

Asia's Economies and the Challenge of AIDS



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In addition to Indu Bhushan, who provided invaluable suggestions and encouragement throughout the conduct of this project, the authors would like to thank the following for their help and comments: Dennis Ahlburg, Ian Andersen, Kate Bendall, Stefano Bertozzi, Alok Bhargava, Erik Bloom, Tim Brown, John Chermack, Victoria Collis, Kevin Frost, Peter Godwin, Emily Hannum, Saidi Kapiga, Jeffrey Laurence, Michel Lavollay, Kenneth Mayer, Bo Malmberg, Eamonn Murphy, A. K. Nandakumar, Marjorie Opuni, Yukihiro Shiroishi, Lene Sommestad, and Myo Thant. An early version of this paper was presented in August 2001 at the Asian Development Bank and at a conference organized by the National University of Singapore and the Harvard Project on Asian and International Relations. The Asian Development Bank provided financial support for this undertaking, with supplementary assistance from UNAIDS, and amfAR. Authors' E-mails at the Harvard School of Public Health: dbloom@hsph.harvard.edu, amahal@hsph.harvard.edu, larry_rosenberg@harvard.edu, jsevilla@hsph.harvard.edu. River Path Associates' E-mail: david@riverpath.com. Independent researcher's E-mail: info@markweston.net.

Contents

Foreword	v
Summary	vii
Introduction	1
The Impact on the Poor	3
The Benefits of Action	4
Outline	5
A Major Caveat	5
Chapter 1: Epidemiology	7
Cross-Region Comparisons	7
Projections	9
Containing the Problem	13
Chapter 2: The Effect on the Poor	17
Links between HIV/AIDS and Poverty	17
Potential Impacts	19
Actual Impacts—Worldwide	22
Actual Impacts—Asia	28
The Case of Cambodia	30
Chapter 3: HIV/AIDS and Economic Development	43
Health to Wealth	43
The Impact of AIDS on Economies	49
Chapter 4: The Benefits of Action	71
Rate of Return	71
The Case of Thailand	74
Maximizing the Benefits	79

Foreword

Over the last few decades, the eyes of much of the world have turned toward Asia and the Pacific. In many countries in the region, economic growth has taken off, poverty has decreased, and people are better educated and healthier than ever before. Not all of Asia has participated equally in these wide-ranging social and economic changes, but much of the region is moving ahead.

Despite this picture of promise, however, HIV/AIDS poses a threat that cannot be ignored. In Asia and the Pacific, as in the rest of the world, the number of those infected with HIV is increasing rapidly, as is the number of people in whom the infection has progressed to the disease of AIDS. This trend potentially represents an enormous human tragedy. There are other reasons for concern as well. Prevention programs are not high on many policy-makers' agendas, treatment is expensive, and no cure is in sight. The period between infection and symptoms is typically long and surveillance systems in most countries at threat are still weak. This means that the actual burden of the disease and its social and economic impact are substantially unknown. Thus, this easily transmitted disease hangs ominously over the social and economic progress made in the region to date.

HIV/AIDS has devastating effects on individuals, families and households and the epidemic, like many others, causes medical trauma and social disarray. In addition, the potential economic effects of the HIV/AIDS epidemic can retard decades of progress. While ADB remains concerned about the enormous health and human effects of the epidemic, the economic impact of HIV/AIDS constitutes the specific focus of this study. Just as we cannot comment with confidence on the current extent and future course of the epidemic, we also cannot, at present, make a well-founded estimate of the epidemic's current and future economic effects. And that is alarming. AIDS may be eroding the hard-won economic gains achieved by our developing member countries. This would add to the individual devastation and social turmoil that the disease is already causing.

What, then, can we say about the economic effects that AIDS has caused or is likely to cause? Since AIDS disproportionately strikes working-age adults, its capacity to inflict economic damage is severe. If an AIDS patient can no longer work, a family will face reduced income and increased medical expenses; children may stop going to school; a pattern of savings may reverse course as basic needs become harder to satisfy. In workplaces, productivity will plummet. What of those who are already poor, who may be particularly vulnerable to the disease and to further impoverishment? And finally, the growing economies of Asia and the Pacific may be at risk on the macroeconomic level.

ADB's overarching goal of poverty reduction could become all the more difficult to reach if AIDS inflicts increasing economic havoc. In rural areas, in particular, where recent health and education advances have taken hold to a lesser extent than in urban areas, the threat posed by AIDS may threaten the sustainability of recent rural progress.

Treating AIDS is expensive, but not treating it—allowing it to spread even faster – may be even more so. In this way, too, the countries of Asia face an enormous challenge.

Obviously, determination and commitment can make a big and necessary difference in combating AIDS, but a clear understanding of the economic threat posed by AIDS is also necessary. This book aims to clarify the toll exacted by AIDS so far – at the level of families and communities, and also on the national level – and to clarify the economic cloud that looms over the region. AIDS may have begun to spread relatively late in Asia, but its now rapid and often silent spread demands that we develop powerful and rapid responses.

A handwritten signature in black ink that reads "Tadao Chino". The signature is written in a cursive, slightly slanted style.

Tadao Chino
President
Asian Development Bank
26 April 2004

Summary

The AIDS¹ epidemic has the potential to cause severe economic problems. In Asia, with its relatively low-level epidemic, these problems are likely to be confined to direct effects on individuals, on specific industries, and on well-defined geographical areas.² However, if the epidemic grows substantially—and there are indications that it could—Asia could face wider economic consequences.

However, even if AIDS does not spread to a broader population within Asia, it has already affected the region's poor and impeded poverty reduction efforts. At current prevalence levels, the virus is also limiting improvements in overall human development. High poverty rates in the region, in turn, make the continued spread of the virus inevitable. According to a December 2002 UNAIDS report, the number of people living with HIV³/AIDS has increased by 10% since 2001, and this trend seems set to continue.⁴

Careful analysis of the evidence from Asia does not justify ringing loud alarm bells about the threat of HIV/AIDS to macroeconomies, but prudent policymakers need to be aware of both the potential impacts of an expanded epidemic and the actual impacts on current poverty reduction efforts. Humanitarian concerns clearly demand that resources be allocated now to those suffering from AIDS, but since government investments and those of external funding institutions in poverty reduction are being rendered less effective by the disease, there is also an economic argument for taking its effects into greater account.

1 Acquired immunodeficiency syndrome.

2 This book refers principally to South, South East, and East Asia.

3 Human immunodeficiency virus.

4 Joint United Nations Programme on HIV/AIDS (UNAIDS), *AIDS Epidemic Update*. (Geneva:UNAIDS, 2002).

With a disease that is continually changing and spreading, it is impossible to be certain where it will eventually end up. Policymakers are therefore forced to make decisions on the basis of limited evidence. Faced with such dilemmas, many governments have in recent years adopted the ‘precautionary principle’—that is, better safe than sorry—until the evidence becomes clearer. The precautionary principle was enshrined at the 1992 Rio Conference on the Environment and Development. Principle 15 of the Rio Declaration states that “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

As for the environment, so for health. We believe that the evidence presented in this book merits strong consideration by policymakers. As we will show, action to prevent the spread of AIDS is extremely cost-beneficial. For example, the successful efforts by Thailand to curtail the spread of the disease have resulted in large economic benefits to the country. Asia’s leaders, particularly those in countries where AIDS prevalence is growing to high levels among certain population groups, would do well to act promptly.

This monograph makes three main points. First, unless it is allowed to spiral out of control, HIV/AIDS is likely to spread at a modest rate in Asia compared to Sub-Saharan Africa. General prevalence levels above 5% are unlikely. Second, even at moderate overall prevalence levels, the epidemic will have a negative impact on Asia’s economic development, but it will do so primarily through its effect on vulnerable groups such as women, the poor, the less educated, and members of particular occupations and industries. Third, spending on HIV prevention and AIDS care is powerfully justified by the high economic returns that can reasonably be expected to flow from such spending.

Introduction

At first sight, Asia would appear to be an easy target for a devastating HIV/AIDS¹ epidemic. Large populations, widespread poverty, weak human development, and relatively large numbers of sex workers and injecting drug users (IDUs) present ideal conditions for the spread of the virus. So far, however, the region has escaped the catastrophic spread of HIV seen in Sub-Saharan Africa. Only among the most vulnerable groups have infection rates risen to African levels, with rates among mainstream populations rarely climbing above 1%.

Compared with Africa's, of course, Asia's health systems are strong, and its educational coverage broad. Crucially, too, HIV/AIDS reached the region after it hit Africa, which gave populations time to arm themselves against the disease. However, all this has not stopped over seven million people being infected with HIV, with over a million new infections in the past year alone.² Asia's populations are so large—the continent is home to three of the four most populous countries in the world—that low HIV prevalence rates can still mean huge numbers of infections. India, for example, has four million infections, and the People's Republic of China (PRC) has one million. Underreporting is thought to be rife, so the true number of infections may be much larger.

HIV's relatively late arrival in Asia means that most of the region's epidemics are at an early stage. However, sudden breakout is possible as an epidemic smolders in a high-risk population, and then suddenly catches in surrounding medium-risk populations such as the partners of sex workers and their clients. For example, Indonesia has recently seen rapid rises in HIV prevalence rates after years of apparent stability. In the PRC, the combination

1 Human immunodeficiency virus/acquired immunodeficiency syndrome.

2 Joint United Nations Programme on HIV/AIDS (UNAIDS), *AIDS Epidemic Update* (Geneva: UNAIDS, 2002).

of simmering levels of HIV/AIDS among IDUs, the recent spread of AIDS on a large scale to blood donors, and an explosion of commercial sex, means that a rapid increase in the number of AIDS cases is possible, unless the government takes strong and immediate preventive measures.³ HIV prevalence among sex workers in Mumbai, India (which has the most sex workers in the world), was already nearly 60% in 2000, and rates were also high in Delhi, Hyderabad, and elsewhere.⁴

The risk of sudden breakout is exacerbated by many Asian governments' lack of action to prevent HIV/AIDS. So far, strong prevention campaigns have been mounted only in countries where the epidemic has become serious. Cambodia and Thailand, for example, reacted to alarming increases in HIV prevalence, but few governments have instigated proactive campaigns to arm their countries against the disease. Many countries may have avoided serious epidemics largely through good fortune. As the examples of Indonesia and recent outbreaks in parts of the PRC show, there is no room for complacency.

If HIV/AIDS epidemics do spiral out of control, Asia may suffer serious economic consequences. Health affects economic performance through its impact on labor, productivity, education, savings and capital accumulation, and age structure. Sub-Saharan Africa has already begun to feel the economic impacts of HIV/AIDS; high infection rates and large numbers of deaths have led to decreased productivity and decimated markets. Asia has escaped such damage, as the effects of AIDS in the region have mainly been felt at a micro level, by infected individuals or households. In the unlikely event that prevalence rates in Asia were to grow to African levels, calculations carried out for this book suggest that AIDS could substantially diminish the growth rate of East Asia's miracle economies, result in economic stagnation in a South East Asian tiger economy, or lead to an absolute decline in living standards in the slower growing economies of South Asia.

Since it is unlikely that Asia will reach African prevalence levels, the macroeconomic consequences of the disease should continue to be mild. However, the microeconomic consequences are likely to be severe for particular groups, and in particular for the poor.

3 Joan Kaufman, "Reproductive Health Policy and Programs in China: Opportunities for Responding to China's AIDS Epidemic," in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).

4 American Foundation for AIDS Research, *HIV/AIDS in Asia: An Overview* (New York: American Foundation for AIDS Research, 2002).

The Impact on the Poor

The poor are more likely to contract HIV, and they will suffer economically because of it. HIV/AIDS may be a significant impediment to continued poverty reduction in Asia. To date, of course, East Asia has seen huge reductions in poverty rates. In the PRC alone, more than 200 million people have climbed out of poverty in the last 20 years. But if HIV/AIDS spreads, as well as being an enormous source of suffering and death, it may become a major barrier to the continued emergence of the poor from poverty.

Although their interpretation is not absolutely clear-cut, survey findings in Cambodia and Viet Nam seem to show that poorer and less educated people are at much higher risk of contracting HIV. They are more likely to be sexually active at an early age; they have less knowledge of the benefits of condoms and they use them less often; they are less likely to have been tested for AIDS; and their knowledge of causes and prevention methods is much weaker. In the interior provinces of the PRC, which are generally much poorer than the coastal provinces, sexually transmitted infections (STIs) are already widespread, condom use is infrequent, and there is little understanding of the behaviors that lead to HIV transmission.⁵ Where these factors combine with other determinants of risk, such as high rates of sex work, multiple partnering, social breakdown leading to drug use, or poor health infrastructure, higher rates of HIV are likely.

Around the world, poorer countries are clearly harder hit by AIDS. Sub-Saharan Africa, the world's poorest region, has by far the highest infection rates. Struggling regions like the former Soviet Union face a rapidly growing threat. Overall, 95% of those living with HIV/AIDS are from developing or transition countries, which are home to 85% of the world's population. Richer societies have more capabilities that help them fend off the epidemic: stronger education systems, greater access to media messages, more and better-trained health workers, and greater social cohesion are just a few of the protecting factors. Those living in poverty lack many of these defenses, making AIDS prevalence correspondingly higher in poorer populations. Although there is no clear evidence that the virus is increasing national poverty rates in Asia, reservoirs of disease among poor populations will inevitably prevent households from climbing out of poverty traps.

5 Joan Kaufman, "Reproductive Health Policy and Programs in China: Opportunities for Responding to China's AIDS Epidemic," in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).

Poverty reduction requires actions to promote broad human development gains. Increasing the capabilities of poor people is central to improving their quality of life. HIV/AIDS, by severely restricting those capabilities, is undermining Asian development. Action to tackle the disease should therefore be a significant part of broad-based efforts to improve human development.

The Benefits of Action

Recent years have seen a number of major political commitments to tackling HIV/AIDS. The Millennium Development Goals commit to halting and reversing the spread of HIV/AIDS by 2015. The Plan of Implementation from the World Summit on Sustainable Development, in August 2002, promised to reduce HIV prevalence among 15–24 year olds by 25% by 2010.

AIDS is a test for society, and for society's ability to mobilize against threats. It demands that the public sector show leadership and marshal action. But it also requires the creativity of non-state actors—nongovernment organizations (NGOs), business, and local communities all have a role to play in raising awareness of the virus and helping to deliver treatment to those infected.

There can be huge economic benefits from early action to combat AIDS. For example, Thailand's successful prevention campaign, discussed in detail in Chapter 4, is thought to have averted what would have been over 10 million deaths from the virus by 2015. Had these deaths been allowed to happen, income per capita would have fallen by 15% by that year. Thailand's investments not only saved lives and prevented economic damage, but were also extremely cost-effective, providing an annual average rate of return of 12–32%, in the most conservative estimate. This is well above the threshold for projects that are fundable to lenders in the field of international development.

At a micro level, too, action will provide enduring rewards. Collective efforts by forward-thinking, large businesses to educate the labor force will lead to sizeable savings on recruitment and training costs for individual firms. Successful prevention campaigns will also help firms to maintain the quality of their workforce. And at a household level, poverty reduction will be greatly facilitated by decreased HIV prevalence. The success of Cambodia, which has reversed increases in HIV prevalence despite extreme poverty and an unstable political situation, shows what is possible even in a very difficult context.

Outline

This book is divided into four chapters. The first chapter outlines the progress of HIV/AIDS in Asia. It traces the history of the disease, which was initially concentrated in vulnerable groups before gradually, in some areas, penetrating the mainstream. The likely future course of the epidemic is then considered, looking in particular at prevalence rates among pregnant women—an important gauge for predicting how far beyond the initially infected groups the disease has spread and is likely to spread. The chapter concludes by outlining examples of successful efforts to tackle the disease.

Chapter 2 focuses on the effect on the poor. New data from Cambodia and Viet Nam are presented, highlighting the heightened risks faced by the poor and less educated. The case of Cambodia is discussed in detail, with fieldwork conducted for this book providing new insights into how the poor interact with health providers and how poor people deal with HIV infection and AIDS.

The third chapter asks whether the negative impacts of AIDS on human development and on the poor translate into damage to economies. It looks at the effect of health on economic development in general, before moving onto HIV/AIDS and its effect on Asia's economies in particular. Macro-level impacts are currently minimal in Asia, but business involvement in tackling the epidemic may reap long-term rewards and fend off future damage.

Recommendations for action form the bulk of the final chapter. Analysis of the rate of return on Thailand's HIV prevention campaign is presented, showing that investment in prevention can have enormous benefits to a society and its economy. Recommendations are made for tackling the disease via better governance, health sector reform, private sector involvement, and the participation of poor people. AIDS should be treated as one of many health problems, not in isolation. Broad action is needed at all levels of society if general health standards are to be improved.

A Major Caveat

In this area it is exceedingly difficult to prove causality, certainly with existing data. When many factors plausibly influence a number of outcomes, which influence each other, disentangling the causal links is difficult and sometimes impossible. This is particularly so when some of the underlying data are questionable or incomplete, and when there is no straightforward

way of measuring the outcomes that are assessed. In addition, showing causality is hampered when conceptual models are new and untested, as is the case with AIDS and economics.

But the connection between AIDS and economics is important to understand, so we have tried to break new ground, if cautiously. To reach policy-relevant conclusions, we have attempted to explain the possible causal roots of certain statistical associations. We are sufficiently confident in our findings to have written our text in a reasonably assertive manner, although we cannot rigorously prove our conclusions. But the links we have tried to clarify are important ones for guiding governments, which aim to design and implement policies to mitigate the possible negative consequences of AIDS on people and on economies.

In many cases, we have had to rely on data and trends from Sub-Saharan Africa, both because of that region's longer and more intense experience with AIDS, and because more analysis has been carried out on AIDS in Africa. We recognize the limitations of this approach, since each of Asia's subregions is quite different from Africa. But Africa's experience with AIDS—and with its economic effects when the epidemic breaks out into the general population—can provide Asia with a picture of what could happen in Asia. Partly because AIDS, for the most part, reached Asia well after Africa, we expect that Asian countries will be more prepared, and will have the wherewithal to be more determined, to counteract the epidemic before it reaches catastrophic levels. The human and economic dimensions of what has transpired in Africa provide a cautionary tale for Asia's policymakers.

A key element in our overall message is that the possible effect of AIDS on economies gives governments a reason other than the clear humanitarian motivations to be vigilant and proactive. We cannot say that AIDS will pose a serious economy-wide problem for Asian economies. But if the epidemic expands significantly into the broader population—and it might—there will be reason to worry about the economic effects. Even as things stand now, human development and poverty reduction will be affected by the disease. Given these premises, and the merits of the precautionary principle approach in a fast-changing world where information continues to grow but is never complete, we believe that policymakers will benefit by keeping in mind the analyses presented here.

Epidemiology

This chapter provides a brief overview of the epidemiology of HIV/AIDS in Asia, tracing its recent history and examining its likely path in the future. Using new UNAIDS⁶ data, we find that, although overall HIV prevalence rates are much lower than Sub-Saharan African levels, high rates among vulnerable groups may pose a threat to mainstream populations unless successfully contained by prevention campaigns.

Cross-Region Comparisons

HIV reached Asia and the Pacific in the mid-1980s. At first, the virus was largely limited to IDUs and was thought unlikely to spread into the general population.⁷ However, rapid increases in prevalence rates in the late 1980s meant that by 1993 there were 2 million HIV-infected adults in the region.⁸ Today, 7.2 million Asians are living with the virus, with 1 million new infections in 2002 alone.⁹ India has 4 million infections—more than any other country in the world besides South Africa. The PRC and Thailand, meanwhile, have 1 million and 670,000 people living with HIV/AIDS respectively, with the number of infections in the PRC having risen from 500,000 in just over 2 years.¹⁰ In addition, widespread underreporting means that the actual figures are likely to be considerably higher. For example, one estimate from Henan province in rural PRC suggests that the tragic situation of blood donors in rural PRC by itself accounts for 1 million infected individuals.¹¹

6 Joint United Nations Programme on HIV/AIDS.

7 James Chin, “Scenarios for the AIDS Epidemic in Asia,” *Asia-Pacific Population Research Reports*. 2 (1995).

8 Ibid.

9 UNAIDS, *Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2002).

10 Ibid; UNAIDS/World Health Organization (WHO), *Epidemiological Country Factsheets* (New York: UNAIDS/WHO, 2000).

11 Joan Kaufman, “Reproductive Health Policy and Programs in China: Opportunities for Responding to China’s AIDS Epidemic,” in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).

Asia's large populations mean that although absolute numbers of HIV/AIDS cases are high, prevalence rates remain low. South and South-East Asia¹² have 6 million infections, but an adult prevalence rate of just 0.6%. East Asia and the Pacific¹³ have 1.2 million people living with HIV/AIDS—a prevalence rate of 0.1%. Only Cambodia (2.7%), Myanmar (2%), and Thailand (1.8%) have seen adult prevalence rates rise above 1%, while many other Asian countries have rates below a tenth of one percent. Even in India, the high numbers of infections do not translate into high prevalence rates, with just 0.8% of adults estimated to be infected. Despite the large numbers of infections, and notwithstanding the 440,000 AIDS deaths in South and South-East Asia and the 45,000 deaths in East Asia and the Pacific in 2001, UNAIDS has described the epidemic as “simmering at low levels,” as it neither grows wildly nor shows clear signs of stabilization.¹⁴

However, while national prevalence rates in Asia are unlikely to approach the 25–30% rates recorded in some Sub-Saharan African countries, they conceal serious, localized epidemics in several areas and among certain groups. Myanmar's national rate of adult HIV prevalence of 2% masks rates of 60% and 40% respectively among its IDUs and sex workers, for example. Infection rates among IDUs in areas such as Manipur in India and Yunnan in the PRC have been above 40% for several years, and Nepal has recently reported similar levels among its IDUs.¹⁵

IDUs bore the brunt of the early impacts of AIDS in Asia, but other vulnerable groups have now begun to experience the effects of the epidemic. Rates among men who have sex with men have risen to 15% in Cambodia, 10% in some states in Malaysia, and are also on the increase, albeit at much lower levels, in Japan.^{16,17} In Indonesia, after years of relatively

12 Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, India, Indonesia, Iran, Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, and Viet Nam.

13 People's Republic of China; Fiji; Hong Kong, China; Japan; Republic of Korea; Mongolia; Papua New Guinea.

14 UNAIDS, *AIDS Epidemic Update 2000* (Geneva: UNAIDS, 2000).

15 Monitoring the AIDS Pandemic (MAP). 2001. *The Status and Trends of HIV/AIDS/STI Epidemics in Asia and the Pacific* (Melbourne: MAP, 2001).

16 Ibid.

17 Even if a small percentage of men in a country have sex with other men, these figures can be significant beyond the gay community. Many of these men also have sex with women, so the possibility of breakout into the heterosexual population is ever-present. In PRC, enormous societal pressure leads to many gay men marrying and having children, while continuing to have sex with men. Geyer delves into the situation of gay men in the PRC in R. Geyer, “Aids in China: Strengths and Vulnerabilities of the Gay Male Community” in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).

low prevalence, rates among sex workers have climbed above 5% in the cities of Karimun and Kodya Batam, and rates among women working in massage parlors in Jakarta have hit 18%.¹⁸

Indonesia had low overall prevalence rates for a long period despite high levels of sex work and low condom use, and rates have only recently begun to climb (overall adult prevalence rates rose from 0.05% at the end of 1999 to 0.1% two years later¹⁹). Nepal's rates, too, have grown rapidly in recent years, rising from 0.3% in 1999 to 0.5% in 2001. A recent report warns of complacency in countries such as Bangladesh and the Philippines, where similarly high-risk behavior (supplemented in Bangladesh by men who have sex with men and IDUs) has not yet translated into growing HIV prevalence rates. "Low rates today," the report argues, "are no guarantee of low rates tomorrow."²⁰

Projections

Forecasting the future course of HIV has proved beyond most commentators in the past. Predictions made at the beginning of the 1990s underestimated the spread of the disease in some countries, while heroic prevention efforts by Cambodia and Thailand have defied those who expected the virus in those countries to skyrocket. HIV infection rates in Asia are currently growing faster than in any other world region bar the former Soviet Union, but this is largely because rate increases in many African countries have slowed as prevalence moves toward saturation levels. With many governments waking up to the threat posed by the virus, whether its spread will speed up or slow down will be largely determined by the success of their response.

A useful typology for determining the risk that HIV/AIDS epidemics will become generalized is outlined in the World Bank report, *Confronting AIDS: Public Priorities in a Global Epidemic*.²¹ In this model, countries can pass through three stages of the epidemic:

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- 18 R. Geyer, "Aids in China: Strengths and Vulnerabilities of the Gay Male Community" in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).
 - 19 UNAIDS, *Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2002); UNAIDS/WHO, *Epidemiological Country Factsheets 2000* (Geneva: UNAIDS/WHO, 2000).
 - 20 Monitoring the AIDS Pandemic (MAP), *The Status and Trends of HIV/AIDS/STI Epidemics in Asia and the Pacific* (Melbourne: MAP, 2001).
 - 21 World Bank, *Confronting AIDS: Public Priorities in a Global Epidemic* (Geneva: World Bank, 1998, p.87).

- nascent epidemics, where HIV prevalence is below 5% in all population subgroups;
- concentrated epidemics, where prevalence is above 5% in at least one population subgroup, but below 1% in women attending antenatal urban clinics; and
- generalized epidemic, where prevalence among women attending antenatal clinics is above 1%.

AIDS generally enters a population through a small, well-defined core population that practices some kind of high-risk behavior. The main core populations are commercial sex workers and their clients, men who have sex with men, and IDUs. For an epidemic to become generalized, two things must happen. First, a bridge population (for example, men who visit sex workers but also have intercourse with non-sex workers) must transmit the disease from the core to the general population. And second, the transmission mechanism in the general population must be sufficiently efficient.²² This second criterion is usually expressed in terms of the reproduction number, or the number of expected secondary infections per new infection. The reproduction number is a function of the frequency of unprotected, multi-partnered sex; the infectivity of partners; and the duration of infectivity. If the reproduction number is one or higher, then once AIDS bridges over into the general population, an epidemic starts. If the reproduction number is less than one, the epidemic does not start.

