

Chapter 5

Economic Migrants and Health Vulnerability

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Introduction

In the midst of an increasingly global economy, a rising number of people are migrating to work, drawing increasing attention to the health impacts of labor migration. The connections between migration and health are complex, multi-faceted, and often difficult to unravel. How has labor migration shaped current global health crises, and how will it define the trajectories of these crises in the future?

The spread of disease in societies is shaped in large part by the political, social and economic environment in which people live. Migrant labor, a paramount and growing force, creates economic inequalities and influences policies, social institutions, familial structures, sexual networks, and individual behaviors in ways that threaten both the health of migrants and that of their communities.

In this chapter we begin by briefly exploring the extent of global labor migration and its economic impact. Thereafter we discuss the links between labor migration and disease, particularly focusing on southern Africa, and examine the different levels at which labor migration can cause health vulnerability. We then present two case studies that further explore the complex association between migrant labor and health vulnerability: the relationship between migration and tuberculosis (TB) in Norway, and the role of labor migration in the explosive spread of HIV/AIDS throughout South Africa. We conclude by making recommendations for effective interventions on the local, national, and regional scales.

The Extent of Global Labor Migration

Migrant labor is a vast and growing global force. The United Nations estimates that the number of migrants worldwide has been increasing by 4-8% annually (SARDI & UNDP, 2004). In 2000, an estimated 175 million people, 2.9% of the world's population, were migrants predominantly motivated by economic need; by 2005, that figure was projected to be between 185 and

192 million (Omelaniuk, 2005). The International Labor Office (ILO) (2004) estimated that of the 175 million global migrants, immigrants, and refugees in 2000, approximately 86 million were economically active.

Estimates of the prevalence of migration should be cautiously interpreted. Illegal and undocumented migration, which is reported to be increasing in many parts of the world, is notoriously difficult to quantify. Many migrants find employment in the informal sector, and are unlikely to be counted in some official statistics. In many countries, the extent of internal migration may be far greater than international migration, and even more difficult to measure. In China alone it is estimated that there are more than 121 million internal migrants (National Statistic Bureau of China, 2001).

Migrant laborers are a central social and economic force both where they work and in the communities that they leave behind. The ILO estimates that 96 million people living outside their country of origin send US \$73 billion back to their homes each year. For example, annually US \$13.3 billion in remittances is sent to India and US \$9.9 billion to Mexico from migrants in the United States (SARDI & UNDP, 2004).

Economically motivated migration follows the fault lines of economic inequality within and between countries. Mexicans motivated by economic need account for most of the northward migration of Latin Americans to the U.S.: the number of legal Mexican born immigrants in the U.S. rose from 750,000 in 1970 to 10 million in 2000 (United Nations Secretariat, 2005). The recent, rapid transition of several countries in Southeast Asia to a market economy has created disparities in standards of living, leading to increased migration within and between these countries (UNAIDS & IOM, 1998). In many regions, better economic and educational opportunities in cities lure rural workers to urban environments (Montgomery, Stren, Cohen & Reed, 2003).

A potent example of how economic disparity drives migration is the flux of health care workers—doctors, pharmacists, and nurses—out of resource poor settings. A recent study found that alarming proportions of health care workers in African countries intend to migrate: 49.3% in Cameroon, 61.6% in Ghana, 37.9% in Senegal, 58.3% in South Africa, 26.1% in Uganda, and 68% in Zimbabwe (Awases, Gbary, Nyoni & Chatora, 2004). Prior to Lithuania's entry into the EU, the Lithuanian Department of Health found that 61% of doctors in training and 27% of current doctors planned to work abroad once Lithuania joined the EU; among those, 15% of doctors in training and 5% of practicing doctors firmly intend not to return (Krosnar, 2004). Factors driving this migration include better training opportunities, higher income and efforts by countries in the developed world to fill vacant positions in their own health care systems (Bala, 2005; Chaguturu & Vallabhaneni, 2005; Krosnar, 2004). The loss of health care workers leaves crippling gaps in health care systems of developing countries already struggling to combat mounting health crises, such as TB and AIDS (Schubert, 2003).

Labor Migration and Health: Levels of Causation

Historically, population movement has played a significant role in the spread of disease. Notably syphilis, carried across the Atlantic by colonialists, played a key role in decimating the Native American population (Brandt, 1985; Patterson & Runge, 2002). Colonial forces, in turn, faced high mortality rates from new exposure to diseases in India, the South Pacific, Africa, and the Americas (Curtin, 1989).

Today, given the interconnection of the global economy, the association between mobile populations and the spread of disease is just as strong, if not more so, than during the colonial era (Denduangboripant, Wacharapluesadee, Lumlerdacha, Ruankaew, Hoonsuwan, Puanghat, & Hemachudha, 2005; Dougan, Payne, Brown, Fenton, Logan, Evans, & Gill, 2004; Fagbo, 2002; Lurie, 2000; Poudel, Okumura, Sherchand, Jimba, Murakami, & Wakai, 2003; Reyburn, Rowland, Mohsen, Khan, & Davies, 2003; White, 2003). For example, the incidence of Mucocutaneous leishmaniasis in the Cuzco region of Peru increased after a gold rush beginning in 1975 drew scores of migrant laborers into the leishmaniasis-endemic region of Madre de Dios (Guthmann, Calmet, Rosales, Cruz, Chang, & Dedet, 1997; Tritteeraprapab & Songtrus, 1999). During the 2003 SARS outbreak, the Chinese government was particularly concerned about the potential role of migrants spreading SARS to new areas (Biao, 2004). More recently, the highly pathogenic H5N1 avian flu virus has sparked renewed concern about the potential for the rapid spread of a highly infectious disease (Aldhous & Tomlin, 2005; Fouchier, Kuiken, Rimmelzwaan, & Osterhaus, 2005; Meltzer, 2004; Stohr & Esveld, 2004).

