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Impacts of HIV/AIDS 2005–2025 in Papua New Guinea, Indonesia and East Timor

FINAL REPORT OF HIV EPIDEMIOLOGICAL MODELLING AND IMPACT STUDY

FEBRUARY 2006

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A research initiative arising from the South West Pacific Dialogue

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Acronyms and abbreviations

ADB	Asian Development Bank	MAP	Monitoring the AIDS Pandemic
AIDS	Acquired Immune Deficiency Syndrome	MMR	Maternal mortality rate
ASPI	Australian Strategic Policy Institute	MSM	Men who have sex with men
ART	Antiretroviral Therapy	NHASP	National HIV/AIDS Support Project (PNG)
ARV	Antiretroviral	OI	Opportunistic Infection
AusAID	Australian Agency for International Development	PLHA	People Living with HIV/AIDS
AUD	Australian Dollar	PMTCT	Prevention of Mother To Child Transmission
BNN	National Narcotics Board of Indonesia	PNG	Papua New Guinea
BSS	Behavioural Surveillance Survey	PNG DoH	Papua New Guinea Department of Health
DFAT	Australian Department of Foreign Affairs and Trade	STI	Sexually Transmitted Infection
IDU	Injecting Drug User	SW	Sex Workers
FHI	Family Health International	TB	Tuberculosis
GDP	Gross Domestic Production	UN	United Nations
GoI	Government of Indonesia	UNAIDS	Joint United Nations Programme on AIDS
GoPNG	Government of Papua New Guinea	UNICEF	United Nations Children's Fund
GoTL	Government of East Timor	UNDP	United Nations Development Programme
GRDP	Gross Regional Domestic Product	USAID	United States Agency for International Development
HEMI	HIV Epidemiological Modelling and Impact	VCT	Voluntary Counselling and Testing
HIV	Human Immunodeficiency Virus	WHO	World Health Organization
HSV-2	Genital herpes type 2		
ILO	International Labour Organization		
IMR	Infant mortality rate		

Executive summary

The HIV Epidemiological Modelling and Impact (HEMI) Study was commissioned by the Australian Government for the Governments of Papua New Guinea (PNG), Indonesia and East Timor. The research was conducted by New South Global Pty Limited in 2005.

An epidemiological model was developed to project the future course of the HIV epidemic over the period 2005–2025 in PNG, Indonesia and East Timor under three scenarios. The first scenario assumed that HIV interventions remain at current levels (baseline scenario). The second and third scenarios assumed increases in HIV interventions to medium and high response levels.

Projections of HIV case numbers and deaths were used as a basis to estimate future social, economic and security impacts. The following outcomes are predicted by 2025 under the baseline scenario:

PAPUA NEW GUINEA

- > a generalised epidemic with over 500,000 people living with HIV
- > HIV prevalence of over 10% of the adult population
- > 300,000 adult deaths
- > 117,000 children will have lost their mothers to AIDS

- > the workforce reduced by 12.5% and annual GDP growth rate by 1.3%
- > health sector severely impacted, with over 70% of medical beds occupied by people living with AIDS

INDONESIA

- > a generalised epidemic with 1.95 million people living with HIV
- > HIV prevalence of over 1% of the adult population nationally
- > 1.69 million deaths
- > Papua will be hardest hit with HIV prevalence of over 7% of adults
- > 5% fewer people of working age in Papua, particularly impacting the agricultural workforce
- > 166,000 maternal orphans in Papua
- > greatest social and economic effects will be felt at household levels
- > rising health sector costs as 27% of public medical beds are occupied by people living with AIDS, rising to over 80% in Papua

EAST TIMOR

- > a mostly urban epidemic of around 5,000 people living with HIV
- > HIV prevalence of 0.6% of the adult population nationally
- > 2,200 adult deaths and 400 maternal orphans
- > HIV prevalence of 34% among sex workers and 6% among men who have sex with men, creating conditions for a severe epidemic to develop after 2025
- > HIV prevalence of 2% of the adult population in urban areas

These impacts will be significantly reduced, and in the case of PNG and Indonesia, hundreds of thousands of lives saved under medium and high level response scenarios.

Increasing the amounts spent on prevention is demonstrated to have long term economic benefits due to savings on treatment and care costs. Enhanced prevention saves government expenditure through reducing treatment and care costs, and allows for greater productivity and development opportunities. In PNG, an additional investment of AUD 12 million per annum in prevention could result in savings of at least AUD 30 million per annum in medical costs by 2025. In Indonesia, an additional investment of AUD 50 million per annum in prevention could result in savings of AUD 400 million per annum in medical costs by 2025.

Impacts are identified at individual, family, community and national levels. Impacts on gender relations are likely to be significant and women may bear a disproportionate burden of family and community impacts. Adverse impacts on security and stability are anticipated, particularly for Papua in Indonesia and for PNG.

Successes in implementing medium and high level responses will require strong political commitment and expansion of infrastructure in areas including primary health care and education. Measures proposed to support elevated responses include:

- > **Indonesia:** expansion in prevention coverage among people who inject drugs, sex workers and their clients, and in Papua culturally appropriate prevention programs for the local population.
- > **PNG:** improving the status of women, challenging stigma, addressing men's roles in prevention, health service strengthening and decisive leadership.
- > **East Timor:** integration of HIV prevention, care and treatment within a health sector-wide approach that strengthens human resources, procurement and distribution systems.

Introduction: Full report

In December 2004, at a meeting of the South West Pacific Dialogue, Governments of Papua New Guinea (PNG), Indonesia, East Timor, the Philippines, New Zealand and Australia agreed on the importance of undertaking a collaborative study of the epidemiological, social and economic risks and vulnerabilities related to HIV/AIDS.

The HIV Epidemiological Modelling and Impact (HEMI) Study was funded by the Australian Government through AusAID, to be undertaken in relation to the sub-region incorporating Papua New Guinea, Indonesia and East Timor.

In May 2005, NewSouth Global Pty Limited, the consulting company of the University of New South Wales, was commissioned by AusAID to conduct the study. A Synopsis Report of the study has been published separately and is available from the AusAID website www.ausaid.gov.au.

The study was undertaken in four phases. First, the research team worked with AusAID to identify in-country partners and data sources. In the second phase of the study, mathematical models were developed to predict the course of the HIV epidemic based on the best available epidemiological data and three different intervention scenarios. The methodology and findings of this phase are presented in Part 1 of the Final Report.

Next, the output of the epidemic model was applied to forecast the economic and social consequences of HIV/AIDS under each of the three intervention scenarios and to provide cost effectiveness analyses of the interventions. The methodology and findings of this phase are presented in Part 2 of the Final Report.

Finally, in-country workshops were held in Indonesia and PNG to present and discuss the results.

Appendices to this Final Report include details of the national counterparts in each of the three countries, assumptions and technical notes relating to the methodology of the study.

Part 1

EPIDEMIOLOGICAL MODEL AND SCENARIOS

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1 Introduction

1.1 STRUCTURE AND CONTENT OF PART 1 FINAL REPORT

The purpose of this Part is to present the mathematical model that has been developed for projecting the course of the HIV epidemic in Papua New Guinea, Indonesia and East Timor, under various intervention scenarios.

This Part is laid out in six sections. Section 1 provides an Introduction to the Report including a description of preparatory scoping activities that informed the study. Section 2 describes the model. The subsequent three sections each present the specific assumptions that have been used to run the model for the three countries, as well as outputs from the model. Each of the three sections concludes with a brief description of the mid and high level expanded intervention scenarios that will be used in Part 2 to project the HIV epidemic and assess economic and social impacts. Section 6 contains tables and figures.

1.2 SCOPING ACTIVITIES

An initial meeting was held between team members and key AusAID staff in Canberra on 13 May 2005. At that meeting, it was agreed that AusAID would communicate with Australian representatives in Papua New Guinea, Indonesia and East Timor, to ensure that the governments of the three countries were in a position to engage with the study team. The first step in this engagement involved the designation of government counterparts.

These communications took place in the subsequent week, and by early June, counterparts had been named for all three countries (see Appendix 1). In the meantime, the team undertook the collection of all available documents relating to the epidemiological occurrence of HIV/AIDS, programmatic responses to HIV/AIDS, and economic and social indicators in the three countries of the study (see References).

The team rapidly established that it would be difficult to arrange full scale scoping visits to meet with in-country counterparts at short notice. Nevertheless, a number of contact missions were undertaken. Two team members visited East Timor and met with key representatives of government and partner agencies. Two team members visited Papua New Guinea and met with government representatives, as well as conducting workshops with program managers from the National HIV/AIDS Support Project (NHASP) and representatives from the World Bank on the proposed approach to the cost effectiveness analysis. With regard to Indonesia, it was agreed with counterparts that it would be difficult to arrange a visit within the designated time frame. Four team members attended the International Conference on AIDS in Asia and the Pacific in Kobe, Japan, and undertook meetings with government representatives from Indonesia.

These interactions served three main purposes. First, they gave team members an opportunity to explain the proposed methodology of the HEMI study. Second, they established linkages to sources

of relevant epidemiological and economic data from the three countries. Third, they provided a forum for counterparts to comment on the study objectives and methodology, including the status of any related projects.

Although the interactions afforded by the meetings with country counterparts were of great value, it must be recognised that their scope was limited by the available time.

2 Epidemiological model for HIV transmission

An extensive body of literature has been built up over the past two decades on the use of mathematical models to simulate the transmission of HIV infection and progression to AIDS (Brown and Peerapatanapokin, 2004; Garnett GP, 2002; Walker et al, 2003). The models are generally based on differential equations, and involve dividing the population into a number of components. HIV transmission occurs between and across components, according to assumptions about the extent of sexual contact and injecting drug use, and the degree to which these activities involve transmission through unprotected sexual intercourse and the reuse of injecting equipment, respectively. The models can also incorporate mother to child HIV transmission.

For the purposes of the HEMI study, a generic HIV-transmission model was developed, that could be adapted for use in each country under various scenarios. Within the adult population, sub-populations modelled were:

- > female sex workers (SWs)
- > male clients of female sex workers
- > men who have sex with men (MSM)
- > injecting drug users (IDUs, male and female)
- > other adults

Figure 1 shows the transitions from HIV negative to positive status that are allowed by the model as a result of contacts between members of each sub-population. Mother to child transmission was also

modelled assuming HIV transmission at 25 per cent of live births in the absence of antiretroviral treatments aimed at interrupting transmission.

The generic transmission model also incorporates urban/rural regions, age groups (0–4, 5–12, 13–19, 20–34, 35–49, 50+ years), and HIV disease progression (early stage HIV infection, later stage HIV infection, AIDS).

A model of this kind is understood to be a vast oversimplification of the real dynamics of HIV transmission in a human population. Furthermore, it is dependant on assumptions about sizes of sub-populations and transmission rates that are generally based on limited sources of data. Although it is generally not possible to validate the models in an absolute sense, it is important to ensure that they are based on the best available data, that they are conceptually coherent, and that they generate estimates of HIV prevalence that are broadly consistent with observed levels.

The generic model was separately adapted for Papua New Guinea, Indonesia and East Timor based on available epidemiological and behavioural data, as described in the following sections. For each of these geographical units, the best available data were used to provide estimates of the current sizes of relevant subpopulations, and prevalences of risk behaviour and sexually transmissible infections in each population. These current estimates constituted the baseline scenario.

Through engagement with national counterparts and other experts and stakeholders, the assumptions underlying the epidemiological models, including the mid and high intensity intervention scenarios, will be closely scrutinised. As these models provide key inputs for the quantitative assessment of economic and social impacts, as well as the cost-effectiveness analysis, their credibility is crucial to the whole process of the HEMI study.

Once there has been agreement on the epidemiological and programmatic assumptions, the models will be used to generate projected numbers of cases of HIV/AIDS, under the baseline intervention scenario, and the mid and high intensity scenarios outlined in the following sections.

3 HIV transmission model for Papua New Guinea

3.1 POPULATION SIZES

Papua New Guinea age and sex-specific population sizes were based on UN World Population Prospects, 2004 Revision (accessed via Spectrum Demography and Projection Software).

- > Population birth rate 30 per 1,000
- > Life expectancy 60 years
- > Mortality rates
 - Infant mortality 75 per 1,000 live births
 - Under 5 mortality 99 per 1,000 live births
 - Adult mortality 9 per 1,000 population

Urban populations were taken to correspond to residents of Port Moresby, Lae and Goroka.

- > Net overall migration from rural to urban populations was taken as 3 per 1,000 per year to give an increase in urban populations from 12 per cent of Papua New Guinea total population in 1985 to 17 per cent in 1998 (Australian Agency for International Development, 2000).
- > Migration from urban to rural populations, in the absence of specific data, was taken as 1 per 1,000.
- > Migration was assumed to be independent of HIV status.

3.2 SUBPOPULATIONS AND BEHAVIOURAL DATA

3.2.1 SEX WORKERS

- > The Transex Project (UNAIDS, 2000) found that in three urban areas in Papua New Guinea with a total population of approximately 315,000, there were 15,000 sex workers (SWs), according to a wide definition of sex work. Based on these data, it was assumed that in urban areas, 10 per cent of the total adult female population was engaged in sex work.
- > Rates of sex work in rural populations, in the absence of specific data, were assumed to be half the rates in urban areas.
- > Average duration of sex work was taken to be 5 years, with stopping sex work assumed to be independent of HIV status.
- > SWs were assumed to have an average of 200 clients per year (World Bank et al, 2004).
- > HIV prevalence in female SWs in Port Moresby has been estimated to be 17 per cent in 1998, and 16 per cent in 2000 (U.S. Agency for International Development, 2004).

3.2.2 CLIENTS OF SEX WORKERS

- > In rural populations, it has been estimated that 36 per cent of adult males had ever paid for sex (World Bank et al, 2004). Same rate assumed for urban populations.
- > Average rates of contacts with SWs taken as 50 per year to reconcile the total number of sex acts between female sex workers and their clients (10 per cent of adult female population having on average 200 sexual contacts/clients per year with 36 per cent of adult male population).

3.2.3 GENERAL HETEROSEXUAL CONTACT

- > It was assumed that all women who did not engage in sex work had one sexual partner, with whom they had 100 sexual contacts per year.
- > All men who did not have sex with sex workers were also assumed to have one sexual partner.
- > Of the men who had sex with sex workers, 35% were assumed to also have one non-sex worker partner. The model therefore does not allow for the possibility of more than one sexual partner outside a sex work context.

3.2.4 SEXUALLY TRANSMISSIBLE INFECTIONS

- > Prevalence of sexually transmissible infections (STIs) in Port Moresby and Lae SWs were estimated in 1997 to be: 31 per cent chlamydia, 32 per cent syphilis, 36 per cent gonorrhoea (World Bank et al, 2004; WHO et al, 2000). It was assumed that the 33 per cent of SWs in urban populations had an STI.
- > Prevalence of STIs in Eastern Highlands was estimated in 1997 to be: 27 per cent chlamydia, 4 per cent syphilis, 18 per cent gonorrhoea (World Bank et al, 2004; WHO et al, 2000). It was assumed that 16 per cent of SWs in rural populations had an STI.
- > STIs were assumed to increase the risk of transmission of HIV by a factor of 3.5 (Fleming and Wasserheit, 1999).