So far, no Asian country has experienced a generalized epidemic. Only Cambodia, Indonesia, Myanmar, Nepal, Thailand, and Viet Nam have reached the ‘concentrated’ stage, with rates among IDUs in particular well above 5%.²³ Infection rates among sex workers vary widely even within a small region: from 20% in Ho Chi Minh City to 1% in Lao People’s Democratic Republic.²⁴ But a connection between IDUs and commercial sex workers is worrisome, as the latter form a bridge to the general population. A strong overlap is particularly evident in Bangladesh, as well as in India and Viet Nam.²⁵

Cambodia, Myanmar, and Thailand are in most danger of their epidemics becoming generalized. Rates of over 5% were recorded in

22 WHO, *HIV/AIDS in Asia and the Pacific Region* (Geneva: WHO, 2001, p. 11).

23 UNAIDS, *Epidemiological Fact Sheets* (Geneva: UNAIDS, 2002).

24 Monitoring the AIDS Pandemic (MAP), “The Status and Trends of the HIV/AIDS Epidemics in the World” (Provisional report, Melbourne, July 7, 2002). Available at www.mapnetwork.org

25 *Ibid.*

antenatal clinics outside the major urban areas in all three countries in 2000. Within the major cities, prevalence in Cambodia and Myanmar was over 3%, while Thailand's successful HIV prevention campaign contributed to urban rates of just 1.6%.²⁶ As we will see later, the efforts of Cambodia and Thailand to control the disease have substantially decreased the risk that those countries' epidemics will become generalized. In Myanmar, too, UNAIDS suggests that efforts to promote condom use and raise awareness are beginning to offset increases in the prevalence rate, with rates among female sex workers having stabilized in 2000, although the effect has not yet been observed at antenatal clinics.²⁷

Certain states of India and some provinces of the PRC also face concentrated epidemics. Over 3% of pregnant women were infected in some areas of urban and rural India in 1999, and levels are likely to have risen since then.²⁸ A 1997 report from UNAIDS cites an estimate that 10–60% of arrested sex workers outside of major cities in the PRC are HIV-positive.²⁹

The rest of Asia is at the 'nascent' stage. There continue to be disputes about the extent to which Asia is likely to move beyond this stage, with James Chin leading those who believe that there are relatively few routes for transmission from vulnerable communities to the general population, making unlikely an epidemic of anything approaching African proportions.³⁰

However, social changes in the region may begin to increase the number of channels into the mainstream. In Japan, higher rates of unprotected sex have been accompanied by rises in abortion and STI rates. Urbanization and internal displacement caused by economic and political troubles have also heightened the HIV risk factors for Indonesia. Prevalence rates among female sex workers and IDUs, which had remained low until 1998, have suddenly risen to "concentrated" levels in many areas.³¹

STIs are also rising in the PRC, with the doubling in the number of treated STIs between 1997 and 2000 suggesting that unprotected sex is on the increase.³² A recent report by the US National Intelligence Council projects that the PRC's number of infections will have risen from 1 million today to

26 UNAIDS, *Epidemiological Fact Sheets* (Geneva: UNAIDS, 2002).
27 UNAIDS, *Epidemiological Fact Sheets: Myanmar* (Geneva: UNAIDS, 2002).
28 Ibid.
29 Joan Kaufman, "Reproductive Health Policy and Programs in China: Opportunities for Responding to China's AIDS Epidemic," in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).
30 James Chin, *HIV/AIDS Projections for Asia* (Draft paper, 2000).
31 UNAIDS, *Epidemiological Fact Sheets: Indonesia 2002 Update* (Geneva: UNAIDS, 2002).
32 Ibid.

10 million to 15 million by 2010.³³ The risks to the PRC are increased by the country's limited response so far. Open discussion of the virus is prohibited by the government, and activists exposing the practice of blood selling, which has caused thousands of AIDS infections in Henan province, have been jailed.³⁴ The National Intelligence Council has warned that the dangers facing the PRC and India will require long-term commitment to tackling the virus. The two countries' governments, the report argues, "have not yet given the issue the sustained high priority that has been key to stemming the tide of the disease in other countries."³⁵

Although governments have in recent months shown signs of waking up to the threat, other pressing issues and the difficulties of overcoming weak health services will make progress in such heavily-populated countries slow and complex. The PRC stands as a possible exception to this pessimistic prediction. Although it has yet to put in place a nationwide effort to spread the message about preventing HIV infection, it has established an extremely effective family planning program that has reached every village in the country. Despite significant weakening of the rural health system by increasing privatization over the last 2 decades, the family planning infrastructure could be used to spread HIV/AIDS messages quite effectively.^{36,37} Meanwhile, in the absence of a nationwide effort, decentralization has meant that different provinces and counties have very different levels of effort with respect to programs to combat AIDS—depending heavily on the priorities of local government.³⁸

Infections in India are also expected to quintuple to between 20 million and 25 million by 2010.³⁹ This will mean prevalence rates in the country as a whole are likely to move to the 'concentrated' stage (with overall rates of 3–4% masking high infection levels among at-risk subgroups), and India will

33 National Intelligence Council, "The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China" (September 2002) <http://www.cia.gov/nic/pubs/index.htm>

34 Nicholas Eberstadt, "The Future of AIDS," *Foreign Affairs*, November/December 2002.

35 National Intelligence Council, "The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China" (September 2002) <http://www.cia.gov/nic/pubs/index.htm>

36 Ann B. Williams and Hong Wang, "Comprehensive Care for HIV/AIDS: China's Challenges and Opportunities," *The Yale-China Health Journal* 2 (Autumn 2003): 21–35.

37 Joan Kaufman, "Reproductive Health Policy and Programs in China: Opportunities for Responding to China's AIDS Epidemic," in *The AIDS Epidemic in China: Points of Vulnerability and Sources of Strength* (Yale-China Association: Yale University, 2002).

38 Sandra Teresa Hyde, "When Riding a Tiger it is Difficult to Dismount: Sexually Transmitted Infections in Contemporary China," *The Yale-China Health Journal* 2 (Autumn 2003): 71–82.

39 National Intelligence Council, "The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China" (September 2002) <http://www.cia.gov/nic/pubs/index.htm>

have more people living with HIV/AIDS than any other country.⁴⁰ India created a National AIDS Control Organization as early as 1986, but it is only recently that new leadership has begun to expand the program, with a survey showing it had reached 70% of households.⁴¹

In sum, Asia does not face the immediate crisis much of Africa is experiencing. Rising infection rates in two of the hardest hit countries—Cambodia and Thailand—have largely been brought under control following successful prevention programs. In the other, Myanmar, rates among the most vulnerable groups appear to be stabilizing as the government has begun to tackle the problem. Most of the rest of the region—with the notable exception of India—is likely to continue to see low prevalence rates in the general population, with problems surfacing mainly among at-risk groups. However, the recent experience of Indonesia, where prevalence rates have climbed suddenly after many years of calm, provides a warning signal for other poor countries in the region. Additionally, absolute numbers of people living with HIV/AIDS are growing rapidly in the PRC and India. Leaders in these countries, and in the region as a whole, will benefit from making attempts first to assess the extent of the virus and then to limit its spread.

Containing the Problem

Several parts of Asia have acted to curb the spread of HIV/AIDS. Cambodia and Thailand have operated successful prevention campaigns, resulting in a slight fall in prevalence rates to 1.8% in Thailand today, and 2.7% in Cambodia in 2001.⁴²

Efforts in both Cambodia and Thailand focused mainly on vulnerable groups. In Cambodia, early surveillance data showed that low rates of condom use resulted in a very high risk of infection among sex workers and their clients, and that the latter were often passing on the infection to their wives. The government and local authorities began to work with brothel owners, sex workers, and their clients to promote condom use and to provide sex workers with treatment for STIs. As a result of the campaign, condom use among brothel workers doubled to 80% between 1997 and 1999.⁴³

40 Nicholas Eberstadt estimates that the current 100,000 new cases per year in India will also multiply tenfold by 2015—an estimate that lies at the high end of current views.

41 National Intelligence Council, “The Next Wave of HIV/AIDS: Nigeria, Ethiopia, Russia, India, and China” (September 2002) <http://www.cia.gov/nic/pubs/index.htm>

42 UNAIDS, *Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2002); UNAIDS/World Health Organization (WHO), *Epidemiological Country Factsheets* (New York: UNAIDS/WHO, 2002).

43 International Organisation of Employers, *Employers’ Handbook on HIV/AIDS* (Geneva: International Organisation of Employers, 2002).

A further example of a successful campaign to target sex workers is the VAMP (Vaishya AIDS Muqabla Parishad) program, which was formed in 1996 in southern Maharashtra in India. The program, which arose from the work of an NGO called SANGRAM based in Sangli, Maharashtra,⁴⁴ is made up of two collectives, with 2,000 to 3,000 sex worker members in each group. SANGRAM's goal was to create a sustainable response to the AIDS epidemic by empowering women in sex work to change their circumstances. The activities of VAMP and SANGRAM include peer education programs in which women in sex work distribute condoms, train and counsel women who were unable to enforce condom use by clients, and help women obtain access to medical care.⁴⁵ Local VAMP organizations also represent the interests of their community by arbitrating community disputes, lobbying the police, and helping women access government programs.

By slowly building a common identity with other women in sex work, VAMP members are beginning to place their own demands, such as decriminalization of sex work and better medical care at public hospitals in regions where VAMP operates, on policy platforms. VAMP frequently addresses disputes between sex workers and powerful brothel owners and, following discussions with the crime investigation units of the state and local police, raids on sex worker establishments have been greatly reduced.⁴⁶ Rates of condom use in areas where VAMP operates increased.⁴⁷

Targeting IDUs can also have significant effects. By the late 1990s, HIV infection rates among IDUs in Manipur, India, had reached 60%. As in many areas, users shared injecting equipment to reduce both the risk of arrest if caught with needles and the immediate cost of injecting. The Society for HIV/AIDS and Lifelines Operations (SHALOM) therefore set up a needle- and syringe-exchange program in the town of Churachandpur. The program also worked to persuade police not to arrest IDUs for possessing needles or

44 There is also the better known "Sonagachi" project based in Calcutta, but we do not discuss it here because it has already attracted extensive interest worldwide and several research papers and projects (Geentanjali Misra, Ajay Mahal, and Rima Shah, "Protecting the rights of sex workers: The Indian experience," *Health and Human Rights* 5 no.1 [2000]:103-106).

45 Geentanjali Misra, Ajay Mahal, and Rima Shah, "Protecting the rights of sex workers: The Indian experience," *Health and Human Rights* 5 no.1 [2000]:103-106.

46 Communication with Meena Seshu, SANGRAM.

47 Ajay Mahal, Meena Seshu, Shashikant Mane, and Shanti Lal, "Old age financial security among sex workers in India: Evidence from Maharashtra and Karnataka" (Draft. Cambridge, MA: Harvard University, School of Public Health, Department of Population and International Health, 2001).

syringes. HIV prevalence among users fell from over 77% in 1997 to under 60% four years later.⁴⁸ (Such a huge decline means, of course, that unless there was a large increase in the number of uninfected IDUs, many of those who were infected died during that period.)

Faced with low but unstable HIV infection rates, Asia's policy makers have so far benefited from focusing on the most vulnerable groups, especially sex workers and their clients and IDUs. As the analysis of Thailand's prevention campaign in Chapter 4 will underline, such a strategy is a cost-beneficial means of ensuring that Asia avoids the dramatic increase in infection rates that many countries in Sub-Saharan Africa have experienced.

Even if HIV/AIDS is contained within vulnerable groups in Asia, however, many Asian societies will nevertheless face sustained, low-level pressure as a result of the virus, with certain areas and certain groups within those societies providing an ongoing challenge to policymakers. If action comes too late to stop infection crossing into the mainstream, prevention activities will have to spread outside high-risk areas. Cambodia and Thailand have had to widen their campaign to encompass the general public, which means accessing another segment of society that is both hard for governments to reach and is particularly vulnerable to health shocks—the poor.

48 UNAIDS, *Report on the Global AIDS Epidemic* (Geneva: UNAIDS, 2002).

Chapter 2

The Effect on the Poor

Economic growth is vital to the poor, but shocks such as war or environmental or health impacts can reverse economic gains. This chapter focuses on the effect of HIV/AIDS—one of the most serious shocks to hit the world's poor in the past century. We start by examining the relationship between AIDS and poverty. We then examine why the poor are at greater risk of HIV infection, and whether they suffer disproportionately from AIDS when they are infected. We examine the effects that are being seen, first at a global level and then within Asia. Finally, we present new research on Cambodia as an example of the effects of HIV/AIDS on the poor and on poverty reduction efforts.

Links between HIV/AIDS and Poverty

The nature of the relationship between AIDS and poverty remains a contentious issue. South African president Thabo Mbeki in 2000 famously and controversially claimed that the problem of AIDS was essentially a problem of extreme poverty. Earlier still, Jonathan Mann, the founding director of the World Health Organization's (WHO) Global Program on AIDS claimed that, "[the] marginalized, stigmatized and discriminated against . . . have later become, over time, those at highest risk of HIV infection."⁴⁹

The links between poverty to HIV/AIDS can be investigated at two levels. First, are poorer countries more vulnerable to the epidemic than wealthier ones? And second, are poorer households and individuals within a particular society more vulnerable to the epidemic than those who are better off?

49 Hawa Rahab, "Africa: Poverty and the AIDS virus," quoted in *Third World Network Online*, (<http://www.twinside.org.sg/title/poverty.htm>).

In answer to the first question, it is often mentioned that 95% of people with HIV/AIDS live in developing or transition countries, which make up 85% of the world's population. Also, none of the developed countries has population prevalence rates above 0.5%. These figures suggest that aggregate socioeconomic development has a protective effect. But the relationship can be subtler at lower levels of aggregation. The global correlation between national poverty and AIDS is strongly driven by Africa, home to 13% of the world's population but 72% of those living with AIDS. Asia, on the other hand, whose people make up 60% of the global total, is host to just 18% of HIV infections. Indeed, while data commissioned for this chapter suggest a link from poverty to AIDS at the global level, within Asia there is, so far at least, no correlation between levels of national socioeconomic development and HIV disease prevalence.

With respect to the second question, while early indications suggested that the better off were more vulnerable to HIV since they could more easily afford to pay for sex and drugs, this situation may reverse itself over time. As information about the causes and behaviors that increase risk diffuse through the population, it is likely that the wealthier and better educated will be better able to adjust behaviours to reduce their risk. For example, the better educated are likely to come to a better understanding of the efficacy of certain kinds of protective behavior such as condom use and the avoidance of prostitutes. They are also less likely to be bound by the financial constraints that make some high-risk activities attractive (such as commercial sex work, having sugar daddies, supplying migrant labor, or donating blood). In general, health shocks, including many infectious diseases—tuberculosis (TB), cholera, malaria, and flu, as well as HIV/AIDS—tend to hit the poor harder than the rich, for reasons discussed in the following section.

In the absence of strong macro-level data on links between AIDS and poverty, policymakers are forced to rely on intuitive reasoning backed up by small-scale studies. Some evidence, albeit scattered, supports the view that the rich learn to protect themselves against AIDS more quickly than the poor. Because of this, and the fact that AIDS arrived in Asia after it had hit Africa, the character of Asia's epidemic is likely to be different from that in Africa. The virus hit Africa's rich before knowledge of its dangers and means of transmission was widespread, while the wealthier segments of Asian societies were forewarned of the risks and had time to protect themselves.⁵⁰

50 David E. Bloom and Jeffrey Sachs, "Geography, Demography, and Economic Growth in Africa," *Brookings Papers on Economic Activity* 2 (1998): 207–295.

The connection between AIDS and poverty is complex and far from clear-cut. Some risk factors for HIV are more prevalent among the poor but others are found more often among richer sections of society. Combinations of factors, of which poverty is one (and mobility, multiple-partnering, and use of sex workers others) put some people at greater risk of HIV infection than others.

The question of the links from AIDS to poverty also remains largely unresolved. Inter-continental poverty differences predate the AIDS epidemic, and there are little accurate time series data on AIDS. It is therefore difficult to test whether variations in AIDS prevalence rates over time are associated with variations in poverty rates over time. Moreover, Africa, which dominates the global scene in terms of both poverty and HIV, is so beset by other problems, that disentangling the specific role played by AIDS is extremely complex. However, local studies point to a strong immiserizing impact at the household level. With fewer savings and fewer assets to dispose of, this impact is felt more keenly by the poor. In many cases, AIDS is likely to cause vicious spirals, where it infects a member of a poor family, the family disposes of its assets, and other family members are forced into high-risk activities to help cope with the disease. HIV/AIDS is likely to hinder the economic growth that is vital to the poor. Analyzing the links between the disease and poverty is therefore important for achieving the reduction in poverty that is a central goal of development policy.

Potential Impacts

The poor are the most vulnerable to poor health and are the least able to deal with health shocks. Those living on less than 1 dollar a day are estimated to be five times more likely to die before the age of 5, and 2.5 times more likely to die between the ages of 15 and 59 than those who are not poor.⁵¹

Asia's poor are no exception. Life expectancy at birth in the region's developing countries ranges from 61 years for those countries with a per capita income of less than US\$2,000 to 77.2 years for those with incomes above US\$10,000.⁵² Infant mortality rates range from 61 to 4.5 per 1,000 live births respectively in the two country groups.⁵³

51 WHO, *World Health Report 1999* (Geneva: WHO, 1999).

52 Andrew Mason, "Population and Human Resource Trends and Challenges," in *Key Indicators of Developing Asian and Pacific Countries 2002 Volume XXXIII*. (Manila: Asian Development Bank, 2002).

53 *Ibid.*

Good health is particularly important to those attempting to escape from poverty. In the unskilled work of many poor people, the body is often the principal asset,⁵⁴ and a health crisis can quickly reverse any progress a family has made in moving out of subsistence. A study in Uganda, for example, found that 80% of TB patients had lost their job or closed their businesses, and in Bangladesh, 8 out of 21 TB patients had been forced to sell assets to pay for treatment and make up for lost income.⁵⁵ The World Bank reports that illness, injury, and death are the most common causes of household impoverishment.⁵⁶

There are many intuitive reasons why the poor are likely to end up bearing the brunt of HIV/AIDS. The poor are less able to protect themselves. They have less access to information about health risks⁵⁷ and, even when information on HIV does get through to poor communities, they may still fail to take preventive measures if they do not understand the messages or if they do not perceive the risk to be more significant than the other problems they face on a day-to-day basis.⁵⁸ As Alex de Waal, commenting on the long-term nature of the disease, has said, "If AIDS is the only disaster that threatens, it is likely that individuals and communities will take action against it. But when AIDS is only one disaster among many, it is not the highest priority."⁵⁹

Health services, too, are often out of reach of the poor. Along with physical obstacles such as an absence of clinics, bad roads, and limited access to transport, the poor frequently have a difficult relationship with

54 World Bank, *Voices of the Poor* (Washington DC: World Bank, 2000).

55 R.A. Croft and R. P. Croft, "Expenditure and loss of income incurred by tuberculosis patients before reaching effective treatment in Bangladesh," *International Journal of Tubercular Lung Diseases* 2, no. 3 (1988): 252–254; P. R. Saunderson, "An Economic Evaluation of Alternative Programme Designs for Tuberculosis Control in Rural Uganda" *Social Science and Medicine* 40, no. 9 (1995): 1203–1212.

56 World Bank, *Voices of the Poor* (Washington DC: World Bank, 2000). See also, David E. Bloom and D. Canning, "The Health and Poverty of Nations: From Theory to Practice" *Journal of Human Development* 4, no. 1 (2003): 47–71.

57 M. van Landingham, et. al., (1997), in a study in northern Thailand, have shown that poverty and illiteracy make people unaware of the benefits of safe sex and condom use. M. van Landingham, N. Grandjean, S. Suprasert, and W. Sittitrai, "Dimensions of AIDS knowledge and risky sexual practices: a study of northern Thai males," *Archives of Sexual Behavior* 26, no. 3 (1997): 269–293.

58 Lau and Thomas (2001) show how less-educated men among those who travel from Hong Kong, China, to the PRC are more likely to have sex with commercial sex workers. J. Lau and J. Thomas, 2001. Risk behaviors of Hong Kong male residents travelling to mainland China: a potential bridge population for HIV infection," *Aids Cure* 13, no. 1 (2001): 71–81.

59 Alex de Waal, "AIDS: Africa's Greatest Leadership Challenge," <http://www.justiceafrica.org> (2001).

health officials, many of whom are poorly paid themselves and attempt to extract supplemental payments from their most vulnerable patients.⁶⁰ Consequently, even where they can access health services, the poor may be reluctant to use them, and may prefer to turn to alternative, less effective forms of medicine. The problem of health access for the poor can exacerbate the spread of HIV. If people who may be vulnerable to HIV infection do not present for testing, a valuable opportunity is missed to deliver prevention messages and condoms. STIs, a key factor in the spread of the virus, may go untreated. And those who are HIV-positive will be unaware that they are continuing to spread the disease.

The poor are also more likely to be forced by hardship and marginalization into activities that put them at high risk of HIV infection.⁶¹ The clearest direct link from poverty to AIDS, not shared by other major infectious diseases, is that poor women are more likely to turn to sex work than rich women,⁶² and poor sex workers can more easily be forced, by the threat of competition, into unprotected sex.⁶³ Other professions at higher risk due to their mobility and proximity to sex workers, such as long-distance truck drivers, soldiers, and migrant industrial workers, are also likely to be entered into by lower-skilled individuals. And poor communities, where social breakdown is often rife, are less able than wealthier, more cohesive groups to mobilize against the threat of AIDS. As noted earlier, there was recently an alarming outbreak of HIV in the PRC's Henan province as poor farmers sold blood to local health authorities. The often-contaminated blood was pooled and, once the plasma had been extracted, injected back into the sellers, who proceeded to spread the virus to their communities. As early as 2001, some villages in the province had HIV prevalence rates of over 60%.⁶⁴

60 Paul Farmer, *Infections and inequalities* (University of California Press, 1999); Deepa Narayan, with Raj Patel, Kai Schafft, Anne Rademacher, and Sarah Koch-Schulte, "Can anyone hear us?" in *Voices of the Poor* (Washington DC: Poverty Group PREM, World Bank, 1999).

61 World Bank, "Confronting AIDS: Public Priorities in a Global Epidemic," *World Bank Policy Research Report* (New York: Oxford University Press, 1997) Chapter 4, 173–233.

62 This connection, however, is countered by the fact that poor men are less likely to be able to afford to visit sex workers than rich men. But when they do go to a sex worker, they are less likely to spend scant resources on condoms (even though the cost, compared with going to a sex worker, is small). In any case, the sex workers that serve the poor are more likely to have more partners, a risk factor in itself and a situation that may imply more open lesions due to sex trauma. On the other hand, the rich are more likely to have lengthier sessions with sex workers, which implies more trauma and possibility of transmission of bodily fluids.

63 R. Hanenberg and W. Rojanapithayakorn, "Changes in prostitution and the AIDS epidemic in Thailand" *AIDS Care* 10, no. 1 (1998): 69–79.

64 "Bad blood spreads AIDS in China," *BBC News*, May 30, 2001; "Chinese AIDS sufferers in mass protest," *Financial Times*, November 23, 2001.

The poor, therefore, face potentially greater risks of HIV infection and are also likely to suffer disproportionately from AIDS when they are infected. Caring for someone with AIDS places a sometimes unbearable burden on poor households. People with AIDS who cannot get adequate palliative treatment (which is the case in most developing countries) are subjected to a long and ultimately hopeless illness, in which they will be unable to work for protracted periods of time. Patients frequently are not provided with diagnosis or prognosis, and many spend large sums on treatment of marginal or no worth. The effects of one illness can be widespread, as a family, for example, sells its land, removes one or more children from school, and diverts expenditure away from other essential areas. A cycle of impoverishment is also common, as a family member leaves home to find work, becomes infected, and returns home when sick, thus further draining the family's assets and encouraging another family member to migrate. The effects of AIDS are especially pronounced in that it disproportionately affects adult wage earners, is responsible for creating large numbers of orphans, and still attracts considerable stigma and discrimination.

Finally, the increase in TB rates caused by AIDS presents another threat to the poor. People with HIV are extremely vulnerable to TB infection, which causes the death of a third of people with AIDS worldwide.⁶⁵ UNAIDS has attributed one third of the increase in TB cases over the last five years to HIV. However, with HIV pushing the spread of TB, TB infection rates are increasing even among HIV-negative people. The World Bank has estimated that “about one out of four TB deaths among HIV-negative people would not have occurred in the absence of the HIV epidemic.”⁶⁶ TB affects the poor to a much greater extent than the rich (and, like AIDS, it is a long-term, costly disease), so AIDS, by pushing up TB rates, has an adverse equity impact on the health status of the poor—an impact that has the potential to increase over time. Other opportunistic infections may show a similar pattern.