Labor migration unfolds in a vast diversity of patterns and conditions in different industries and different regions. Amidst various forms of migrant labor, certain common conditions and structures link migrant labor and disease vulnerability. Here, we examine three different levels of disease causation operating in migrant settings: superstructural, structural, and environmental (Sweat & Denison, 1995).

Superstructural Factors: Poverty and Social Marginalization

Superstructural forces are macro social, economic, and political forces that shape the distribution of resources and opportunities. Labor migration emerges from and creates systems of economic inequality, political oppression, marginalization, and social fragmentation, all of which can render migrants at greater risk of sexual coercion, unhealthy working and living conditions, and exploitation and violence. Women, in particular, are at risk, and in many countries appear to comprise the majority of informal, trans-border traders. Although migration provides opportunities for women's economic empowerment, it can also render them socially and economically vulnerable,

and consequently at risk for contracting STIs (Ybanez, 1999a). Some female traders, such as those crossing the border between Haiti and the Dominican Republic, may be coerced into sex to obtain passage from customs officials at border crossings (Inter-American Commission on Human Rights, 1999; Severino & de Moya, 1999; Wilson, 2001). Female migrant farm laborers often cannot report sexual abuse, sexual coercion, and rape on commercial farms for fear of losing their jobs (Crush, Mather, Mathebula, Lincoln, Maririke, & Ulicki, 2000).

Structural Factors: Laws, Policies, and Regulations

Structural factors—laws, policies and regulations—enforce and perpetuate the systems of inequality and oppression that place migrants at risk. Few governments have instituted policies protecting the legal rights of migrants and providing them with health education and services (Duckett, 2001). For example, rarely do domestic workers have any kind of written contract, paid leave, benefits or medical aid, and they are frequently subject to poor living and working conditions, harassment, and abuse (Beresford, 1998; Hubbard & Girvan, 1996). Sometimes, in countries such as the U.S., Costa Rica, and Singapore, even the valid legal status of a domestic worker does not necessarily ensure that they are covered by all national labor laws (Piper, 2005).

In places where government policies do formally protect the health rights of migrants, these policies are often inadequate or may not be properly implemented. A study of two counties in South Florida found that commercial farms did not adequately implement state and federal laws regarding pesticide exposure, and failed to report cases of farm workers suffering symptoms of pesticide poisoning (Murphy-Greene, 2002). Even if offered health services by host countries, migrants often bear the brunt of the treatment costs (Piper, 2005).

Without legal rights, migrants may feel reluctant to seek out formal health services (Duckett, 2001). Some employers of migrant laborers use illness as grounds for dismissal, driving migrant workers to self-medicate and avoid formal health services (Ybanez, 1999b). For example, in the South African gold mines, there are examples of workers who became too sick to work having been “retrenched” absolving mining companies of the expense of their treatment.

Environmental Factors: Conditions of Living, Working, and Moving

The environment in which migrant laborers move, work, and live is largely shaped by systems of social and economic inequality, as poverty, discrimination, and lack of legal protection precipitate unhealthy living and working conditions. Migrants are subject to poor working conditions, and are also vulnerable to sexual exploitation, coercion and violence from employers, host communities, and other migrants. Moreover, while the link between migrant

labor and high-risk sexual behavior requires further exploration, migrants' frequent and lengthy absences from home is likely to "disrupt their familial and stable sexual relationships" (Decosas et al., 1995). The mobility of migrant laborers creates vast and complex social and sexual networks that link disparate communities. These disparate communities often have significantly different health and disease profiles—for instance, higher prevalence of TB and HIV in urban areas—exposing migrants, and subsequently their home communities, to increased risk of disease transmission.

Direct health risks arise from the paucity of regulations governing migrant working conditions. Two hundred migrant workers from several villages in the Henan Province of China acquired severe pneumoconiosis in quartz factories in Jiangsu Province because of the lack of protective measures in the mine. A 1996 study reported that as many as 70,000 female workers at the shoemaking factories in China's Fujian Province had suffered from benzene poisoning (Biao, 2004). South African gold miners face a 1-in-3 chance of being seriously injured and a 1-in-40 chance of being killed by underground rock fall. Migrant farm workers can face exposure to dangerous levels of pesticides; in California, for example, pesticide-related illness is an important cause of acute morbidity in migrant farm workers (Das, Steege, Baron, Beckman, & Harrison, 2001; Reidy, Bowler, Rauch, & Pedroza, 1992).

The living conditions of domestic workers, their separation from their partners and families, their vulnerability to sexual exploitation, and their lack of access to medical care likely has a serious impact on their reproductive health and risk of STI infection. A 2001 South African study found that 36% of domestic workers live in the house where they work, while only 25% said they live in their own house (Peberdy & Dinat, 2004). Employers often place restrictions on domestic workers having male and other visitors, and prevent husbands, partners and children from living with or visiting them. Filipino domestic workers in Hong Kong report sexual advances by their employers, lack of medical attention, inadequate eating arrangements, and poor sleeping accommodations, sometimes on the floor or near the bathroom (Ybanez, 1999c).