3.2.5 CONDOM USE

Condom use by SWs has been estimated to cover 15 per cent of acts in 1999 (UNAIDS, UNICEF, WHO, 2004). Condom awareness in 1995 was found to be very low, with only 9 per cent of first-time rural STI clinic attendees reporting knowledge about the role of condoms in preventing infections (WHO, 2001). Condom use in the general population was found to cover 7 per cent of acts in 2000 (WHO et al, 2000). There is evidence that condom use by SWs and policemen has increased since 1996 (Jenkins, C., 1997). Based on these data, it was assumed that:

- > There was no condom use prior to 1995, with a linear increase in condom use by SWs in urban populations to 20 per cent of acts in 2005, and to 14 per cent of acts among the general population.
- > In the absence of specific data, it was assumed that condom use by SWs and the general population in rural populations was half that in urban populations.

3.2.6 MEN WHO HAVE SEX WITH MEN AND INJECTING DRUG USERS

- > In the absence of specific data of MSM in Papua New Guinea, the estimated number of MSMs were based on survey data from Papua. The proportion was taken to be 2 per cent of the population (BPS-Statistics and Ministry of Health, Indonesia, 2004).
- > It was assumed that the role of injecting drug use in Papua New Guinea was negligible.

3.2.7 ANTIRETROVIRAL TREATMENT

In 2005 it was reported that there were 213 people with advanced HIV disease receiving antiretroviral treatment (ARV), all in urban areas.

It was assumed in baseline scenarios that ARV was provided to 20 pregnant HIV-positive women, aimed at interrupting mother to child transmission of HIV. The coverage is assumed to increase to 600 women by 2010 (The Global Fund grant proposal, 2004; The Global Fund grant agreement, 2005).

3.2.8 TIME TRENDS 1985–2005

All assumptions, except for condom use and ARV coverage, were taken to remain stable throughout the time period 1985–2005, and through to 2025 for projections of the baseline epidemics.

3.3 MODEL OUTPUT UNDER BASELINE SCENARIO

The estimated total number of people living with HIV/AIDS in Papua New Guinea between 1985 and 2025 under the baseline assumptions above is summarised in Figure 2. The model suggests there were some 64,000 people living with HIV/AIDS in Papua New Guinea in 2005, and projects that the total number of people living with HIV/AIDS will increase to 120,000 in 2010, 211,000 in 2015 and 537,000 in 2025.

The total number of adults aged 15–49 years living with HIV/AIDS was estimated by the model to be 50,000 in 2004, a prevalence rate of 1.8 per cent. This compares with national consensus estimates in Papua New Guinea in 2004 of 47,000 (range 25,000 to 70,000) (NHASP, 2004). The model estimated there to be 5,600 children aged 0–14 years living with HIV/AIDS in 2004.

The model estimated there to be 35,000 adults and children living with HIV/AIDS in urban Papua New Guinea in 2005, an overall urban prevalence rate of 3.5 per cent. It was estimated there were 29,000 people living with HIV/AIDS in rural areas in 2005, an overall prevalence rate of 0.6 per cent.

The numbers of people living with HIV infection, new HIV infections, AIDS deaths and orphans are summarised in Table 1, for each of the years 2005, 2010, 2015 and 2025. For the same years, Table 2 presents the prevalence of HIV/AIDS estimated by the model according to subpopulations within urban and rural areas of Papua New Guinea.

3.4 FUTURE INTERVENTION SCENARIOS

Table 9 summarises the key elements of three possible intervention scenarios for Papua New Guinea. Under the baseline scenario, the mix and intensity of interventions are assumed to remain unchanged. The mid and high intensity scenarios involve expansion of programs as indicated in the Table. Interventions under both the mid and high intensity scenarios are assumed to be introduced in a linear fashion over a five-year period between 2006 and 2010, and held constant thereafter.

Figure 2 illustrates the impact of the two intervention scenarios in reducing the total number of people living with HIV/AIDS in Papua New Guinea over the period 2005–2025.

4 HIV transmission model for Indonesia

On the basis of available surveillance data, there are several key features to the HIV epidemic in Indonesia. First, transmission in urban settings, particularly the major cities, has been largely linked to injecting drug use. There has also been transmission, on a more limited scale, associated with the sex industry, in several parts of the country. In Papua, heterosexual transmission appears to be taking place on a broad scale. In recognition of these distinct patterns, the transmission model for Indonesia was constructed using two separate components, one covering Papua, and the other covering the rest of the country. The non-Papua component was further considered as being made up of the major urban populations, as distinguished from the non-urban populations.

4.1 POPULATION SIZES

Indonesia age and sex-specific population sizes were based on UN World Population Prospects, 2004 Revision (accessed via *Spectrum* Demography and Projection Software).

- > Population birth rate 20.2 per 1,000
- > Life expectancy 66 years
- > Mortality rates
 - Infant mortality 39 per 1,000 live births
 - Under 5 mortality 50 per 1,000 live births
 - Adult mortality 7.2 per 1,000 population

For Indonesia excluding Papua, the following population size assumptions were made:

- > Net overall migration from rural to urban populations was taken as 5 per 1,000 to give an increase in urban populations from 26 per cent of total Indonesian population in 1985 to 43 per cent in 2002 (World Bank, 2002).
- > Migration from urban to rural populations, in the absence of specific data, was taken to be 1 per 1,000.
- > Migration was assumed to be independent of HIV status.

For the Papua component, life expectancy, birth and mortality rates (infant and adult) were assumed to be the same as those of Papua New Guinea. Changes in the population size as a result of migration were incorporated into the model based on McGibbon R, 2004. In the 2002 National Estimates of HIV, the proportion of the urban Papua population was 25 per cent in 2002 (Ministry of Health, Indonesia, 2003).

The following data were used as guides in defining Papua migration rates and population sizes over time (McGibbon R, 2004):

- > Total Papua population size in 2004 was 2,352,518.
- > The population size tripled between 1970 and 2000 as a result of the influx of migrants.

- An estimated total of 220,000 transmigrants and 560,000 other unsponsored migrants have settled in Papua.
 - Between 1995 and 2000, the rate of entry was 15,000 people per year, through official transmigration.
 - For every official transmigrant, 2.5 people enter through independent means.
 - Considering the known annual rate of migration for 1995–2000, the annual total number of migrants entering Papua from 1985 (start of model year) to 1995 was calculated to be 20,300 per year, with about 60,750 existing settlers in 1985.
- > The transmigration program was suspended from 2000 onwards, and the model assumes that migration stopped at that time.

In the absence of specific data, the current model assumed no migration to other Indonesian provinces.

4.2 SUBPOPULATIONS AND BEHAVIOURAL DATA

Subpopulation sizes and behavioural data were based on the National Estimates of Adult HIV Infection (Ministry of Health, Indonesia, 2003) and the Behavioural Surveillance Survey (BSS), Indonesia 2002–2003 (BPS-Statistics and Ministry of Health, Indonesia, 2004). In the absence of specific data for urban and rural populations separately, provinces with urban populations of 40 per cent or more were taken to be representative of ‘urban’ risk populations, and provinces with less than 40 per cent urban population were used as representative of rural populations (Ministry of Health, Indonesia, 2002). Model parameter estimates for urban and rural populations were based on the average values from urban and rural provinces respectively. Further, high and low estimates were given for many behavioural parameters, which were again averaged to give the estimates used in the models.

For Papua, survey data were based on three main economic locations, Merauke, Sorong and Jayapura, and do not indicate the ethnicity of respondents (BPS-Statistics and Ministry of Health, Indonesia, 2004).

4.2.1 SEX WORKERS

- > For Indonesia excluding Papua, 0.9 per cent of the female adult population were taken as SWs in urban populations, and 0.3 per cent in rural populations (BPS-Statistics and Ministry of Health, Indonesia, 2004). For Papua, 1.6 per cent of the urban female adult population were assumed to be SWs corresponding to the lower limit on provincial estimates (BPS-Statistics and Ministry of Health, Indonesia, 2004), and 2.2 per cent of the rural female adult population were taken as SWs corresponding to the upper limit on provincial estimates.
- > Average duration of sex work was taken as the average of direct and indirect SWs, equal to 3.2 years in urban SWs and 3.3 years in rural SWs (BPS-Statistics and Ministry of Health, Indonesia, 2004). For Papua, average duration of sex work was taken as the average for direct and indirect SWs, equal to 2.7 years (BPS-Statistics and Ministry of Health, Indonesia, 2004).
- > Urban SWs were assumed to have an average 313 clients per year, and rural SWs 278 per year (BPS-Statistics and Ministry of Health, Indonesia, 2004). For Papua, SWs were assumed to have an average 183 clients per year (BPS-Statistics and Ministry of Health, Indonesia, 2004).
- > HIV prevalence among SWs has been estimated to be 5.5 per cent in urban populations and 1.0 per cent in rural populations (Ministry of Health, Indonesia, 2003). In Papua, HIV prevalence among urban SWs has been estimated to be 11 per cent (Ministry of Health, Indonesia, 2002).

4.2.2 CLIENTS OF SEX WORKERS

- > In urban provinces, it has been estimated that 26.2 per cent of adult males had paid for sex, and that 8.6 per cent did so in rural provinces (BPS-Statistics and Ministry of Health, Indonesia, 2004). For Papua, in urban populations it has been estimated that 37 per cent of adult males had paid for sex in the previous year (BPS-Statistics and Ministry of Health, Indonesia, 2004). In the absence of specific data, the same rate was assumed for rural Papuan adult male populations.

- > Average rates of contacts with SWs was taken as 10 per year.
- > HIV prevalences among clients of SWs were 0.7 per cent and 0.1 per cent in urban and rural provinces respectively (Ministry of Health, Indonesia, 2003). In Papua, HIV prevalence among clients of SWs was 1.7 per cent in 2002 (Ministry of Health, Indonesia, 2003).

4.2.3 GENERAL HETEROSEXUAL CONTACT

- > It was assumed that all women who did not engage in sex work had one sexual partner, with whom they had 100 sexual contacts per year.
- > All men who did not have sex with sex workers were also assumed to have one sexual partner.
- > Of the men who had sex with sex workers, 35% were assumed to also have one non-sex worker partner. The model therefore does not allow for the possibility of more than one sexual partner outside a sex work context.

4.2.4 MEN WHO HAVE SEX WITH MEN

- > Men who have sex with men (MSM, including waria) were taken to be 3 per cent of the urban adult male population, and 1 per cent of the rural adult male population (Ministry of Health, Indonesia, 2003). For Papua, the proportion was taken to be 2 per cent of the population, based on survey data for the urban adult male population.
- > Average numbers of partners among MSM were taken to be 25 and 12 per year in urban and rural populations respectively (MAP, 2004).

4.2.5 INJECTING DRUG USERS

- > Rates of injecting drug use were taken to be 0.3 per cent of total adult population in urban populations, and 0.05 per cent in rural populations, with 10 per cent of all injectors being female (Ministry of Health, Indonesia, 2003). For Papua, rates of injecting drug use have been estimated to be 0.3 per cent of total adult urban population (Ministry of Health, Indonesia, 2003),

Injecting drug use in rural populations was taken to be 0.05 per cent of adult males. It was assumed that there was negligible injecting among women in Papua.

- > Average duration of injecting was taken to be 5 years, with an average of 60 injecting acts per year. It was assumed that 12 per cent of all injecting acts were with clean needles (MAP, 2004; Zwaren et al, 2003).
- > HIV prevalence in injecting drug users was taken to be 19.2 per cent and 34.4 per cent in urban and rural populations respectively in 2005 (Ministry of Health, Indonesia, 2003). For Papua, HIV prevalence in urban injecting drug users has been estimated to be 20 per cent in 2002 (BPS-Statistics and Ministry of Health, Indonesia, 2004).
- > In the absence of specific data, sexual behaviour among male IDUs was assumed to be similar to that in other male populations.
- > In the absence of specific data, the proportion of male IDUs who are also clients of SWs are taken to be the same as in the general male population. Similarly, the proportion of female IDUs who are SWs is the same as the proportion in the general female population.

4.2.6 SEXUALLY TRANSMISSIBLE INFECTIONS

- > Rates of STI symptoms in the past year among female SWs were taken to be 21 per cent and 26 per cent in urban and rural populations respectively (BPS-Statistics and Ministry of Health, Indonesia, 2004). For Papua, rates of STI symptoms in the past year among urban female SWs were taken to be 25 per cent (BPS-Statistics and Ministry of Health, Indonesia, 2004). In the absence of specific data, STI rates among rural SWs were taken to be 16 per cent, the same as in rural Papua New Guinea.
- > STIs were assumed to increase the risk of transmission of HIV by a factor of 3.5.

4.2.7 CONDOM USE

- > Condom use by SWs was taken to cover 23 per cent and 17 per cent of acts in urban and rural populations respectively in 2005 (BPS-Statistics and Ministry of Health, Indonesia, 2004). In Papua, condom use by urban SWs was taken to cover 36 per cent of acts in 2005 (BPS-Statistics and Ministry of Health, Indonesia, 2004). Condom use in rural SWs was taken to be 3.5 per cent, generally to represent indigenous SWs not in brothel-based services (Butt et al, 2005).
- > In the absence of specific data, condom use by the general population was taken to cover 14 per cent and 7 per cent of acts in urban and rural populations respectively.
- > Condom use in male to male sexual contact was taken to cover 33 per cent of acts in 2005 in urban populations (MAP, 2004). In the absence of specific data, condom use in rural male to male sexual contact was taken to be half the urban rate.
- > In all subpopulations, condom use was assumed to have increased linearly from 0 per cent in 1995, and to remain at 2005 values thereafter.

4.2.8 ANTIRETROVIRAL TREATMENT

In 2005 there were some 2,500 people with advanced HIV disease receiving antiretroviral treatment (ARV), all in urban areas, corresponding to approximately 20 per cent of people living with AIDS in these areas (UNAIDS, 2005). It was assumed in the baseline scenarios that ARV access remained at a coverage of 20 per cent of people with AIDS in urban areas, with no ARV available in rural populations. Based on indication that there are programmes in place to provide ARV aimed at interrupting mother to child transmission of HIV (The Global Fund, Indonesia 2005), the baseline model assumes that starting from 2005, ARV treatment of pregnant HIV-positive women reaches 10 per cent of HIV-positive pregnancies by 2010.

For Papua, it was assumed that there were 80 people on ARV in 2005, increasing to 10 per cent of AIDS

patients by 2010. It was also assumed that there were no ARV for the prevention of mother to child transmission, and that this would remain the case throughout 2025.

4.2.9 TIME TRENDS 1985–2005

All assumptions, except for condom use and ARV, were taken to remain stable throughout the time period 1985–2005, and through to 2025 for projections of the baseline epidemics.

4.3 MODEL OUTPUT UNDER BASELINE SCENARIO

For Indonesia (excluding Papua), the model-estimated total number of people living with HIV/AIDS between 1985 and 2025 is summarised in Figure 3. The model suggests there were some 238,000 people living with HIV/AIDS in Indonesia (excluding Papua) in 2005. The model projects that the total number of people living with HIV/AIDS will increase to 476,000 in 2010, 832,000 in 2015 and 1,804,000 in 2025.

Combining estimates with those for Papua (see below), the number of adults aged 15–49 years living with HIV/AIDS in the whole of Indonesia was estimated by the model to be 143,000 in 2002. This compares with national consensus estimates for the whole of Indonesia in 2002 of 133,000 (range 99,000 to 145,000) (Ministry of Health, Indonesia, 2003). The model estimated there to be around 7,800 children aged 0–14 years living with HIV in 2004.