Actual Impacts—Worldwide

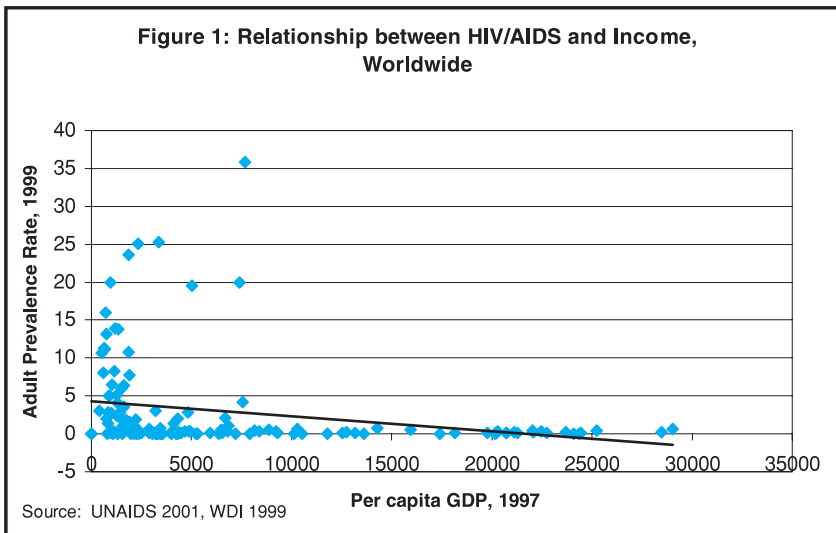
We have seen in the previous sections that the poor are at higher risk of getting HIV/AIDS. They are also less able to cope with its consequences, struggling as they must to afford treatment or meet the financial expenses

65 Centers for Disease Prevention and Control, 2001. “The deadly interaction between TB and HIV,” <http://www.cdc.gov>.

66 World Bank, “Confronting AIDS: Public Priorities in a Global Epidemic,” *World Bank Policy Research Report* (New York: Oxford University Press, 1997) Chapter 4, 173–233.

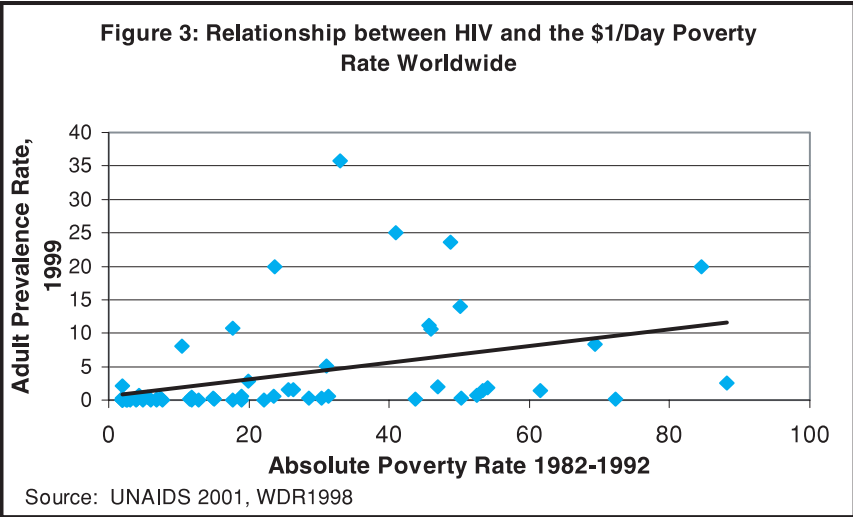
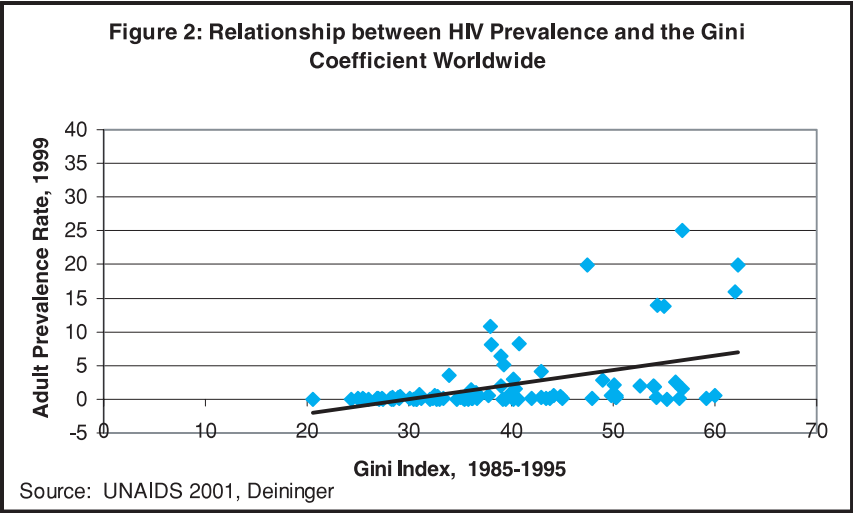
associated with illness and death. Various aspects of household well-being, such as levels of consumption and savings, investment in the education of children, and ability to support the elderly, are therefore more likely to deteriorate in poorer households with infected members than in wealthier ones. So far, however, the empirical literature is inconclusive regarding many of the intuitively appealing hypotheses that examine the link between AIDS and poverty. This section shows that although the pattern across countries suggests a link between the two, there are as yet insufficient data to provide conclusive proof, particularly as to the nature and direction of causality.

Can we be confident of any elements in the relationship between poverty and HIV? There are two indisputable facts, both based on national level data for a cross-section of countries. The first is a strong negative correlation between per capita gross domestic product and adult HIV prevalence across countries (Figure 1). No wealthy industrialized nation has an adult HIV prevalence rate even close to 1%, and almost all countries with prevalence rates greater than 1% have per capita incomes below US\$10,000 (a few small Caribbean countries are exceptions). This is also supported by the observation stated in the Introduction, that 95% of those currently infected with HIV live in less developed and transition countries.

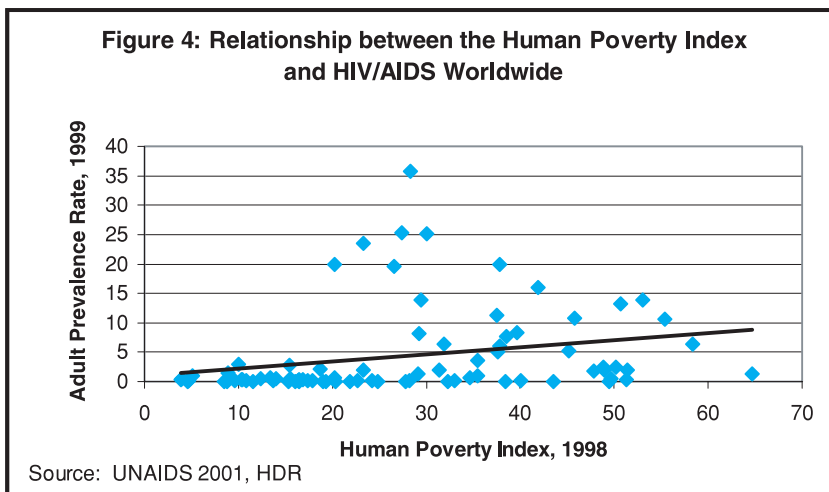


An inverse relationship between income per capita (an average) and adult HIV prevalence does not directly translate into a positive correlation between poverty and adult HIV prevalence. This is because the relationship between average income levels and poverty is intermediated by economic

inequality. For instance, an economy with a higher average level of income than another may have a greater proportion of its population living below the poverty line if it also happens to have a suitably greater degree of inequality in the distribution of income. However, both the degree of inequality in the distribution of income and the proportion of the population living below the poverty line are positively correlated with adult HIV prevalence (Figures 2 and 3). Figure 2 shows the relationship between the Gini coefficient for income (a measure of income inequality) and adult HIV prevalence for a cross-section of countries. Figure 3 indicates the relationship between the poverty ratio, based on the US\$1 a day definition of poverty, and adult HIV prevalence.



In the same vein, Figure 4 suggests that measures of poverty that go beyond being purely income/consumption based are likely to be positively related to HIV prevalence in cross-country data. Thus, high values (i.e., high poverty) on the United Nations Development Programme (UNDP) Human Poverty Index, which takes into account mortality, literacy, malnutrition and access to water, sanitation, and health services, are correlated with high rates of adult HIV prevalence.



In sum, these correlations indicate that the socioeconomic well-being of a country is broadly protective against HIV/AIDS. The very wealthiest countries are relatively well-protected from the epidemic, while low to middle income countries are the most severely affected. In this sense, AIDS is a problem of poverty.

The second indisputable fact is that even after controlling for the level of socioeconomic development, Africa remains especially vulnerable. Some countries outside Africa are equally poor, but they have considerably lower prevalence rates. On average, African countries have prevalence rates that are 8.5 percentage points higher than non-African countries with similar income levels (see Appendix 1 for regression analysis). Further support for this conclusion is that all but one of the countries with prevalence rates above 5% are in Africa (the exception is Haiti). Therefore, poverty is not entirely to blame for high prevalence rates.

Apart from the relationships between macro-variables of the kind noted above, several smaller-scale studies have examined the links between economic status and AIDS. Most support the intuitive link between

knowledge and reduced HIV transmission, and therefore support the existence of causal links from low socioeconomic status to an increased risk of HIV infection. School enrolment rates and literacy rates in the majority of the developing world are substantially lower than those in richer countries, and the poor within countries are least likely to receive education.⁶⁷ The poor are therefore less likely to be aware of the dangers of HIV/AIDS than the rich and so take less preventive action:

- Analysis of household data from Cambodia, Nicaragua, Tanzania, and Viet Nam (Appendix 2) shows a strong correlation between both wealth and education and: knowledge that condoms prevent AIDS; knowledge of where condoms can be obtained; and self-reported usage of condoms.⁶⁸
- Recent research in Cambodia, the country with the most advanced epidemic in Asia, demonstrates that the poorest segments of society have much less knowledge of how AIDS is transmitted and prevented; are more likely to have sex at a younger age; use condoms less frequently; and, in the case of young women, are more likely to turn to sex work as a means of supporting themselves and their families.⁶⁹
- A study in Brazil showed that three-quarters of people newly diagnosed with HIV in the early 1980s had a secondary or university education, but by the early 1990s this share had fallen to one-third.⁷⁰
- A study in Uganda shows that the better educated were hit hardest in the early stages of the epidemic (Figure 5), but that HIV infection rates are now falling most quickly among those with more education.⁷¹

While the micro data suggest a causal link from poverty to AIDS, most of the small-scale studies mentioned above analysed non-representative samples in the hardest-hit areas. As mentioned earlier, the risk of AIDS is determined not only by a number of factors in isolation, but also by the

67 See Third World Institute, *The World Guide 1997/98—A View from the South* (Oxford: New Internationalist Publications Ltd., 1997).

68 Macro International, "Cambodia Demographic & Health Survey" (2001). Analysis conducted by the authors.

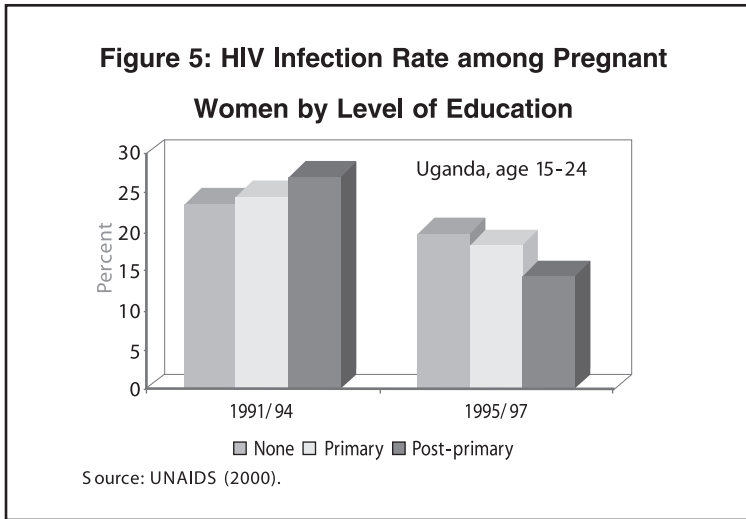
69 David E. Bloom, River Path Associates, and Jaypee Sevilla. "Health, wealth, AIDS and poverty—the case of Cambodia," (ADB/UNAIDS, 2001).

70 R.G. Parker, *Historic Overview of Brazil's AIDS Programmes and Review of the World Bank AIDS Project* (Arlington, VA: Family Health International/AIDSCAP, 1998 [Processed]); M. Ainsworth and I. Semali, "Who is most likely to die of AIDS? Socioeconomic correlates of adult deaths in Kagera Region, Tanzania," cited in *Confronting AIDS: Evidence from the Developing World*, ed. Martha Ainsworth, Lieve Fransen, and Mead Over (Brussels, 1997).

71 UNAIDS, *AIDS Epidemic Update 2000* (Geneva: UNAIDS, 2000).

interaction between them. These factors include lack of knowledge about HIV transmission, unprotected sex, multi-partnering, sharing of injecting equipment, and HIV levels of partners.

In conclusion, the available macro-level evidence, such as a rapidly increasing share of poor and developing nations in HIV infections in recent years and the large numbers of HIV infections in developed countries in earlier years, together with some of the micro-evidence, would suggest the following. Richer individuals and societies, by virtue of higher education and better access to information, appear increasingly to be less vulnerable to HIV infection than their poorer counterparts.



Moreover, as an epidemic progresses, the poor are increasingly at risk due to lack of education and other economic exigencies. We might, therefore, expect HIV epidemics to be increasingly embedded in poor communities. Although not established with any rigor, this picture is broadly consistent with patterns of HIV transmission seen in Africa and other regions, including wealthy industrial countries such as the United States.

What evidence is there regarding the reverse link, the impact of HIV/AIDS on poverty? Although there are few large-scale analyses of the impact of HIV/AIDS on poverty, there is little doubt that HIV/AIDS will worsen poverty among households affected by it. This is because HIV and the opportunistic infections associated with it are expensive to treat, they lead to premature mortality among adults and so lost incomes (and opportunities), and there are hardly any social safety nets in developing countries to ameliorate these impacts. Data from several studies conducted

in Asian countries clearly indicate that even in the pre-anti-retroviral-therapy phase in the early- to mid-1990s, the annual cost of treating AIDS was nearly double the per-capita income and that, in many of these countries, the cost of treatment and the economic burden of early adult mortality would have to be borne by the affected households.⁷²

Actual Impacts—Asia

The epidemics in most Asian countries, with the exceptions of Cambodia, Thailand, and Myanmar, are comparatively underdeveloped compared with those in Africa. However, new groups are becoming more vulnerable to infection, even as the initial vulnerable groups (principally commercial sex workers and their clients) learn to protect themselves.

Though poverty data that are comparable across countries are scarce, it is clear that Asia contains a large share of the world's poor as well as of its population. Existing data for the late 1980s and early 1990s show that the two most populous nations in the world, the PRC and India, have 22% and 53% of their respective populations living on incomes of less than a dollar a day. The population shares living on incomes of under two dollars a day are 58% in the PRC and 89% in India. The record for other poor countries in the region is not much better. Nepal, Indonesia, and Pakistan have 87%, 59%, and 57% of their populations below the two-dollar poverty line. Even middle-income countries in the region such as Malaysia and Thailand have about a quarter of their populations under the two-dollar poverty line. These numbers predate the East Asian financial crisis and the global economic slowdown of the late 1990s, so they potentially understate the magnitude of existing poverty in the region.

Although so far no comprehensive national study has examined whether AIDS disproportionately affects the poor within a country, smaller-scale studies back up the notion that the link is strengthening in Asia. A household study in Thailand found that people from the poorest and least educated households were most likely to be infected with HIV.⁷³ A study in India found that a household's socio-economic status was a significant

72 David E. Bloom and Joyce Lyons, eds., *Economic Implications of AIDS in Asia* (New Delhi: Oxford University Press, 1993).

73 Sumalee Pitanyon, Sukontha Kongsin, and Wattana Janjareon, "The economic impact of HIV/AIDS mortality on households in Thailand," in *The economics of HIV and AIDS—the case of South and South East Asia*, ed. David E. Bloom and Peter Godwin, (New Delhi: Oxford University Press, 1997).

contributing factor to its likelihood of being infected with HIV.⁷⁴ Ethnic and marginalized groups in Southeast Asia have been shown in one study to be most vulnerable to HIV/AIDS.⁷⁵ And low income has been linked to heightened risk of infection in Sri Lanka—people on low incomes were less aware about the risks of the epidemic, and low-class Sri Lankan sex workers were less likely to use condoms than higher-class ones.⁷⁶

As we have seen, data surveying adult women in Cambodia, the country with the most advanced epidemic in Asia, emphasizes the extent to which Asia's poor are potentially at greater risk of HIV infection than better off sections of society⁷⁷ (Appendix 3). Wealthier and more educated groups are likely to know more about AIDS and practice less risky behavior. Data from Viet Nam show similar links between wealth and education on the one hand, and sexual behavior and knowledge about HIV/AIDS on the other (Appendix 3). And data from Bangladesh, Nepal, Indonesia, and Viet Nam suggest that the least educated are increasingly at risk, with knowledge that condoms prevented transmission markedly lower among women with no education than among those with primary education. The latter, in turn, knew less than those with secondary education or higher.⁷⁸ Education is clearly a vital factor for the prevention of HIV transmission: a study of Thai males showed that men with a good understanding of the inefficacy of inappropriate prevention strategies and the mechanics of contagion patronize commercial sex workers significantly less frequently than men who have a poor understanding of these areas. Those with a weaker understanding were mainly men of low socioeconomic status.

Wealth and education may also have independent effects, so one is not simply a proxy for the other (Appendix 3). In other words, a well-educated but poor population will be able to protect itself against AIDS in a similar way to a richer group. For example, Kerala in India has a notably well-educated population, and much lower HIV prevalence rates than neighboring states

74 Alaka Basu, Devendra Gupta, and Geetanjali Krishna, "The household impact of adult morbidity and mortality: some implications of the potential epidemic of AIDS in India," in *The economics of HIV and AIDS—the case of South and South East Asia*, ed. David Bloom and Peter Godwin, (New Delhi: Oxford University Press, 1997).

75 Myo Thant, The economic implications of AIDS in Southeast Asia: Equity considerations in *Economic implications of AIDS in Asia*, ed. David Bloom and J. Lyons, (New York: UNDP Regional Program Division, Regional Bureau for Asia and Pacific, 1993).

76 David E. Bloom, et al., "Socioeconomic dimensions of the HIV/AIDS epidemic in Sri Lanka," in *The economics of HIV and AIDS—the case of South and South East Asia*, ed. David E. Bloom and Peter Godwin, (New Delhi: Oxford University Press, 1997).

77 Macro International, "Cambodia Demographic & Health Survey" (2001).

78 Ibid.

with similar or higher per capita income such as Andhra Pradesh, Karnataka, and Tamil Nadu. Therefore, even if a country is not experiencing short-term economic growth, investment in education can provide health improvements that act as a long-term driver of development.

The Case of Cambodia

Cambodia, which has the most advanced HIV/AIDS epidemic in Asia, has recently begun to make inroads into tackling the virus and has gone from being the most at-risk country in Asia to one of its success stories. The number of reported infections dropped by nearly 20% from 1997 to 2000. As in the rest of Asia, however, Cambodia's poor are the most difficult section of society to reach, and a look at the problems posed by HIV/AIDS to poverty reduction programs is instructive for policy makers across the region.

This section explores the nature of the HIV/AIDS epidemic in Cambodia, and its effect on the country's development and on the 40% of Cambodians who live below the poverty line. It views AIDS within a wider health context, and explores the socioeconomic factors that underlie both the epidemic's development and the shape of the country's response. Finally, it examines Cambodia's options going forward, arguing that future responses will be needed along three tracks—those specific to AIDS, those specific to health, and those with a broad development focus.

Health in Cambodia

Health standards in Cambodia are poor, as might be expected from its low standards of human development. It ranks 121st in the human development index, ahead of only Bangladesh and Lao People's Democratic Republic within Asia. It has a life expectancy at birth of only 56.4 years (of which only 85% are likely to be healthy⁷⁹) and unexceptional levels of educational attainment, with an adult literacy rate of only 71%. Arguably, Cambodia's economic indicators are even worse than its human development ones. Gross domestic product (GDP) is only US\$1,361 per capita, ranking thirteen places below its human development index.⁸⁰

79 WHO, *World Health Report 2000* (Geneva: WHO, 2000).

80 United Nations Development Programme, *Human Development Report 2000* (New York: United Nations, 2000); Ministry of Planning, *Cambodia Human Development Report* (Cambodia: Ministry of Planning, 1999).

Like many of its other problems, Cambodia's poor health is a reflection of a history of conflict, which stretches back for half a century. Over this period, Cambodia has, at times, been exceptionally open to outside influence; at others, it has existed in almost total isolation. The health system was largely disassembled by the Khmer Rouge, with Cambodians having, at best, access to facilities run by untrained staff.⁸¹ During the period 1975–1979, when there was also a serious famine, around 1 in 4 children died before reaching the age of 5, while malnourishment and overwork were among the primary causes of death of the large numbers of adults who died prematurely.

Rapid health improvements followed the ousting of the Khmer Rouge by the Vietnamese army in January 1979. Infant mortality dropped back to its pre-war rate of around 130 per 1,000 live births, and currently stands at 73 per 1,000 live births.⁸²

Despite the significant progress, however, much work remains to be done. Cambodians privately spend US\$25–US\$30 per head per year on health, compared to government expenditure of around US\$3.⁸³ This situation has two main causes. First, access to the health system is severely limited, especially outside urban areas. Although coverage has increased dramatically since the demise of the Khmer Rouge, half the population is still thought to lack access to health care services, with the average village 3 km from the nearest public health care clinic.⁸⁴ As a result, most Cambodians look in three directions for front-line medical care. All involve expense for treatment that is seldom effective:

81 According to a study of the village Prasath, in the Kompong Speu province: “the Khmer Rouge set up a ‘hospital’ at the Pongro pagoda building a few km away staffed by inexperienced and untrained doctors. Villagers had many jokes to tell about the medicines offered there. They were of the opinions that these medicines were prepared by the doctors themselves using coconut water and palm sugar, among other things. People referred to these medicines as *thnam arch tonsay* (rabbit-dropping medicine) because of their appearance.” The study also points out that villagers were afraid to admit they were sick, in case they were killed by the Khmer Rouge for faking illness. V. Krishnamurthy, *The Impact of Armed Conflict on Social Capital—A Study of Two Villages in Cambodia* (Cambodia: Social Services of Cambodia March 1999).

82 United Nations, *World Population Prospects: The 2000 Revision* (New York: United Nations Publications, 2000).

83 WHO, *WHO Country Cooperation Strategy: Cambodia* (Cambodia: WHO, 2000). The WHO Country Cooperation Strategy (CCS) defines the broad framework for WHO's work with the Royal Government of Cambodia for 2001–2005. Cambodia.

84 Royal Government of Cambodia, *Interim Poverty Reduction Strategy Paper 2000* (Phnom Penh: Royal Government of Cambodia, 2000).

- Legal and illegal pharmacies are probably the main source of health care in Cambodia. They offer widespread access to drugs, many of which are unavailable “over-the-counter” in developed health systems. Drugs are often prescribed without diagnosis and the patient often (if not usually) leaves with the wrong medication, the wrong dosage, the wrong usage instruction—or all three.
- Traditional healers appear to be the next most important providers of health services. These services can be expensive, especially due to the belief that different treatments should be tried until a cure is finally achieved, although many traditional practitioners do charge according to the patient’s perceived ability to pay.⁸⁵ For serious illnesses, traditional medicines are unlikely to have more than a marginal impact on the eventual outcome.
- Private medical practitioners and facilities are also thought to rarely offer a cost-effective service. According to the WHO, efforts to tackle the problem of poor quality and exploitative health care have so far been limited. Although legislation has been passed, there is no capacity for implementation.⁸⁶

The second cause of high levels of private expenditure on health is that supposedly free public health services are seldom what they seem. Cambodian public servants—including health workers—are paid a wage that is below subsistence levels. Unofficial charges are therefore levied throughout the system. One hospital, funded by an overseas NGO, prides itself on being free of unofficial payments. It has only achieved this, however, by paying its staff what they would earn in salaries and unofficial payments if they worked at a public hospital.⁸⁷ Widespread corruption is a major reason why public levels of trust in the public health system (and in state action more generally) are low.⁸⁸ It is also the result of a seldom-mentioned link between poverty and health, as the poverty of those providing health care results in a degradation of the health system. As well as depending on

85 William Collins, *Medical Practitioners and Traditional Healers—A Study of Health Seeking Behavior in Kampong Chhang, Cambodia* (Phnom Penh: Centre for Advanced Study, January 2000).

86 WHO, *WHO Country Cooperation Strategy: Cambodia* (Cambodia: WHO, 2000).

87 Robert Colebunders, “Anti-retroviral Therapy in Resource Poor Settings” (in *Meet the Professor*, Sunway Hotel, Phnom Penh, Cambodia, Saturday, April 7, 2001).

88 USAID/Cambodia 2001, for example, reports that sick children are not taken to receive medical advice from health centres on account of the poor standard of treatment available, while *Voices of the Poor* provides an international perspective on how strong a disincentive corruption is to the use of health systems by poor people.

unofficial payments, many full-time health workers also work full-time in private practice, or have jobs that are unrelated to their professional qualification.

Economic hardship and poor quality health systems interact with each other, of course. Poor health increases poverty:⁸⁹ a study in 2000 commissioned by Oxfam found that 45% of the landless in Cambodia had lost their land due to serious illness of a single family member.⁹⁰ Such family illness forces many people from the labor market, and has an especially severe impact on arduous pursuits such as rice farming. It also results in children, especially girls, being withdrawn from school to act as carers or to help with income generation. The poverty-health interaction is even stronger in the reverse direction. Medical costs can consume sizeable portions of household income,⁹¹ effectively denying access to health care among many poor families. In order to meet health expenses, families are forced to borrow and, ultimately, to sell their assets. The sale of major assets often comes at the end of a cycle of increasing indebtedness, with families borrowing at high rates of interest in order to buy drugs. Finally, economic hardship encourages short- or long-term migration. This has long increased vulnerability to malaria, as people move from areas with little malaria to those where it is common.⁹² However, it is with the advent of HIV/AIDS that the potential for interaction between disease and migration has been most fully realized in Cambodia.

AIDS in Cambodia

HIV was first detected in Cambodia in 1991, and 2.7% of Cambodians are now HIV positive, the highest prevalence rate in Asia.⁹³ The genesis of the epidemic reflects the strengths and weaknesses of Cambodia's rapidly developing society. As Cambodians have attempted to respond, meanwhile, the interaction between epidemic and society has become two-way and increasingly complex.⁹⁴

89 For a full discussion of this link, see David E. Bloom and David Canning, "The Health and Poverty of Nations: From Theory to Practice," *Journal of Human Development* 4, no. 1 (2003): 47–71.