In a variety of other migrant industries, workers must also leave their spouses, families, and communities for extended periods of time. In South Africa, more than 90% of mine workers live in single-sex hostels (Crush, 1995), often in close proximity to commercial sex workers (Campbell, 2000). Foreign workers on the mines are generally able to return home less frequently than their South African counterparts, and their partners are less likely to be able to visit them on the mines (Lurie, Williams, Zuma, Mkaya-Mwamburi, Garnett, Sturm, Sweat, Gittelsohn, & Karim, 2003a). Formal migrant labor systems that are dominated by men frequently create a market for commercial sex (Campbell, 2000; Quinn 1994). The prominence of commercial sex and alcohol-related business create conditions that render both migrant and non-migrant members in surrounding communities vulnerable to HIV (Williams, Taljaard, Campbell, Gouws, Ndhlovu, van Dam, Caraël, & Auvert, 2003) and other STIs (Kark, 1949).

Several studies have linked the early spread of HIV in Southern Africa to migrant laborers working on construction projects, highlighting the health risks faced by another sector of migrant laborers. For example, a 1992 study on the Katse Dam Project in Lesotho reported that 5.3% of construction workers were infected with HIV, compared with 0.8% prevalence in mountain villages of the region. A 2001 report found approximately 160 sex workers, daily, around a more recent dam construction site in Mohale (Wilson, 2001). In Malawi, too, road construction projects have been associated with the spread of HIV (IOM, 2003). Commercial fishermen can also work for extended periods away from their communities, families, and regular partners. These workers often frequent and support alcohol and commercial sex industries in fishing ports, rendering them susceptible to STI contraction (Samnang, Leng, Kim, Canchola, Moss, Mandel, & Page-Shafer, 2004). For example, fishermen in Sihanouk Ville, a port and fishing area in Cambodia, have an overall HIV prevalence of 16.1%, more than twice that of the general Khmer population (Samnang et al., 2004). In Uganda, the first cases of AIDS were identified in 1985 in fishing villages along the shores of Lake Victoria. Sexual networking was investigated in one Ugandan fishing village in order to better understand HIV infection dynamic (Pickering, Okongo, Bwanika, Nnalusiba, & Whitworth, 1997). Pickering and associates found that casual, paying partners accounted for 42% of sexual contacts among married women and 80-100% of sexual contacts among single women. Finally, the conditions of migrant labor can affect the health of children of migrant laborers. While remittances from migrant workers can increase familial resources and improve children's access to education, better living conditions, and health services, the familial fragmentation caused by absent parents may have detrimental affects on child health, especially in situations where extended families cannot mitigate the impact of absent parents (Collinson, Lurie, Kahn, Wolff, Johnson, & Tollman, forthcoming; Kanaiaupuni & Donato, 1999).

Case Studies

Migration and Tuberculosis Transmission in Western Europe

The case of TB control and migration policy in Western Europe provides a revealing example of the role of migrant labor in the spread of infectious diseases. In 2004, 10 countries from Eastern and Central Europe joined the European Union and Romania and Bulgaria joined in early 2007. Western Europe, with its better employment opportunities and higher average income, will face rising rates of immigration. As many as 3 to 4 million migrants, about half of them economically motivated, are projected to arrive in Western European countries from new member states in the 25 years following expansion (Anon, 2004).

The number of TB cases and deaths in Western Europe and other industrialized countries decreased steadily during the 20th century. However, in the past two decades these rates have stopped decreasing or are increasing in many countries, and some attribute this change to increasing migration from countries with elevated TB prevalence (Heldal, Dahle, Sandven, Caugant, Brattaas, Waaler, Enarson, Tverdal, & Kongerud, 2003). Rising rates of multi-drug resistant (MDR) TB in Eastern Europe have raised concerns that increasing migration between EU countries will result in the spread of multi-drug resistant TB throughout the continent (Dahle, 2005).

In Norway, immigration in the 1990s was almost double that of the 1980s—50,000 new immigrants arrived in the 1990s, primarily from Yugoslavia, Iraq, and Somalia. TB incidence rose significantly in Norway from 4.7/100,000 in 1997 to 6.6/100,000 in 2001. Genetic studies have allowed researchers to track the course of TB incidence and transmission. One such study found that foreign-borne patients account for an increasing proportion of new TB cases in Norway: more than 70% of TB patients between 1999 and 2001 were found to be of foreign origin, compared to 53% of cases between 1994 and 1998. Most of these cases were reactivations of latent infections that occurred before arriving in Norway (Dahle, Sandven, Heldal, & Caugant, 2003). A similar DNA fingerprinting study in Denmark found that Somalian immigrants accounted for a high percentage of TB cases between 1992 and 1999, and that 74.9% of these cases were most likely infected before their arrival. This research indicates that migrants with latent TB infections account for an increasing proportion of TB cases in both Denmark and Norway, and a similar trend might be expected in other Western European countries, too, as migration from high-prevalence countries continues to increase.

Further data from both Denmark and Norway, however, indicate the complexity of TB transmission. In Norway, native-born Norwegians were *more likely* to transmit TB to immigrants than vice versa: six out of nine outbreaks that included both foreign-born and native-born Norwegians were of Norwegian origin. Further, most outbreaks of TB within Norway were found to be of Norwegian origin, from strains that had been in Norway for many years (Dahle et al., 2003). Similarly, in Denmark, although a large percentage of TB patients were Somali, only .9% of Danish TB patients were probably infected by Somalis (Lillebaek, Andersen, Bauer, Dirksen, Glismann, de Haas, & Kok-Jensen, 2001). Thus, transmission from migrants to native-born individuals appeared to be uncommon in both countries, perhaps in part because of the patterns of mixing.