The model estimated there to be 212,000 adults and children living with HIV/AIDS in the provinces with over 40 per cent urban population by 2005, an overall urban prevalence rate of 0.19 per cent. There were an estimated 27,000 people living with HIV in rural areas in 2005, an overall prevalence rate of 0.02 per cent.

It is of note that under the model described in Section 2, the assumptions presented in this section about the sizes of subpopulations, rates of contact

and HIV transmission rates per contact in Indonesia have led the model to predict that there was a very substantial increase (almost 50 per cent) between 2002 and 2005 in the number of people living with HIV/AIDS in Indonesia.

The numbers of people living with HIV infection, new HIV infections, AIDS deaths and orphans in Indonesia excluding Papua are summarised in Table 3, for each of the years 2005, 2010, 2015 and 2025. For the same years, Table 4 presents the prevalence of HIV/AIDS estimated by the model according to subpopulations within urban and rural areas.

For Papua, the model-estimated total number of people living with HIV/AIDS between 1985 and 2025 is summarised in Figure 4. The model suggests there were some 13,000 people living with HIV/AIDS in Papua in 2005. The model projects that the total number of people living with HIV/AIDS will increase to 29,000 in 2010, 58,000 in 2015 and 145,000 in 2025.

The number of adults aged 15–49 years living with HIV/AIDS was estimated by the model to be 7,700 in 2002, a prevalence rate of 0.34 per cent. This compares with consensus estimates in Papua in 2002 of 9,800 (Ministry of Health, Indonesia, 2003). The model estimated there to be 680 children aged 0–14 years living with HIV/AIDS in 2002.

For Papua, the numbers of people living with HIV infection, new HIV infections, AIDS deaths and orphans are summarised in Table 5, for each of the years 2005, 2010, 2015 and 2025. For the same years, Table 6 presents the prevalence of HIV/AIDS estimated by the model according to subpopulations within urban and rural areas.

4.4 FUTURE INTERVENTION SCENARIOS

For Indonesia (excluding Papua), Table 10 summarises the key elements of three possible intervention scenarios. The corresponding scenarios for Papua are summarised in Table 11. Under the baseline scenario, the mix and intensity of interventions are assumed to remain unchanged. The mid and high intensity scenarios involve expansion of programs as indicated in the Tables. Interventions under both the mid and high intensity scenarios are assumed to be introduced in a linear fashion over a five-year period between 2006 and 2010, and held constant thereafter.

Figures 3 and 4 illustrate the impact of the two intervention scenarios in reducing the total number of people living with HIV/AIDS over the period 2005–2025, in Indonesia (excluding Papua) and the Province of Papua, respectively.

5 HIV transmission model for East Timor

5.1 POPULATION SIZES

East Timor age and sex-specific population sizes were based on Preliminary Population Projection Statistics for 2004–2015, which were based on East Timor census data (National Directorate of Statistics, 2005).

- > Population birth rate 42 per 1,000
- > Life expectancy 57 years
- > Mortality rates
 - Infant mortality 75 per 1,000 live births
 - Under 5 mortality 99 per 1,000 live births
 - Adult mortality 15 per 1,000 population

Population size assumptions:

- > Net overall migration from rural to urban populations was taken as 6 per 1,000. East Timor population was taken as 20 per cent urban in 2005 (National Directorate of Statistics, 2005).
- > Migration from urban to rural populations, in the absence of specific data, was taken to be 1 per 1,000.
- > Migration was assumed to be independent of HIV status.

5.2 SUBPOPULATIONS AND BEHAVIOURAL DATA

5.2.1 SEX WORKERS

- > It was assumed there were 450 female SWs in urban populations in 2005 (The Global Fund, proposal form 2005). In the absence of specific data, but assuming that sex work is very rare in rural East Timor (J Rock, FHI, personal communication), it was assumed that there were half this number of SWs in rural populations.
- > Average duration of sex work was taken to be 3 years.
- > Urban and rural SWs were assumed to have an average 144 clients per year (J Rock, FHI, personal communication; Pisani E et al, 2004 unpublished)
- > HIV prevalence among SWs has been estimated to be 3 per cent in urban populations in 2004 (Pisani E et al, 2004). It was assumed that HIV prevalence among rural SWs was 0 per cent in 2004.

5.2.2 CLIENTS OF SEX WORKERS

- > While up to 48 per cent of surveyed groups (taxi drivers and soldiers) reported having bought sex (Pisani E et al, 2004; Pisani E et al, 2004 unpublished), it is likely that this figure is an over-representation by a high risk group of males.

Comparing with a figure of 8.6 per cent in the rural provinces of Indonesia, an averaged value of 28 per cent was assumed for the model.

- > Average rates of contacts with SWs taken as 10 per year.
- > There were no data on HIV prevalence among clients of sex workers. However, it was assumed that in rural East Timor, the prevalence was 0 per cent.

5.2.3 GENERAL HETEROSEXUAL CONTACT

- > It was assumed that all women who did not engage in sex work had one sexual partner, with whom they had 100 sexual contacts per year.
- > All men who did not have sex with sex workers were also assumed to have one sexual partner.
- > Of the men who had sex with sex workers, 35% were assumed to also have one non-sex worker partner. The model therefore does not allow for the possibility of more than one sexual partner outside a sex work context.

5.2.4 MEN WHO HAVE SEX WITH MEN

- > Men who have sex with men (MSM, including waria) were taken to be 5 per cent of the urban adult male population (J Rock, FHI, personal communication). In the absence of specific data, it was assumed that the rate of MSM in rural areas was approximately half the urban value.
- > Average numbers of partners among MSM were taken to be 25 and 12 per year in urban and rural populations respectively.
- > 46 per cent of urban MSM also reported heterosexual contact in the past year (Pisani E et al, 2004). In the absence of specific data, half this rate was assumed for rural MSM.

5.2.5 INJECTING DRUG USERS

Injecting drug use is thought to be very limited in East Timor, and was not included in the model.

5.2.6 SEXUALLY TRANSMISSIBLE INFECTIONS

- > Rates of STI symptoms among female SWs ranged from 14.0 per cent (gonorrhoea), to 60.2 per cent (HSV-2). An averaged value of 24 per cent among urban SWs, and half that among rural SWs were assumed. (Pisani et al, 2004)
- > STIs were assumed to increase the risk of transmission of HIV by a factor of 3.5.

5.2.7 CONDOM USE

- > Condom use by SWs was estimated to cover 1 per cent of acts in urban areas in 2003 (Pisani E et al, 2004; UNICEF 2003). In the absence of specific data, a similar rate was adopted for rural areas.
- > Based on indications of very low awareness of condom use, condom use by the general population was taken to be 0 per cent of acts in both urban and rural populations.
- > Condom use in male to male sexual contact was taken to cover 5 per cent of acts in 2005 in urban populations (Pisani E. et al, 2004; UNICEF, 2003). In the absence of specific data, condom use in rural male to male sexual contact was taken to be half the urban rate.
- > In all subpopulations, condom use was assumed to have increased linearly from 0 per cent in 1995, and to remain at 2005 values thereafter.

5.2.8 ANTIRETROVIRAL TREATMENT

It was assumed that 10 people were on ARV in East Timor in 2005, and none were available for prevention of mother to child transmission, and that this would remain the case throughout 2025 (The Global Fund, proposal form, 2005; J Rock, FHI, personal communication).

5.2.9 TIME TRENDS 1985–2005

All assumptions, except for condom use, were taken to remain stable throughout the time period 1985–2005, and through to 2025 for projections of the baseline epidemics.

5.3 MODEL OUTPUT UNDER BASELINE SCENARIO

The model-estimated total number of people living with HIV/AIDS in East Timor between 1985 and 2025 is summarised in Figure 5. The model suggests there were some 138 people living with HIV/AIDS in East Timor in 2005. The model projects that the total number of people living with HIV/AIDS will increase to 400 in 2010, 1,100 in 2015 and 4,900 in 2025.

The number of adults aged 15–49 years living with HIV/AIDS was estimated by the model to be 126 in 2005, a prevalence rate of 0.03 per cent. National estimates of HIV prevalence for East Timor are unavailable, but national surveillance data report 24 HIV diagnoses and five AIDS deaths to the end of 2004 (Ministry of Health, East Timor, 2004). Assuming a median time from HIV infection to death of around 10 years, and a very recent HIV epidemic in East Timor, the report of five deaths would suggest a rough estimate of around 200 people living with HIV. The model estimated there to be nine children aged 0–14 years living with HIV in 2005.

Under the model, there were 133 adults and children living with HIV/AIDS in urban East Timor in 2005, an overall urban prevalence rate of 0.06 per cent. It was estimated there were five people living with HIV in rural areas in 2005, essentially as a result of urban to rural migration, as it was assumed that the initial epidemic in East Timor is concentrated to the urban regions.

The numbers of people living with HIV infection, new HIV infections, AIDS deaths and orphans are summarised in Table 7, for each of the years 2005, 2010, 2015 and 2025. For the same years, Table 8 presents the prevalence of HIV/AIDS estimated by the model according to subpopulations within urban and rural areas of East Timor.

5.4 FUTURE INTERVENTION SCENARIOS

Table 12 summarises the key elements of three possible intervention scenarios for East Timor. Under the baseline scenario, the mix and intensity of interventions are assumed to remain unchanged. The mid and high intensity scenarios involve expansion of programs as indicated in the Table. Interventions under both the mid and high intensity scenarios are assumed to be introduced in a linear fashion over a five-year period between 2006 and 2010, and held constant thereafter.

Figure 5 illustrates the impact of the two intervention scenarios in reducing the total number of people living with HIV/AIDS in East Timor over the period 2005–2025.

6 Tables and figures

TABLE 1. PAPUA NEW GUINEA: NUMBERS OF PEOPLE LIVING WITH HIV INFECTION, NEW HIV INFECTIONS, AIDS DEATHS AND HIV-RELATED ORPHANS IN 2005, 2010, 2015 AND 2025

Indicator	2005	2010	2015	2025
People living with HIV (% prevalence)	64,184 (1.08)	119,812 (1.80)	210,811 (2.82)	537,416 (5.79)
New infections	14,509	26,105	44,494	105,382
AIDS deaths	4,406	8,550	15,531	41,178
AIDS deaths, cumulative	27,228	60,828	123,144	408,768
HIV-related orphans (% among 0–14 age group)	9,401 (0.357)	19,826 (0.64)	38,398 (1.11)	117,452 (2.68)

TABLE 2. PAPUA NEW GUINEA: MODEL PREDICTED PREVALENCE OF HIV/AIDS IN 2005, 2010, 2015 AND 2025 BY REGION AND SUBPOPULATION

	2005 Prevalence (%)			2010 Prevalence (%)			2015 Prevalence (%)			2025 Prevalence (%)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Injecting drug users	0	0	0	0	0	0	0	0	0	0	0	0
Female sex workers	14.03	2.85	5.05	20.34	5.01	8.10	27.24	8.48	12.32	39.04	19.94	23.98
Male clients of CSW	6.90	1.20	2.17	10.38	2.13	3.57	14.48	3.67	5.60	22.43	9.20	11.64
Men who have sex with men	3.55	0.52	1.46	7.24	1.02	3.00	11.66	1.84	5.02	21.43	5.03	10.47
Paediatric (0–14)	0.55	0.10	0.17	0.79	0.17	0.28	1.11	0.30	0.44	1.80	0.77	0.96
Adult 15–49	6.17	1.13	2.02	9.36	2.01	3.36	13.10	3.45	5.27	20.42	8.58	10.88
Total population	3.47	0.60	1.08	5.21	1.07	1.80	7.23	1.84	2.82	11.09	4.54	5.79

TABLE 3. INDONESIA (EXCLUDING PAPUA): NUMBERS OF PEOPLE LIVING WITH HIV INFECTION, NEW HIV INFECTIONS, AIDS DEATHS AND HIV-RELATED ORPHANS IN 2005, 2010, 2015 AND 2025

Indicator	2005	2010	2015	2025
People living with HIV/AIDS (% prevalence)	238,367 (0.10)	475,632 (0.19)	832,264 (0.31)	1,804,356 (0.61)
New infections	53,540	99,814	162,814	308,774
AIDS deaths	16,099	34,419	64,328	152,264
AIDS deaths, cumulative	86,147	217,578	474,438	1,592,876
HIV-related orphans (% among 0–14 age group)	7,912 (0.01)	18,406 (0.03)	37,625 (0.06)	110,843 (0.15)

TABLE 4. INDONESIA (EXCLUDING PAPUA): MODEL PREDICTED PREVALENCE OF HIV/AIDS IN 2005, 2010, 2015 AND 2025 BY REGION AND SUBPOPULATION

	2005			2010			2015			2025		
	Prevalence (%)			Prevalence (%)			Prevalence (%)			Prevalence (%)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Injecting drug users	13.13	25.08	14.62	21.61	34.00	23.01	29.14	39.84	30.28	37.04	45.59	37.88
Female sex workers	5.05	1.10	4.18	9.13	2.06	7.69	14.62	3.48	12.47	25.95	7.47	22.66
Male clients of SW	0.61	0.08	0.49	1.13	0.14	0.91	1.85	0.22	1.51	3.54	0.44	2.96
Men who have sex with men	0.29	0.06	0.23	0.54	0.09	0.44	0.89	0.14	0.73	1.74	0.24	1.45
Paediatric (0–14)	0.02	0.01	0.01	0.04	0.01	0.02	0.07	0.02	0.04	0.12	0.03	0.08
Adult 15–49	0.29	0.04	0.17	0.54	0.06	0.32	0.89	0.09	0.54	1.70	0.15	1.08
Total population	0.19	0.02	0.10	0.34	0.03	0.19	0.55	0.05	0.31	1.02	0.08	0.61

TABLE 5. PAPUA, INDONESIA: NUMBERS OF PEOPLE LIVING WITH HIV INFECTION, NEW HIV INFECTIONS, AIDS DEATHS AND HIV-RELATED ORPHANS IN 2005, 2010, 2015 AND 2025

Indicator	2005	2010	2015	2025
People living with HIV (% prevalence)	12,840 (0.53)	28,921 (1.06)	57,799 (1.85)	144,581 (3.61)
New infections	3,228	6,982	12,980	27,020
AIDS deaths	713	1,675	3,615	10,852
AIDS deaths, cumulative	4,082	10,239	23,961	97,115
HIV-related orphans (% among 0–14 age group)	1,101 (0.10)	2,756 (0.21)	5,967 (0.40)	19,587 (1.03)

TABLE 6. PAPUA, INDONESIA: MODEL PREDICTED PREVALENCE OF HIV/AIDS IN 2005, 2010, 2015 AND 2025 BY REGION AND SUBPOPULATION

	2005			2010			2015			2025		
	Prevalence (%)			Prevalence (%)			Prevalence (%)			Prevalence (%)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Injecting drug users	8.92	20.64	15.91	17.70	22.69	20.68	27.99	26.99	27.40	40.44	37.27	38.59
Female sex workers	3.31	8.48	8.21	7.02	15.83	15.35	13.29	25.57	24.86	29.07	41.30	40.52
Male clients of SW	0.61	1.43	1.39	1.30	2.83	2.74	2.56	5.02	4.86	6.51	10.03	9.78
Men who have sex with men	0.40	0.65	0.64	0.90	1.30	1.28	1.83	2.50	2.45	5.45	6.65	6.56
Paediatric (0–14)	0.04	0.10	0.10	0.09	0.20	0.20	0.18	0.35	0.34	0.46	0.68	0.66
Adult 15–49	0.42	1.06	1.03	0.91	2.07	2.00	1.78	3.59	3.48	4.44	6.95	6.78
Total population	0.23	0.55	0.53	0.50	1.09	1.06	0.98	1.91	1.85	2.46	3.69	3.61