90 Oxfam GB, *Cambodia Land Study Project* (Phnom Penh: Oxfam & Ministry of Health, 26 July 2000).

91 WHO, *WHO Country Cooperation Strategy: Cambodia* (Cambodia: WHO, 2000).

92 Veena Krishnamurthy, *The Impact of Armed Conflict on Social Capital—A Study of Two Villages in Cambodia* (Phnom Penh: Social Services of Cambodia, 1999).

93 UNAIDS, *AIDS Epidemic Update 2000* (Geneva: UNAIDS, 2000).

94 For a full discussion, see David E. Bloom, River Path Associates, and Karen Fang, "Social Technology and Human Health" (concept paper for the *Human Development Report 2001* "Channelling technology for Human Development," <http://www.un.org/Depts/DPKO/Missions/untac.htm> [2001]).

The roots of the Cambodian HIV/AIDS epidemic can be found in the country's emergence from the relative isolation of the Vietnamese-backed Heng Samrin government. The United Nations Transitional Authority in Cambodia (UNTAC) arrived in the country in March 1992 to ensure the implementation of the Agreements on the Comprehensive Political Settlement of the Cambodia Conflict, signed in Paris on 23 October 1991. It was granted full authority by the Cambodian Supreme Court to govern the country and continued in this role until the end of its mandate in September 1993, when it handed over authority to the new democratically elected government, operating under a new constitution.⁹⁵

The United Nations operation involved approximately 22,000 military and civilian observers. During this period, large numbers of refugees were resettled, the Cambodian economy (especially in Phnom Penh) experienced a boom, and there was significant (and ongoing) market liberalization through an IMF-inspired Structural Adjustment Program.⁹⁶ The sex industry also grew explosively, fuelled partly by foreign peacekeepers (a high percentage of whom admitted contact with sex workers) and also by newly-prosperous Cambodians with money to spend. Economic development was uneven, however, with uneducated rural women benefiting least. As a result of this, a plentiful source of supply was created to meet the growing demand for commercial sex.⁹⁷

The Cambodian HIV epidemic is fuelled primarily by heterosexual sex, with injecting drug use and sex between men relatively minor factors. In 2001 there were 74,000 adult women and 86,000 adult men living with HIV, with prevalence rates among different groups showing wide variations: 31.1% of direct commercial sex workers (those who work in brothels) were found to be infected in the latest sentinel survey, compared to 16.1% of indirect sex workers (who usually have other jobs, but also sell sex) while 3.1% of police officers, and 2.3% of pregnant women at antenatal clinics were also reported to be living with the disease.

However, prevalence rates are currently falling, largely due to the success of the country's prevention campaign. There were 210,000 people living with HIV in 1997, compared to 170,000 in 2001, indicating that more

95 Cambodia-UNTAC Department of Public Information, United Nations, 31 August 1996.

96 Kasumi Nishigaya, *Poverty, Urban Migration and Risks in Urban Life Labour Seminar: Empowerment of Garment Factory Workers* (Tokyo: Japan International Cooperation Agency, 1999).

97 Peter Godwin, Suth Wantha Seng, and Chhi Vun Mean, "The HIV/AIDS Epidemic in Cambodia: the Contribution of the Health Sector" *Espace, Populations, Societes*, no. 2 (2000).

people are now dying of the disease each year than are becoming infected. Rates have fallen among almost all sentinel groups and most rapidly among the most vulnerable groups. This is probably the result of information campaigns on the dangers of AIDS and the growing use of condoms, especially the socially marketed “No. 1” condom, of which over 1.3 million are now sold each month.⁹⁸ The “100% Condom Use” campaign, which has been piloted in two provinces, will soon be launched nationally. It is a reprise of the pioneering Thai campaign and aims to ensure that condom use is universal in brothels. It can be expected to continue to drive down prevalence rates in both the direct and indirect commercial sex industries. Cambodia has shown what can be done to combat AIDS, even in a country faced with a soaring epidemic and with very little money or resources to spend on health.

The rapid progress of the Cambodian HIV epidemic—seemingly from first case to maturity in only 10 years—poses difficult challenges for those working to combat it. However, successful efforts are being made to further drive down rates of new infection, even though a certain level of infection will almost certainly persist in the absence of a vaccine or a rapid, cheap cure with few side effects. In addition, even as HIV prevalence declines, the number of AIDS cases will continue to increase, as people who have been infected for a while begin to develop AIDS. As Peter Godwin, Seng Suth Wantha, and Mean Chhi Vun predicted in 1999: “At some time in the next decade the incidence of HIV will start to decrease; that means fewer and fewer people will become infected: the epidemic will stop spreading. This will partly be due to the success of programs to prevent the spread of HIV, partly due to the natural epidemiology of the disease, and partly due to changing socioeconomic conditions. Soon after this the prevalence of HIV will first plateau, and then start to decrease; there will slowly be fewer and fewer infected people. By this time the focus of the national response will have to change: it will no longer be focused only on preventing the spread, because this will have been achieved. It will be focused on mitigating the impact; for this will be the next challenge.”⁹⁹

98 UNAIDS, *Country Profile—The Situation and the Response in Cambodia* (Geneva: UNAIDS, 2001) 4th Edition.

99 Peter Godwin, Suth Wantha Seng, and Chhi Vun Mean, “The HIV/AIDS Epidemic in Cambodia: the Contribution of the Health Sector” *Espace, Populations, Societes*, no. 2 (2000).

The Poverty-AIDS Link in Cambodia

Recent data from the Demographic & Health Survey (DHS) in Cambodia clarify the extent to which Asia's poor are at greater risk of HIV infection.¹⁰⁰ The DHS surveys a nationally representative sample of women of child-bearing age and the households to which they belong about demographic characteristics, household structure, educational attainments, and many aspects of reproductive health, including histories, behaviors, and knowledge. It also contains a survey module of questions about AIDS and other sexually transmitted diseases. It therefore provides a wealth of valuable information on these women's behavior and knowledge that bear on their possible risk and exposure to the epidemic. An analysis of systematic variations in survey responses by socioeconomic status reveals that

- though most women know about condoms and have access to them, women from the wealthiest households are twice as likely to practice safe sex and almost twice as likely to know of the AIDS-preventive benefits of condom use than those from the poorest;
- although 30% of all surveyed women want to be tested for AIDS, women from the wealthiest quintile are almost four times more likely to know where to get tested than women from the poorest quintile;
- wealthier women are more exposed to the media (TV, radio, and press) than poorer women, and are therefore more likely to be exposed to national public health campaigns;
- wealthier women are less likely to move or to travel from one place to another than poorer women; and
- married women from the wealthiest households are more than 50% more likely to have spoken to their spouses about trying to avoid AIDS than their counterparts from the poorest households.

As well as wealth, education is also positively correlated with better knowledge and less risky behavior. Analysis of DHS data from Viet Nam shows similar correlations between wealth and education on the one hand, and sexual behavior and knowledge about HIV/AIDS on the other. Both the Cambodian and the Vietnamese data broadly suggest that wealth and education are positively correlated with reduced risk factors for AIDS, in

100 Macro International, "Cambodia Demographic & Health Survey" (2001).

particular through higher condom use and greater knowledge of its AIDS-preventive benefits. Accordingly, once HIV penetrates a society, the poor and uneducated are likely to be at highest risk.

The poor, therefore, do appear to be at greater risk of HIV infection than wealthier segments of Cambodian society. While there is at present little evidence that this risk is translating into higher HIV rates (more detailed studies are required to substantiate the link), studies from elsewhere in Asia, as we have seen, suggest that the disease is likely to end up hitting the poor hardest. Poverty reduction efforts will increasingly have to take into account the potential impact of AIDS. In the next section, we discuss whether the impact of AIDS will affect the development prospects of Cambodia as a whole.

The Impact of AIDS

An analysis of the current and future impact of AIDS on Cambodia is made difficult by a paucity of data. This does not, of course, mean that the impact of the epidemic will be negligible. First, AIDS will continue to contribute to Cambodia's generally poor health, while diverting resources away from other pressing health problems. The interactions between health and economic growth are significant, with Cambodia desperately needing to complete its demographic transition from high to low fertility and mortality if it is to prosper in the modern global economy.¹⁰¹ Large families in Cambodia are significantly more likely to be poor than small ones, and their children are more likely to experience poor health and to receive comparatively little education—critical factors both for their own and for the country's future prosperity. Evidence of significant unmet demand for contraception from Cambodian women—and very recent efforts to meet this demand—suggests that family sizes will probably continue to fall rapidly.¹⁰² However, the experience of other countries suggests that perceptions of general improvements in health influence parents to choose smaller family sizes. A growing number of people sick with AIDS in the general population will do little to aid such a perception.

101 For the boost that favorable demographic conditions gave development in some Asian countries, see David E. Bloom, David Canning, and Pia Malaney, "Demographic Change and Economic Growth in East Asia," *Population and Development Review* 26 (2000): 257–290. For a full discussion of the interactions between health and development, see David E. Bloom and David Canning, "The Health and Wealth of Nations," *Science* 287 (February 2000): 1207, 1209.

102 W. Rojanapithayakorn, "National Policy on 100% Condom Use in the Kingdom of Cambodia" (Phnom Penh: Ministry of Health, 1998).

Second, poverty is certain to increase in households with a family member suffering from AIDS, with the disease having the potential to condemn even relatively comfortable households to abject poverty. The connection between ill health and landlessness has already been discussed and there is evidence that this connection is particularly strong when ill health is caused by AIDS (because of the combination of treatment costs, lost productivity, and social stigma). People with AIDS are frequently not tested for HIV. As a result, families make ruinous expenditure on health care, which they fund by selling assets or borrowing at high rates of interest, using assets as security. In one study of eight families in the province of Banteay Meanchey, only one patient was initially diagnosed with the disease, with most believing that the illness could be cured.

In fieldwork conducted for this book, a 38-year-old woman we interviewed had spent considerable sums of money on traditional medicine, suffering side effects that she believed had nearly killed her. She commented “AIDS is about being poor forever—about resources that are gone forever.” A 37-year-old female had spent US\$25 on the services of a traditional healer who advertises in the Phnom Penh media. She was forced to sell her house and now rents it from the person she sold it to. She is US\$26 in debt, roughly a month’s income. Such serious levels of poverty have a marked impact on the prospects of all members of the household.

It is hard to estimate the cumulative cost of this burden of care. Mike Merrigan has reported that some families spend US\$50–US\$88 per dose of traditional medicine and US\$28–US\$75 for a single dose of Western medicine.¹⁰³ According to WHO, 12,000 people are likely to seek care and support annually, with dramatically higher numbers of AIDS patients needing treatment within the health system over the next ten years. Clearly, the impact of such a number of people needing to spend so much money and therefore further impoverishing themselves will be great. However, Cambodia is already making efforts to provide cheap home care and there is potential for further effective response, with improvements in diagnosis and prognosis, combined with education for carers as to appropriate responses, helping to ensure that available resources are spent more widely. The possibility of attempting to ensure wide access to sophisticated drugs such

103 Monthly incomes ranged from US\$20–US\$75. Mike Merrigan, “HIV/AIDS and landlessness in Cambodia,” (dissertation, Edith Cowan University, 2000).

as anti-retrovirals (ARVs) further complicates the situation.¹⁰⁴ Currently, ARVs are available in Phnom Penh pharmacies, though it is likely that they are rarely taken in anything that even approximates the recommended fashion (a failure that increases the risk of drug-resistant strains of the virus developing). Again, however, wider, but more carefully controlled, access to these drugs could have a positive impact, as the availability of effective treatment helps boost the country's inadequate medical infrastructure.¹⁰⁵

The third way that AIDS could adversely affect Cambodia's prospects is if it becomes a disincentive to general development efforts or if it makes some development measures less favorable to the poor. Cambodia's Second Socio-Economic Development Plan notes that, while it is important to invest in rural areas where the majority of poor people live, urban investment to create productive employment for surplus rural labor must form part of any poverty reduction strategy.¹⁰⁶ At present, however, insufficient new jobs in urban areas are being generated to meet the needs of the many young people joining the labor market, with the result that more people are competing over the same amount of agricultural land. The government therefore strongly favors further urbanization but will need to successfully increase urban investment.

Currently, AIDS is raising doubts about this policy. Economic migrants are among the most vulnerable to HIV. Away from their families, men are more likely to visit sex workers, while men and women are more likely to have sweethearts. Many are forced to return home if they become sick, further impoverishing the families they left home to support. Major infrastructure projects, funded by overseas donors, are open to similar criticism. Already, the Asian Highway (Route 5) is regarded as having the potential to increase the risk of AIDS as it is improved and resurfaced. However, without improved infrastructure, it seems impossible that Cambodia will solve the many other problems it faces. National health authorities and international organizations will need to closely monitor and educate the populations that will be at greater risk as a result of the new road.

104 For a discussion of the issues surrounding access to AIDS treatment and care, see David E. Bloom and River Path Associates, "Something To Be Done: Treating HIV/AIDS," *Science* 288 (June 23, 2000): 2171–2173.

105 Sihanouk Hospital Centre of Hope, *Newsletter*, no. 45 (Phnom Penh: Sihanouk Hospital Centre of Hope, 2001) March–April.

106 <http://www.bigpond.com.kh/users/ngoforum/sedp2prs.htm>

Looking Ahead

The Cambodian HIV/AIDS epidemic is now maturing and seems to be plateauing, at least in part because of a relatively successful response from Cambodian society. However, the epidemic does not stand alone, either in its action or its impact. It must be viewed as part of Cambodia's wider health problems, taking into account the interaction between health and development. The health of a people is a reflection of the strengths and weaknesses of the society they live in, and HIV/AIDS is one problem that Cambodians must face as their society and economy struggle to overcome the problems of the present, as well as of the past.

Action against the epidemic, therefore, must continue along three tracks: AIDS-specific, health-specific, and general development actions that include a far greater level of health awareness than has traditionally been displayed. Balanced development should be a priority for Cambodia, as current encouraging economic signs are unlikely to be sustained in the long run unless significant effort is put into investing in human development for the future. Populations do not become healthy and educated by chance. Certainly, health and education are in demand in societies rich and poor. But their supply requires heroic effort from all sections of society.

The major impact of AIDS is likely to fall on Cambodia's poor. If vicious spirals are to be avoided—whereby a person is infected with HIV and the costs of care and lost labor push the family into, or further into poverty, forcing other family members to take actions that expose them to AIDS—the poor need better and deeper knowledge of the risk factors and prevention methods. Policymakers should aim for a virtuous spiral, with education improving knowledge of health, which in turn improves health and makes families more productive. Currently, AIDS threatens poverty reduction efforts in Cambodia, but concerted and sustained efforts to involve the poor and give them the tools to improve their health in the long term will have far-reaching positive effects on development efforts.

Conclusion

Nearly one third of Asia and the Pacific's population live in poverty and, although some areas are well on their way to meeting the UN's target of reducing extreme poverty by half by 2015 (in the PRC the number of poor fell from 360 million to 210 million between 1990 and 1998), others have seen increases in poverty rates in recent years. East Asia saw the impressive declines in its poverty rate between 1987 and 1996 reverse by 1998 as a result of the area's economic crisis; and, while the percentage of poor in South

Asia fell, this decline was not enough to keep absolute numbers from rising. With a poverty rate of 40%, South Asia is only 6 percentage points behind Sub-Saharan Africa, the world region most ravaged by AIDS.

Although AIDS is unlikely to have a sizeable effect on Asia's poverty rates (HIV infection rates are low and, even if individuals are forced to withdraw from the workplace, the effect of this will be balanced by their being replaced by people who would otherwise be unemployed), it will have a broad range of effects on a society's health. From pushing up TB levels to increasing the number of orphans, AIDS presents a challenge to development efforts. If it goes unchecked, it may also pose a threat to governance and institutional capacity, creating conditions that abet corruption and political instability—and, therefore, for further indirect negative impacts on the poor.

Policy, therefore, should focus on AIDS as part of a wider challenge to societies. All levels of society—governments, donors, NGOs, the private sector and poor communities themselves—should be brought on board in an effort to reform health systems to make them responsive to people's needs. Good governance and strong institutions are essential for successful poverty reduction efforts, action to improve health in general, and programs to tackle AIDS. Addressing AIDS has the potential to act as a trigger for wider health improvements, which in turn can trigger development.

Chapter 3

HIV/AIDS and Economic Development

In Chapter 2, we saw that HIV/AIDS poses a threat to the poor, in Asia and elsewhere. In this chapter, we ask whether the effects of HIV/AIDS translate into damage to economies. We first explore the link between health and economic development. We then examine the effects of HIV/AIDS on the global economy, before looking at the specific effects of HIV/AIDS on economies, at the macro, household, and business levels. Finally, we use data on Thailand to illustrate the potential economic consequences of HIV/AIDS on Asia.

Health to Wealth

In 1978, in the Declaration of Alma Ata, the international community committed to achieving health for all by 2000. Clearly, that goal has not been reached, although most countries have achieved significant health improvements. In Asia, over the fifteen years from 1980 to 1995, average life expectancy increased from 62.2 to 68.4 years, an improvement of over 6 years. Three of the most populous countries in the region, Bangladesh, India, and Indonesia all saw life expectancy grow by more than seven and a half years in this period.

Health is now again at the heart of international debate. The UN Security Council is discussing the implications of AIDS for global security, the leaders of the Group of Eight Countries are signing up to new disease reduction targets, and UN Secretary General Kofi Annan called for an increased global response to HIV/AIDS at the recent United Nations General Assembly Special Session.¹⁰⁷

107 David E. Bloom and David Canning, "The Health and Poverty of Nations: From Theory to Practice," *Journal of Human Development* 4 no. 1 (March 2003): 47–71.

The renewed interest in health has two main causes. First, good health is of profound importance to people, topping the United Nations Millennium Poll as the thing that people most value in life.¹⁰⁸ In rich and poor countries, voters place pressure on democratic governments to improve health standards, while internationally, the health problems of developing countries provide one focus for discontent at the perceived inequities of globalization.¹⁰⁹

Second, we now know more about the importance of health to economic and social development.¹¹⁰ Healthy societies are more likely to become wealthy societies—an effect that was felt especially strongly by the Asian tiger economies.

Economists have conventionally believed that increased wealth leads to better health, and have largely overlooked the reverse link.¹¹¹ Until the early 1990s, the empirical economic growth literature focused exclusively on the role of capital and labor (the latter often augmented by schooling), and technological change, but hardly ever on health as a key element of human capital.¹¹² Even where a relationship has been found between indicators of health and income per capita, it has either been discounted, or thought to be an indication of the impact of economic development on health. The standard perspective of this earlier literature appears to have been that of Preston (1976) who noted the key role of economic development in improving life expectancy.¹¹³

108 WHO, *Health, Economic Growth, and Poverty Reduction* (Geneva: WHO, Working Group 1, 2002).

109 David E. Bloom and River Path Associates, "Social Capitalism & Human Diversity," in *The Creative Society of the 21st Century* (Paris: OECD, 2000).

110 David E. Bloom and David Canning, "The Health and Wealth of Nations," *Science* 287 (February 18, 2000): 1207, 1209.

111 For a review of the literature, see John Strauss and Duncan Thomas, "Health, nutrition and economic development," *Journal of Economic Literature* 36 (June 1998): 766–817.

112 Robert Barro, "Economic growth in a cross section of countries," *Quarterly Journal of Economics* (May 1991): 407–43; Rober Barro and Xavier Sala-I-Martin, *Economic Growth*. (New York: McGraw Hill, 1995); Robert Solow, "A contribution to the theory of economic growth," *Quarterly Journal of Economics* 70, no.1 (1956): 65–94; Robert Solow, "Technical change and the aggregate production function," *Review of Economics and Statistics* 39 (August 1957): 312–20.

113 Samuel Preston, *Mortality Patterns in National Populations* (New York: Academic Press, 1976).

However, there is now significant evidence demonstrating the aggregate impacts of health on growth and on levels of real GDP per capita.¹¹⁴ For example, Bloom, Canning and Sevilla find that a one-year improvement in a population's life expectancy (a standard measure of health status) contributes to a 4% increase in output. In another study, the same authors estimate that a one percentage point increase in adult survival rates boosts labor productivity by about 2.8%.¹¹⁵ Formal analysis suggests that a country can, on average, expect to see per capita incomes grow by an extra 0.3-0.5 percentage points a year for every 5 years it adds to its life expectancy. This is a considerable boost, given that between 1965 and 1990 global income per capita grew by an average of 2% per year.¹¹⁶

Similar effects have been found in Asia. Andrew Mason has found that, "controlling for initial income, [developing Asian] countries with low infant mortality rates in 1965 achieved much higher rates of economic growth than countries with high infant mortality rates."¹¹⁷ "The potential returns to health investments," he concludes, "appear to be substantial [in the region]."

Moreover, studies that consider 'full income'—which assigns economic value to changes in life expectancy—suggest that falling mortality rates have a more substantial positive impact on economic development than is shown by GDP per capita data. For example, in an assessment of the growth of real income per capita in the United States over the 20th century, Nordhaus concluded that over half of the growth in full income up to 1950 was attributable to mortality decline.¹¹⁸

114 Alok Bhargava, Dean Jamison, Lawrence Lau, and Christopher Murray, "Modeling the effects of health on economic growth," *Journal of Health Economics* 20 (2001): 423-440; David Bloom, David Canning, and Jaypee Sevilla, "The Effect of Health on Economic Growth: A Production Function Approach," *World Development* (January 2004): 1-13; David Bloom, Neil Bennett, Ajay Mahal and Waseem Noor, "The impact of AIDS on human development (Draft. New York, NY: Columbia University, Department of Economics, 1996); John Gallup and Jeffrey Sachs, "The economic burden of malaria," *Working paper #52*. (Cambridge, MA: Harvard University, Center for International Development, 2000); Amar Hamoudi and Jeffrey Sachs, "Economic consequences of health status: A review of the evidence," *Working paper #30* (Cambridge, MA: Harvard University, Center for International Development, 1999).

115 David E. Bloom, David Canning, and Jaypee Sevilla, "The Effect of Health on Economic Growth: A Production Function Approach," *World Development* (January 2004): 1-13.

116 David E. Bloom, David Canning, and Pia Malaney, "Demographic Change and Economic Growth in East Asia," *Population and Development Review* 26 (2000): 257- 290; David E. Bloom and David Canning, "The Health and Wealth of Nations," *Science* (February 18, 2000): 1207-1209.

117 Andrew Mason, "Population and Human Resource Trends and Challenges," in *Key Indicators of Developing Asian and Pacific Countries 2002 Volume XXXIII*. (Manila: Asian Development Bank, 2002).

118 William Nordhaus, "The Health of Nations: The Contribution of Improved Health to Living Standards" in *Measuring the Gains from Medical Research: An Economic Approach*, ed. Kevin H. Murphy and Robert H. Topel (Chicago: University of Chicago Press, 2003).

Considering the effect of mortality rates on full income suggests that estimations of the impact of AIDS on economic performance are understated. Bloom, Canning, and Jamison (2004) suggest, in a new review of the literature on ‘value of a statistical life’ (VSL) indicators, that the adverse economic impact of AIDS in sub-Saharan Africa has already been more significant than GDP per capita data indicate.¹¹⁹ For example, VSL analysis for Malawi shows a positive growth rate in full income in the 1980s, compared with a slightly negative growth rate in GDP per capita. However, in the 1990s, as adults of working age began to die from AIDS, the full income rate turned sharply negative, compared with a more gentle decline in GDP per capita.

There are four key channels through which health affects economic performance. All are pertinent to understanding the economic implications of AIDS, the key features of which are a large number of cases, costly treatment, and mortality that is heavily concentrated among working-age adults.

The first channel involves the effect of health on labor productivity. Healthier workers are more energetic, have better attendance records and are likely to have higher mental capacity and morale. In developing countries in particular, manual work makes up a large proportion of output, and physical endurance and strength rely crucially on sound health. A major study by Weil estimated that health differentials accounted for 17% of the difference in worker productivity between countries—giving health roughly the same influence on productivity as physical capital (18%) and education (21%).¹²⁰ Several microeconomic studies support this finding.¹²¹

The second channel from health to wealth involves the effect of health on education. Healthy children are better able to attend school and learn, and have more to gain by doing so because they can expect to live and work longer; and healthy families impose fewer burdens on children of having to care for sick relatives. An extra year of life expectancy is estimated to increase schooling levels by 0.25 years.¹²²

The third channel involves the effect of health on savings and capital accumulation. Individuals who live long tend to save more in anticipation of a long retirement, and their savings are invested in the infrastructure and

119 David E. Bloom, David Canning, and Dean Jamison, “Health, Wealth and Welfare” *Finance and Development*, 41, no. 1 (March 2004): 10–15.

120 D. Weil, Accounting for the Effect of Health on Economic Growth (mimeo, Brown University, 2001).

121 See J. Strauss and D. Thomas, “Health, nutrition and economic development,” *Journal of Economic Literature* 36, no. 2 (June 1998): 766–817.

122 M. Bils and P. Klenow, “Does Schooling Cause Growth?” *American Economic Review* 90 (2000):160–183.

factories that are essential for economic prosperity. In a stable population, the high savings of those who are yet to retire are offset by the ‘dissaving’ of those who have retired—in Western Europe and the US, therefore, net national savings rates are low and fairly stable. But where life expectancy rises in a short space of time, as it did in East Asia in the second half of the 20th century, increases in the proportion of young and then working-age people in a country’s population mean that savings rates increase, while dissaving remains low until that inflated young generation reaches retirement. Health improvements therefore spur the increase in savings which, by enabling greater investments in physical capital, spurs economic growth. East Asia’s dramatic savings boom between 1950 and 1990, which contributed greatly to its unprecedented economic growth,¹²³ was driven by the region’s rapidly improving life expectancy and by the increased proportion of people in the age groups that save the most.¹²⁴

The fourth channel from health to wealth involves the effect of health on a country’s age structure, whereby improvements in health result in declines in the dependency burden. This can trigger growth by tilting the balance between the productive and unproductive segments of a population. Bloom and Williamson demonstrated the long-term effect of health improvements associated with the process of demographic transition.¹²⁵ Health improvements lead to declines in infant mortality. This results in a large cohort of young people. Eventually, increased child survival rates encourage families to have fewer children, so fertility rates fall. The swollen cohort of young people produced by the fall in mortality rates forms a unique ‘bulge’ in a population’s age distribution—often described as a ‘baby boom’ generation.