These findings have significant implications for policies aimed at addressing connections between migration and TB. Given that transmission of TB from migrants to native Norwegians accounts for such a small proportion of new cases, regulations that limit migration and the rights of migrants would hardly provide greater protection. On the contrary, such policies could further marginalize migrants and make it more difficult for them to access the care

they need, thus increasing the probability that those with latent infections will develop active and infectious TB. Even if migrants were more likely to transmit TB, ensuring that entering migrants received high quality health care and TB treatment would most effectively prevent further disease transmission. While the role of migrant movement in introducing infectious diseases to new areas has been extensively documented, this case illustrates that the trajectory of transmission facilitated by migration is not necessarily straightforward, and may depend on numerous complex factors. Why did increasing numbers of TB-positive migrant workers entering Norway not lead to TB outbreaks there? Why does labor migration fuel infectious disease epidemics and other health crises in other contexts? To answer these questions, we must look deeply at the structures of migrant labor systems, and the conditions in which migrant laborers work, live, and move between communities.

Dynamic Structures and Patterns of Migrant Labor and Disease: The Case of HIV in Southern Africa

Imperfect estimates of the prevalence of migration in Southern Africa are that there are more than 2.5 million legal, and many more illegal migrants, drawn to work in South Africa's mines, factories and farms from rural areas within South Africa and from neighboring countries (Zwi & Bachmayer, 1990). Large-scale migration to industries in South Africa is a regional issue with far-reaching consequences. Migration patterns in South Africa were an integral part of the way in which government, with the support of industry (in particular the mining industry), structured South African society from early in the 20th century. This "social engineering" culminated in the system of apartheid, which was formalized in 1948. During the early decades of the 20th century, the movement of labor was strictly controlled so as to ensure a continuing supply of cheap black workers for agriculture, industry and commerce (Wilson, 1972) while simultaneously protecting the relative privilege of white workers (Lurie, 1992). The demise of apartheid and the rise of democracy has already changed the pressures and demands for labor, and it is still not clear precisely what form and patterns labor migration will take in the new South Africa.

The dynamic nature of migration in South Africa can best be understood by examining the way in which sources of rural livelihoods changed over the course of the last century. In the mid 1930s, 40-50% of rural subsistence food requirements were still met by rural production (May, 1990). Over the next 40 years, however, remittances from family members working in urban areas increased in importance. By 1970, agricultural production in these rural areas had declined to the point where only 10% of the total income for most rural households came from agriculture, with the remainder coming from remittances by family members employed as migrant laborers. In KwaZulu/Natal, for example, by the late 1980s, remittances from migrant workers made up over three-quarters of rural household income (May, 1990).

The patterns of migration in South Africa have changed considerably over the last century. In the early decades of the last century, migrant workers tended to work in the mines or other sectors of the economy for a few years after which time they would return permanently to their rural homes. In 1936, for example, the chance that by the time a migrant was 45 years old, he would have ceased to engage in migrant labor was greater than 75% (Natrass, 1976). Today, migrant labor tends to be a more long-term phenomenon, with more frequent trips home. Several factors have combined in recent years to encourage easier and more rapid movement of people in South Africa. These include the lifting of apartheid laws that restricted the movement of the majority of the population, the development of a significant transportation infrastructure, and the negotiation of more flexible work contracts resulting from strengthened trade unions. All of these events have made it easier for people to become migrants, and for migrants to return home more frequently than they could in the past.

In several parts of the world, geographic mobility, migration and widespread population displacement have been identified as significant risk factors in the transmission of HIV (Decosas et al., 1995). A number of studies have shown that migrants are at greater risk of infection with HIV and other STDs than are non-migrants, both in South Africa (Jochelson, Mothibeli, & Leger, 1991; Lurie et al., 2003a; Lurie, Williams, Zuma, Mkaya-Mwamburi, Garnett, Sweat, Gittelsohn, & Abdool Karim, 2003b) and elsewhere (Decosas et al., 1995; Hunt, 1989; Lurie, Hintzen, & Lowe, 1995; Nunn, Wagner, Kamali, Kengeya-Kayondo, & Mulder, 1995; Quinn, 1994). In an early study of HIV seroprevalence in a rural KwaZulu/Natal community, people who had recently changed their place of residence were three times as likely to be HIV infected compared to those who had not (Abdool Karim & Abdool Karim, 1992).

Studies in South Africa conducted by Lurie and associates (2003a, 2003b) provide insight into the link between migration and HIV. HIV prevalence among migrant men was found to be 25.9% compared to 12.7% among non-migrant men, so that migrant men were 2.4 times more likely to be HIV-infected than non-migrant men. In multivariate analysis, the main risk factors for being HIV-infected among men were being a migrant, ever having used a condom, and having lived in four or more places during the course of a lifetime. The study also found very high rates of HIV among women; overall 17.5% of women were HIV-infected (Lurie et al., 2003a). The study further examined patterns of HIV concordance and discordance among migrant and non-migrant couples, offering a mirror into the dynamics of HIV transmission during a mature epidemic. Migrant couples were 2.28 times more likely than non-migrant couples to have one or both partners infected (35% versus 19%) and over twice as likely to be HIV-1 discordant (27% versus 15%) (Lurie et al., 2003b).

It has long been assumed that in the context of southern African migration, HIV transmission largely occurs uni-directionally from returning migrant men—who themselves became infected while away—to their rural

partners when they return home. But if this were the case, it would be the man who was the infected partner in all migrant HIV discordant couples. However, among HIV discordant couples in this study, the female was the infected partner in 29% of the cases; this did not differ by migration status of the couple (Lurie et al., 2003b). Clearly a woman who is HIV-infected—and whose primary partner is not HIV-infected—could not have been infected by her partner. Additionally, women whose partners were migrants were as likely to be HIV-infected compared to women whose partners were not migrants, suggesting that rural transmission is playing a large role in the spread of HIV as well (Lurie et al., 2003a). The study raises questions about the sexual networks of rural women, and challenges the common assumption of unidirectionality of HIV transmission in the context of large-scale population mobility. This finding highlights the importance of understanding the rural, as well as the urban, dynamics of the epidemic, and implies that successful prevention efforts should concentrate not only on the urban ‘receiving’ areas but on the rural ‘sending’ areas as well.