TABLE 7. EAST TIMOR: NUMBERS OF PEOPLE LIVING WITH HIV INFECTION, NEW HIV INFECTIONS, AIDS DEATHS AND HIV-RELATED ORPHANS IN 2005, 2010, 2015 AND 2025

Indicator	2005	2010	2015	2025
People living with HIV (% prevalence)	138 (0.01)	398 (0.04)	1,112 (0.09)	4,916 (0.31)
New infections	46	105	278	997
AIDS deaths	6	25	73	380
AIDS deaths, cumulative	17	96	346	2551
HIV-related orphans (% among 0–14 age group)	4 (<0.01)	20 (<0.01)	65 (0.01)	404 (0.05)

TABLE 8. EAST TIMOR: MODEL PREDICTED PREVALENCE OF HIV/AIDS IN 2005, 2010, 2015 AND 2025 BY REGION AND SUBPOPULATION

	2005 Prevalence (%)			2010 Prevalence (%)			2015 Prevalence (%)			2025 Prevalence (%)		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Injecting drug users	0	0	0	0	0	0	0	0	0	0	0	0
Female sex workers	4.89	0.18	3.17	9.33	0.44	6.21	20.75	1.18	14.01	49.28	4.74	33.91
Male clients of SW	0.17	<0.01	0.04	0.45	0.01	0.11	1.08	0.02	0.29	3.52	0.10	1.05
Men who have sex with men	2.98	0.06	1.05	3.66	0.11	1.36	6.22	0.20	2.41	16.03	0.63	6.61
Paediatric (0–14)	0.01	<0.01	<0.01	0.02	<0.01	0.01	0.05	<0.01	0.01	0.16	0.01	0.04
Adult 15–49	0.12	<0.01	0.03	0.27	<0.01	0.07	0.63	0.01	0.17	1.97	0.05	0.58
Total population	0.06	<0.01	0.01	0.15	<0.01	0.04	0.35	0.01	0.09	1.08	0.03	0.31

TABLE 9. INTERVENTION SCENARIOS FOR PAPUA NEW GUINEA

Response	Region	Scenarios		
		Baseline	Mid	High
Antiretroviral coverage	Urban	213 in 2004, increasing to 20% of people with AIDS	30% late stage HIV 40% AIDS	60% late stage HIV 80% AIDS
	Rural	No treatment	15% late stage HIV 20% AIDS	30% late stage HIV 40% AIDS
Antiretroviral treatment of pregnant women	Urban	20 people in 2005, increasing to 50% of AIDS by 2010	25%	50%
	Rural	0	15%	25%
Prevalence of sexually transmissible infections	Urban	33%	24%	16%
	Rural	16%	12%	8%
Coverage of condom use by female sex workers	Urban	20% of acts	30%	40%
	Rural	10% of acts	15%	20%
Coverage of condom use in general population	Urban	14% of acts	22%	30%
	Rural	7% of acts	11%	15%

TABLE 10. INTERVENTION SCENARIOS FOR INDONESIA EXCLUDING PAPUA

Response	Region	Scenarios		
		Baseline	Mid	High
Antiretroviral coverage	Urban	2,500 patients in 2004, remaining at 20% of people with AIDS	30% late stage HIV 40% AIDS	60% late stage HIV 80% AIDS
	Rural	No treatment	15% late stage HIV 20% AIDS	30% late stage HIV 40% AIDS
Antiretroviral treatment of pregnant women	Urban	10%	35%	65%
	Rural	0	15%	25%
Prevalence of sexually transmissible infections	Urban	21%	15%	10%
	Rural	26%	19%	13%
Coverage of condom use by female sex workers	Urban	23% of acts	40%	60%
	Rural	17% of acts	30%	50%
Coverage of condom use in general population	Urban	14% of acts	17%	20%
	Rural	7% of acts	8.5%	10%
Coverage of condom use in male to male sexual contact	Urban	33% of acts	45%	60%
	Rural	16% of acts	20%	30%
Use of clean needles in injecting drug use	Urban	12% of acts	24%	36%
	Rural	12% of acts	18%	24%

TABLE 11. INTERVENTION SCENARIOS FOR PAPUA, INDONESIA

Response	Region	Scenarios		
		Baseline	Mid	High
Antiretroviral coverage	Urban	80 patients in 2004, increasing to 10% of AIDS	30% late stage HIV 40% AIDS	60% late stage HIV 80% AIDS
	Rural	No treatment	15% late stage HIV 20% AIDS	30% late stage HIV 40% AIDS
Antiretroviral treatment of pregnant women	Urban	0	25%	50%
	Rural	0	15%	25%
Prevalence of sexually transmissible infections	Urban	25%	18%	12%
	Rural	16%	12%	8%
Coverage of condom use by female sex workers	Urban	36% of acts	40%	60%
	Rural	10% of acts	15%	20%
Coverage of condom use in general population	Urban	14% of acts	17%	20%
	Rural	7% of acts	8.5%	10%
Coverage of condom use in male to male sexual contact	Urban	33% of acts	45%	60%
	Rural	16% of acts	20%	30%
Use of clean needles in injecting drug use	Urban	12% of acts	24%	36%
	Rural	12% of acts	18%	24%

TABLE 12. INTERVENTION SCENARIOS FOR EAST TIMOR

Response	Region	Scenarios		
		Baseline	Mid	High
Antiretroviral coverage	Urban	10 patients in 2005, to 20% of AIDS	30% late stage HIV 40% AIDS	60% late stage HIV 80% AIDS
	Rural	No treatment	15% late stage HIV 20% AIDS	30% late stage HIV 40% AIDS
Antiretroviral treatment of pregnant women	Urban	0	25%	50%
	Rural	0	15%	25%
Prevalence of sexually transmissible infections	Urban	24%	18%	12%
	Rural	12%	9%	6%
Coverage of condom use by female sex workers	Urban	1% of acts	15%	30%
	Rural	1% of acts	7.5%	15%
Coverage of condom use in general population	Urban	0% of acts	5%	10%
	Rural	0% of acts	2.5%	5%
Coverage of condom use in male to male sexual contact	Urban	5% of acts	15%	30%
	Rural	2.5% of acts	7.5%	15%

FIGURE 1: MODEL TRANSITION STATES, APPLIED TO RISK GROUPS AMONG THE ADULT POPULATION, DISTINGUISHING HIV INFECTED AND UNINFECTED SUP-POPULATIONS