While this baby boom generation is at school, it puts pressure on education systems and lowers per capita incomes (as population size increases while production does not). When it enters the workforce, however, the resulting high ratio of working-age to non-working-age people offers the possibility of a ‘demographic dividend,’ whereby a large working

123 David E. Bloom, Larry Rosenberg, Mark Weston, and David Steven, “Economic growth, liberalization and sustainable human development in Asia: learning from the miracle workers,” in *Solving the Riddle of Globalization and Development*, ed. Manuel R. Agosin, Georges Chapelier, and Jagdish Saigal (Earthscan, UK: forthcoming 2004).

124 R. D. Lee, A. Mason, and T. Miller, “Saving, Wealth, and Population,” (Berkeley: University of California, 1998) Processed; R. D. Lee, A. Mason, and T. Miller, “Life Cycle Saving and the Demographic Transition in East Asia,” *Population and Development Review* 26 (Supplement, 2000): 194–222.

125 David E. Bloom and Jeffrey Williamson, “Demographic transitions and economic miracles in emerging Asia,” *The World Bank Economic Review* 12, no. 3 (1998): 419–455.

population has a diminished number of dependents (retired people and children) to support. Given the right economic conditions, this can lead to a dramatic increase in production and savings, creating a virtuous circle of savings and investment.¹²⁶ Bloom and Williamson estimate that the 'demographic dividend' accounted for nearly one third of East Asia's economic miracle.

While health improvements can promote virtuous development spirals, health shocks can set off vicious spirals. HIV/AIDS is slashing life expectancy in many African countries by up to 30 years. Based on estimates in the literature of the link from life expectancy to economic growth (Bloom and Canning [2000]),¹²⁷ Commission on Macroeconomics and Health [2001]), AIDS in Africa has the potential to consume two percentage points of economic growth. With average annual growth rates of real per capita income in most of Sub-Saharan Africa ranging from -2% to 3%, the damage will be significant. Other health problems can also impede growth. For example, Gallup and Sachs report that countries with high levels of malaria have much lower levels of income, even after controlling for potentially confounding factors.¹²⁸

Health, therefore, poses a complex and pressing series of challenges for governments. Major shifts in health status are sometimes built on the same foundations as economic growth—new knowledge and technology (exploited through new or reinvigorated institutions), new investment, and new labor structures. But health will not be improved by economic development alone. Rather, as East Asia's proactive health policies showed,¹²⁹ specific policies are needed, as part of a consistent political commitment to the goal of better health.

126 David E. Bloom, David Canning, and Jaypee Sevilla, *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change* (Santa Monica, Calif.: RAND, MR-1274, 2002).

127 David E. Bloom and David Canning, "The Health and Wealth of Nations" *Science* 287 (February 18, 2000): 1207–1209.

128 John Gallup and Jeffrey Sachs, "The economic burden of malaria." *Working paper #52*. (Cambridge, MA: Harvard University, Center for International Development, 2000).

129 David E. Bloom, Larry Rosenberg, Mark Weston, and David Steven, "Economic growth, liberalization and sustainable human development in Asia: learning from the miracle workers," in *Solving the Riddle of Globalization and Development*, ed. Manuel R. Agosin, Georges Chapelier, and Jagdish Saigal (Earthscan, UK: forthcoming 2004).

The ability to respond to major health challenges, in other words, depends on the health of institutions themselves, at local, national, regional, and global levels. Can we match the supply of health technology to national needs, rather than just market demand?¹³⁰ Can we find significant investment today in the expectation of avoiding much greater costs in the future? Can effective new partnerships be formed to make a “cross-sectoral” response more than a theoretically desirable dream?

These central questions are given ever-greater urgency by the knowledge that the threats to our health do not stand still. Aging populations, increasing drug resistance, and the growing burden of chronic disease in rich and poor countries, all mean that policy makers must try to solve a problem that is continually changing. New diseases do most to mutate the battlefield. Over the last 20 years, around thirty new diseases have emerged, including Ebola, Hepatitis C, the Hanta virus and new variant Creutzfeldt-Jakob disease.¹³¹ However, the most serious new threat has been HIV/AIDS, which has now caused the death of around 28 million people, with 40 million currently living with the disease. The next section will look at its impact on economies, both in Asia and elsewhere.

The Impact of AIDS on Economies

The humanitarian case for taking action to prevent HIV/AIDS is abundantly clear. However, there is also value in exploring the economic case for action. With many problems competing for public sector budgets, governments need guidance on where to devote their resources. Businesses may also need to adjust their strategies to respond to the epidemic. In this section, we outline the potential effects of AIDS on macro-, household-, and business-level economies, before presenting data on the effect of the virus on Thailand’s economy.

130 David E. Bloom and River Path Associates, “Something To Be Done: Treating HIV/AIDS,” *Science* 288 (June 23, 2000): 2171–2173.

131 WHO, “Removing Obstacles to Healthy Development,” *World Health Organization Report on Infectious Diseases 1999* (Geneva: WHO, 1999). Available: <http://www.who.int/infectious-disease-report/index-rpt99.html>

The Potential Impacts of HIV/AIDS

There are several mechanisms through which AIDS may have a potential impact on the economy. First, the sheer scale of the virus makes some economic effect inevitable. As noted, 28 million have now died of AIDS; the number of deaths is certain to rise from its current level of 3 million per year. Over 40 million people are currently living with HIV/AIDS and over 5 million were infected with HIV in 2002 alone. Infection rates may be stabilizing in Sub-Saharan Africa, home to 70% of those infected with the virus, principally because relatively few high-risk individuals remain uninfected. In other areas, however, the epidemic is still growing. Russia saw nearly a 50% increase in HIV infections in 2001, and the number of cases in Eastern Europe and Central Asia has risen by more than one-quarter in 2002.¹³² With UNAIDS also voicing concerns over complacency in the West and in Asia¹³³ (and with the number of young gay black men in the United States reported to be infected with HIV rising rapidly¹³⁴), it seems likely that we continue to underestimate the future impact of this devastating epidemic.¹³⁵ Indeed, the number of people living with HIV today is 50% above the predictions for the year 2001 made by the United Nations in 1991.

Second, because—unlike most other deadly illnesses—HIV’s prime target is people of working age, there is a direct effect on businesses.¹³⁶ Businesses whose workers die of AIDS must recruit and train new staff, a problem discussed in more detail later in this chapter. Moreover, AIDS is debilitating, particularly in the final 2 years before death, and absenteeism both for those infected and for those caring for them may have an economic impact on businesses and other work organizations. And the impact on productivity may also decrease an economy’s attractiveness to foreign investors, and diminish tax revenue.

132 UNAIDS, *Epidemiological Fact Sheets on HIV/AIDS and Sexually Transmitted Infections* (Geneva: UNAIDS, 2000); UNAIDS, *AIDS Epidemic Update: December 2002* (Geneva: UNAIDS, 2001). Available: <http://www.unaids.org>

133 The history of tuberculosis provides a salutary lesson here, as complacency over tuberculosis in the US in the 1980s reversed the positive progress that had been made in eradicating the disease over the previous 50 years. See David E. Bloom, River Path Associates and Karen Fang, “Social Technology and Human Health” (concept paper for the *Human Development Report 2001* “Channelling technology for Human Development,” <http://www.un.org/Depts/DPKO/Missions/untac.htm> [2001]).

134 Daniel Q. Haney, “AIDS rampant among young gay black men,” *Associated Press*, February 5, 2001.

135 See UNAIDS, *AIDS epidemic update: December 2000* (Geneva: UNAIDS, 2001).

136 Most AIDS-related deaths are likely to hit the 25–45 year age group. ING Barings, *The demographic impact of HIV/AIDS on the South African economy* (Johannesburg: ING Barings, December 1999).

Third, the susceptibility of working-age individuals leads to a potential reduction in savings rates and disposable income, which may have an economic impact.¹³⁷ Savings will decline both because there are fewer working-age people available to earn, and because the high costs of treating the virus will eat into household savings.¹³⁸

Fourth, high rates of AIDS-related deaths could act to reduce the stock of human capital. People will have less of an incentive to acquire costly educational capital if they do not expect to live long enough to enjoy substantial gains from acquiring it, even if there are temporary increases in the measured stock in the early years of the epidemic, for reasons discussed in the previous chapter. And the future stock of educational capital could also be affected if children whose parents die prematurely due to AIDS are unable to afford to continue their education.¹³⁹

Finally, in addition to the influences on aggregate economic performance, individuals working in particular sectors within economies are likely to be especially vulnerable to HIV/AIDS. HIV is particularly likely to infect individuals in sectors that involve mobile and sex-segregated labor, such as trucking, fishing, and the military; sectors that have to do with ill people, such as health care; and sectors that may be particularly sensitive to the risk of ill health, such as tourism.¹⁴⁰

137 Kieren Daly, *The Response of Business to AIDS: Impacts and Lessons Learnt* (London: UNAIDS, The Prince of Wales Business Leaders Forum, and The Global Business Council on HIV & AIDS, 2000).

138 John Cuddington, "Modeling the macroeconomic effects of AIDS, with an application to Tanzania," *World Bank Economic Review* 7, no. 2 (1993a): 173–189; John Cuddington, "Further results on the macroeconomic effects of AIDS: The dualistic labor surplus economy," *World Bank Economic Review* 7, no. 3 (1993b): 403–417; John Cuddington and John Hancock, "Assessing the impact of AIDS on the growth path of the Malawian economy," *Journal of Development Economics* 43 (1994a): 363–368. Mead Over, "The macroeconomic impact of AIDS in sub-Saharan Africa," *Technical working paper #3* (Washington DC: The World Bank, Africa Technical Department, 1992).

139 They may also experience reduced levels of nutrition.

140 Tony Barnett and Piers Blaikie, *AIDS in Africa: Its Present and Future Impact* (New York: The Guilford press, 1992); Tony Barnett and Alan Whiteside, "HIV/AIDS and development: Case studies and a conceptual framework," *European Journal of Development Research* 11, no. 2 (1999): 220–234; Durban, South Africa: University of Natal, Health Economics and HIV/AIDS Research Division. David E. Bloom and Sherry Glied, "Economic implications of AIDS in Asia," in *Economic Implications of AIDS in Asia*, ed. David E. Bloom and Joyce Lyons (New Delhi: Oxford University Press, 1993); David E. Bloom and Ajay Mahal, "Economic implications of AIDS in Asia," (Draft. New York, NY: Columbia University, Department of Economics, 1996); David E. Bloom, Ajay Mahal, and River Path Associates, "HIV/AIDS and the Private Sector," (Draft. Boston, MA: Harvard School of Public Health, Department of Population and International Health, 2002).

However, other influences may counter these effects. Although HIV/AIDS mortality can reduce overall output, it also reduces population—workers who die of AIDS may be replaced by people who were previously unemployed, so per capita productivity may not be reduced. A smaller labor force may even lead to a rise in output per capita.¹⁴¹ Therefore it is possible that GDP per capita may not decline, even in the hardest-hit areas, although, as we shall see, shrinking overall output may have some long-term effects on a country's production.

Macro-Level Impacts

Having established the potential for AIDS to affect economies, we will examine whether this potential has translated into real impacts. As noted in Chapter 2, there is a lack of reliable time series data on poverty rates and AIDS, and disentangling the effects of AIDS from other influences is particularly problematic in Africa, making drawing conclusions about macro-level impacts difficult.

Macro evidence from the early phases of the epidemic generally failed to support the hypothesis that AIDS would have a detrimental effect on growth rates of per capita income. Macro-simulation models, customized in various ways to account for key aspects of the AIDS epidemic, did suggest some impacts. An estimate based on a computable general equilibrium model suggested that HIV/AIDS would have resulted in a two-percentage point decline in the rate of growth of real GDP in Cameroon during the period 1987–1990.¹⁴² Another set of simulation analyses conducted by John Cuddington and co-authors in a neoclassical growth model suggested that the AIDS epidemic would depress the annual rates of growth of real GDP per capita in Malawi and Tanzania by an average of 0.25 percentage points over the period 1991–2010.¹⁴³ In contrast to the results of these simulation studies, the findings from the only empirical study conducted over a comparable period, from 1980 to 1992, concluded that AIDS had no statistically significant impact on per capita income growth.¹⁴⁴

141 C. Arndt and J.D. Lewis, "The HIV/AIDS pandemic in South Africa: Sectoral impacts and unemployment," *Journal of International Development* 13 (2001): 427–450.

142 G. Kambou, S. Devarajan, and M. Over, "The economic impact of AIDS in an African country: Simulations with a Computable General Equilibrium Model of Cameroon," *Journal of African Economies* 1, no. 1 (1992):109–130.

143 John Cuddington, "Modeling the macroeconomic effects of AIDS, with an application to Tanzania," *World Bank Economic Review* 7, no. 2 (1993): 173–189; John Cuddington and John Hancock, "Assessing the impact of AIDS on the growth path of the Malawian economy," *Journal of Development Economics* 43, no. 2 (April 1994): 363–368.

144 David E. Bloom and Ajay Mahal, "Does the AIDS epidemic threaten economic growth?" *Journal of Econometrics* 77, no.1 (1997): 105–124.

However, the epidemic has since grown rapidly and has begun to have a significant effect on life expectancy and other human development indicators.¹⁴⁵ In South Africa, for example, life expectancy is expected to fall between 18 and 25 years below its pre-AIDS level.¹⁴⁶ Recently, Arndt and Lewis used a Computable General Equilibrium model that was even more comprehensive than that of Kambou, Devarajan and Over¹⁴⁷ to conclude that over the period 2000–2010 the annual rate of growth of real GDP in South Africa under their projected AIDS scenario would be substantially lower in comparison to a no-AIDS scenario, with the difference ranging from 1 percentage point to 2.6 percentage points, depending on the year. They also found that per capita real GDP would suffer on account of HIV/AIDS, although not as much as real GDP.¹⁴⁸ A macro-simulation analysis has also been undertaken for Botswana, where there is currently one of the most severe HIV epidemics in the world.¹⁴⁹ The main finding of this study is that overall GDP under projected AIDS scenarios in Botswana would be substantially lower in 2021, compared to a no-AIDS scenario. However, HIV/AIDS also reduces population substantially in their model, so that the direction of effect on real income per capita is less clear. Additional, simulation-model-based findings on the negative effects of AIDS on the rate of growth of real GDP and GDP per capita can be found in UNAIDS (2002).¹⁵⁰

Here, we present new econometric evidence on the links between HIV/AIDS and growth of real income per capita.¹⁵¹ Apart from the fact that empirical analyses are able to capture channels of transmission of the effects of HIV that are not necessarily accounted for in macro-simulation models, this is a useful exercise for three reasons. First, compared to the situation a decade ago, data are available for a much greater set of

145 David E. Bloom, Neil Bennett, Ajay Mahal, and Waseem Noor, "The Impact of AIDS on Human Development" (Draft. New York: Columbia University, Department of Economics, 1996).

146 C. Arndt and J.D. Lewis, 2000, give the figure 25 years, while UN. 2001. indicates 18 years.

147 G. Kambou, S. Devarajan, and M. Over. 1992.

148 C. Arndt and J.D. Lewis, "The HIV/AIDS pandemic in South Africa: Sectoral impacts and unemployment," *Journal of International Development* 13 (2001): 427–450.

149 Maitland MacFarlan and Silvia Sgherri, "The macroeconomic impact of HIV/AIDS in Botswana," *Working paper #WP/01/80* (Washington DC: International Monetary Fund, 2001).

150 UNAIDS, "The Mounting Impact" (2002). Available: <http://www.unaids.org/barcelona/presskit/barcelona%20report/chapter3.html>

151 The results reported here are based on a recently completed UNDP sponsored study: Ajay Mahal, *The Economic Implications of Inertia and Benefits of Action on HIV/AIDS* (New Delhi: United Nations Development Programme, 2002b). The list of countries used for the purposes of our estimation exercise can also be found in that study.

countries.¹⁵² UNAIDS now provides estimates of HIV prevalence in more than 200 countries. Second, the data are of improved quality compared to a decade ago. In particular, sentinel surveillance data for women visiting antenatal clinics in many countries offers a glimpse into HIV-prevalence rates in a group reasonably representative of trends in the general population.¹⁵³ Third, we use AIDS case estimates, instead of HIV, in our analysis. Use of AIDS data is desirable, because many of the adverse consequences of the HIV/AIDS epidemic for aggregate economic performance result from the effects on the labor force once the AIDS stage has been reached, rather than after initial infection with HIV. The impact of premature death or morbidity and treatment costs will be felt at this stage, rather than earlier. Most developing countries have poor record-keeping systems, so in all likelihood AIDS cases will be underreported. Thus model-based approaches to estimating AIDS cases have been used for developing countries in the empirical analyses. Our estimation exercise includes several countries that are not located in Asia simply because the sample of countries would otherwise be too small to estimate the macroeconomic impact of HIV with any precision when using cross-country data.

152 Rene Bonnel, "HIV/AIDS and economic growth: A global perspective," *South African Journal of Economics* 68, no. 5 (2000): 820–855; Scott McDonald and Jennifer Roberts, *AIDS and economic growth: A panel data analysis* (Sheffield, UK: University of Sheffield, Department of Economics, 2001).

153 Some qualifications to this claim are necessary. It is not obviously true that HIV prevalence rates among women visiting antenatal clinics are representative of prevalence rates among men. Are these rates reasonably representative of HIV-prevalence rates among women in the reproductive age group? Many people do not visit antenatal clinics, many of which are located in urban areas, so they are likely to have lower proportions of rural women. Second, young women at high risk for HIV infection do not visit antenatal clinics on account of stigma. Third, HIV seems to lead to lower fertility rates, so that visitors to antenatal clinics would disproportionately represent individuals with lower HIV prevalence, relative to the whole group. Finally, most of the sentinel surveillance sites are located in public facilities, so that there would be socio-economic differences between women whose blood is tested for HIV in the sentinel surveillance sites, and those who visit private facilities, and are not covered. These caveats suggest that sentinel surveillance data would underestimate HIV prevalence among women in reproductive age groups. The relatively greater ease with which HIV is transmitted to women, compared to men, and the increasing role of heterosexual sex in HIV transmission in developing countries, suggests however, at least one factor leading to a bias in the other direction when using antenatal clinic HIV data to assess HIV prevalence rates among all adults, men or women.

The econometric specifications that we used for estimating the impact of HIV/AIDS on the rate of growth of real income per capita are essentially empirical counterparts of the well-known Solow model.¹⁵⁴ Two such specifications were used: a modified version of the empirical specification used in Bloom and Mahal (1997) with new data, for the period 1980 to 1998, for 69 countries; and a modified version of the equation used by Bloom and Williamson (1998). Estimation of the two specifications allows for the possibility of reverse causation running from growth in income per capita to HIV prevalence as well.

Table 1 reports the estimated coefficients (and associated standard errors) from a statistical analysis, using cross-country data, where the rate of growth of real GDP per capita during the period 1990–1998 was regressed on a set of explanatory variables. Two sources for the sets of explanatory variables used in Table 1 were used: the Bloom and Mahal (BM) formulation, and the Bloom and Williamson (BW) formulation, respectively. Under the BM specification, the annual rate of growth of real GDP per capita during 1980–1998 was negatively related to the AIDS variable, but statistically insignificant even at the 10% level. The finding of statistical insignificance continues to hold even if we undertake the estimation exercise for the two sub-periods, 1980–1990 and 1990–1998, separately, although we do not report the results here. These results are consistent with the original Bloom and Mahal (1997) findings that relied on data from a set of 51 countries for the period 1980 to

154 David E. Bloom and Ajay Mahal, “Does the AIDS epidemic threaten economic growth?” *Journal of Econometrics* 77 (1997): 105–124; David E. Bloom and Jeffrey Williamson, “Demographic transitions and economic miracles in emerging Asia,” *The World Bank Economic Review* 12, no. 3 (1998): 419–455. The set of countries chosen was smaller than the countries for which UNAIDS provides HIV prevalence data, in order to include only those developing countries for which a large number of sentinel surveillance data were available for some years, for reasonably sized samples. Our sample of countries also included developed nations from Europe and North America, as well as Australia, Japan and New Zealand, where reported AIDS cases can be expected to be a reasonably accurate indicator of the true AIDS cases. These were combined with data on a range of geographic demographic and socioeconomic variables as additional explanatory factors—real GDP per capita in 1980, government expenditures on education and defense as a proportion of GDP, mean years of schooling, the ratio of exports and imports to GDP, rate of growth of population, the rate of growth of working age population (15–64 years), whether the country was landlocked, quality of institutions, whether located in tropical regions, life expectancy at birth in 1980 and the rate of growth of lagged per capita income. The sources of these data include the World Development Indicators database, the Penn World Tables (Summers and Heston 1991), Barro-Lee database on education indicators, Human Development Reports for various years (UNDP, various), and Gallup and Sachs. 2000.

1992, that HIV/AIDS did not have a statistically significant influence on the rate of growth of real income per capita during the first decade of the AIDS epidemic. Indeed, the magnitude of the coefficients of the AIDS variables in Table 1 for the BM specification are remarkably similar to those reported by Bloom and Mahal (1997). Table 1 also presents the results of estimating the BW specification. Notice that under this specification, too, the direct impact of HIV/AIDS on economic growth is statistically insignificant for the period from 1980 to 1998. These results on the effects of AIDS on real income per capita are broadly consistent with the findings based on the macro-simulation model for Botswana.

While potential adverse impacts of the HIV/AIDS epidemic on per capita income may be mitigated by declines in population, the fall in a country's overall output (GDP) and its covariates may have significant long-term impacts. A smaller workforce—one likely outcome of a large number of deaths due to AIDS—reduces the opportunities for division of labor and specialization, with consequences for productivity. Moreover, both employees and employers will perceive fewer incentives to invest in long-term training, so productivity at the level of the firm may be negatively affected. Even if per capita incomes do not decline in the short term, the shrinking of a country's workforce that results from HIV/AIDS may pose threats to production and, ultimately, to individual workers. However, more research is needed to confirm whether these theoretical effects are felt in practice.

In reviewing all the available evidence, UNAIDS states that, “despite incomplete data, there is growing evidence that as HIV prevalence rates rise, both total national income and growth in national income fall significantly.”¹⁵⁵ However, as we have discussed, while most existing studies are unanimous in their conclusions about the impact of AIDS on national output, there is less agreement over the effect of AIDS on GDP per capita. In general, most simulation studies support the hypothesis that AIDS will have a negative effect on real income per capita, whereas the econometric evidence on this issue is decidedly less firm. Our own view is that additional data may be necessary before any firm conclusions can be made. As a recent review of the literature shows, many of the studies forecast rather than report impacts; and the methodology and data of some of the existing econometric studies can be questioned.¹⁵⁶

155 UNAIDS, *AIDS Epidemic Update 2000* (Geneva: UNAIDS, 2000).

156 David E. Bloom, River Path Associates, and Jaypee Sevilla. “Health, wealth, AIDS and poverty—the case of Cambodia,” (ADB/UNAIDS, 2001).

**Table 1: AIDS and Growth of Real Income Per Capita
1980–1998**

Variable	Annual Rate of Growth of Real GDP Per Capita (BM Specification)	Annual Rate of Growth of Real GDP Per Capita (BW Specification)
Constant	5.85 (1.76)	-18.31 (12.77)
Average Annual Increase in Cumulative AIDS Prevalence (per 1,000 population)	-0.03 (0.07)	-0.05 (0.10)
Log of Real GDP Per Capita 1980 PPP (as proportion of US GDP per capita)	-1.92 (0.55)	-1.89 (0.69)
Government Expenditures (education+defense) as proportion of GDP (%)	0.23 (0.08)	-0.01 (0.04)
Rate of Growth of Real GDP Per Capita (lagged)	0.28 (0.12)	
Log of Average Schooling, 1980	1.02 (0.45)	0.07 (0.37)
(Exports+Imports)/GDP	0.84 (0.29)	1.20 (0.21)
Average Annual Increase in Population Growth (%)	-1.56 (0.34)	-1.99 (1.16)
Annual Average Increase in Working-Age Population (%)		1.44 (0.99)
Whether Landlocked Dummy: Yes=1; No=0		-0.64 (0.83)
Whether in Tropical Region Dummy: Yes=1; No=0		-1.37 (0.57)
Index of Institutional Quality		0.26 (0.16)
Log of Life Expectancy at Birth, 1980		5.92 (3.29)
N	69	68
R-squared	0.503	0.575

Note: Heteroskedasticity-corrected standard errors reported in parentheses.

Given the lack of hard conclusions on macro-level effects on key variables such as real income per capita, the assessment of household- and, particularly, business-level impacts may be more instructive. These areas will therefore be addressed in turn.