These findings are particularly pertinent given the mature stage of the South African epidemic. It is likely that early in the epidemic, the role of migration was critical in disseminating of the virus from urban to rural areas, and that this role was relatively more important compared to that during the more mature stage of the epidemic (Coffee, Garnett, & Lurie, 2000). Nevertheless, migration still appears to be an independent risk factor for men at a mature stage in the epidemic, even against the background of extremely high HIV prevalence. This highlights the importance of migration as one explanation for the size and rapidity of spread of the southern African AIDS epidemic, during all of its stages.

Recommendations for Interventions

The two case studies provide evidence for the complexity of the relationship between migration and the spread of disease in diverse settings. The South African case study highlights the impact of migration on the health of not only those travelling, but on all communities involved in the migration process. Assessing the health impact of migration in other industries and other regions is critically important; the impact of migration on disease risk and transmission is likely to be different under different migratory, social, cultural, economic and political conditions. Understanding the mechanisms behind the spread of disease through migration is an essential step toward addressing and preventing these adverse health consequences. While small-scale interventions can confront local health concerns, their effectiveness is limited, given the national and regional nature of migration.

Small-scale interventions target high-risk groups in key locations. Interventions in South African mining towns have provided STI treatment and education specifically to female sex workers, while other interventions

have used peer educators as a means of stimulating discussion and debate at the workplace (Williams et al, 2003). Workplace interventions are likely to grow in importance, particularly in Southern Africa where mining companies are taking the lead in delivering effective antiretroviral therapy to HIV-infected workers. Indeed, in some work settings, industry's need for a healthy workforce has stimulated the growth of company-run health clinics, which are often better staffed and equipped than clinics in the public sector. Unfortunately, well-designed evaluations aimed at measuring the impact of such workplace programs have been few and far between.

Also on a local scale, organizing grassroots efforts has proven to be an effective means of empowering both migrants and their communities to proactively address and transform the health vulnerabilities they face. In the Cuzco region of Peru, when the government did not effectively respond to a leishmaniasis outbreak in 1975, affected migrants organized patients' associations, which provided a mutual support structure for learning about, advocating for, accessing, and taking treatment together. Within this context, these associations played a crucial role in encouraging sick, marginalized migrant laborers to seek out the medical care they needed (Guthmann et al., 1997). Some migrant workers in China are actively organizing grassroots activities through which migrant workers are taking ownership over their own health care and building alternative structures to fill the gaps in government health care services (Biao 2004).

On a national scale, policy changes can play a crucial role in improving the general living conditions of migrants, which in turn would positively impact their health. Such policies might include regulating safe working conditions for migrant laborers, ensuring that they have secure legal rights, and protecting them from discrimination and sexual violence. Additionally, the establishment of humane monitoring systems to diagnose and treat migrants as they enter a country is crucial to protecting the health of both migrants and the communities they move between.

In recognizing the potential of infectious disease to spread along migration routes, it is important not to indict migrant workers as the agents of disease spread whose movements must be contained. If not carefully designed to promote the health of migrants and the health of the communities they move between, migration policies can have detrimental health effects by marginalizing migrants from the health and social support services they need (Duckett, 2001). A potent example of this is the U.S. internment of HIV-positive Haitian refugees in Guantanamo Bay. Following a violent 1991 coup in Haiti, 34,000 Haitian refugees were denied asylum in the U.S., most of whom were interned at Guantanamo Bay and subjected to mandatory HIV testing (Farmer, 2005). Two-hundred and sixty-eight HIV-positive Haitians were put in an "HIV detention camp," where detainees reported that they were confined to cramped barbed wire enclosures, forced to eat food with maggots, and beaten when they demonstrated to demand better living conditions. Judge Sterling Johnson, who ruled on the case in 1993, called

the conditions of HIV-positive detainees “cruel and unusual punishment” (Farmer, 2005).

While interventions targeting high-risk migrant groups, such as those mentioned above, may have an impact on HIV prevention, they frequently do not address the deeper conditions that put individuals and entire communities at risk. If the chain of disease transmission is to be broken, interventions must be aimed at people both in the areas sending and receiving labor. A successful case of a small-scale intervention that addresses the problematic social structures associated with disease transmission is that of the Lonmin Platinum mine in Rustenburg, South Africa. This mine has started to replace single-sex hostels with more family-friendly housing, a move that could greatly reduce risk-related behaviors caused by the separation of migrants from their families. Mathematical models show that eliminating single-sex mine hostels would be cost-effective and could have a substantial impact on HIV transmission (Gebrekristos, Resch, Zuma, & Lurie, 2005). Today, more than 90% of mine workers still live in single-sex hostels.

Highly effective interventions will change the broader social and economic structures that make migrant labor dangerous, i.e. the roots of the connection between migration and disease. For example, facilitating local development and economic empowerment in rural and urban resource-poor areas would eliminate the need for workers to migrate in the first place, allowing them to remain with their families, communities, and social support structures. These deeper socio-economic transformations will require considerable resources, time, and political will to affect, and their greatest results will be long-term (Sweat & Denison, 1995). As labor migration plays an increasingly prominent role in shaping social and economic structures and determining health vulnerability, these more comprehensive interventions aimed at structural factors that help facilitate HIV transmission are urgently needed.