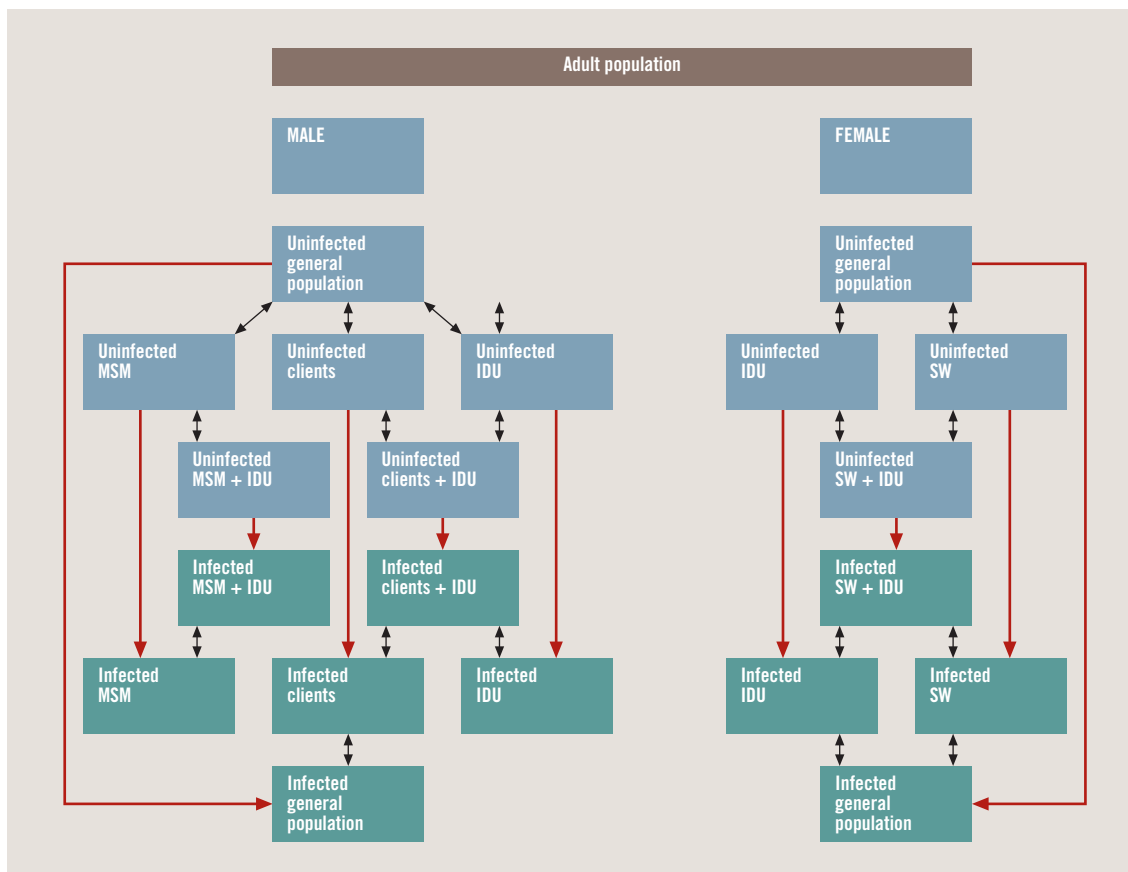


FIGURE 2: PROJECTED TOTAL HIV/AIDS, PAPUA NEW GUINEA, UNDER DIFFERENT INTERVENTION SCENARIOS

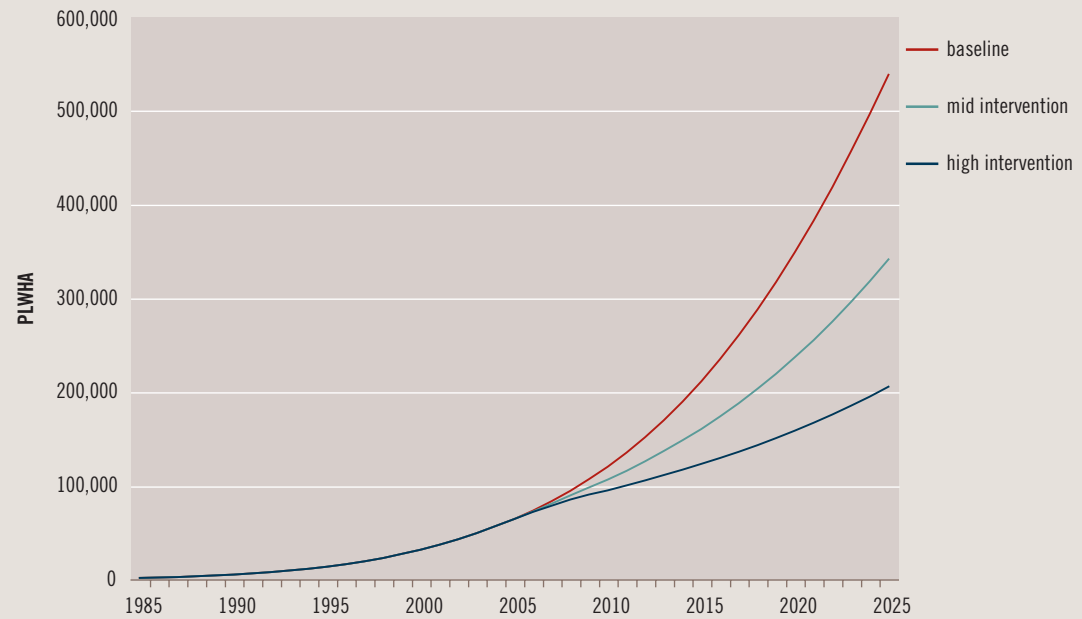


FIGURE 3: PROJECTED TOTAL HIV/AIDS, INDONESIA (EXCLUDING PAPUA), UNDER DIFFERENT INTERVENTION SCENARIOS

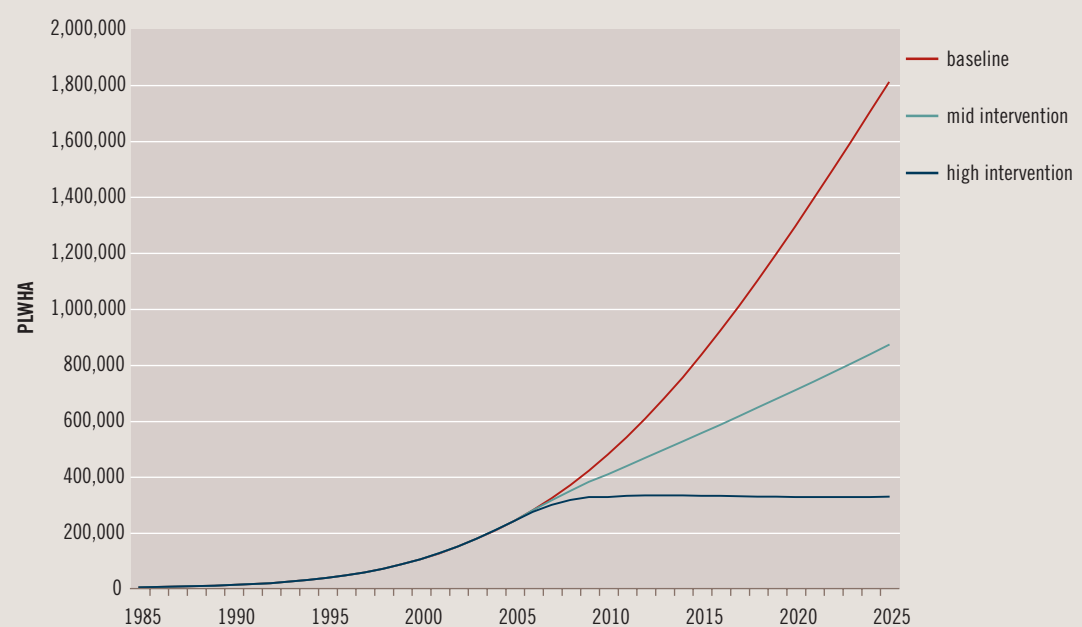


FIGURE 4: PROJECTED TOTAL HIV/AIDS, PAPUA, INDONESIA, UNDER DIFFERENT INTERVENTION SCENARIOS

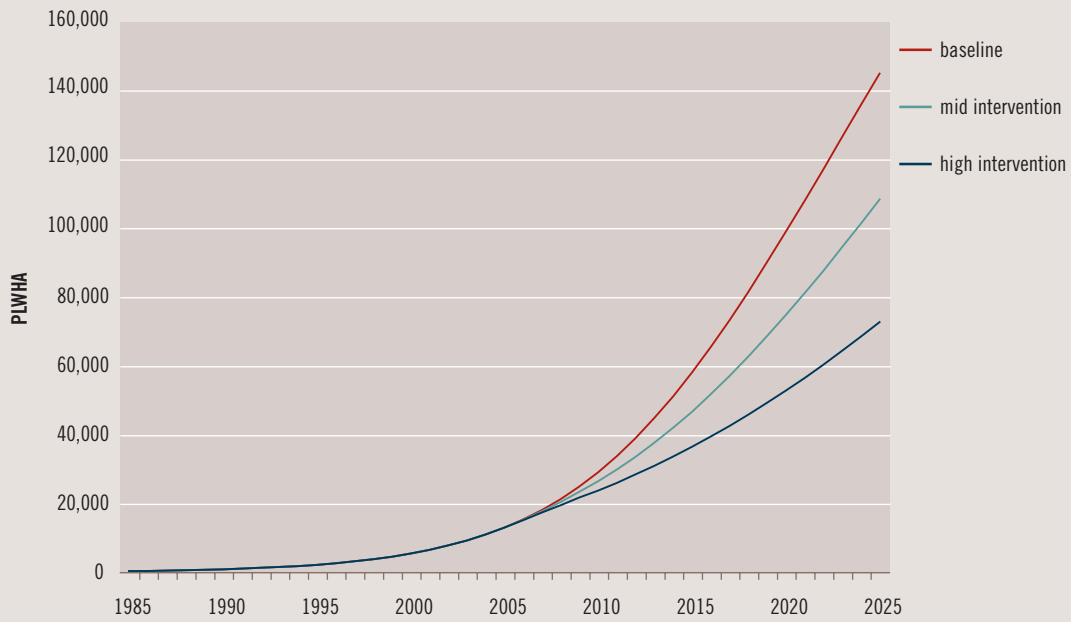
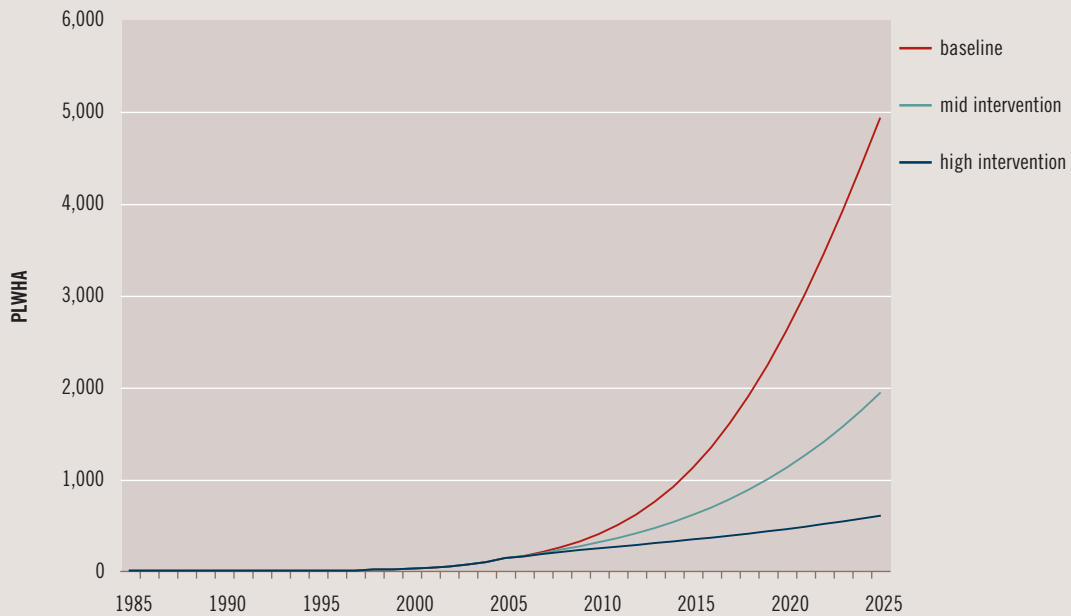


FIGURE 5: PROJECTED TOTAL HIV/AIDS, EAST TIMOR, UNDER DIFFERENT INTERVENTION SCENARIOS



Part 1 References

- Australian Agency for International Development (2000). *Social and economic indicators, Papua New Guinea*.
- BPS-Statistics Indonesia and Ministry of Health (2004). *Behavioural Surveillance Survey (BSS) Result in Indonesia 2002–2003*.
- Brown T, Peerapatanapokin W (2004). The Asian epidemic model: A process for exploring HIV policy and programme alternatives in Asia. *Sex Transm Infect*, 80(Suppl 1):i19-i24.
- Butt L, Munro J, Wong J (2005). Border testimonials: Patterns of AIDS awareness across the Island of New Guinea. *Papua New Guinea Medical Journal (in press)*.
- Fleming DT, Wasserheit JN (1999). From epidemiological synergy to public health policy and practice: The contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sex Transm Infect*, 75:3–17.
- Garnett GP (2002). An introduction to mathematical models in sexually transmitted disease epidemiology. *Sex Transm Infect*, 78:7–12.
- Jenkins C (1997). Final Report to UNAIDS: Police and sex workers in Papua New Guinea. http://walnet.org/csis/papers/jenkins_papua.html
- MAP (Monitoring the AIDS Pandemic) (2004). *AIDS in Asia: Face the facts. A comprehensive analysis of the AIDS epidemic in Asia*. www.mapnetwork.org/reports/aids_in_asia.html
- McGibbon R (2004). Plural society in peril: Migration, economic change and the Papua conflict. *East-West Center Washington, Policy Studies 13*. <http://www.eastwestcenter.org/stored/pdfs/PS013.pdf>
- Ministry of Health, East Timor (2004). *HIV/AIDS in East Timor until 2004 (unpublished data provided by Carlos Tilman)*
- Ministry of Health, Indonesia (2002). *HIV/AIDS and risk group estimation in Indonesia, by province, 2002 (unpublished data provided by Nurlan Silitonga)*
- Ministry of Health, Indonesia (2003). *National estimates of adult HIV infection, Indonesia 2002 (Workshop Report)*.
- National Directorate of Statistics, East Timor (2005). *Population East Timor 2004 Census (Provisional) (unpublished data)*.
- National HIV/AIDS Support Project (NHASP) (2004). *National Consensus Workshop of Papua New Guinea 2004 (draft report)*.
- Pisani E and Dili Survey Team (2004). HIV, STIs and risk behaviour in East Timor: An historic opportunity for effective action. *U.S. Agency for International Development, Family Health International*.
- Pisani E, Purnomo H, Sutrisna A, Asih A, Zaw M, Tilman C, Bull H, Neilsen G (2004). Basing policy on evidence: Low HIV, STIs and risk behaviour in Dili, East Timor argue for more focused interventions (unpublished).
- Rock J and Family Health International (2005). *The Global Fund to Fight AIDS, Tuberculosis and Malaria: Proposal East Timor (personal communication)*

The Global Fund to Fight AIDS, Tuberculosis and Malaria (2005). *Grant Performance Report, Indonesia*.
http://www.theglobalfund.org/search/docs/1INDH_375_139_gpr.pdf

The Global Fund to Fight AIDS, Tuberculosis and Malaria (2005). *The Global Fund to Fight AIDS, Tuberculosis and Malaria: Proposal East Timor*.

The Global Fund to Fight AIDS, Tuberculosis and Malaria and National Department of Health, Papua New Guinea (2005). *Programme grant agreement between The Global Fund to Fight AIDS, Tuberculosis and Malaria and National Department of Health, Papua New Guinea*.

The Global Fund to Fight AIDS, Tuberculosis and Malaria and National Department of Health, Papua New Guinea (2004). *Proposal, the National Department of Health, Papua New Guinea*.

UNAIDS (2000). The Transex Project: Sex and transport workers, police and security men in Papua New Guinea. In: *Female Sex Worker HIV Prevention Projects: Lessons learnt from Papua New Guinea, India and Bangladesh, UNAIDS Case study*.

UNAIDS, UNICEF, World Health Organisation (2004). *Papua New Guinea Update 2004. Epidemiological fact sheets on HIV/AIDS and sexually transmitted infections*.

UNAIDS (2005). *A scaled-up response to AIDS in Asia and the Pacific*.

UNICEF (2003). *Multiple Indicator Cluster Survey, East Timor, 2002*.

United States of America Agency for International Development (2004). *Papua New Guinea country profile: HIV/AIDS*.

Walker N, Stanecki KA, Brown T, Stover J, Lazzari S, Garcia-Calleja JM, Schwartlander B, Ghys PD. Methods and procedures for estimating HIV/AIDS and its impact: The UNAIDS/WHO estimates for the end of 2001. *AIDS*, 17:15:2215–2225.

World Bank, Australian Agency for International Development and Asian Development Bank (2004). *Control of HIV/AIDS in Papua New Guinea: A situation assessment and proposed strategy (draft)*.

World Bank (2002). Indonesia Social Indicators. <http://siteresources.worldbank.org/INTINDONESIA/Resources/Country-Data/SocialIndicators.pdf>

World Health Organization, National AIDS Council, Papua New Guinea and National Department of Health, Papua New Guinea (2000). *Consensus Report on STI, HIV and AIDS epidemiology, Papua New Guinea*.

World Health Organization, Regional Office for South-East Asia and Regional Office for the Western Pacific (2001). *The Condom Situation Assessment in 11 Asian and Western Pacific Countries*.

Zwahlen M, Vlahov D (2003). Commentary: Modelling and understanding differences in human immunodeficiency and hepatitis C virus epidemiology in injecting drug users. *International Journal of Epidemiology*, 32:715–716.

Part 2

CURRENT AND FUTURE ECONOMIC AND SOCIAL IMPACTS

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Introduction

EPIDEMIC IMPACTS ARE HISTORY CHANGING EVENTS. THEY TERMINATE SOME LIVES, INCAPACITATE OTHERS AND STUNT THE CAPABILITIES OF THOSE WHO HAVE TO DIVERT ENERGY AND TIME INTO CARE. IN THE END, SUFFICIENT NUMBERS OF DEATHS AND ILLNESSES MAKE A SOCIETY TAKE A PATH OTHER THAN THAT WHICH IT WOULD PREVIOUSLY HAVE FOLLOWED. THIS IS IMPACT

(Barnett & Whiteside 2002, p.159).

The aim of this Part of the HIV Epidemiological Modelling and Impact (HEMI) study was to “provide an analysis of the potential national and subregional social, economic and security impacts of the HIV/AIDS pandemic” (AusAID Terms of Reference, p.4), projected over the next 20 years. In Part 1 of the HEMI study, mathematical models were developed to predict the course of the HIV epidemic based on the best available epidemiological data and three different intervention scenarios. In the second Part of the Study, the output of the epidemic model was applied to forecast the economic and social consequences of HIV/AIDS under each of the three intervention scenarios.

This Part is laid out in five sections. In this Introduction we define what is meant by economic and social impacts (including security impacts), and illustrate their interrelationships. We then describe the methodology that is used to project these impacts, under a range of alternative future scenarios. The sections that follow deal with Papua New Guinea, Indonesia (other than Papua), Papua (Indonesia), and East Timor respectively. In considering the impacts of HIV within Indonesia, Papua has been presented in its own section because the epidemiology of the HIV epidemic and related risk factors are so markedly different from the rest of Indonesia.

Economic analysis is central to any study of the impact of a serious health condition, but the social, cultural and security impacts are equally important. However, much of the research on socio-economic

implications of HIV, as Loewenson and Whiteside argue (1997), “draw[s] the attention of planners and decision makers away from the social costs of AIDS on to the economic concerns, ignoring questions such as how to meet the health, welfare and educational needs of lower income and less skilled wage earners and their dependents”.

Increased levels of sickness and death from HIV can have economic and social impacts both in terms of short-term shocks, which may be primarily at the individual, household or family level and, depending on the extent of the epidemic, long-term complex deteriorations to the community and national interest. Furthermore, HIV does not take place in isolation; there are multiple long-wave social and economic events and systems which influence both its spread and its impact, including political change, conflict, the treatment of women and girls and migration.

Within any society, there are differentials in susceptibility to HIV as well as to its impact. Those on the margins of societies generally tend to be most susceptible and feel the impact greatest although, as Barnett and Whiteside argue, “perception and estimation of impact depends on... the degree to which those who are affected count in society” (2002, p.163). Social vulnerabilities make for greater morbidity and mortality and for impacts on education and skills, access to care and the compassionate (or otherwise) response by society to those with HIV.

In undertaking the social and security assessment in this report we comment on the shocks that are beginning to be felt in the region, and will be fully experienced in the next ten years. The full long-wave impact will be felt twenty years out. We use a matrix to indicate both the kinds of social and security impacts under consideration, and how they may be manifested at individual, family, community and state levels (see Table 2, below).

Economic impact is based on the premise that there is a link between ill health and development that is well recognised and has placed health at the centre of poverty reduction strategies (Russell, 2004). HIV is at the forefront of these health concerns. The epidemic largely affects adults in their most productive years, and has the potential to undermine achievement of the Millennium Development Goal 1 of eradicating extreme poverty and hunger in countries such as Papua New Guinea, where the epidemic is projected to climb above 5 per cent.

In the short term, impact will be felt at household level, as people living with HIV and AIDS find themselves unable to fulfil their social and economic contributions to society and the economy. In the long run the formation of social capital – the fabric of society and the force that generates economic growth - may deteriorate. Knowledge is lost when young adults die, and this loss is compounded when knowledge is not passed on to younger generations because of the death of their parents (Bell, Devarajan et al., 2003).

LEVELS OF ECONOMIC IMPACT

The economic impacts of HIV/AIDS differ from impacts of other globally important infectious diseases for two reasons. First, the severe mortality associated with HIV/AIDS in resource-poor settings has its greatest impact in the most productive years. Therefore the epidemic affects the size, growth rate, age and skill composition of the future labour force, in turn affecting the growth rates of output and productivity. Second, current treatments for HIV/AIDS are not curative, and must be provided indefinitely to maintain health and quality of life.

The diagram below (Figure 1) illustrates the consequences of an HIV/AIDS illness or death,

which is first felt at the household level, and then (given a threshold of prevalence) flows on to impact at the workforce, firm and state levels. This diagram also illustrates the impacts on the health sector. Each of these components are returned to and examined in the country analysis sections.

HOUSEHOLD IMPACTS

The economic impact of HIV and AIDS on households has been described as the ‘medical poverty trap’, undermining household prosperity. On one hand, the household has reduced income through decreased earnings of both people living with HIV and carers; on the other, the household has increased expenses in medical (and funeral) costs and associated transport costs (see Figure 1, element A). HIV reduces the time and labour available to the household increasing the number of poor households, and making poorer those who are already poor.