Household Impacts

There are several ways in which individual households are likely to be economically affected by AIDS. The expenses incurred by households with a member infected with the virus are the most visible impact. Bloom and Mahal (1996) and Bloom and Glied (1993) examined the annual treatment costs of HIV/AIDS in nine Asian countries in the mid-1990s and concluded that in most cases, these costs were more than twice the country's per capita income. For example, the ratio of treatment costs to per capita income was 2.4 in Indonesia, 2.2 in the PRC and India, and 1.5 in Sri Lanka.¹⁵⁷ The cost estimates by Bloom and Mahal did not include the costs of anti-retrovirals (ARV), which are likely to further increase the economic burden on families and households.¹⁵⁸

A second key impact is on earnings and incomes of households with members with HIV/AIDS, especially since, as discussed earlier, HIV/AIDS usually affects working-age individuals in their most productive years. Lost earnings when individuals are sick or die prematurely of AIDS can be quite large given that they accumulate over several years, even under fairly conservative assumptions about discount rates and working life span.¹⁵⁹ Bloom and Mahal (1996) estimated that lost lifetime earnings were nearly three and one-half times the annual costs of treating AIDS. In Sri Lanka, lost lifetime earnings due to an AIDS-death were nearly eleven times the annual treatment costs of AIDS. In Nepal, rough calculations suggest that earnings losses due to an AIDS death were more than four times per capita income.¹⁶⁰ Incomes and earnings can also be lost due to the loss of a job from stigma associated with HIV infection, even if the HIV-positive individual is not sick

157 David E. Bloom and Sherry Glied, "Economic implications of AIDS in Asia," in *Economic Implications of AIDS in Asia*, ed. David E. Bloom and Joyce Lyons (New Delhi: Oxford University Press, 1993); David E. Bloom and Ajay Mahal, "Economic implications of AIDS in Asia," (Draft. New York, NY: Columbia University, Department of Economics, 1996).

158 Joan Kaufman, op cit, points to recent moves by the Chinese government to reduce the cost of AIDS treatment. AZT (and, soon, other AIDS drugs) are being manufactured in PRC, thus lowering the cost considerably. She notes that patients in rural areas, for the most part, will still not be able to afford these drugs, but the government is seeking assistance from the Global AIDS Fund for large-scale testing and counselling to be carried out on a voluntary basis.

159 Bloom and Glied. 1993. 164; Bloom and Mahal. 1996. 39–40; Mechai Viravaidya, Stasia Obremsky, and Charles Myers, "The economic impact of AIDS on Thailand," in *Economic Implications of AIDS in Asia*, ed. David E. Bloom and Joyce Lyons (New Delhi: Oxford University Press, 1993); Bong-Min Yang, "The economic impact of AIDS on the Republic of Korea" in *Economic Implications of AIDS in Asia*, ed. David E. Bloom and Joyce Lyons (New Delhi: Oxford University Press, 1993).

160 David E. Bloom and Ajay Mahal, "Economic implications of AIDS in Asia," (Draft. New York, NY: Columbia University, Department of Economics, 1996).

with opportunistic infections associated with HIV/AIDS. In these cases, the discounted value of lost earnings is even greater than in the case of an AIDS death, since the period over which the household does not have access to an individual's earnings is greater.

Lost earnings and increased expenditures due to AIDS deaths among adults result in a number of short- and long-term consequences for households that are not generally fully ameliorated by the counteracting influences of support from the community and extended family, or by health and life insurance. These could include declines in household savings and asset holdings. Studies in Thailand demonstrate that households with AIDS deaths experienced a greater decline in asset holdings than households with non-AIDS related adult deaths, or those with no deaths at all.¹⁶¹ There is also evidence from a number of African countries to suggest that, even after changes in the living arrangements of extended family members are taken into account, overall labor input in agricultural activities declined in households that experienced an adult death.¹⁶² Not surprisingly, the magnitude of the adverse effects varied with the initial economic position of the household—with richer households better able to cope than poorer ones.¹⁶³

In addition to long-term declines in household asset holdings, some evidence suggests that members of households affected by HIV/AIDS will have lower long-run accumulations of human capital, measured in terms of achievements in education or health. A study of 324 rural and urban households in Zambia suggests that AIDS deaths within households are likely to be associated with declines in nutrition and the loss of educational continuity among children, with the effects likely to be especially concentrated among rural households and the urban poor.¹⁶⁴ Bechu found

161 Sumalee Pitayanon, Sukontha Kongsin, and Wattana Janjareon, "The economic impact of HIV/AIDS mortality on households in Thailand, in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997); Guinness and Alban, "Socioeconomic Impact of HIV/AIDS in Africa," in the *Africa Development Forum* (Geneva, 2000).

162 Tony Barnett and Piers Blaikie, *Aids in Africa: Its Present and Future Impact* (New York: The Guilford Press, 1992); Guinness and Alban. 2000.

163 Alaka Basu, Devendra Gupta, and Geetanjali Krishna, "The household impact of adult morbidity and mortality: some implications of the potential epidemic of AIDS in India," in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997); Guinness and Alban. 2000.; Nampanya Nampanya-Serpell, "Social and economic risk factors for HIV/AIDS Affected families in Zambia," in *International AIDS Economics Network AIDS and Economics Symposium* (Durban, South Africa, July 7–8, 2000).

164 Nampanya Nampanya-Serpell, "Social and economic risk factors for HIV/AIDS Affected families in Zambia," in *International AIDS Economics Network AIDS and Economics Symposium* (Durban, South Africa, July 7–8, 2000).

household consumption declines of as much as 44% in the year following an AIDS death in Cote d' Ivoire, although it is less clear, given the length of the study, whether this effect was sustained over time.¹⁶⁵ However, both studies are also based on small-sized samples, so further work may be necessary to generalize their findings.

Finally, the lack of availability of formal health and life insurance can also cause economic damage to households. In any case, a variety of excludability clauses prevent access to such insurance by the few people with HIV/AIDS who might otherwise be able to afford it.¹⁶⁶ This, combined with very limited private insurance coverage in most developing countries, implies that safety nets offered by the public sector, or public sector insurance coverage, are the sole options open to households. However, in many developing countries the availability of suitable public safety nets is hampered by the poor fiscal situation and the predominance of informal sector employment.

One of the few ways in which households can reduce the impact of AIDS is by using public sector health facilities that are often available at subsidized rates to the poor. Unfortunately, in countries with a substantially advanced HIV/AIDS epidemic, this is overwhelming the capacity of the public health sector. HIV-related bed occupancy rates in public hospitals in several countries in Sub-Saharan Africa, for example, range from 25–70%, with obvious implications for the health budget.¹⁶⁷ Yet the need for subsidies is clear. A National AIDS Accounts study in Rwanda indicates that less than 30% of the AIDS-affected households were able to pay for all of their own health care.¹⁶⁸

Household-level studies indicate that HIV/AIDS has a significant impact on affected families. However, most available estimates suggest that this does not translate at a macro level into pressure on national economies. This

165 Natalie Bechu, "The impact of AIDS on the families of Cote d'Ivoire: changes in consumption among AIDS affected households," in *Confronting AIDS: Evidence from the Developing World*, ed. Martha Ainsworth, Lieve Fransen, and Mead Over (Washington DC: The World Bank, 1998).

166 David E. Bloom, Ajay Mahal, Lene Christiansen, Amala de Silva, Soma de Silva, Malsiri Dias, Saroj Jayasinghe, Swarna Jayaweera, Soma Mahawewa, Thana Sanmugam and Gunatillake Tantrigama, "Socioeconomic dimensions of AIDS in Sri Lanka," in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997).

167 Guinness and Alban, "Socioeconomic Impact of HIV/AIDS in Africa," in the *Africa Development Forum* (Geneva, 2000).

168 Ibid.

pressure is likely to grow, however, if businesses begin to suffer from the effects of the virus. In the next section, we will focus on the impact of HIV/AIDS on the private sector.

Business Impacts

In this section we discuss the impacts of HIV in four business sectors—health, tourism, agriculture, and private industry. We then discuss the motivations for companies to take action to prevent HIV and care for those infected, and present some examples of successful actions by Asian businesses. Finally, we consider the findings of a new paper that examines the private sector’s understanding of, and response to, the AIDS epidemic.

The relationship between HIV and health is obvious. But have the impacts of HIV been reflected at the sector level, by way of, for example, an increased burden on health services, increased share of health budgets, and an impact on the health insurance sector? There is some evidence, particularly from Sub-Saharan Africa, that this is indeed the case.¹⁶⁹

Relative to studies of the impact of HIV/AIDS on health services and public health spending, there are very few analyses of the impact on the private health insurance sector. Presumably a major reason for this is the exclusion of HIV-positive individuals from the pool of insurable individuals. However, exclusion clauses may not always be effective in reducing the costs to insurance companies, especially if treatment costs for opportunistic infections are passed on to third-party payers without disclosure of an individual’s HIV status. Insurance company reaction to HIV/AIDS is another way to discern potential impacts of HIV/AIDS. For example, Thailand’s American International Assurance (AIA) works with NGOs to promote HIV-

169 In their survey of the literature, Guinness and Alban cite studies from Burkina Faso, the Democratic Republic of Congo, Tanzania, and Uganda indicating that bed occupancy attributable to HIV/AIDS exceeded 50% in selected hospitals (Guinness and Alban, “Socioeconomic Impact of HIV/AIDS in Africa,” in the *Africa Development Forum* [Geneva, 2000] 5). These are countries with HIV-prevalence rates of 5–10% around the time the study was conducted. For countries with HIV prevalence rates in excess of 10% (Cote d’Ivoire, South Africa, Swaziland, Zambia, and Zimbabwe), available data suggests that bed occupancy due to AIDS ranged from 25–70% in urban hospitals. Guinness and Alban also summarize studies that indicate significant shares of the health budget being accounted for by HIV/AIDS—AIDS care took up 20% of the Malawi health budget in 1996 and 13% of the Swaziland Ministry of Health budget in 1994. In Cote d’Ivoire and Tanzania, about 5.7 and 3.1% respectively, of public health spending in 1995 was AIDS-related. (Don Shepard, “Levels and determinants of expenditures on HIV/AIDS in five developing countries,” in *Confronting AIDS: Evidence from the Developing World*, ed. Martha Ainsworth, Lieve Franssen and Mead Over (Washington DC: The World Bank, 1998. 247.)

prevention among factory owners. The company gives financial incentives and discounts to companies with strong workplace and community prevention programs.¹⁷⁰

One might hypothesize that tourism would be adversely affected in a country with a high HIV prevalence. HIV/AIDS can potentially affect the tourism sector in high-prevalence countries by decreasing visits by foreigners who do not want to face the risk of HIV infection, a concern expressed by several of the respondents in a survey of tourism experts in Sri Lanka.¹⁷¹ However, in general, and provided the blood supply is safeguarded against HIV contamination, visitors should not face an increased risk of infection unless they undertake activities with high risk for HIV infection, such as unprotected sex with individuals likely to be infected, sharing of injecting equipment and the like. Since the proportion of such visitors in the overall flow of tourists is unlikely to be very large, it is difficult to imagine large effects of HIV on tourist flows. This is backed up by the little empirical evidence that exists. A cross-country analysis of data from 31 countries concerning tourist flows, HIV/AIDS, and other determinants of tourist flows suggests no association between HIV/AIDS and tourism in a country.¹⁷²

Given its disproportionately high impact on young adults, it is possible that HIV/AIDS will have a significant impact on agricultural activities, which are generally labor intensive. A study in Rwanda estimated that the loss of a female adult member of an agricultural household could lead to a nearly 50% decline in its farm labor inputs,¹⁷³ and similar results have been documented elsewhere in Sub-Saharan Africa.¹⁷⁴ One consequence has been a shift to less labor-intensive cash crops, declines in areas cultivated, and less animal husbandry.¹⁷⁵

170 Don Shepard, "Levels and determinants of expenditures on HIV/AIDS in five developing countries," in *Confronting AIDS: Evidence from the Developing World*, ed. Martha Ainsworth, Lieve Fransen, and Mead Over (Washington DC: The World Bank, 1998. 247.

171 David E. Bloom, Ajay Mahal, Lene Christiansen, Amala de Silva, Soma de Silva, Malsiri Dias, Saroj Jayasinghe, Swarna Jayaweera, Soma Mahawewa, Thana Sanmugam, and Gunatillake Tantrigama, "Socioeconomic dimensions of AIDS in Sri Lanka," in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997).

172 Ibid.

173 Stuart Gillespie, "Potential impact of AIDS on farming systems: A case study of Rwanda," *Land Use Policy* 6, no.4 (1989) : 301–312.

174 Guinness and Alban, "Socioeconomic Impact of HIV/AIDS in Africa," in the *Africa Development Forum* (Geneva, 2000).

175 Tony Barnett and Piers Blaikie, *AIDS in Africa: Its Present and Future Impact* (New York: The Guilford press, 1992); Guinness and Alban. 2000. 7–8.

HIV/AIDS could also impose costs in agricultural settings of having to replace labor, not reaping a full harvest, and paying funeral expenses. But do these results translate into company- or sector-level effects? There is some evidence of these effects in Sub-Saharan Africa, where studies have found that HIV/AIDS has significant impacts on production costs, lost labor time, and labor productivity.¹⁷⁶

However, the effects of HIV/AIDS on national or regional agricultural production levels have not been as well documented. A major reason could simply be that the lost production is replaced by increased agricultural production among households not affected by AIDS, which is facilitated by land transfers or sales from AIDS-affected families to such households. In their survey of the literature on the economic impacts of AIDS in Africa, for instance, Guinness and Alban state, “The adverse impacts of the epidemic on small holder agriculture are often subtle enough to be invisible at the macro-level...”¹⁷⁷ The only sector-level estimates available are from CGE model-based simulations undertaken by Arndt and Lewis for South Africa, which report that value added in the overall agricultural sector in that country would be 17% lower in 2010 under a projected AIDS scenario compared to a situation of no AIDS.¹⁷⁸

Examples of private firms in other sectors facing an increased economic burden on account of HIV/AIDS are provided in a recent survey of the literature by Bloom, Mahal, and River Path Associates.¹⁷⁹ The costs to business arise from two major factors—the effect of HIV on the workforce and the threat to the customer base, with potential further impact on a company’s corporate reputation stemming from the presence of HIV-infected individuals at the company.

176 One early-1990s study of a sugar estate in Zambia suggests that HIV/AIDS-related illnesses accounted for about 2% of lost labor time and 2% of its costs of production, projected to increase to 3.1% by the mid-1990s. Another study of a sugar estate in Swaziland suggests that 30% of the deaths in its labor force over a three-year period from 1996–1998 could be attributed to AIDS. Analyses of agricultural firms in Kenya suggest a decline in labor force productivity and profitability due to AIDS in recent years. And production losses due to HIV/AIDS related deaths and morbidity were estimated to be 3.4% of gross profit in one Malawi tea and coffee estate.

177 Guinness and Alban, “Socioeconomic Impact of HIV/AIDS in Africa,” in the *Africa Development Forum* (Geneva, 2000). 2.

178 Channing Arndt and Jeffrey Lewis, “The HIV/AIDS pandemic in South Africa: Sectoral impacts and unemployment,” *Journal of International Development* 13 (2001): 427–49, 16.

179 David E. Bloom, Ajay Mahal, and River Path Associates, *HIV/AIDS and the Private Sector* (Draft. Boston, MA: Harvard School of Public Health, Department of Population and International Health, 2002).

The evidence on the economic impact of HIV/AIDS on workforces is therefore mixed. The effect on the workforce is felt mainly through increased absenteeism, burial and funeral costs, recruitment and training costs, lost knowledge, and damaged morale. Using data from a survey of nearly one thousand firms in Sub-Saharan Africa, Biggs and Shah concluded that the impact of AIDS on staff turnover was minimal, although they did find that replacing professional staff—often thought to be at high risk for HIV infection based on early studies in Africa—was a significant problem, with firms taking 24 weeks to replace a deceased professional, compared with 2–3 weeks for less skilled staff.¹⁸⁰ Indeed, there are examples of multinationals in South Africa hiring three workers for each skilled position to ensure that replacements are on hand when trained workers die.¹⁸¹ Overall, a set of smaller-scale studies show a pattern of small but significant impacts.¹⁸²

HIV/AIDS can also reduce a firm's customer base or limit its disposable income. The group hardest hit by AIDS—young adults of working age—is also the major source of demand for goods and services. Moreover, caring for people with AIDS is expensive, so while certain sectors such as health might see increased demand, most others are likely to experience spending redirected away from them. Such effects will only be detected by individual firms when many people's consumption decreases. Effects on the customer base are more likely to be transparent if there are dominant firms, or firms organized into business associations. One example is that of JD Group (South Africa's leading furniture retailer), which performed its own research on the potential impact of the epidemic on its markets. The company used a forecast

180 Tyler Biggs and Manju Shah, "The impact of the AIDS epidemic on African firms," *RPED Discussion Paper #72* (Washington DC: The World Bank, Africa Region, 1997).

181 David E. Bloom, Ajay Mahal, and River Path Associates, *HIV/AIDS and the Private Sector* (Draft, 7. Boston, MA: Harvard School of Public Health, Department of Population and International Health, 2002).

182 Zambia's largest cement factory saw a 15-fold increase in funeral-related absenteeism between 1992 and 1995. In Benin, a 14-firm case study found that 50% of HIV-positive employees held positions considered "important" by these firms. In Zambia, at Barclays Bank, the death rate among employees rose from 0.4% in 1987 to 2.2% in 1992, and the company lost an average of 36 of its 1,600 employees to HIV/AIDS each year. Payments to families increased substantially over this period and more than 70% of the deaths occurred among employees aged less than 40 years. In Zimbabwe, one study estimated that at a large firm with 11,500 employees, there were nearly 3,400 HIV-positive workers, with the costs of AIDS in 1996 amounting to roughly 20% of the company's profits, mainly on account of health care benefits. Much of this literature is recent and further work is obviously necessary to arrive at concrete conclusions.

of HIV-prevalence among its customers and found that changes in demography would reduce its customer base by 18% from current levels by the year 2015.¹⁸³

The impact on a company's reputation is more difficult to quantify, although there is growing evidence that companies' behavior is having an increasing influence on consumers.¹⁸⁴ The ultimately positive response of pharmaceutical companies (after they came under severe pressure) to the South African campaign for cheaper anti-retroviral drugs suggests that some sectors are beginning to acknowledge the potential effects and, as we will see later, several Asian companies are also taking positive action to combat the virus.

There are therefore both negative and positive motivations for the private sector to work to tackle HIV/AIDS. Negative motivations result from the desire to protect a company from, for example, litigation or bad publicity, while positive motivations are linked to a desire to innovate and stand out above competitors. Bloom et al (2002) describe a framework whereby basic actions to avoid negative impacts on a company's workforce, market, and brand can be supplemented by positive actions to push ahead of competitors and gain leadership. As the authors suggest, "the most successful incursions are those which have a) the greatest saliency for a company's core business, b) the most relevance to a company's stakeholders (including staff, customers, suppliers, and the community), and c) the best fit with a company's skills and expertise."¹⁸⁵

Bloom et al (2002) present several examples from Asia. Most are focused on the workforce, but some combine workforce protection with market-driven efforts:

- *Get Paper Industry, Nepal*: The company provides health education to the local community, via community events, outreach programs, and condom distribution. The program, which includes efforts to target sex workers, migrant workers, police and truck and bus drivers, now covers 12% of Nepal.

183 David E. Bloom, Ajay Mahal, and River Path Associates, *HIV/AIDS and the Private Sector* (Draft, 7. Boston, MA: Harvard School of Public Health, Department of Population and International Health, 2002).

184 David E. Bloom, Ajay Mahal, and River Path Associates, *HIV/AIDS and the Private Sector* (Draft, 12. Boston, MA: Harvard School of Public Health, Department of Population and International Health, 2002).

185 Ibid., 19.

- *Regent Hotel, Bangkok, Thailand:* The Regent Hotel focuses its HIV prevention efforts primarily on new and existing staff. But training and fundraising events have been complemented by the development of a workplace manual for the hotel industry.
- *Godrej and Boyce, India:* This major manufacturing firm has implemented an AIDS awareness program aimed at employees and their families. Articles in newsletters, lectures to schools, and programs carried out by company medical staff and social workers are supplemented by ongoing support to employees living with HIV/AIDS.
- *Shopping-Mall Based Youth Center, Philippines:* The Remedios AIDS Foundation's 'Youth Zone' project uses the internet to support counseling services for Filipinos aged 10–24 years. Tutuban Properties has provided space in shopping malls and support to the program.
- *Larsen and Toubro Limited, India:* This engineering and construction firm launched an HIV awareness program aimed at reducing the stigma around the virus. The company does not discriminate against HIV-positive individuals in its hiring and promotion practices, and it provides counseling to those living with HIV, and education to promote acceptance of colleagues living with the virus. Beyond its own staff, the program targets local families and schools, and slum communities. The company also provides access to its HIV/AIDS training modules to other firms.
- *AIA, Thailand:* The largest life assurance company in Thailand focuses its HIV/AIDS efforts on its market. HIV/AIDS is likely to increase insurance payments, and therefore premiums, which may mean many more Thais will be unable to afford life insurance. AIA therefore gives discounts on insurance to firms with strong workplace and community HIV/AIDS programs.

A recent paper,¹⁸⁶ based on data from 7,789 executives in 103 countries, shows that many businesses have little understanding of the potential impact of AIDS on their organization and in particular on their workforce. While 47% of businesses anticipate some impact from HIV/AIDS on their operations, 54% believe that less than 1% of their workforce is currently infected, and only 16% base their estimate on a quantitative survey.

186 David E. Bloom, Lakshmi Bloom, David Steven, and Mark Weston, "AIDS and Business: Who Me?" in *World Economic Forum* (Geneva, December 2003). Available at http://www.weforum.org/pdf/Initiatives/GHI_BusinessAIDSWhoMe_All.pdf

However, businesses operating in the developing world, and particularly in locations where national prevalence rates are high, are more likely to have undertaken studies. In Asia, 20% of firms report that they have done so, and figures are particularly high in Indonesia (47%), Korea (28%), Thailand (27%), and the PRC and Pakistan (both 24%).

Questions about the response of businesses to the threat of AIDS on their operations show that many firms are taking little action. Only 6% of the sample has a written policy, approved at board level, although this too increases among those in locations where national prevalence rates are high. Just 8% of Asian businesses have a policy, in contrast with 12% in Africa, but figures are higher for Indonesia (39%), Thailand (16%), India (11%), and Korea (10%).

These findings suggest that businesses are not particularly active in taking steps to combat the effects of AIDS on their operations, even in situations where they believe they are at risk. Further, the data show that many are making decisions about dealing with AIDS based on scant information about the extent and potential of the problem at the firm level. Examples like the ones cited above are still the exception rather than the rule.

The Effect on Asia

Studies focusing on Africa suggest that some economic impact of HIV/AIDS is inevitable. In Asia, the small rate of increase of cumulative AIDS prevalence means the AIDS epidemic has had a negligible effect on economic growth in the region so far. However, a substantial rise in prevalence rates could pose a serious threat to Asia's economies, so it is important that the region's governments continue to contain the spread of the virus.

Data are far from adequate, but calculations made for Thailand may be instructive for understanding the potential economic effect of AIDS in high-prevalence areas in Asia. Thailand's ratio of working-age to total population is projected to be 0.70 in 2015.¹⁸⁷ We estimate that cumulative AIDS deaths by that year will be about 1 million, a relatively small number because risky behaviors have declined as a result of Thailand's highly successful anti-HIV policies. Yet if we simulate cumulative AIDS deaths in the absence of these substantial behavioral improvements, they could be as high as 10 million. Add to this an estimate of the number of children that

187 United Nations, *World Population Prospects: The 2000 Revision* (New York: United Nations Publications, 2000).

would not have been born because of these deaths and the population could be about 11.6 million smaller than it otherwise would have been. AIDS mortality is disproportionately selective of adults, and we project that of the 10 million deaths, 92% or 9.2 million would be among adults. To this number, we add the 0.75 million children these adults would have had, and who would have had the chance to reach working age by 2015, and we find that this high-risk scenario causes the working-age population to be smaller by about 9.95 million.¹⁸⁸

This combined effect on the total and working-age population would result in a decline in the working-age share of the population from 0.70 to 0.67. This difference could reduce the average annual growth rate of real per capita GDP between 1990 and 2015 by about 0.65 percentage points, such that annual growth rates are projected to be 2.81% instead of 3.46%. As a result, the level of GDP per capita in 2015 would be US\$1,272 lower than its projected US\$8,500—a difference of 15%.

At Thailand's current prevalence rates, still among the highest outside Africa at an adult rate of 1.8%, the impact on GDP is minimal. Nevertheless, the example demonstrates that an unchecked AIDS epidemic—as some African countries are experiencing—can have a substantial effect on the growth of income per capita because it is so highly concentrated in working-age individuals.¹⁸⁹

188 Given an estimated cumulative number of females dead in 2015, we estimate the number of children these females would have had by assuming that over the 25-year period from 1990 to 2015 over which we are performing the projections, each female who dies from AIDS loses an average of 12.5 years of child-bearing life (the midpoint of the 25-year interval). We divide the 1995 Thai total fertility rate of 1.94 (UNPOP 2000) by 35, the number of childbearing years (from 15 to 50 years of age), to obtain the average number of children born to a woman each year, about .06. We multiply this by 12.5, the number of child-bearing years lost to AIDS, to obtain the number of children lost to an AIDS death, about .75. We then calculate the total number of children lost by multiplying this number by the cumulative number of female deaths. Given this total number of children who were not born because of AIDS deaths, we (again roughly) compute the fraction of these children who would have reached working age by the year 2015 by simply assuming that the same number of children would have been born every year, and that those born by 2000 would reach working age by the year 2015.

189 See David E. Bloom, David Canning, and Jaypee Sevilla. 2001. *Economic Growth and the Demographic Transition* (November).

Conclusion

The example of Thailand, along with those described in Africa, demonstrates what could happen if Asia's leaders fail to attend to the problem of HIV/AIDS. If prevalence rates are allowed to spiral out of control, the impacts on economies will be increasingly strong. Current prevalence rates suggest that large macro-level impacts are unlikely outside Africa, but, as we have seen, the effect on the hardest-hit groups in Asia—and particularly the poor—could be significant. Businesses and households are also likely to be faced with AIDS-related costs, and the final chapter will outline the rationale for taking action on HIV/AIDS, with a focus on Thailand's successful prevention and treatment campaign.