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References

- Abdool Karim, Q. & Abdool Karim, S.S. (1992). Seroprevalence of HIV Infection in Rural South Africa. *AIDS*, 6, 1535-1539.
- Aldhous, P. & Tomlin, S. (2005). Avian flu special: Avian flu: Are we ready? *Nature*, 435, 399.
- Anon (2004). The coming hordes: fears of migration from east to west. *The Economist* (January 15).
- Awases, M., Gbary, A., Nyoni, J., & Chatora, R. (2004). *Migration of Health Professionals in Six Countries: A Synthesis Report*. South Africa: World Health Organization Regional Office for Africa. <http://www.afro.who.int/dsd/migration6countriesfinal.pdf> (accessed 11/22/2005).

- Bala, M.M. (2005). Poland is losing its doctors. *British Medical Journal*, 331, 235.
- Beresford, B. (1998). Domestic Workers and the Law. (October 16). *Mail & Guardian*.
- Biao, X. (2004). Migration and health in China: Problems, obstacles, and solutions. *Asian Metacentre Research Paper Series*, No. 17. http://www.populationasia.org/Publications/Research_Papers.htm (accessed 11/21/2005).
- Brandt, A.M. (1985). *No Magic Bullet: A Social History of Venereal Disease in the United States since 1880*. Oxford: Oxford University Press.
- Campbell, C. (2000). Selling sex in the time of AIDS: The psycho-social context of condom use by sex workers on a Southern African mine. *Social Science and Medicine*, 50(4), 479-494.
- Chaguturu, S. & Vallabhaneni, S. (2005). Aiding and abetting – nursing crises at home and abroad. *New England Journal of Medicine*, 353(17), 1761-1763.
- Coffee, M., Garnett, G., & Lurie, M. (2000). Modelling the impact of circular migration on the rate of spread and the eventual scale of the HIV epidemic in South Africa. Poster presented at the *XIII International AIDS Conference*, Durban, South Africa.
- Collinson, M., Lurie, M., Kahn, K., Wolff, B., Johnson, A., & Tollman, S. (forthcoming). Health Consequences of Migration: Evidence from South Africa's Rural North-East (Agincourt). In (M. Tienda, S.E. Findley, S. Tollman, & E. Preston-Whyte, Eds.). *African Migration and Urbanization in Comparative Perspective*. Princeton: Princeton University and Wits University Press.
- Crush, J. (1995). Mine migrancy in the contemporary era. In (J. Crush & W. James, Eds.), *Crossing Boundaries: Mine Migrancy in a Democratic South Africa*. Cape Town: IDASA/IDRC.
- Crush, J., Mather, C., Mathebula, F., Lincoln, D., Maririke, C., & Ulicki, T. (Eds.), (2000). *Borderline Farming: Foreign Migrants in South African Commercial Agriculture*, South African Migration Project, Migration Policy Series No.16. <http://www.queensu.ca/samp/sampresources/samppublications/policyseries/policy16.htm> (accessed 11/22/2005).
- Curtin, P.D. (1989). *Death by Migration: Europe's Encounter with the Tropical World in the Nineteenth Century*. Cambridge: Cambridge University Press.
- Dahle, U.R. (2005). TB in immigrants is not public health risk, but uncontrolled epidemics are. *British Medical Journal*, 331, 237.
- Dahle, U.R., Sandven, P., Heldal, E., & Caugant, D.A. (2003). Continued low rates of transmission of *Mycobacterium tuberculosis*. *Journal of Clinical Microbiology*, 41(7), 2968-2973.
- Das, R., Steege, A., Baron, S., Beckman, J., & Harrison, R. (2001). Pesticide-related illness among migrant farm workers in the United States. *International Journal of Occupational and Environmental Health*, 7(4), 303-312.
- Decosas, J., Kane, F., Anarfi, J.K., Sodji, K.D., & Wagner, H.U. (1995). Migration and AIDS. *Lancet*, 346(8978), 826-828.
- Denduangboripant, J., Wacharapluesadee, S., Lumlertdacha, B., Ruankaew, N., Hoonsuwan, W., Puanghat, A., & Hemachudha, T. (2005). Transmission dynamics of rabies virus in Thailand: Implications for disease control. *BMC Infectious Diseases*, 5, 52.
- Dougan, S., Payne, L.J., Brown, A.E., Fenton, K.A., Logan, L., Evans, B.G., & Gill, O.N. (2004). Black Caribbean adults with HIV in England, Wales, and Northern Ireland: An emerging epidemic? *Sexually Transmitted Infections*, 80(1), 18-23.
- Duckett, M. (2001). *Migrants' Right to Health*. Joint United Nations Programme on HIV/AIDS and the International Organization for Migration. Geneva: The Joint United Nations Programme on HIV/AIDS (UNAIDS).