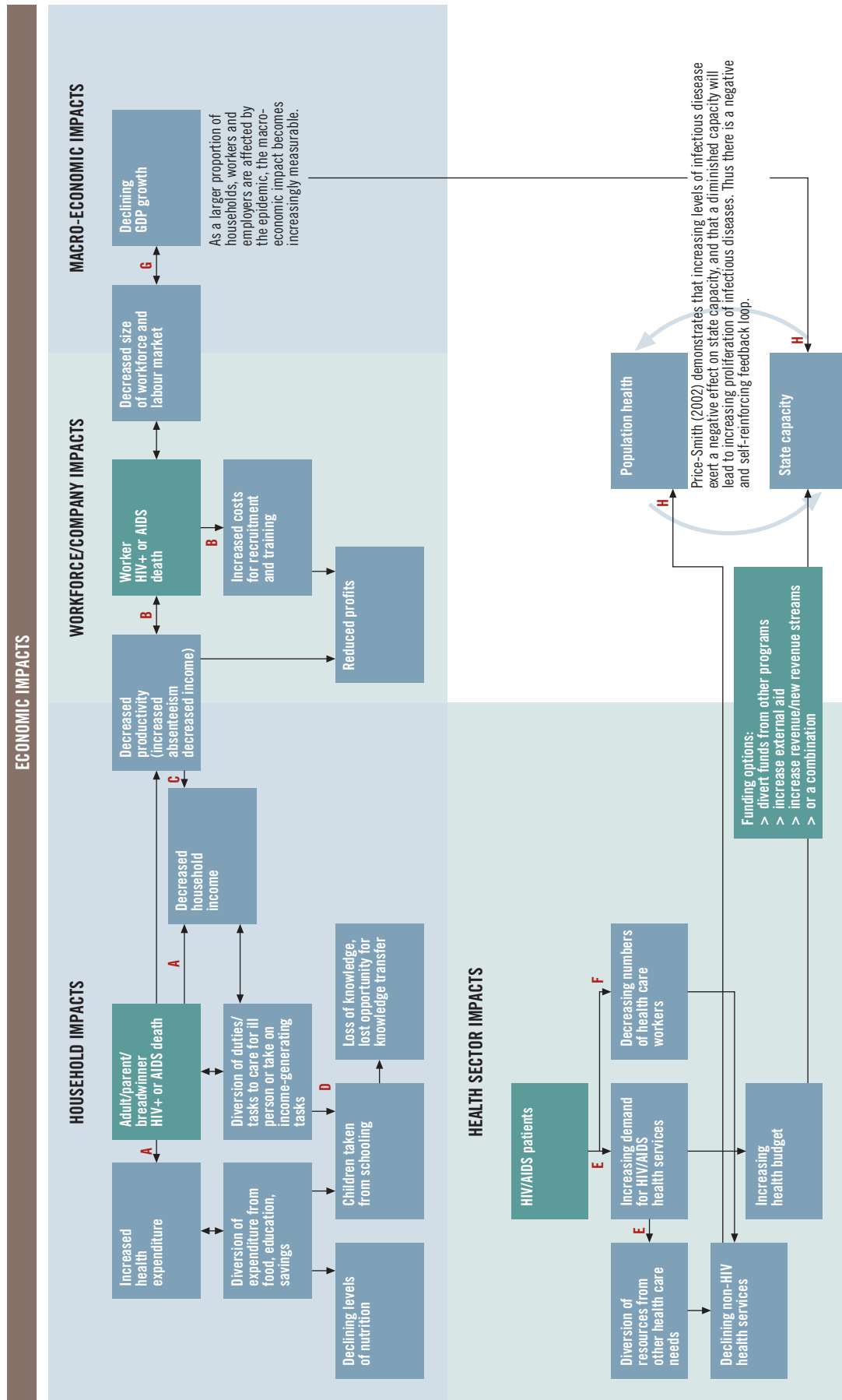
Poor households appear to be more vulnerable to income losses due to increased HIV/AIDS mortality in the sense that they have the fewer assets on which to draw (Cohen; Haacker, 2004). The costs of HIV for many poor households in developing countries may be such that the viability of the household is under threat.

Direct costs for households

Household medical costs will be influenced by a number of factors, including health seeking behaviours, accessibility of health care, health costs (public versus private expenditure) and availability of antiretroviral therapy. Direct health costs are also opportunity costs, in that expenditure on health means a diversion of expenditure from other items such as education, food or savings.

Various attempts have been undertaken to measure the direct medical costs of HIV and AIDS to households. In a review of six published studies, Russell (2004) found that in four of them, the direct household costs of HIV were between 50 per cent and 100 per cent of household income and in one of these they exceeded 100 per cent. By way of comparison, Russell analysed costs associated with malaria and tuberculosis, and found that their direct

FIGURE 1.



Sources: (Cohen 2002; Fox, Rosen et al. 2004; International Labour Office 2004; Price-Smith 2002; United Nations 2004)

costs as a percentage of household income were considerably less, at about 2 per cent and between 5 and 21 per cent respectively.

Indirect costs for households

Indirect costs are harder to quantify than direct costs but are likely to be the most significant costs households will incur. Studies attempting to measure indirect costs examine the costs of diversion of activities away from non-income generating and non-productive activities to caring and loss of breadwinner and income earning opportunities (Russell, 2004). (See Figure 1, element D.) Indirect costs can take the form of loss of income from labour, declining agricultural inputs, reduced food crop production and household assets and rising malnutrition (Russell, 2004).

A 1997 Thai study found 35 per cent of AIDS affected households felt a serious impact on their agricultural production, leading to a 48 per cent reduction in family income (Pitayanon et al, cited in Russell 2004). A second study of rural Thai households in the late 1990s found income per capita declined by 68.4 per cent and consumption per capita decreased by 43.5 per cent (Kongsin and Watts, 2000). Households respond to this by employing loss management strategies such as spending savings and borrowing and selling possessions (Policy Project, 2003). In rural settings of high HIV prevalence, households first seek to switch to production of lower maintenance subsistence

food crops, liquidise savings or assets like livestock undertake borrowings either formal or informal and decrease spending on education and non-urgent health. The second stage of loss management involves disposal of productive assets, including selling land and tools, reducing size of land that is farmed, borrowings at very high interest and further reductions in consumption, education and health expenditures. In the final stage (destitution), there is dependence on charity, breaking up of the household and migration (Policy Project 2003). It is recognised that the household's long-term viability depends on holding on to its productive assets (Barnett and Whiteside, 2002).

Impacts to education are viewed as both economic and social. On the economic side, as indicated at the above diagram, one of the adjustments households can make in curbing their expenses and increasing available time for caring or household duties is to withdraw children from schooling. There is some evidence of declining school enrolments from Africa, with girls disproportionately affected. However, increasing education levels has been shown to be an important element in responding to HIV (Cohen, 2002).

WORKFORCE IMPACTS

As mentioned above, the HIV/AIDS epidemic has the potential to have a significant impact on reducing both the size of the working age population and an

TABLE 1: LABOUR FORCE LOST PRODUCTIVITY

	HIV cases 2–3 years before death	HIV cases 1–2 years before death	HIV cases 0–1 year before death
Aggregate impact on output (less than comparison)		30.5 per cent	35.1 per cent
Output (less than comparison) (as measured by weight of tea plucked)		6–13 per cent	17 per cent
Absenteeism at work (increase over comparison) (including sick, annual, unpaid leave)	89 per cent	100 per cent	87 per cent
Switching to light duties (increases over comparison)		58 per cent	66 per cent
Productivity (proportion of daily output of cases to that of comparison)		92 per cent	81–85 per cent

(Fox, Rosen et al. 2004)

individual worker's ability to contribute (Cohen, 2002). However, the size of impact of loss of workforce depends on supply of surplus labour and the degree to which hard-to-replace labour is affected by HIV/AIDS (United Nations, 2004).

Analysis of the affect of HIV/AIDS on individual labour productivity in Kenya over a 5-year period undertaken by Fox, Rosen et al (2004) provides insights into the scale of this impact. The study found that, as HIV positive workers neared death, there were marked increases in absenteeism, increased numbers of workers switching to light duties and reduction in output produced. In short, there was decreased productivity.

These changes have a number of consequences. To firms they represent decreased value of workers through less output, reduced productivity and increased costs (Figure 1, element B), while for households they represent a reduction in earnings (Figure 1, element C).

When the workforce size and skill base of firms is depleted productivity is dampened, costs rise and profitability declines (United Nations, 2004). Depending on employment contracts, firms carry both direct and indirect costs for employees with HIV/AIDS. Direct costs incurred can include medical expenses for employees, recruitment and retraining costs (see Figure 1, element B). Indirect costs include reduced productivity and increased turnover costs. If there are many cases of HIV/AIDS within the firm's workforce, organisational costs, including insurance premiums, production disruption and loss of experienced workers (Rosen cited in International Labour Office, 2004) will also be incurred.

Subsistence agriculture depends heavily on human labour. As the main output is also consumed by the household, reductions in output affect both nutrition and any income losses through reduction in goods for market (Barnett, Blas et al. 2000). The balance between farm work, caring and domestic work is finely tuned for subsistence agriculture households (Barnett and Whiteside, 2002 p.232) and changes in one component disrupt the balance of work. However, the loss of a family member also translates to less food requirements for that family. The workforce in subsistence agricultural settings

is also affected in the longer-term, as location and task specific skills are lost and not passed to the next generation (International Labour Office, 2004) (Figure 1, element D) thus making lost 'unskilled labour' hard to replace.

Family based farmers will face critical constraints in replacing labour lost to HIV and AIDS. However, survival of the farm may depend on whether management responsibilities are centralised or dispersed (Cohen, 2002). The former may result in the loss of key skills and asset depletion, whereas the latter provides a more viable path for survival.

HEALTH SECTOR IMPACTS

The health sector is the first sector to see the impact of the epidemic. On the demand side, there is an increase in the number of people requiring treatment for opportunistic infections, and there is a corresponding increase in resources and services to meet that demand which may result in diversion away from other health needs (Figure 1, element E). The increase in demand is also from people with HIV/AIDS who would not normally be extensive users of health care facilities. On the supply side there is an impact on the number of health care workers as they also become infected (United Nations, 2004). (See Figure 1, element F).

Home based care for advanced illness can present an alternative to lessen the burden on the health sector and in some case as a personal preference. However, this increases the burden on the very households already coping with significant financial loss along with distress and social losses (Cohen, 2002).

Increases in HIV prevalence present a serious policy and fiscal dilemma for government, as it may lead to pressure to divert resources both from within the health budget and from areas such as education, infrastructure and law enforcement. As the number of AIDS cases rises, the treatment burden will primarily fall on secondary and tertiary hospitals, which are already overstretched in most developing country settings.

MACRO IMPACTS

It is difficult to empirically estimate the effects of HIV/AIDS on economic performance, as many factors other than HIV/AIDS affect growth. However, some studies have shown that the macroeconomic impacts, where measurable, increase as HIV prevalence increases. In populous countries with low prevalence, or countries with very low prevalence, the macroeconomic impact is not measurable.

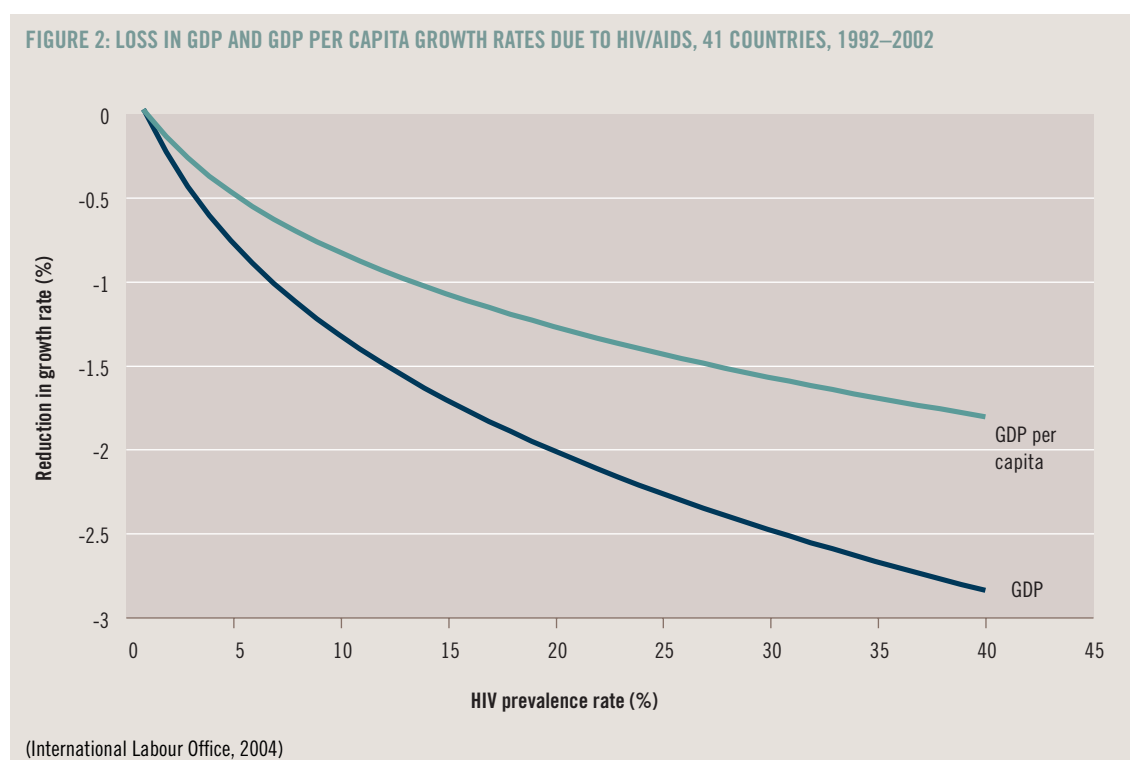
The macroeconomic impact becomes more measurable as a larger proportion of individuals become affected by the epidemic. The macroeconomic impact is typically measured through the effect on GDP growth (Bell, Devarajan et al., 2003; International Labour Office, 2004). Analysis here will focus on the impact on GDP and GDP per capita growth and measuring the impact of decreased numbers of workers (Figure 1 element G). The impact on GDP per capita is an alternative measure (see Figure 2), that will generally be smaller than the absolute impact on the workforce size, as the population is reduced by deaths due to HIV/AIDS (United Nations, 2004).

The model underlying this figure uses interactions between health capital (life expectancy) caused by

HIV prevalence rates, and economic growth. The HIV prevalence variable in the model is expected to capture the effect of the epidemic both on the growth of the labour supply and the transmission of HIV.

Absent from these economic impact studies is the cost of replacing workers and the cost of the loss of institutional memory and social capital. Including these types of costs would see an increase in the size of the macroeconomic impact (International Labour Office, 2004). Furthermore, these unmeasurable impacts are likely to have long-term and cumulative effects on the economy.

While economists contend 'that HIV/AIDS in developing countries will tend to make income distribution more unequal and will increase poverty, notably by impoverishing many of the households directly affected by the disease' (United Nations, 2004), this has not been shown to cause a change in the Gini coefficient, which measures income distribution and inequality. This conclusion is supported by analysis of inequality in Botswana, one of the most heavily affected countries in the world (Greener in Haacker, 2004). The reason suggested is that while the impact on poor households was worse, it is coupled with a reduction in inequality for those



in the higher-income quartiles (Haacker, 2004). Analysis of Sub-Saharan countries' HIV prevalence mapped against the Gini coefficient shows that increased inequality is associated with high HIV rates, but no causal relationship can be drawn (Husain, 2005).

Price-Smith's work on the impact of infectious disease on national security and development supports the findings of economic modellers. He found a negative correlation between infectious disease and macroeconomic measures such as GNP and government expenditure and therefore state capacity, defined as 'one country's ability to maximize its prosperity and stability, to exert de facto and de jure control over its territory, to protect its population from predation, and to adapt to diverse crises' (Price-Smith, 2002). This work suggests that improving public health contributes to the economic productivity of a society (Figure 1, element H).