Chapter 4

The Benefits of Action

This chapter examines the potential benefits to economies of taking action to prevent HIV/AIDS, and suggests courses of action aimed at maximizing these benefits.

Rate of Return

Whether or not all the economic impacts of the HIV/AIDS epidemic can be measured, investments in HIV/AIDS prevention can be shown to have the potential of yielding high rates of economic return. In this chapter we provide rough estimates of the rate of return to HIV prevention and compare it to returns on other investments, in the health sector and elsewhere. It is difficult for governments to set investment priorities when the array of demands is intense, so estimating the rates of return can become a key guide to policy choices.

Ministries of health and finance in most developing countries face severely constrained resources and competing demands. Ministries of health, for example, are often faced with the policy challenge of whether to spend the marginal dollar on diarrhoea and/or malaria prevention, or HIV prevention. At other times, they may have to choose between investments on treating the elderly versus HIV prevention. Information available for Thailand, the one country in Asia with a significant record of public spending on HIV/AIDS, indicates that more than 5% of all public sector health spending in the mid-1990s was on HIV/AIDS. (Public expenditures on HIV/AIDS for countries in the South and South-West Asian region are much smaller, however.¹⁹⁰) Scenario analyses also indicate that the effect of HIV/AIDS on

190 David E. Bloom, Ajay Mahal, Lene Christiansen, Amala de Silva, Soma de Silva, Malsiri Dias, Saroj Jayasinghe, Swarna Jayaweera, Soma Mahawewa, Thana Sanmugam, and Gunatillake Tantrigama, "Socioeconomic dimensions of AIDS in Sri Lanka," in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997).

bed occupancy, while small in magnitude, could still be severe given that excess capacity (supply of inpatient days relative to demand) appears to be extremely limited at present.¹⁹¹ The cited study also pointed to a second way in which an expanded HIV/AIDS epidemic could pose problems for the health sector—by constraining supply of medical personnel, many of whom stated that they would need added payments to compensate for an increased risk of HIV infection in health care settings with high HIV prevalence rates. The unenviable nature of the choices that these conflicting uses of funds highlight may cause health ministries to seek additional funds from ministries of finance, which, in turn, also face competing demands for funds.

The standard approach adopted by economists advising governments on resource allocation is to calculate the rate of return on competing demands for resources and direct the funds to investments that yield the highest return, followed by the second highest, and so on, until the budget is exhausted. If an activity offers higher rates of return than alternative uses, the case for investing in that activity is strengthened. Benefits from HIV prevention accrue from both the medical costs averted (by both private and public sectors) and the value of lives saved on account of the intervention.

Economists use both cost-benefit and cost-effectiveness analyses to compare alternative investments. Cost-benefit analysis compares the benefits of a policy action to its costs, both evaluated in monetary terms. In Sri Lanka, studies have shown that preventing HIV transmission by the screening of blood used for transfusion, and the use of disposable instead of reusable injecting equipment in hospital settings can yield benefits that are large relative to costs.¹⁹²

191 David E. Bloom, Ajay Mahal, Lene Christiansen, Amala de Silva, Soma de Silva, Malsiri Dias, Saroj Jayasinghe, Swarna Jayaweera, Soma Mahawewa, Thana Sanmugam, and Gunatillake Tantrigama, "Socioeconomic dimensions of AIDS in Sri Lanka," in *The Economics of HIV and AIDS: The Case of South and Southeast Asia*, ed. David E. Bloom and Peter Godwin (New Delhi: Oxford University Press, 1997).

192 Ibid.

Cost-effectiveness analysis, on the other hand, typically compares outcome indicators such as lives saved and disability adjusted life years gained that are not measured in monetary units, using costs that are measured in monetary units. Several studies demonstrate the potentially high cost-effectiveness ratio of programs such as needle exchanges, STI prevention, information provision and the like.¹⁹³ Cost-effectiveness analyses for health interventions (including HIV/AIDS) are not always useful for policymakers when comparing with policies in sectors other than health, since the former have outcome indicators in units other than money. Thus, cost-benefit analyses are typically the method of choice since both benefits and costs are reduced to monetary units—provided, of course, policies in other areas are similarly evaluated.

Although investments in HIV prevention are often believed to yield relatively high rates of return, there is little empirical evidence for this.¹⁹⁴ In the absence of such evidence, it is difficult to argue (against competing claims) that governments ought to spend more on HIV. This is a first attempt to provide a rate of return on investments in HIV prevention.¹⁹⁵ We analyze the rate of return to Thailand's HIV prevention efforts, using the internal rate of return method, which is often used in cost-benefit analyses.¹⁹⁶

193 See, for example, Edward Kaplan and Elaine O'Keefe, "Let the needles do the talking! Evaluating the New Haven Needle Exchange," *Interfaces* 23, no. 1 (1993): 7–26. A comprehensive review of such studies is Damian Walker, "Cost and cost-effectiveness of HIV/AIDS prevention strategies in developing countries: is there an evidence base?" *Health Policy and Planning*, 18, no. 1 (2003): 4–17.

194 The only study that we are aware of and that does, in fact, report rates of return for HIV prevention expenditures relies on assumed rates of change in behavior on account of such expenditures (Dayton 1998).

195 One might construct a rough estimate of the rate of return to expenditures on AIDS prevention by taking a cost per DALY saved for a particular intervention (e.g. STI management) and valuing the DALY at some multiple of per capita income, say three times. For example, Gilson et. al. 1997, find that the cost per DALY gained in an STI management project in Tanzania is US\$10. Since per capita income is roughly US\$500, then the ROR is: $[(1500-10)/10] * 100 = 14900\%$.

196 We use internal return (IRR), in keeping with much conventional practice. However, IRR tends to be higher than net present value (NPV). The difference is well known and could be consequential when looking to rate of return analysis for policy guidance. IRR can be a reasonable way to compare competing investments when project duration and size are similar. It is entirely possible that alternative projects could have duration and size that are not similar to the AIDS-prevention programs under consideration here, with the consequent conceptual issues that follow from those differences. For a discussion of some of these issues, see Richard Layar and Stephen Glaister, eds., *Cost-Benefit Analysis* (Cambridge, U.K.: Cambridge University Press, 1994) Second Edition, pp.1–56.

The Case of Thailand

Along with Cambodia, Thailand is seen by many as a beacon in the fight against HIV. As with many other Asian countries today, the early spread of the infection in Thailand was slow and was connected mainly to sex workers. Many therefore predicted that AIDS would not become a serious problem. However, the late 1980s saw an alarming rise in infection levels among vulnerable groups, with reported rates among IDUs in Bangkok rising from 1% to 30% in less than a year from 1987 to 1988, and rates among sex workers showing similarly sharp increases. These rises were quickly followed by reports from all 14 of Thailand's provinces of HIV infection in men attending STI clinics and pregnant women, and it was clear that the epidemic was beginning to cross over into the mainstream population. By 1992, HIV rates among pregnant women had reached 2.3%.

The Thai government responded to the threat of AIDS with a range of measures including introducing a reliable sentinel surveillance system, promoting condom use in commercial sex through "100% Condom" campaigns, expanding STI treatment, and implementing mass media campaigns. The government AIDS budget expanded from US\$18,000 in 1988 to US\$81 million in 1996.¹⁹⁷ Results were impressive. HIV prevalence rates among sex workers in Bangkok declined from 13 to 7% between 1994 and 1997; patronage of commercial sex workers declined by 48% from 1993 to 1996;¹⁹⁸ and HIV prevalence rates among pregnant women declined to 1% in 1997. Thailand's annual total of new AIDS cases, which had doubled to 26,000 between 1994 and 1997, fell back to 1994 levels within just 2 years.

We have analyzed the period from 1990, when Thailand's prevention activities began, to 2020, when the full effects will be measurable. Public sector and donor expenditures on HIV/AIDS jumped from US\$0.68 million in 1988 to nearly US\$10 million in 1991 and US\$82 million by 1997. It is estimated that

197 UNAIDS, *Relationships of HIV and STI declines in Thailand to behavioral change: A Synthesis of Existing Studies* (Geneva: UNAIDS, 1998); DFID, "A strategic response to HIV in Asia" (Unpublished. London: DFID, February 2000).

198 S. Mills, P. Benjarattanaporn, A. Bennett, R.N. Pattalung, D. Sundhagul, P. Trongswad, S.E. Gregorich, N. Hearst, and J.S. Mandel, "HIV risk behavioral surveillance in Bangkok, Thailand: sexual behavior trends among eight population groups," *AIDS Control and Prevention Project. Family Health International, AIDS*. 11, Suppl 1 (September 1997): S43-51.

roughly 15% of these expenditures were on prevention activity.¹⁹⁹ The private sector spent an estimated US\$80 million on prevention messages in 1991.²⁰⁰

There are two main monetary benefits from HIV prevention. First, prevention reduces the medical care expenditures incurred by the public and private sectors in the treatment of AIDS cases. This can be estimated to be the number of AIDS cases for each year (in person-year-equivalent terms) times the cost of treating an AIDS case for that year. The second benefit is the monetary value of lives that are “saved” on account of the intervention. This can be measured as the reduction in the number of AIDS deaths due to the HIV prevention program times the value of a “life.” One approach commonly used to estimate the value of a life is to look at the income losses that result from the death.²⁰¹ Another is to estimate the value of a “statistical life” obtained from studies of the additional amounts people need (as compensation) to accept small increases in the risk of dying. We have calculated both effects.

Calculation of benefits from a specific HIV prevention program requires AIDS-related data of the following type for the relevant period: (i) the number of AIDS cases averted on account of the intervention in each year; (ii) the medical cost of treating a single case of AIDS in each year; (iii) the number of AIDS deaths (annual and cumulative) for each year; (iv) the value of a statistical life in any given year; and/or (v) income “lost” for each future year on account of an AIDS death in any given year.

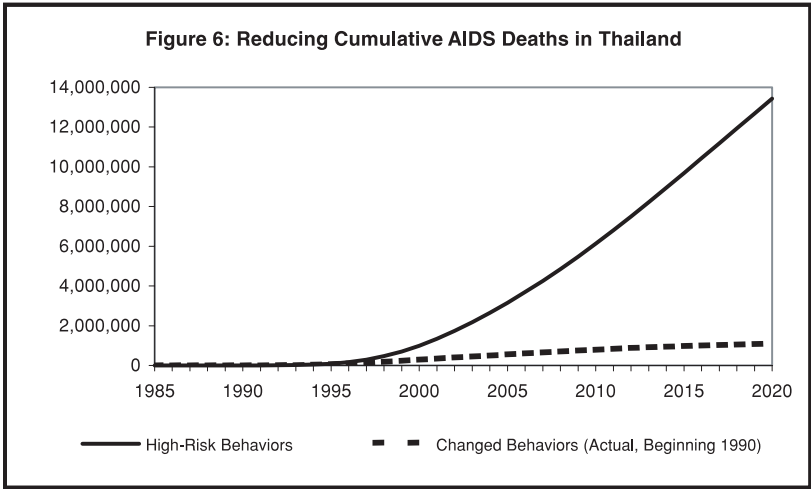
There are good data in Thailand on changes in the behaviors that put people at high risk for HIV infection, which has allowed reliable calculations of AIDS cases and deaths with the help of sophisticated epidemiological models. In particular, these models can help predict the profile of HIV and AIDS cases, and deaths linked to AIDS, over time. As a consequence, we can construct a profile of AIDS cases and deaths over time had behaviors remained unchanged at their 1990 levels, and compare them with the profile that actually emerged following 1990. Comparing the two series yields

199 Martha Ainsworth, et al., *Thailand's response to AIDS: Building on success, confronting the future* (Bangkok, Thailand: The World Bank, 2001).

200 Mechai Viravaidya, Stasia Obremsky, and Charles Myers, “The economic impact of AIDS on Thailand, in *Economic Implications of AIDS in Asia*, ed. David E. Bloom, and Joyce Lyons (New Delhi: United Nations Development Programme, HIV/AIDS Regional Project, 1992).

201 Notwithstanding its relative ease of implementation and its widespread use among health economists, this approach is vulnerable to theoretical criticism.

startling numbers. For instance, if behaviors had remained unchanged at 1990 levels, there would have been more than 12 million extra deaths due to AIDS in Thailand, cumulatively, by the year 2020 compared to current behavioral patterns (Figure 6).



We cannot assume that the difference in the time profile of AIDS cases and deaths (with and without the behavior change following 1990) was due solely to HIV prevention interventions. In particular, faced with high risks of HIV infection, individuals might seek on their own to acquire the knowledge and adopt some of the steps necessary to prevent HIV infection to themselves and people they care about, without any public intervention. If only a portion of the difference in the two profiles (with and without behavior change) can be attributed to HIV prevention expenditures, then our method of calculating the rate of return must account for that fact. Also, some of the reductions in HIV/AIDS infections arise out of increased expenditures on AIDS treatment. This would occur when infected individuals come into contact with the formal health system, counseling and the like, and adopt protective measures that lead to a reduction of secondary infections. Exactly how many of the averted cases arise from treatment-related expenditures is uncertain, but not insignificant.

We assumed here that compared to a public campaign, individuals acting alone or in small groups will take longer to adopt preventive measures and in less intensive ways than would result from the sort of all-out public campaign like Thailand’s. Specifically, we assumed that during the period 1990–2000, all the reduction in AIDS cases and deaths were due to HIV prevention expenditures of the public and private corporate sectors.

However, during the period 2000–2020, we attributed only half of the averted AIDS cases and deaths to prevention expenditures.

Calculating benefits requires assigning monetary values to the averted AIDS cases and deaths. Consider first medical expenditures due to AIDS. Information on the annual cost of treatment of an AIDS case (about 25,700 Baht at 1995 prices—US\$837) was obtained from a 1991 study of Thailand²⁰² and forecasted forward (and backward) in two ways: (i) based on regression analysis linking the log of the annual costs of AIDS treatment to the log of per capita income using cross-country data for 9 Asian countries (authors' calculations); and (ii) from the rate of growth of the annual costs of AIDS cases in the United States over the period 1992–1997 (slightly higher than the growth rate based on per capita income changes).²⁰³ This scenario was considered necessary since costs of treating AIDS will likely increase over time as AZT and various combination therapies are used with greater frequency in Thailand.²⁰⁴

To forecast the cost of AIDS cases, we needed to know the expected rate of growth of real GDP per capita. The rate of growth of real GDP per capita in Thailand during 1999–2020 was forecast to be its average annual rate of growth during 1989–1998—about 3.6% per year. This is somewhat lower than forecasts reported in a recent International Monetary Fund report and so leads to conservative estimates of benefits in terms of the amounts of medical expenditures avoided through HIV prevention programs.

Next, there were benefits from averted AIDS deaths as the money values of lives saved. Benefits in terms of lost incomes averted from a person dying of AIDS in a specific year were calculated to be the per capita GDP for that year; and for subsequent years, the forecasted levels of real per capita GDP until the year 2020. In 1995, for instance, the per capita GDP (at 1995 prices) was about 71,000 Baht, rising to 138,000 Baht by 2020.

On the other hand, the gains in terms of the value of a statistical life (estimated to be 38.73 million Baht in 1993 at 1995 prices) were directly allocated in the year in which the AIDS death occurred and assumed to grow at

202 Mechai Viravaidya, Stasia Obremsky, and Charles Myers, "The Economic Impact of AIDS on Thailand, in *Economic Implications of AIDS in Asia*, ed. David E. Bloom and Joyce Lyons (New Delhi: Oxford University Press).

203 Fred Hellinger, "Cost and financing of care for persons with HIV disease," *Health Care Financing Review* 19, no. 3 (1998): 5–18.

204 Jos Pierrens estimated medical expenditures per AIDS case per year for Thailand in 1996 to be roughly US\$1,335 (the mid-point of his estimated range, communication with Stefano Bertozzi). These are very similar to projected estimates that we obtain for Thailand for that year based on the methodologies described above.

3.6% per year in line with the rate of growth of real GDP per capita. This estimate of the value of a statistical life was based on US numbers but multiplied by the ratio of Thailand's income per capita to the US income per capita in PPP terms.²⁰⁵ Not surprisingly, estimates of the rate of return based on benefits measured in terms of the value of statistical lives saved turned out to be very high.

We did not have any data on forecasted HIV prevention expenditures during the period 2000–2020 and on private (corporate) prevention expenditures for years other than 1991, so we considered two scenarios. Both assumed that for the period 2000–2020, annual HIV prevention expenditures would remain the same (in real terms) as the mean of expenditures during the period 1990–2000. However, one scenario assumed that private corporate expenditures would be fixed at their 1991 levels for the period 1990–2000. The other assumed that the ratio of private corporate prevention expenditures to public sector (and donor) prevention expenditures would remain constant during 1990–2000.

Results

The estimates of the rates of return were obtained under three main benefit profile scenarios (medical expenditures averted; medical expenditures averted plus income losses averted; and medical expenditures avoided plus losses in the value of a statistical life averted), and four main time profiles for prevention expenditures. The scenarios and detailed results for each are described in Appendix 4. To summarize, even with conservative estimates of the impact of the prevention campaigns on the changes in behavior, rate of return is calculated at between 12 and approximately 400% annually, depending on the scenario posited:

- If we focus only on benefits in terms of medical expenditures avoided, the annual average rates of return range from 12 to 32% over a 30-year period (the lower bound is an outcome of assuming growth of medical expenditures in tune with per capita income).
- If we include averted income losses as additional benefits resulting from the reduced number of AIDS deaths (i.e., in addition to savings in medical expenditures), the rate of return jumps upwards very sharply—with the range now from 37 to 55%.

205 United Nations Development Programme, *Human Development Report 1996* (New York: United Nations, 1996). Michael J. Moore and Kip Viscusi, "Doubling the estimated value of life: Results using new occupational fatality data," *Journal of Policy Analysis and Management* 7, no. 3 (1988): 476–490.

- If, however, instead of income losses, we consider the value of an averted AIDS death to be equal to the statistical value of a life, the rates of return of HIV prevention programs jump to approximately 400% per year.

These figures can be compared to estimates of the rate of return for some other health interventions. For example, the rate of return (inclusive of income losses due to disability) of the global guinea-worm eradication program is roughly 29%, compared to 37–55% for Thailand for HIV prevention, calculated by an equivalent methodology. Our estimates for the rate of return on HIV prevention expenditures (inclusive of income losses) also exceed the range of rates of return from interventions for river blindness eradication in Africa (which the World Bank estimates at 6–17%²⁰⁶).

Clearly, intervention to prevent HIV/AIDS provides a potentially high rate of return on investment (even the lowest estimate is above the criteria used by international agencies). However, further research is needed in this area, to explore the rate of return in different countries, with different intensity of epidemic, at different stages in the development process, and with different intervention portfolios.

Maximizing the Benefits

This book has underlined the importance of health to a country's development and its vital role in improving the lives of the poor. It has stressed that AIDS should be treated as one of many health problems, rather than in isolation—but that there should be broad action at all levels of societies to ensure that general health standards are improved.

An attempt to consider AIDS within health, and health within development, will mean facing many different problems in different countries. However, some consistent areas can be identified:

- The need for peace, stability, and good governance. War leads to sudden increases in mobility, the destruction of infrastructure, and the diversion of human capital from development to destruction. Peace and political stability, guaranteed by strong democratic institutions, must be the foundation of any broad effort to tackle AIDS. Even within a

206 World Bank, "Global Partnership to Eliminate River Blindness: African Program for Onchocerciasis Control," (2002). Available: <http://www.worldbank.org/gper/apocsuccess.htm>

peaceful society, the importance of effective governance cannot be over-emphasized. At every level, the ability to make effective decisions and execute them is essential, especially when governments are expected to attempt ambitious cross-sectoral programs, rather than simple vertical interventions. AIDS crosses not only sectors, but borders. Trade corridors and high rates of sex work make this fact especially relevant in Asia. Region-wide donors, and in particular the Asian Development Bank (ADB), are well placed to play a key role in implementing cross-country and regional projects, recognizing the existence of international public goods in the form of policy research and the generation and dissemination of knowledge. The wider view that donors are able to take can counter the tendency of national governments to overlook such areas.

- The need for data-driven decision making. Part of the process of improving governance involves ensuring that decisions are made using data that are reliable, relevant, and available. A genuine multi-sectoral approach requires judgments to be made about the competing claims of quite different interventions—a process that can only intensify as issue after issue attempts to “mainstream” itself across government. Only data and clear processes can begin to discriminate among competing claims in any rational fashion and ensure that interventions are demand- and client-driven—responsive to the particular context rather than being generalized prescriptions. Ongoing measurement of the effectiveness of interventions also enables policymakers to keep track of the changing nature of the epidemic. For example, although Thailand has achieved remarkable results in reducing HIV rates among sex workers and their clients, the profile of those infected is currently changing, with rates among children and drug users on the rise and rates among pregnant women either stable or rising in most areas.²⁰⁷ Only reliable surveillance can alert governments to these changes and allow them to prioritize effectively, and only consistent policy can ensure that gains are not reversed.
- The need to build broad partnerships. External funding institutions such as ADB should work with governments to initiate and inform policy dialogue related to AIDS. Government—in its broadest sense—has traditionally been atomized, with government ministries working in narrow channels, each cultivating a constituency of interested

207 World Bank, *Thailand's response to AIDS: Building on success, confronting the future* (Bangkok: World Bank Thailand Social Monitor V, 2001).

professionals, lobby groups and, more recently, NGOs. In developing countries, these divisions have often been mirrored and emphasized by intense competition among donors for influence and the “right” to spend funds on pet projects. Broad action on a subject like AIDS requires a concerted attempt to break down these barriers and to take a cross-sectoral approach. Alliances should be sought whereby larger donors and governments, which traditionally work with big budgets and therefore big projects, have the flexibility to work with NGOs and grassroots organizations, which have on-the-ground access to poor communities. Action will also require a clear assessment from government of where it can act effectively, and where it is better facilitating action from the private or civil sectors.

- The need for health sector reform. There are a growing number of people in the Asia/Pacific region who are in need of AIDS care and this is exposing the weakness of the health systems in many countries. Health sector reform therefore becomes increasingly urgent and it, in turn, should be seen in the context of broader public service reform in many countries. For example, as we have seen in Cambodia, in some countries, where public servants are paid extremely low wages, many charge the public unofficial fees for their services to survive. Such institutionalized corruption bedevils all government initiatives and dramatically distorts a country’s health service. Without some attempt to tackle these problems, improvements that may be achieved in the lives of poor people and those ill with AIDS will happen despite, rather than because of, government action. Developed nations could also play a role in health sector reform in the developing world, perhaps by giving aid or loans that are tied to reform and the targeting of poor parts of the population.
- The need for private sector involvement. It may be more cost-effective for companies to protect their workers against disease than to replace them. And at a broader level, private sector actions may have an impact on firms’ local communities. As the examples from Chapter 3 show, simple, inexpensive actions, using the private sector’s skills and networks, can have far-reaching effects. The drug nevirapine, for example, has been shown to be effective in reducing mother-to-child transmission of HIV during labor and through breastfeeding.²⁰⁸ The

208 UNAIDS Asia Pacific Intercountry Team Bangkok, UNICEF East Asia Pacific Regional Office, WHO Thailand, “Large-scale Implementation for the Prevention of Mother To Child Transmission of HIV: Issues for South East Asia and the Pacific,” *Technical Update No. 1. Prevention of Mother To Child Transmission of HIV* (Bangkok: UNAIDS Asia Pacific Intercountry Team, UNICEF East Asia Pacific Regional Office, WHO Thailand, November, 1999).

pharmaceutical company Boehringer Ingelheim provides this drug free to developing countries. If nevirapine is offered to all pregnant women in vulnerable populations, the promise of preventing HIV transmission to their babies is likely to encourage many more women to present for HIV testing. At the same time, the women can be given information about the virus along with other health risks. The relatively simple, cost-effective distribution of nevirapine can thereby have the much wider effect of indirectly strengthening the knowledge of these key gatekeepers of family health.²⁰⁹

- Cambodia and Thailand benefited from addressing the problem of HIV/AIDS directly and honestly. The two countries were open about the scale of the problem they faced, and this openness carried over to prevention programs which specifically targeted IDUs and sex workers and their clients—groups whose existence many governments prefer to deny.²¹⁰ Addressing these taboo areas has led to sharp declines in HIV prevalence rates among at-risk groups. Ignoring them, on the other hand, can have serious consequences. In India, for instance, sex work per se is not illegal, if practiced without disturbing public order. However, there is constant harassment of sex workers by the police, leading often to incarceration in prisons or rehabilitation centers.²¹¹ In Pakistan, the practice of sex work is illegal, and carries severe penalties if caught.²¹² This pushes sex work underground and makes sex workers more difficult to reach with HIV/AIDS prevention messages and treatment.
- The need for special consideration of the role of women. Although men suffer disproportionately from HIV everywhere except Africa, women remain key to fighting the epidemic. Their education is vital to ensuring better health for whole families, while their empowerment will give them a better chance of avoiding infection with HIV as the epidemic matures and their risk of infection continually increases. Women are also likely to bear the main burden for providing care, and the World Bank has recommended microinsurance programs to help

209 For more information on the donation program, see <http://www.viramune-donation-program.org/en/program/index.cfm?c=countries>

210 A member of Iran's national AIDS committee was recently cited as saying: "We don't have any commercial sex workers. It is extremely illegal." UN, "Iran: IRIN focus on the battle against HIV/AIDS," *IRIN News*, February 2002.

211 Geetanajali Misra, Ajay Mahal, and Rima Shah, "Protecting the rights of sex workers: The Indian experience," *Health and Human Rights* 5, no. 1 (2000): 88–115.

212 UN, "Pakistan: IRIN focus on the battle against HIV/AIDS," *IRIN News*, February 2002.

women fend off health shocks.²¹³ Perhaps more than any other intervention, progress towards national targets for the major indicators of female welfare (i.e. educational attainment, maternal mortality and general health status, role in the labor market, access to birth spacing technologies, use of condoms, etc.) has the potential to deliver benefits to a country's fight against AIDS, its attempt to improve health standards, its poverty alleviation work, and its general development.