- Fagbo, S.F. (2002). The evolving transmission pattern of Rift Valley fever in the Arabian Peninsula. *Annals of the New York Academy of Sciences*, 969(1), 201-204.
- Farmer, P. (2005). *Pathologies of Power*. Berkeley: University of California Press.
- Fouchier, R. Kuiken, T., Rimmelzwaan, G., & Osterhaus, A. (2005). Global task force for influenza. *Nature*, 435, 419-420.
- Gebrekristos, H.T., Resch, S.C., Zuma, K., & Lurie, M.N. (2005). Estimating the impact of established family housing on the annual risk of HIV infection in South African mining communities. *Sexually Transmitted Diseases*, 32(6), 333-340.
- Guthmann, J.P., Calmet, J., Rosales, E., Cruz, M., Chang, J., & Dedet, J.P. (1997). Patients' associations and the control of leishmaniasis in Peru. *Bulletin of the World Health Organization*, 75(1), 39-44.
- Heldal, E., Dahle, U.R., Sandven, P., Caugant, D.A., Brattaas, N., Waaler, H.T., Enarson, D.A., Tverdal, A., & Kongerud, J. (2003). Risk factors for transmission of Mycobacterium tuberculosis. *The European Respiratory Journal*, 22(4), 637-642.
- Hubbard, D. & Girvan, L. (1996). *The Living and Working Conditions of Domestic Workers in Namibia*. Namibia: Gender Research and Advocacy Project with the Legal Assistance Centre. <http://www.lac.org.na/grap/grapDW.htm> (accessed 11/22/2005).
- Hunt, C., (1989). Migrant Labor and Sexually Transmitted Disease: AIDS In Africa. *Journal of Health and Social Behavior*, 30, 353-373.
- Inter-American Commission on Human Rights. (1999). *Report on the Situation of Human Rights in the Dominican Republic*. <http://www.cidh.oas.org/countryrep/DominicanRep99/Table.htm> (accessed 11/22/2005).
- ILO (2004). Towards a fair deal for migrant workers in the global economy. *International Labor Conference, 92nd Session*.
- IOM (2003). *Mobile Populations and HIV/AIDS in the Southern African Region: Recommendations for Action*. Pretoria: Southern African Regional Poverty Network/International Organization for Migration. <http://www.sarpn.org.za/documents/d0000365/index.php> (accessed 11/22/2005).
- Jochelson, K., Mothibeli, M., & Leger, J. (1991). Human immunodeficiency virus and migrant labor in South Africa. *International Journal of Health Services*, 21(1), 157-173.
- Kanaiaupuni, S.M. & Donato, K.M. (1999). Migradollars and mortality: The effects of migration on infant survival in Mexico. *Demography*, 36(3), 339-353.
- Kark, S. (1949). The social pathology of syphilis in Africans. *South African Medical Journal*, 23, 77-84.
- Krosnar, K. (2004). Could joining EU club spell disaster for the new members? *British Medical Journal*, 328, 310.
- Lillebaek, T., Andersen, A.B., Bauer, J., Dirksen, A., Glismann, S., de Haas, P., & Kok-Jensen, A. (2001). Risk of Mycobacterium tuberculosis transmission in a low-incidence country due to immigration from high-incidence areas. *Journal of Clinical Microbiology*, 39(3), 855-861.
- Lurie, M. (1992). *Preserving White Privilege: Industrial Unrest on the Witwatersrand, 1913*. University of Florida: Master's Thesis.
- Lurie, M. (2000). Migration and AIDS in Southern Africa: A review. *Southern African Journal of Science*. 96(6), 343-347.
- Lurie, M., Williams, B., Zuma, K., Mkaya-Mwamburi, D., Garnett, G., Sturm, A.W., Sweat, M.D., Gittelsohn, J., & Abdool Karim, S.S. (2003a). The impact of migration on HIV-1 transmission: A study of migrant and non-migrant men, and their partners. *Sexually Transmitted Diseases*, 40(2), 149-156.

- Lurie, M., Williams, B., Zuma, K., Mkaya-Mwamburi, D., Garnett, G.P., Sweat, M.D., Gittelsohn J. & Abdool Karim S.S. (2003b). Who infects whom? HIV concordance and discordance among migrant and non-migrant couples in South Africa. *AIDS*, 17, 2245-2252.
- Lurie, P., Hintzen, P., & Lowe, R. (1995). Socioeconomic Obstacles to HIV Prevention and Treatment in Developing Countries. *AIDS*, 9, 539-546.
- May, J. (1990). The Migrant Labour System: Changing Dynamics in Rural Survival. In *The Political Economy of South Africa*. Cape Town: Oxford University Press.
- Meltzer, M.I. (2004). Presentation at WHO consultation on priority public health interventions before and during an influenza pandemic. Geneva: World Health Organization Meeting, March 16-18 (www.who.int/csr/disease/avian_influenza/consultation/en/).
- Montgomery, M.R., Stren, R., Cohen, B., & Reed, H.E. (Eds.) (2003). *Cities Transformed: Demographic Change and its Implications in the Developing World*. London, UK: Earthscan.
- Murphy-Greene, M.C. (2002). The occupational safety and health of Florida farm workers: environmental justice in the fields. *Journal of Health and Human Services Administration*, 25(3), 281-314.
- National Statistic Bureau of China (2001). 2000 nian zhongguo nongcun liudong renkou xin tezhen' (New characteristics of rural floating population in China in 2000). *Zhongguo Guoxing Guoli (Chinese National Situation and National Power)*, 9.
- Natrass J. (1976). *The Migrant Labour System and South Africa's Economic Development, 1936-1970*. University of Natal: Unpublished Doctoral Dissertation.
- Nunn, A., Wagner, H., Kamali, A., Kengeya-Kayondo, J.F., & Mulder, D.W. (1995). Migration and HIV-1 seroprevalence in a rural ugandan population. *AIDS*, 9, 503-506.
- Omelaniuk, I. (Ed.). (2005). *World Migration 2005: Costs and Benefits of International Migration*. France: Clerc SAS/International Organization for Migration.
- Patterson, K.B. & Runge T. (2002). Smallpox and the Native American. *American Journal of the Medical Sciences*, 323(4), 216-222.
- Peberdy, S. & Dinat, N. (2004). *Domestic workers in Johannesburg: Worlds of Work and Health*. Paper presented at the "HIV and the Workplace" symposium (June). Johannesburg, South Africa: University of the Witwatersrand.
- Pickering, H., Okongo, M., Bwanika, K., Nnalusiba, B., & Whitworth, J. (1997). Sexual behaviour in a fishing community on Lake Victoria, Uganda. *Health Transition Review*, 7(1), 13-20.
- Piper, N. (2005). *Gender and Migration*. Geneva: Global Commission on International Migration. <http://test.gcim.org/attachements/TP10.pdf> (accessed 3/30/2006).
- Poudel, K.C., Okumura, J., Sherchand, J.B., Jimba, M., Murakami, I., & Wakai, S. (2003). Mumbai disease in far western Nepal: HIV infection and syphilis among male migrant-returnees and non-migrants. *Tropical Medicine and International Health*, 8(10), 933-939.
- Quinn, T. (1994). Population Migration and the Spread of Types 1 and 2 Human Immunodeficiency Virus. *Proceedings of the National Academy of Sciences*, 91, 2407-2414.
- Reidy, T.J., Bowler, R.M., Rauch, S.S., & Pedroza, G.I. (1992). Pesticide exposure and neuropsychological impairment in migrant farm workers. *Archives of Clinical Neuropsychology*, 7(1), 85-95.

