. (2002) *Impact of HIV/AIDS on Agricultural Productivity and Rural Livelihoods in the Central Region of Malawi*. Lilongwe, Malawi, CARE International.
- Shoma, G. (2003) The nourishing nutritional answer to HIV/AIDS. *Pakistan Journal of Nutrition* 2(4), pp. 210–220.
- Singer, M. (1994) AIDS and the health crisis of the US urban poor: the perspective of critical medical anthropology. *Social Science and Medicine* 39(7), pp. 931–948.
- Singer, M. (2006) Syndemics. In: Boslaugh, S. (ed.) *Encyclopedia of Epidemiology*. Thousand Oaks, California, Sage Publications.
- Stanecki, K.A. (2004) The AIDS pandemic in the 21st century. Washington, D.C., International Population Reports, USAID and US Department of Commerce.
- Stillwaggon, E. (2002) HIV/AIDS in Africa: fertile terrain. *Journal of Development Studies* 38(2), pp. 1–22.
- Stillwaggon, E. (2006) *AIDS and the Ecology of Poverty*. New York, Oxford University Press.
- Stillwaggon, E. (2009) Complexity, cofactors, and the failure of AIDS policy in Africa. *Journal of the International AIDS Society* 12(12). Online at: <<http://www.jiasociety.org/content/12/1/12>>.
- Suttman, U., Ockenga, J., Selberg, O., Hoogestraat, L., Deicher, H. & Muller, M.J. (1995) Incidence and prognostic value of malnutrition and wasting in human immunodeficiency virus-infected outpatients. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology* 8(3), pp. 239–246.
- Tabi, M.M. & Frimpong, S. (2003) HIV infection of women in African countries. *International Nursing Review* 50(4), pp. 242–250.
- Tang, A.M. (2003) Weight loss, wasting, and survival in HIV-positive patients: current strategies. *AIDS Reader* 13(supplement 12), pp. S23–S27.
- Tang, A.M., Graham, N.M., Chandra, R.K. & Saah, A.J. (1997) Low serum vitamin B-12 concentrations are associated with faster human immunodeficiency virus type 1 (HIV-1) disease progression. *Journal of Nutrition* 127(2), pp. 345–351.
- Tang, A.M., Graham, N.M., Semba, R.D. & Saah, A.J. (1997) Association between serum vitamin A and E levels and HIV-1 disease progression. *AIDS* 11(5), pp. 613–620.
- Turkon, D. (2008) Commoners and kings and subaltern: political factionalism and structured inequality in Lesotho. *Political and Legal Anthropology Review* 31(2), pp. 203–223.
- UNAIDS (2004) *Report on the Global AIDS Epidemic*. Geneva, UNAIDS.
- UNAIDS (2006) *Report on the Global AIDS Epidemic: Executive Summary. A UNAIDS 10th anniversary special edition*. Available at: <http://data.unaids.org/pub/GlobalReport/2006/2006_GR-ExecutiveSummary_en.pdf>.
- UNAIDS (2007) *AIDS Epidemic Update*. Geneva, UNAIDS.
- USAID (2005) 'Lesotho: HIV/AIDS Health Profile.' September 2008. Online at: <www.usaid.gov/our_work/global_health/aids/countries/africa/lesotho_05.pdf>.
- United Nations Development Programme (UNDP) (2005) *Human Development Report. International Cooperation at a Crossroads: Aid, Trade and Security in an Unequal World*. New York, UNDP.
- Van Hook, M.P. & Ngwenya, B.N. (1996) The majority legal status

- of women in southern Africa: implications for women and families. *Journal of Family and Economic Issues* 17(2), pp. 173–188.
- Victoria, C.G., Adair, L., Fall, C., Hallal, P.C., Martorell, R., Richter, L. & Sachdev, H.S. (2008) Maternal and child undernutrition: consequences for adult health and human capital. *The Lancet* 371(9609), pp. 340–357.
- Von Braun, J., Tesfaye, T. & Webb, P. (1999) *Famine in Africa: Causes, Responses and Prevention*. Baltimore, Maryland, Johns Hopkins University Press.
- Wehler, C., Scott, R. & Anderson, J. (1992) The Community Childhood Hunger Identification Project: a model of domestic hunger. Demonstration project in Seattle, Washington. *Journal of Nutrition Education* 24(supplement 1), pp. S29–S35.
- Weingärtner, L. (2004) *The Concept of Food and Nutrition Security: Food and Nutrition Security Assessment Instruments and Intervention Strategies*. Background Paper No. 1. Bonn, Germany, InWEnt (Internationale Weiterbildung und Entwicklung gGmbH).
- Weiser, S.D., Leiter, K., Bangsberg, D.R., Butler L.M., Percy-de Korte, F., Hlanze, Z., Phaladze, N., Iacopino, V. & Heisler, M. (2007) Food insufficiency is associated with high-risk sexual behavior among women in Botswana and Swaziland. *PLoS Medicine* 4(10), p. e260.
- Wheeler, D.A., Gibert, C.L., Launer, C.A., Muurahainen, N., Elion, R.A., Abrams, D.I., Bartsch, G.E. & The Terry Bein Community Programs for Clinical Research on AIDS (1998) Weight loss as a predictor of survival and disease progression in HIV infection. *Journal of Acquired Immune Deficiency Syndromes* 18(1), pp. 80–85.
- Whiteside, A. (2004) Responding to AIDS in crisis situations. In: Poku, N.K. & Whiteside, A. (eds.) *The Political Economy of AIDS in Africa*. Burlington, Vermont, Ashgate Publishing Company.
- Wiegiers, E., Curry, J., Garbero, A. & Hourihan, J. (2006) Patterns of vulnerability to AIDS impacts in Zambian households. *Development and Change* 37(5), pp. 1073–1092.
- World Bank (2004) *Project appraisal document on a proposed grant in the amount of US\$5 million to the Kingdom of Lesotho for a HIV/AIDS capacity-building and technical assistance project*. Washington, D.C., The World Bank.
- World Food Programme (WFP) (2006) *2006 Estimated Needs and Shortfalls for WFP Operational Activities as of 1 November 2006*. Rome, WFP. Available at: <http://one.wfp.org/appeals/current_shortfalls/documents/2006/0611/0611.pdf>.