- The need to increase the participation and involvement of poor people. Targeting of vulnerable populations has been, and will continue to be a valuable strategy in the fight against AIDS. However, the adoption of this strategy has been encouraged by the fact that most of these groups have been concentrated in urban centers (often, indeed, in the capital). If governments are to take seriously the possibility that AIDS epidemics will become “stuck” in poor populations even as overall prevalence rates decline, they will need to confront a generalized inability to target poor people. Both geography and politics have played a part here. Rural areas have always been neglected, due partly to distance and partly to the fact that the poor generally exert the least political pressure and therefore can easily be ignored. Risk areas such as trade corridors should be the focus of knowledge campaigns aimed at the poor, but strategies to encourage participation of the poor remain the sustainable long-term answer, especially as prevention campaigns switch from the provision of information to an attempt to give people the tools to understand the risks they face and to make better decisions, both individually and collectively.²¹⁴
- The need to consider the impact of AIDS on institutions and donor strategies. Poverty reduction is the key goal of external funding institutions such as the World Bank and ADB, and health and governance, too, are a major focus of the international donor community. Poverty reduction, health, and governance are all potentially vulnerable to the impact of AIDS and as such, funding organizations must account for its effects on their strategies. The virus puts pressure on Asia's health systems, tests regional cooperation through its cross-border nature,

213 World Bank, *Thailand's response to AIDS: Building on success, confronting the future* (Bangkok: World Bank Thailand Social Monitor V, 2001).

214 Ibid.

undermines progress towards economic and gender equality, and weakens civil society as a whole, with potentially disastrous effects on social stability. Funding agencies, many of whom have been the object of increased criticism of late over the ineffectiveness of their investments, should use their influence to channel AIDS into mainstream thinking in governments of developing countries, through dialogue with ministries, loan conditions, and direct interventions for prevention and care programs. Without such efforts, the effectiveness of their other programs is likely to be reduced. Action on AIDS in Asia offers an opportunity for funding agencies under fire to “promise small and deliver big”—with small-scale investments likely to produce broad beneficial effects.

Conclusions

HIV/AIDS has so far affected only a tiny fraction of Asia’s population. Doom-laden predictions of Asia’s huge populations suffering prevalence rates as high as those in Sub-Saharan Africa have, so far, proven wide of the mark. Even those countries that have seen alarming rises in HIV infection rates have taken swift and successful action to reverse the virus’s spread. However, we have seen that absolute numbers of HIV/AIDS cases in many countries in Asia are high and increasing. While the epidemic may never reach Sub-Saharan African levels, Asia’s governments must act quickly to protect their people.

Some sectors of society are already experiencing very high levels of HIV infection. Rates among sex workers and IDUs in many parts of Asia are above 40%, and increasing alarmingly among men who have sex with men. In many areas where these vulnerable groups have avoided serious epidemics, there is a high risk that complacency or lack of awareness will lead to explosive future outbreaks.

There continue to be disputes over whether HIV will cross over from vulnerable groups into the general population. So far, the virus has largely been contained, but transmission via heterosexual sex (the key route into the mainstream) is increasing. The experience of Africa shows that society’s response to AIDS determines whether it spreads into the general population. Senegal, for example, mobilized all sections of society to keep infection rates low. Botswana, South Africa, and many others failed to act, and infection rates mushroomed. Of greatest relevance for Asia is that prompt, taboo-breaking efforts to educate and protect sex workers and IDUs in Cambodia, parts of India, and Thailand have had great success, and provide valuable lessons to the rest of the continent.

However, even in those countries that have had success in tackling HIV/AIDS, the poor have proved particularly difficult to protect. The poor are especially vulnerable to health shocks, and HIV/AIDS—whose prevention depends so crucially on access to educational messages and health services—poses a serious threat to poverty reduction efforts in the region. One third of Asia’s people live in poverty and, as the analyses in this book confirm, a lack of awareness of the dangers of HIV/AIDS—and presumably also more high-risk behavior—are more commonly found among the poorest sections of society. Small-scale studies suggest that HIV prevalence rates are higher among the poor, supporting the notion that the poor are most at risk.

Assuming that HIV/AIDS in Asia continues to be confined primarily to high-risk groups and the poor, will the impacts on these groups translate into damage to economies? Probably not. So far in most of Asia, the effects have been minimal as prevalence rates have been relatively low. A failure to control the virus, however, could result in significant impacts. As noted earlier, calculations for Thailand show that, in the absence of the country’s successful prevention campaign, GDP per capita in 2015 would have been reduced by 15%. The Thai Government’s actions had a significant effect on the country’s economy, and were also extremely cost-effective. Even with the most restrictive and conservative estimates, the rate of return for HIV prevention in Thailand is between 12 and 32% annually.

Investing in AIDS prevention activities therefore offers Asia’s governments an effective tool for promoting development, by promoting good health (which abets development), by averting income losses, and ultimately by freeing up funds that can be used for other human needs. Ignoring the threat will exacerbate the problems of poverty reduction that so beset large swaths of the continent. Efforts to tackle HIV/AIDS among the poor should form part of a broader strategy to improve human development throughout Asia. Economic status is an important determinant of risk, but literacy, health, liberty, mobility, and equality also contribute. HIV/AIDS prevention and treatment activities should be seen as a vital plank in general efforts to reduce poverty and strengthen societies.

Ultimately, Asia’s economies will suffer if hitherto small-scale epidemics are not controlled. Cambodia and Thailand have shown that HIV/AIDS need not become a serious threat to Asian societies, and that combating the virus does not require huge amounts of money. Governments elsewhere in the region would do well to act with similar promptness.

Appendixes

Appendix 1

The following is a table of coefficients from an OLS regression of adult prevalence in 1999 (per 100 adults aged 15–49 years) on per capita gross domestic product in 1998 and an Africa dummy for developing countries with annual per-capita incomes below US\$10,000:

Table A1: Covariates of Adult HIV Prevalence

Item	Dependent Variable: Adult HIV Prevalence 1999 (per 100 adults aged 15–49 years)
Constant	-0.731 (1.470)
Real GDP per Capita (US Dollars)	0.00027 (0.00026)
Africa Dummy	8.504 (1.333)
R-squared	0.34
Number of Observations	96

GDP = gross domestic product, HIV = human immunodeficiency virus.

Note: Standard errors are shown in parentheses.

Source: Authors' calculations

Appendix 2

We ran binary logits on each of the following outcome variables (with the results shown in the tables in this appendix):

1. Knowledge of the HIV¹-Preventive Benefits of Condom Use
2. Knowledge of the HIV-Preventive Benefits of Having Just One Sexual Partner
3. Knowledge of the HIV-Preventive Benefits of Avoiding Sex with Prostitutes
4. Knowledge of a Source of Condoms
5. Knowledge of Condoms
6. Ever Having Used a Condom

Each logit contained dummy variables for wealth quintile, highest level of education achieved, and 5-year age cohort. We report odds ratios² for the effect of being in the wealthiest quintile and having the highest level of education. In all countries but Tanzania, the highest education level is higher education. In Tanzania, the highest education level is secondary education.

1 Human immunodeficiency virus.

2 To simplify the tables, we only present the odds ratios for the wealthiest quintile, women with completed secondary schooling, and women with higher education. The odds of a particular event are the ratio of the probability of that event happening to the probability of its not happening. For example, if a person's probability of knowing about condoms is p , then that person's odds of knowing about condoms is $p/(1-p)$. The odds ratio is the ratio of two people's odds: the odds of the person we are interested in over the odds of some baseline person. Thus the odds ratio for secondary schooling is the ratio of the odds of someone with secondary schooling to the odds of someone with no schooling. If schooling does not affect the odds of knowing about condoms, then the odds should be similar for the two individuals and the odds ratio should be one. If schooling raises the odds of knowing about condoms, the odds ratio should be larger than 1, but if it lowers the odds of knowing about condoms, the odds ratio should be smaller than 1. The number of stars denotes the significance of the odds ratio estimate, with *, **, and *** representing significance at the 10%, 5%, and 1% level respectively. Unlike linear regressions, 95% confidence intervals for odds ratio estimates are not approximated by an interval twice the size of the standard errors, so the relative size of odds ratio estimates and standard errors do not have the same significance as they do in linear regression. Confidence intervals are available from the authors upon request.

Table A2: Covariates of HIV-Related Knowledge

Country/ Number of Respondents	Wealthiest Quintile	Highest Education
AIDS: Use Condoms During Sex		
Cambodia, n = 15,351	2.139 (0.259)***	1.953 (1.142)
Viet Nam, n = 1,658	2.684 (1.157)**	6.455 (4.284)**
Nicaragua, n = 1,334	1.970 (0.377)***	1.876 (0.723)
Tanzania, n = 1,675	3.031 (0.894)***	3.771 (1.355)***
AIDS: Only One Sex Partner		
Cambodia, n = 15,351	1.127 (0.095)	1.109 (0.291)
Viet Nam, n = 1,658	1.959 (0.797)	4.144 (2.552)**
Nicaragua, n = 1,334	1.084 (0.283)	3.206 (1.300)***
Tanzania, n = 1,675	1.577 (0.384)*	1.254 (0.359)
AIDS: Avoid Sex with Prostitutes		
Cambodia, n = 15,351	0.799 (0.073)**	1.398 (0.423)
Viet Nam, n = 1,658	2.233 (0.588)***	0.967 (0.655)
Nicaragua, n = 1,334	2.251 (0.836)**	1.103 (0.630)
Tanzania, n = 1,675	1.069 (0.510)	0.960 (0.563)
Ever Having Used a Condom		
Nicaragua, n = 1,419	1.766 (0.424)**	2.046 (0.916)*
Tanzania, n = 1,698	2.779 (1.834)	3.457 (2.529)*
Source of Condoms		
Viet Nam, n = 1,867	2.175 (0.771)**	34.132 (36.592)***
Nicaragua, n = 1,416	2.042 (0.440)***	12.417 (7.988)***
Tanzania, n = 1,698	2.462 (0.669)***	16.005 (6.815)***
Knowledge of Condoms		
Viet Nam, n = 1,832	2.504 (0.970)**	26.720 (15.523)***
Nicaragua, n = 1,416	4.713 (2.051)***	6.984 (7.403)*
Tanzania, n = 1,530	17.996 (19.313)***	8.664 (3.894)***

* = * p<.1__, ** = ** p<.05__, *** = *** p<.01__.

Note: Standard errors are in parentheses.

Source: Authors' calculations.

Summary of Results:

1. *Knowledge of HIV-Preventive Benefits of Condom Use:* In all countries, the wealthy and better educated are better informed of the HIV-preventive benefits of condom use.

2. *Knowledge of HIV-Preventive Benefits of having Just One Sexual Partner:* In all countries, the wealthy and better educated are better informed of the HIV-preventive benefits of having just one sexual partner but results are statistically significant only in Viet Nam and Nicaragua for education, and Tanzania for wealth.

3. *Knowledge of HIV-Preventive Benefits of Avoiding Sex with Prostitutes*: Knowledge of the HIV-preventive benefits of avoiding sex with prostitutes does not seem to vary by level of education. The correlation between this knowledge and wealth is ambiguous. It is positive in Viet Nam and Nicaragua, negative in Cambodia, and roughly zero in Tanzania.

4. *Knowledge of a Source of Condoms*: The wealthy and better educated are considerably more likely to know of a source of condoms. (There are no data from Cambodia on this.)

5. *Knowledge of Condoms*: The wealthy and better educated are considerably more likely to know about condoms. (There are no data from Cambodia on this.)

6. *Ever Having Used Condoms*: The wealthy and better educated are considerably more likely to have ever used condoms, though the effect is insignificant in Tanzania. (There are no data from Cambodia on this.)

Appendix 3

Variations in risk factors for HIV¹ by wealth quintile and educational attainment: results from a multivariate logit analysis of Demographic & Health Survey (DHS) data from Cambodia and Viet Nam.

This section contains the results of logit regressions that measure variations in risk factors for HIV by wealth quintile and educational attainment using DHS data from Cambodia and Viet Nam. Sections A and B contain results for Cambodia and Viet Nam respectively.

Each row in the tables represents a logistic regression. The first column lists the dependent variable in each regression. Each of the dependent variables is binary. All regressions include dummy variables for wealth quintile²

- 1 Human immunodeficiency virus.
- 2 We can use information on household asset holdings to construct a measure of wealth that can be used to classify households by wealth quintile following a method based on principal components analysis proposed by Pritchett and Filmer (1998). Our purpose is to assess whether behaviors and beliefs that may be risk factors for HIV vary systematically by socio-economic status. Since the DHS surveys only contain information on asset holdings, but not on expenditures, income, or consumption, SES must be defined in terms of wealth. To construct an index of wealth, we follow the strategy proposed by Pritchett and Filmer (1998). The DHS contains information indicating whether households own or possess certain assets. Thus a household's collection of assets can be represented by an n-vector, where n is the number of assets being considered, and each element of the vector is a 1 if the household possesses that asset, and 0 otherwise. This vector is standardized by taking each individual indicator, subtracting its sample mean, and dividing by its sample standard deviation. The asset index is a weighted average of the individual elements in the standardized vector where the weights are chosen to maximize the variance of the resulting weighted average in the sample. Intuitively, doing so allows us to compute a scalar weighted average which parsimoniously "explains" as much variation in the n-dimensional asset vector as possible, akin to maximizing the explained sum-of-squares in regressions, though of course in this case, there is no dependent variable! Technically, this is called principal components analysis. We assign households to wealth quintiles on the basis of this index. Quintile 1 the poorest and quintile 5 is the wealthiest.

In our case, the n-vector representing a household's wealth has n=36 indicators for whether it has each of the following:

Electricity	Car	Own toilet w/ sewer/tank	Private piped water	Rainwater Source	Other floor
Radio	Phone Sewer/Tank	Own toilet w/o Water	Public piped source	Surface water	Plastic roof
TV	Sewing machine	Shared toilet	Private well water	Finished floor	Natural roof
Fridge	Boat	Trad. latrine	Public well water	Earth/Sand/Clay floor	Iron/alum. Roof
Bicycle	Motorboat	Mod. latrine	Tanker water source	Wood floor	Cement/Concrete roof

We assume economies of scale and do not adjust household wealth for household size. A woman's wealth quintile is simply the wealth quintile of the household to which she belongs.

Reference: Filmer, D. and Pritchett, L. 1998. Estimating wealth effects without expenditure data or tears: an application to educational enrollments in states of India. *World Bank Policy Research Working Paper 1994*. Washington DC: Development Economics Research Group, The World Bank.

educational attainment, and 5-year age categories, as well as a constant. The educational categories are: no education, some primary education, completed primary education, some secondary education, completed secondary education, and higher education respectively. Results are presented as odds ratios and their standard errors, adjusted for sampling weights and clustering. To simplify the tables, we only present the odds ratios for the wealthiest quintile, women with completed secondary schooling, and women with higher education. Empty cells in the table imply that the corresponding column variable is a perfect predictor of the dependent variable.

A. Cambodia

Var	Wealthiest Quintile	Completed Secondary Schooling	Higher Education
Has Access to Condom(s)	5.23 (1.711)***		
Sexually Experienced, Aged 15-24	0.649 (0.091)***	0.439 (0.139)***	0.288 (0.131)***
Knows about Modern Contraception	4.269 (0.708)***	5.144 (3.355)**	
Has Used Modern Contraception(s)	2.613 (0.266)***	0.595 (0.157)**	0.555 (0.316)
Knows of AIDS-Preventive Benefits of Condom Use	3.846 (0.449)***	6.258 (1.961)***	5.868 (3.414)***
Has Spoken to Spouse About Trying to Avoid AIDS	3.414 (0.393)***	4.467 (3.029)**	10.853 (11.280)**
Been Tested for AIDS	16.205 (7.982)***	5.536 (1.762)***	4.971 (2.352)***
Wants to be Tested for AIDS	1.014 (0.098)	1.775 (0.349)***	1.372 (0.444)
Knows Where to be Tested for AIDS	4.184 (0.578)***	10.861 (2.471)***	28.918 (12.215)***
Respondent Has Some Say on Contraception	0.570 (0.217)	0.525 (0.445)	
Spouse Ever Pushed, Shook, or Thrown Object	0.621 (0.164)*	9.120 (11.944)*	
Spouse Ever Slapped or Twisted Arm	0.604 (0.153)**	8.450 (11.417)	
Spouse Ever Forced Sex	0.582 (0.25)		

(s): sexually active sample, * p<.1, ** p<.05, *** p<.01.

B. Viet Nam

Var	Wealthiest Quintile	Completed Secondary	Higher Education
Knows About Modern Contraception		14.427 (16.621)**	
Has Ever Used Modern Contraception	1.302 (0.367)	2.595 (0.804)***	2.484 (1.428)
Knows of AIDS-Preventive Benefits of Condom Use	2.684 (1.157)**	3.462 (2.231)*	6.455 (4.684)**
Used Condoms in Last Intercourse	6.612 (3.098)***	0.874 (0.610)	2.403 (1.892)
Has Access to condoms	2.173 (0.770)**	15.313 (8.500)***	34.143 (36.623)***

* $p < .1$, ** $p < .05$, *** $p < .01$.

C. Discussion

Both Cambodian and Vietnamese data suggest that there are strong correlations between wealth and education on the one hand, and reduced risk for HIV on the other. What is more, wealth and education have independent effects in the sense that increased wealth reduces risk of HIV even after controlling for education, and vice-versa. Hence wealth and education are not proxies for each other.

More specifically, the Cambodia logits show that women from the wealthier quintiles have more access to condoms than those from poorer ones. The odds ratio for a woman from the wealthiest quintile (relative to a woman from the poorest) is 5.2. And everyone with at least a completed secondary education has access to condoms. In Viet Nam, the corresponding odds ratio for the wealthiest quintile is 2.17. And for those with completed secondary schooling and some higher education, the odds ratios are 15.3 and 34.1 respectively, relative to women with no schooling.

With respect to knowledge about the benefit that condom use brings in reducing AIDS³ risk, the Cambodian data show that the odds ratio for women from the wealthiest quintile is 3.8, and for women with completed

3 Acquired immunodeficiency syndrome.

secondary and at least some higher education are 6.2 and 5.8 respectively. In Viet Nam, the corresponding numbers are 2.6, 3.4, and 6.4.

Lastly, with respect to knowledge and use of modern contraception in general: in Cambodia, the odds ratio for women in the wealthiest quintile knowing about contraception is 4.2, while everyone with at least some higher education knows about modern contraception. In Viet Nam, the pattern is even clearer: everyone from the wealthiest quintile and the highest educational attainment knows about modern contraception. With respect to ever having used modern contraception, the Cambodian results are a little puzzling. Despite the fact that the odds ratio of a woman from the wealthiest quintile having used modern contraceptives is 2.6, the odds ratios for women with at least completed secondary schooling hover at around 0.5. In contrast, the corresponding numbers for Viet Nam are 1.3 for women from the wealthiest quintile, and roughly 2.5 for women with at least completed secondary schooling.

In conclusion, both Cambodian and Vietnamese data broadly suggest that wealth and education are positively correlated with better knowledge and behavior. They also suggest that wealth and education have independent effects, so one is not simply a proxy for the other. For the most part, the sizes of the correlations are roughly the same in Cambodia and Viet Nam, though there are some instances when these effects seem considerably bigger for Viet Nam than for Cambodia. For example, the effect of education on knowing about modern contraception is much larger in Viet Nam: the odds ratio for someone with completed secondary education is 14.4 for knowing about contraception. In Cambodia, the corresponding number is 4.1.

Appendix 4

What is the rate of return to investments in HIV¹ prevention? The average annual returns from HIV prevention expenditures over a 30-year period are:

1. If benefits include only averted medical expenditures: 12–32%
2. If averted income losses and medical expenditures: 37–55%
3. If averted value of statistical lives and medical expenditures: approximately 400%

A. Approach

The technique that we use to estimate the rate of return is a classic one used in the cost-benefit analysis literature. Specifically, we seek to estimate the “internal rate of return” to investments in HIV infection.

If I_t are the investments in HIV prevention in year ‘t’ and B_t are a money value of the benefits in terms of avoided HIV infections and AIDS cases that can be attributed to those investments, then the rate of return to HIV prevention is the ‘r’ that solves the following equation, where the summation is over the time horizon of interest.

$$\sum_t (B_t - I_t) / (1+r)^t = 0$$

Expenditures on HIV prevention (I_t) in any given year ‘t’ are the sum, after taking account of inter-institutional flows, of public sector expenditures, private sector expenditures (for-profit, non-profit, and households), and expenditures incurred by the international donor community.

There are two main benefits (B_t) from HIV prevention. The first is the avoidance of medical care expenditures incurred by the public and private sectors in the treatment of AIDS² cases. This is estimated to be the number of AIDS cases for each year (in year-equivalent terms) times the cost of treating an AIDS case for that year. The second benefit is the monetary value of lives that are “saved” on account of the intervention. This can be measured as the reduction in the number of AIDS deaths due to the HIV prevention program times the value of a “life.” The value of a life can be estimated either from the income losses resulting from death, or from the value of a “statistical life,”

1 Human immunodeficiency virus.

2 Acquired immunodeficiency syndrome.

obtained from studies of the additional amounts people need (as compensation) to accept small increases in the risk of dying (Chapter 4).

Calculation of benefits from a specific HIV prevention program requires AIDS-related data of the following type for the relevant period: (i) the number of AIDS cases averted on account of the intervention in each year; (ii) the medical cost of treating a single case of AIDS in each year; (iii) the number of AIDS deaths (annual and cumulative) for each year; (iv) the value of a statistical life in any given year; and/or (v) income “lost” for each future year on account of an AIDS death in any given year.

B. Results

The estimates of the rates of return were obtained under three main benefit profile scenarios, and four main time profiles for prevention expenditures:

1. Benefits evaluated in terms of medical expenditures averted only (with two possibilities: growth at US levels, or based on per capita income growth);
2. Benefits evaluated in terms of medical expenditures averted plus income losses averted;
3. Benefits evaluated in terms of medical expenditures averted plus losses in the value of a statistical life averted;
4. Private prevention expenditures were fixed at their 1991 levels; and during 2001–2020, prevention expenditures (public and private) were the mean of all prevention expenditures during the period 1990–2000.
5. Private prevention expenditures were fixed at a constant proportion of public (and donor spending) based on their 1991 levels; and for 2001–2020 prevention expenditures (public and private) were the mean of all prevention expenditures during the period 1990–2000.

In total, 12 cases were considered and are summarized in the 6 scenarios reported below. The main findings are as follows:

Scenario I:

Medical expenditures per AIDS case grow over time; Private corporate expenditures on HIV prevention are fixed at their 1991 levels; No income losses, or value of statistical lives lost on account of AIDS deaths.

Rate of return on HIV prevention expenditures 31.5%, with rate of growth of per person AIDS expenditures linked to per capita income growth in Thailand.

Scenario II:

Medical expenditures per AIDS case grow over time; Private corporate expenditures on HIV prevention are a ratio of public expenditures; No income losses, or value of statistical lives lost on account of AIDS deaths.

Rate of return on HIV prevention expenditures 12.3%, with rate of growth of per person AIDS expenditures linked to per capita income growth in Thailand.

Scenario III:

Medical expenditures per AIDS case grow over time; Private corporate expenditures on HIV prevention are fixed at their 1991 levels; Losses on account of AIDS deaths included and measured in terms of per capita income losses for each year subsequent to an AIDS death.

Rate of return on HIV prevention expenditures 55%, with rate of growth of per person AIDS expenditures linked to per capita income growth in Thailand.

Scenario IV:

Medical expenditures per AIDS case grow over time; Private corporate expenditures on HIV prevention are a ratio of public expenditures; Losses on account of AIDS deaths included and measured in terms of per capita income losses for each year subsequent to an AIDS death.

Rate of return on HIV prevention expenditures 37%, with rate of growth of per person AIDS expenditures linked to per capita income growth in Thailand.

Scenarios V and VI:

Medical expenditures per AIDS case grow over time; Private corporate expenditures on HIV prevention are fixed at their 1991 levels (scenario V) or taken as a fixed proportion of public expenditures (scenario VI); Include value of statistical lives lost on account of AIDS deaths.

Rate of return on HIV prevention expenditures was in the range of 385–415%.

In sum: If we focus only on benefits in terms of medical expenditures avoided, the rates of return range from 12 to 32% over a 30-year period. The

lower bound of our numbers is an outcome of assuming growth of medical expenditures in tune with per capita income.

If we include averted income losses as additional benefits resulting from the reduced number of AIDS deaths (in addition to savings in medical expenditures), the rate of return jumps upwards very sharply—with the range now from 37 to 55%. If instead of income losses, we consider the value of an averted AIDS death to be equal to the statistical value of a life, the rates of return of HIV prevention programs jump to approximately 400% per year!

C. Cautionary Remarks

1. We are not fully confident about what proportion of the reduction in AIDS cases and deaths in Thailand can be attributed to HIV prevention programs, but we do believe that we have made a conservative estimate of this.
2. Even though returns from HIV prevention programs appear high, for a fair comparison with other health interventions and programs, rates of return from the latter ought to be evaluated using the same methodology.

Our estimates of the internal rate of return considering only avoided medical expenditures as benefits (12–32%) bracket the 26.7% estimate based on scenario prevention analyses carried out for India and reported in Dayton (1998). Our estimates of the rate of return on HIV prevention expenditures exceed those calculated for interventions for the global guinea-worm eradication program and river blindness eradication in Africa (Chapter 4).

3. We had to make several assumptions about the level of private corporate spending during the period 1990–2020 and beyond, with obvious implications for the estimates of the rate of return that we report here.
4. The fact that we observe high rates of return on HIV prevention does not imply that expenditures for much needed treatments for people with HIV and AIDS ought to be ignored or placed on a lower level of priority. As noted earlier, care for people living with HIV/AIDS, aside from being crucial from basic humanitarian and equity concerns, is potentially important for HIV prevention.

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