- Reyburn, H., Rowland, M., Mohsen, M., Khan, B., & Davies, C. (2003). The prolonged epidemic of anthroponotic cutaneous leishmaniasis in Kabul, Afghanistan: "bringing down the neighbourhood." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 97(2), 170-176.
- Samnang, P., Leng, H.B., Kim, A., Canchola, A., Moss, A., Mandel, J.S., & Page-Shafer, K. (2004). HIV Prevalence and risk factors among fishermen in Sihanouk Ville, Cambodia. *International Journal of STD & AIDS*, 15(7), 479-483.
- Schubert, C. (2003). Nurses disappearing from developing nations. *Nature Medicine* 9, 979.
- Severino, I.L. & de Moya, E.A. (1999). *Migratory Routes from Haiti to Dominican Republic: Implications for HIV/AIDS and Human Rights of Infected People*. Santo Domingo, Dominican Republic: Patronato de Lucha Contra el SIDA (PLUS), Inc.
- SARDI & UNDP (2004). *Situational Assessment on Migration and HIV/AIDS: A Generic Tool*. South Asian Research and Development Initiative & UNDP. <http://www.mobilityandhiv.org/docs/saardi.pdf> (accessed 11/22/2005).
- Stohr, K. & Esveld, M. (2004). Will vaccines be available for the next influenza pandemic? *Science*, 306(5705), 2195-2196.
- Sweat, M.D. & Denison, J.A. (1995). Reducing HIV incidence in developing countries with structural and environmental interventions. *AIDS*, 9 (suppl A), S251-257.
- UNAIDS & IOM (1998). Migration and AIDS. *International Migration*, 36(4), 445-468.
- Triteerapapab, S. & Songtrus, J. (1999). High prevalence of bancroftian filariasis in Myanmar-migrant workers: a study in Mae Sot district, Tak province, Thailand. *Journal of the Medical Association of Thailand*, 82(7), 735-739.
- United Nations Secretariat, Population Division of the Department of Economic and Social Affairs. (2005). In International Organization for Migration, *World Migration Report 2005*. <http://www.iom.int/iomwebsite/Publication/ServletSearchPublication?event=detail&id=4171> (accessed 11/22/2005).
- White, R. (2003). What can we make of an association between human immunodeficiency virus and population mobility? *International Journal of Epidemiology*, 32(5), 753-754.
- Williams, B.G., Taljaard, D., Campbell, C.M., Gouws, E., Ndhlovu, L., van Dam, J., Caraël, M., & Auvert, B. (2003). Changing Patterns of knowledge, reported behaviour and sexually transmitted infections in a South African gold mining community. *AIDS*, 17, 2099-2107.
- Wilson, D. (2001). *Lesotho and Swaziland HIV/AIDS Risk Assessments at Cross-Border and Migrant Sites in Southern Africa*. Arlington: Family Health International IMPACT Project.
- Wilson, F. (1972). *Labour in the South African Gold Mines 1911-1969*. Cambridge: The University Press.
- Ybanez, R.F.C. (1999a, 6 May). Addressing the needs of families of migrant workers in the Philippines. *CARAM News*. http://caramasia.gn.apc.org/page.php?page=publications/c_issue6philippinefam&title=CARAMASIA.ORG%20::%20Publications%20: %20Newsletter (accessed 3/30/2006).
- Ybanez, R.F.C. (1999b). *Breaking Borders: Bridging the Gap between Migration and HIV/AIDS*. Manila, Philippines: Kalayaan, Inc. and CARAM-Asia.
- Ybanez, R.F.C. (1999c, 23-27 October). *Conditions in Labor Migration that Contribute to the HIV Vulnerability of Migrant Workers: A Case Study of Filipino Domestic Workers in Hong Kong*. Paper presented at the Fifth International

Congress on AIDS in Asia and the Pacific (ICAAP). Kuala Lumpur: Kalayaan, Inc. and CARAM-Asia. http://caramasia.gn.apc.org/page.php?page=publications/Ritchie_HK_conditions&title=CARMASIA.ORG%20::%20Publications%20::%20Papers for further information, see <http://caramasia.gn.apc.org/reports/Labor%20Migration%20&%20HIV-AIDS.pdf> (accessed 11/22/2005).

Zwi, A. & Bachmayer, D. (1990). HIV and AIDS in South Africa: What is an appropriate public health response? *Health Policy and Planning*, 5(4), 316-326.