LEVELS OF SOCIAL IMPACT

INDIVIDUAL IMPACT

This impact is felt in terms of the individual's own illness and possible impending death and the trauma of the illness and death around him or her. The severity of the impact depends not just on the individual's own resources but on the composite of psychic and social structures and relationships found in families and communities, primarily, but also in the wider world. The social life of an individual is reproduced within these complexities, which are hard to quantify, but without which he or she could not exist.

FAMILY IMPACT

Individuals cluster in families (nuclear and extended, traditional and unconventional), as may cases of HIV/AIDS, due to sexual or mother-to-child transmission. The impact on women of the death of a husband and/or children is severe, and because of their central role in both having children and caring for families, women's illness and death are often most severely felt within families. One of the

severest shocks is the dissolution of families which occurs when mothers and fathers become ill and cannot care for others, or fewer children are born or die early, or are left as orphans. As Barnett and Whiteside argue (2002, p.187), "inevitably, this means that the personnel of the household are not replaced, and that the life ways and traditions of that household are not carried forward". As well, different forms of families emerge – ones headed by the elderly or by children – which may be less effective than more traditional families in terms of passing on cultural values and traditions. The impact on families of HIV is increased or decreased depending on community and state support.

COMMUNITY IMPACT

The notion of a 'community' is a problematic one. In rural areas a community may be a local village, tribally or clan-based. In urban areas a community may be defined by geographic or other characteristics ("imagined" in the terminology of Benedict Anderson, 1983) such as religious characteristics. Communities may have hierarchical structures or be more or less loose associations between people. In resource-poor settings members of communities can work together to provide utilities such as wells, health care such as midwifery, protective services, and cultural education and recreation. They may be the prime site of social reproduction, where local mores get decided. The impact of HIV will not initially be felt at community level, but will be as prevalence increases, families begin to falter, deaths and illness become more widespread and the epidemic begins to have an effect on the abilities of families to participate in community life, or the ability of the community to support families in need. The presence of HIV challenges cultural and religious beliefs of communities (particularly around beliefs about sex and drug use) and may be immensely divisive.

NATIONAL IMPACT

Many countries in the Asia-Pacific region are relatively newly-established nations or are fragile in some way due to conflict, decolonisation, or crises. The impact of HIV on the nation may be

felt through its ability to deliver services and to even govern in the face of growing numbers of deaths. Whether HIV will impact at this level is unsure, even at high levels of prevalence, but the areas in which it could impact include loss of skills at a national level, and increases in insecurity and conflict. Governments can play a huge role in the response to HIV, through willingness to show leadership and ensure adequate funding and support for HIV prevention, care and treatment.

AREAS OF GREATEST SOCIAL IMPACT

DEMOGRAPHICS

Demography is concerned with population dynamics such as size and growth rates, structure by gender and age, and key indicators such as fertility rates, life expectancy, and infant and child mortality. HIV produces higher levels of death amongst the most productive part of the population (15–49 years) and amongst infants and children. It reduces life expectancy, and skews the population structure.

GENDER RELATIONS

HIV has the potential to alter relationships between men and women. There are myriad, diverse and context-specific ways in which gender relationships influence the social impact of the epidemic. In most parts of the world, women have less power than men over many aspects of life, particularly (in the context of HIV) sexual choices. Lack of power impacts dramatically on women's experience of the epidemic; their productive and reproductive life, and role in the community – what Bennett (1990) calls a 'triple jeopardy'. As well, widows may not have secure land tenure or rights; women's responsibility for household food production may result in the loss of crucial knowledge and experience; mothers' deaths increase the levels of malnutrition in children and women may be forced into unwanted sexual relationships as a result of increasing impoverishment (see Harvey, 2003 p.25–26). Furthermore, women bear much of the burden of AIDS care in both the formal or informal sectors. HIV increases "time poverty"; it puts pressure on

the hours women are required to spend on social and family responsibilities, particularly when they and their family members get ill. Girls may be less likely to attend school when their mothers are ill or have died.

SECURITY, CONFLICT AND GOVERNANCE

Conflict at local levels fuels the spread of HIV through the breakdown of communities, forced migration, separation of families and the destruction of social services such as schools and clinics. Rape and other human rights abuses that proliferate during conflict particularly affect women, and their impoverishment may force them into unwanted sexual choices. Conflict also destroys communication networks, strains precarious health-care systems, and impacts negatively on efforts to monitor the health of populations and to provide HIV prevention and support. HIV/AIDS spreads rapidly as a result of this breakdown of vital services and low awareness about HIV.

The impact of conflict can be so deep and so long lasting that it is difficult for countries to rebuild and turn their attention to not only food production but other issues such as HIV and AIDS. The armed forces themselves can play a role in exacerbating HIV transmission; UNAIDS estimates that armed services personnel have an HIV infection rate that is two to five times higher than their civilian counterparts. With the advent of HIV, social unity as well as social support become eroded, and community groups and organisations may not be able to engender the social cohesion necessary to fight HIV (Luker, 2004).

As prevalence reaches very high levels, HIV has the ability to impact on human security and governance at not only the village level but nationally. HIV can create volatile social and political situations, by aggravating or provoking social fragmentation. There are links between national and regional stability and HIV prevalence. A recently published ISS (Institute for Security Studies) research paper found that HIV/AIDS could complicate attempts at post-conflict reconstruction in countries with high HIV prevalence rates (Bazergan, 2004). Post-conflict situations are particular sites of concern because

demilitarisation may be threatened if combatants return to dying families. As well, children orphaned by HIV may fall into crime and exploitation because of poor living conditions, malnourishment and a lack of education.

EDUCATION

Decline in school enrolment and deaths of teachers are the most visible effects of the epidemic in the education sector. In high prevalence countries of Africa, fewer children are attending school because they need to stay home to care for parents and family members, and their families can no longer afford school fees and other expenses. Girls may be particularly affected. Absences from school will in turn have an effect on HIV prevention, as a good basic education is a key element of most strategies for preventing HIV transmission. The extent to which schools and other education institutions are able to continue functioning (as part of the essential infrastructure of societies and communities) will influence how well societies can cope with the epidemic.

CULTURAL TRADITION

Culture can be understood as the ways of life, traditions and beliefs, representations of health and disease, sexual norms and practices, power and gender relations, family structures, languages and means of communication. HIV impacts on cultures; when people die they are no longer able to pass on traditions. Culture influences attitudes and behaviours related to the HIV epidemic, but is in turn impacted by HIV. Attitudes towards sexuality, male-female relationships, illness and death play an important role in shaping responses to HIV and AIDS.

Religion is one of the foundations of community in many countries. HIV poses a particular challenge to religious beliefs due to the nature of its main modes of transmission, including sex and intravenous drug use. Empirical studies suggest that religion and spirituality can be both resources for people with HIV and sources of pain and struggle. Some aspects of religious value systems have the potential to add

to the stigmatisation of those with HIV, but religion has a vital role to play in disease mitigation, through compassion and the faith-based provision of essential services, such as child welfare, medical care, childcare, housing, transportation, and counselling, as well as HIV prevention and education.

MIGRATION

People move within and between countries for a number of reasons. While migration for work may be beneficial both for nations and peoples, various factors such as economic distress, violence, oppression, different forms of discrimination and conflicts force people in developing countries to move, often with little or no knowledge of the complex mix of vulnerabilities that await them on the way. A large number of migrants face an acute risk of exploitation, physical violence, sexual abuse and socio-political marginalisation. Added to these factors, the acute gender bias that is widespread in the region makes women especially vulnerable. HIV thrives in such situations. Crowded and unsafe camps for internally displaced persons and refugees expose women and children to the risk of sexual violence. Combined with inadequate health services and reduced opportunities for learning and recreation, this creates situations that may be conducive to the spread of HIV.

HUMAN RIGHTS

HIV impacts not only the physical health of individuals, but also their social identity. Lack of recognition of the human rights of people living with or affected by HIV stigmatises and discriminates against people living with HIV. It also contributes directly to the spread of the epidemic since it hinders the response. When human rights are not respected, people are less likely to seek counselling, testing, treatment and support because of lack of confidentiality, lack of access or other negative consequences. HIV is found disproportionately among groups that already experience a lack of protections of human rights including protection from social and economic discrimination, or that are marginalised by their legal status.

TABLE 2: SOCIAL IMPACT MATRIX

	Individual	Family	Community	State
Demographics	Loss of partners, children, friends	Loss of carers	Loss of productive members/ Increased burden of care	Population pyramid skewed/loss of productive and reproductive capacity
Gender relations	Rape Brutality	Domestic violence	Loss of civil society which depends on women	Persistence of male governance
Conflict, Security and Governance	Violence/Lack of trust/orphans on the streets	Lack of trust, Inward looking, Diminished food security	Intertribal, community violence/ Loss of civil society/decline in social controls	Faltering democracy Civil unrest/ Terror/Immiseration
Education	Lack of access	Inability to get a job	Skills loss	Skills loss
Cultural Tradition	Lack of transmission	Lack of transmission	Loss of local traditions	Alienation
Religion	Loss of hope	Loss of hope/tradition	Decline in local religious traditions/ rise of cults	Rise of cults, fundamentalism
Migration	Dispossession, Migrating for work/ food	Dispossession, Coming home to die	Disruption of social structures	Refugees, migrants
Human Rights	S rejection	Isolation from community	Divided communities	Breakdown of the rule of law

THE SCENARIOS

Each of the social, security and economic impacts outlined above are used to measure the potential impacts over the 20 year period for Papua New Guinea, Indonesia and East Timor. The economic assessment will focus on the impacts to the workforce and health sector. We will provide a socio-economic assessment of the impact on the education sector and households. Social impacts will look at the impact on women, caring responsibilities, governance and conflict. These impacts culminate in producing impacts on state capacity, which are also discussed.

THE BASELINE – STATUS QUO RESPONSE

The baseline is defined here as the status quo, with no explicit or implicit policy changes to the current response to HIV. We also assumed there are no policy changes in sectors such as education, health and armed forces, and no changes to legislation and no new infrastructure.

Under the baseline scenario for PNG, the epidemiological model projected that:

- > HIV adult prevalence will exceed 10 per cent in the 15–49 year old age group in 2025, and

- > There will be over 400,000 deaths from AIDS between 2005 and 2025.

For Indonesia, the baseline model projected that:

- > The concentrated epidemic currently observed in Indonesia in 2005 will become a generalised epidemic with adult HIV prevalence passing 1 per cent by 2025.
- > Papua will see a much more serious generalised epidemic with HIV adult prevalence reaching 6 per cent by 2025.

In East Timor, the baseline scenario projected that:

- > the epidemic will take on the characteristics of a concentrated epidemic with 34% prevalence among sex workers by 2025
- > HIV adult prevalence will grow to 2% in urban areas, but remain very low in rural areas.

THE ALTERNATIVE SCENARIOS – MID AND HIGH RESPONSE

As alternatives to the baseline, mid and high policy and program response scenarios were formulated and used to carry out projections to 2025 for each of the three countries. The mid and high response scenarios represent alternatives for policy makers.

For the purpose of epidemiological modelling the mid and high policy responses were characterised by:

- > Increases in the proportion of HIV positive pregnant women receiving treatment for prevention of mother to child transmission,
- > Increases in proportions of sex workers and MSM who receive effective prevention education,
- > Increases in the number of sexual acts with condom coverage, and
- > Decreases in the prevalence of sexual transmitted infections.

For Indonesia, the alternative scenarios also involved increased use of clean needles and syringes by people who engage in injecting drug use.

For the purpose of estimating a potential HIV financial impact the mid and high responses are also characterised by costs associated with:

- > Increases in community education and youth mobilisation, and
- > Voluntary counselling and testing.

In practice, achievement of the mid and high responses will be dependent on the capacity for change in both the social and health sector. The increased provision of skilled human resources and infrastructure required for scaling up the responses (see below), requires not only substantial financial inputs, but also significant lead time to establish the necessary training and infrastructure.

Education and leadership capacity are other elements that will influence the level of response achievable. Experience from South Africa with HIV education and condom distribution indicates that the most important factors in uptake and behavioural change are the life prospects and social and economic imperatives of men and women in daily life (Campbell, 2003).

HIV epidemics have already demonstrated how remarkably resilient social life is, even under the most adverse conditions. By the same token, deep social change tends to be harder to achieve than financial or political commitment, even though the foundational features of social life tend to be less tractable, slower to respond, and deep social change harder to achieve, than financial and political commitment. However, social factors such as gender

relations, attitudes to sex and sexuality and religious beliefs are critical to the achievement of mid and high enhanced response scenarios.

Social factors that limit or engender an expanded response

It is now clear that HIV/AIDS is as much about society, as it is about a virus

(Mann & Tarantola, 1996)

Examining the social factors which limit (or, conversely, which might engender) the creation of a medium or high response to the epidemic in the three countries under question means going beyond individual risk (that is attitudes and behaviours) and risk groups to broader contextual factors which converge to negatively shape the complex environment in which individual sexual and drug using practice takes place. Over the past decade, social researchers have documented some of the structural factors that can hold back adequate responses to rising rates of HIV transmission (see Zwi, 1993; Parker 1996). Despite their cultural and epidemiological uniqueness, many countries share common structures and processes that hinder their ability to establish enhanced responses.

Ideally, an increased response to HIV would involve addressing a broad spectrum of structural determinants. The response should involve interventions that address both individual risk as well as the creation of an enabling environment. For example, there can be no high response in Papua New Guinea without a decrease in the levels of violence against women. In Indonesia, only high level support for harm reduction programs will enable a high response and, in East Timor, ensuring that all women have access to antenatal care will be necessary to prevent mother to child HIV transmission.

One of the most important aspects of the battle against HIV is political commitment. Leaders at the national, provincial, and local levels of government must speak out and encourage commitment to work against HIV. Sustained political commitment is uncommon, and fragile. The lower the respect for civil and political rights, the less likely it is that government leaders will speak out on HIV. Nor

can communities easily challenge ineffective or deleterious policies when there is no guarantee of individual rights. Early research on the determinants of political will showed that many countries whose heads of state had remained silent on HIV ranked lower on the UNDP's Human Freedom Index (see Mann & Tarantola, 1992). Stiglitz (1998) identified the key ingredients in a successful development strategy as ownership and participation. There is a strong causal relationship between better governance and better HIV response. However, there must be a realistic expectation of adequate government capacity, at least within the time frame needed for an effective response to the epidemic (Altman, 1999).

Scaling up the response to HIV means increasing (and in some cases, putting in place) social support structures for those living with HIV, ensuring adequate care for individuals, households and communities affected by HIV and AIDS, and access to essential legal, education and social services including orphan care.

Health sector constraints to an expanded response

Understanding the current limitations of health systems provides both a foundation for discussion on the mid and high response scenarios and is the

starting point in assessing the economic impact of HIV on the health sector.

Scaling up the responses to HIV relies on both health sector (staffing and facilities) and associated infrastructure (roads and communications). Figure 3 below illustrates the extent to which various HIV prevention program components rely on health services and infrastructure. Included under infrastructure are roads, supply and distribution systems, whereas the health sector incorporates doctors, nurses, laboratory technicians and health facilities.

The intensity of contact required with the health sector for provision of ART and treatment and care for opportunistic infections would place these treatment components well above the prevention components in the top right corner illustrated here, as they require skilled clinical personnel and specialised facilities.

The table below provides a number of indicators of health sector development in Papua New Guinea, East Timor and Indonesia. For comparison purposes some indicators are also provided for Australia, India and Thailand.

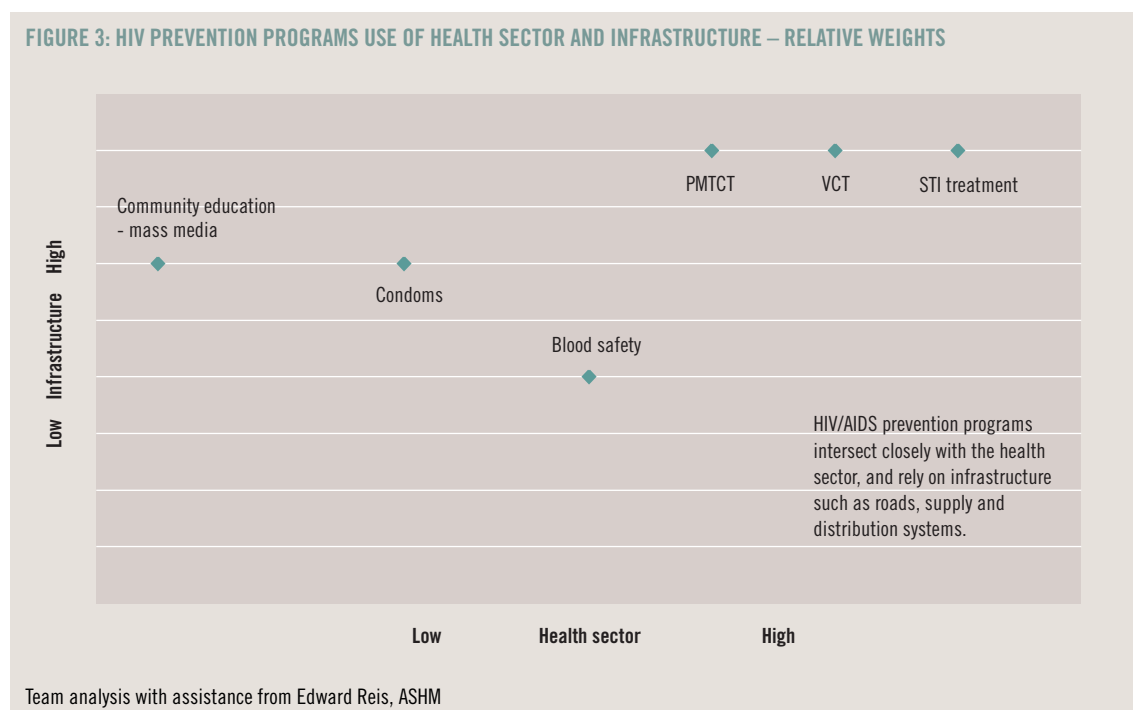


TABLE 3: INDICATORS OF HEALTH SECTOR DEVELOPMENT

	Papua New Guinea	East Timor	Indonesia	Australia	India	Thailand	Sources
Doctors per 100,000 head of population	5	8	16	249	51	30	World Health Organisation 2004; East Timor: GoTL Directorate of Policy and Planning Ministry of Health 2005
Nurses per 100,000 head of population	53	90	43	774	61	161	World Health Organisation 2004; East Timor: GoTL Directorate of Policy and Planning Ministry of Health 2005
Health expenditure per capita in 2002 (US \$)	\$22	\$28	\$26	\$1,995	\$30	\$90	World Bank 2005, East Timor: GoTL Ministry of Health, GoTL Ministry of Education et al. 2005.
Visits to health clinic per capita per annum	1.49	2.11	n/a				PNG: GoPNG Department of Health 2003, East Timor
UNDP reported percentage of births attended by skilled health personnel	53 per cent	24 per cent	64 per cent				UNDP 2005
Percentage of births supervised by skilled health personnel	National average 39 per cent. Ranging from 16 per cent in the Southern Highlands to 100 per cent in the Capital.	National average 18 per cent. Ranging from 9 per cent in Highland area to 40 per cent in urban areas.	National average 68.4 per cent. Ranging from 35 per cent in Southeast Sulawesi to 96 per cent in Jakarta.				PNG: GoPNG Department of Health 2003; GoPNG Department of Health and Hiawalyer 2005, East Timor: World Bank and International Development Association 2005; Indonesia: GoI 2004
Health expenditure per capita in 2002 (AUD)	\$28	\$36	\$34	\$2615	\$39	\$118	World Bank 2005; East Timor: GoTL Ministry of Health, GoTL Ministry of Education et al. 2005.
Government Health expenditure (AUD) millions	\$218	\$18.7	\$693				PNG: GoPNG 2005; East Timor: GoTL Ministry of Health 2005; Indonesia: GoI 2005

Of note from the table above is the low number of doctors in both PNG and East Timor, and the low percentage of supervised births. In addition, there are few nurses in PNG and Indonesia. For PNG, with its potentially higher prevalence of infection, the absence of clinical personnel represents a significant limitation in the country's ability to maintain or improve health indicators while simultaneously scaling up the response to HIV.

TABLE 4: HEALTH INDICATORS

	Papua New Guinea	East Timor	Indonesia	Australia	India	Thailand	Sources
Life expectancy	60	57	66	80.3*	63.3*	70*	UN World Population Prospects 2004; * UNDP 2005
MMR (per 100,000)	118	800	307				PNG: GoPNG Department of Health and Hiwalyer 2005; East Timor: GoTL Directorate of Policy and Planning Ministry of Health 2005; Indonesia: GoI 2004
UNDP adjusted MMR in 2000 (per 100,000) (adjusted)	300	660	230	8	540	44	UNDP 2005
IMR in 2003 (per 1,000)	69	87	31	6	63	23	UNDP 2005

The three indicators of life expectancy, maternal mortality and infant mortality can be used as general indicators of a nation's health. Life expectancy reflects the impacts of both communicable and non-communicable diseases, and infant mortality reflects the impact of communicable diseases and the quality of health services. Maternal mortality rate is reflective of access to health services and quality of health care available. By these indicators PNG and East Timor have both high health care needs and low levels of health care services available.

The health system and associated infrastructure represents a significant constraint in these countries' ability to scale up their HIV responses. To reduce the constraint there would be significant associated costs to ensure that the appropriate infrastructure is in place and the health system is able to support scaling up to the mid and high responses.

1 The social and economic impact of HIV in Papua New Guinea 2005–2025

THE HIV/AIDS EPIDEMIC IS BEING EXPERIENCED NOT AS ONE EPIDEMIC, BUT AS MANY EPIDEMICS... IN OTHER WORDS, THE DIVERSE CULTURES OF PNG BORN OF PARTICULAR HISTORICAL AND SOCIAL CIRCUMSTANCES, ARE PUTTING THEIR IMPRINT ON THE EPIDEMIC, ARE AFFECTING ITS NATURE, AND HOW IT IS EXPERIENCED AND LIVED.

Eves, 2004

1.1 INTRODUCTION

The social, economic and political landscape of Papua New Guinea (PNG) is characterised by its extreme diversity. Most of the population continues to live in rural areas and depends on the semi-subsistence sector, where there has been little intensive economic growth. There is widespread cultural diversity in PNG and there are differential experiences of sexual cultures, colonialism and missionisation (Eves, 2004). Although cultures vary widely, traditional structures generally include the following characteristics: the practice of subsistence economy; recognition of bonds of kinship with obligations extending beyond the immediate family group; generally egalitarian relationships with an emphasis on acquired, rather than inherited, status; and strong attachment of the people to land, which is held communally (US Department of State, Bureau of East Asian and Pacific Affairs, 2005). Traditional social structures and customs have survived into the post-colonial era and most Papua New Guineans still adhere strongly to these structures and customs, which have their roots in village life. Customary law, mediated by village courts, remains influential. However, the growing importance of cash in economic and social exchange has in some respects undermined previous value systems and modes of exchange.

There has been a slowing of investment in essential infrastructure such as education, health, communications, law and order, transport and roads.

As well, PNG has suffered an overall decline in economic conditions since the mining boom came to an end in the 1990s, and the vast majority of Papua New Guineans remain poor by regional and international standards: more than 80 per cent are involved in subsistence agriculture and between 30–37 per cent of people are estimated to be living below the poverty line, with a higher proportion of those poor in rural areas. In its 2004 report, the United Nations Development Programme (UNDP, 2005) ranked PNG 133rd out of 177 countries on social indicators and placed it far behind all other Pacific countries in life expectancy and infant mortality. Papua New Guinea has the worst Gini coefficient (an indicator of income inequality) in the Asia-Pacific region, estimated at 51. Moreover, unemployment continues to rise, and has been estimated at around 40 per cent amongst young urban males (GoPNG National Statistical Office of Papua New Guinea, 2005), with underemployment even higher.

In Papua New Guinea most people have heard of HIV but many have not experienced it first hand. Koczberski (2000) has argued that there are three key socio-cultural factors in the spread of HIV in PNG: contemporary sexual culture, the position of women, and migration. To this may be added issues of violence, governance and security.

There are widespread changes taking place in the country. Recent studies have pointed to important shifts in two salient areas of social practice – warfare and exchange relations (Lederman, 1998). Both of

these have a significant impact on sexual cultures and gender relations, and on the AIDS epidemic. These rapid changes must be taken into account when examining the social and cultural factors which limit or, on the contrary, expedite the creation of effective responses to the epidemic.

It must be remembered that it is extremely problematic to estimate the impact of HIV in Papua New Guinea given its tremendous economic, social and cultural variations, leaving such projections, as Koczberski (2000, p. 63) has argued, ‘open to charges of large inaccuracies and generalisations’. Thus, this report should be read with caution as a guide rather than as the definitive statement about the epidemic in Papua New Guinea.

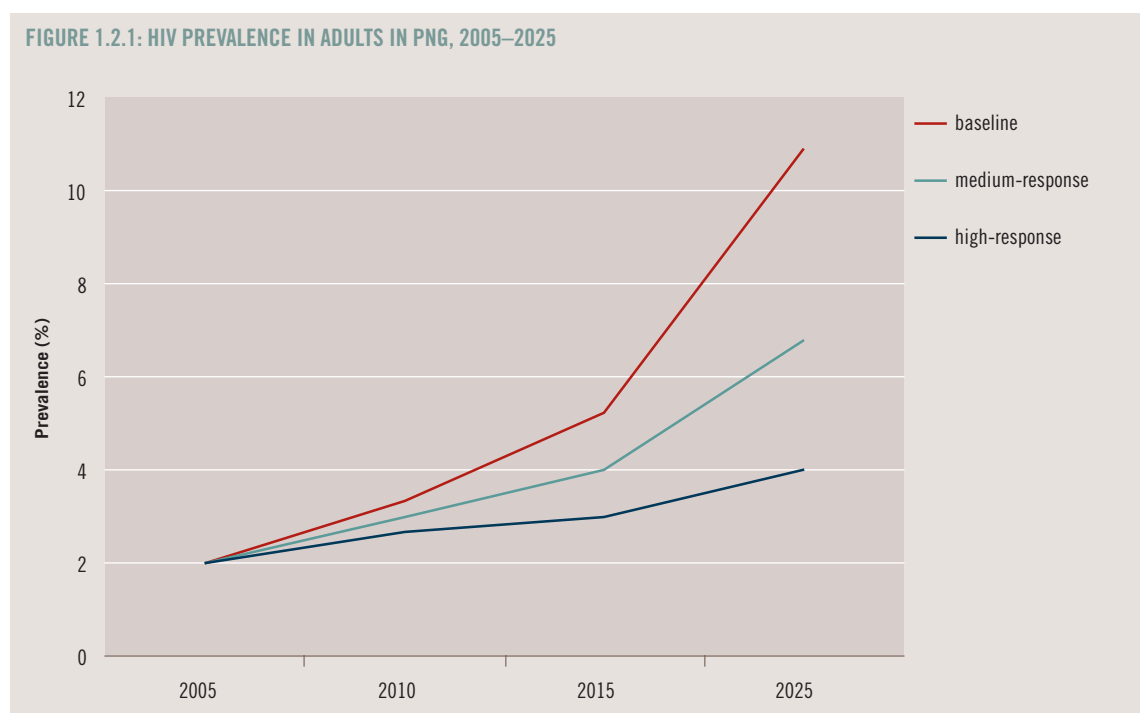
1.2 HIV PREVALENCE IN PAPUA NEW GUINEA 2005–2025 SCENARIOS

Under the baseline scenario prevalence in Papua New Guinea is projected to increase to above 5 per cent, and at this level would certainly have a very substantial impact on individuals, families, communities, workplaces and the nation. Among people aged 15–49, who represent much of the workforce and the reproductive component of the population, prevalence under the baseline scenario is

projected to reach 11 per cent by 2025 (as indicated in Figure 1.2.1 below).

At this level, the prevalence rate will be similar to those of a number of countries in sub-Saharan Africa at the end of 2004. For example, Tanzania has a rate of 8.8 per cent. The current impact of HIV on Tanzania may give us some indication of what will occur in Papua New Guinea without an increased response. The government of Tanzania has argued that HIV has had a “clear impact on all sectors of development through not only pressure on AIDS cases care and management of resources, but also through debilitation and depletion of the economically active population especially young women and men” (Tanzania Commission for AIDS, 2003). A study of the Kagera region of Tanzania where the epidemic has hit hardest, indicated that poor fishing and farming communities have had substantially changed livelihoods. As women and men in their prime have fallen ill and died, there have been major economic and social stresses for those left behind (Appleton, 2000).

However, this situation is not inevitable. As Figure 1.2.1 shows, under the high-response scenario, the adult HIV prevalence rate in PNG in 2025 would be less than half that projected under the baseline scenario.



1.3 DEMOGRAPHIC IMPACT

It is difficult to look at the socioeconomic impact because most of the consequences of increased adult morbidity and mortality have not yet been felt, let alone measured: in many countries they will not be felt for many years. (Zaba et al., 2004)

Over the next twenty years Papua New Guinea will not only face a rapidly increasing HIV prevalence but also increasingly higher death rates due to AIDS-related conditions. The population growth rate will decline, but it is not projected to become negative.

Figure 1.3.1 graphs the population size at 2025 by age group, with and without AIDS. The pale bars indicate the projected population size without AIDS. The dark bars show that, with AIDS, all age groups show some decline in size. However, the percentage decrease is most noticeable in the age groups 20-49.

Under the baseline scenario, by 2010 nearly 60,000 people will have died, rising to over 400,000 by 2025. Deaths will mostly be in the age group 15-49 and will considerably skew the population pyramid. Of these deaths, about a third will be of adult women. There will also be a potential loss in reproductive capacity if women are less willing or unable to have children because of their HIV status; fertility rates

may also decrease from the current 4.1 births per mother at 2001 (WHO, 2004a).

Such a large number of deaths will affect people's ability to envision a positive future for families, communities and the nation. As well, internationally, through qualitative studies at the level of households and communities, the impact of HIV at these levels of prevalence is catastrophic, causing impoverishment and trauma (Whiteside & de Waal, 2004). For example, in a survey of 700 South African households affected by HIV, half reported not having enough food and that children were suffering from hunger (Steinberg, et al., 2004).

Figure 1.3.2 indicates that over 300,000 adults will die from AIDS-related conditions by 2025 under the baseline or 'status quo' scenario. The impact of these deaths will be felt in families, communities, the workforce, social service provision and nationally. Deaths will affect children, grandparents, family relationships, community cohesion, farming and food production.

Dependency

The dependency ratio is a measure of the proportion of the dependent population, in this case those between 0 and 14 years old and those over 50 years

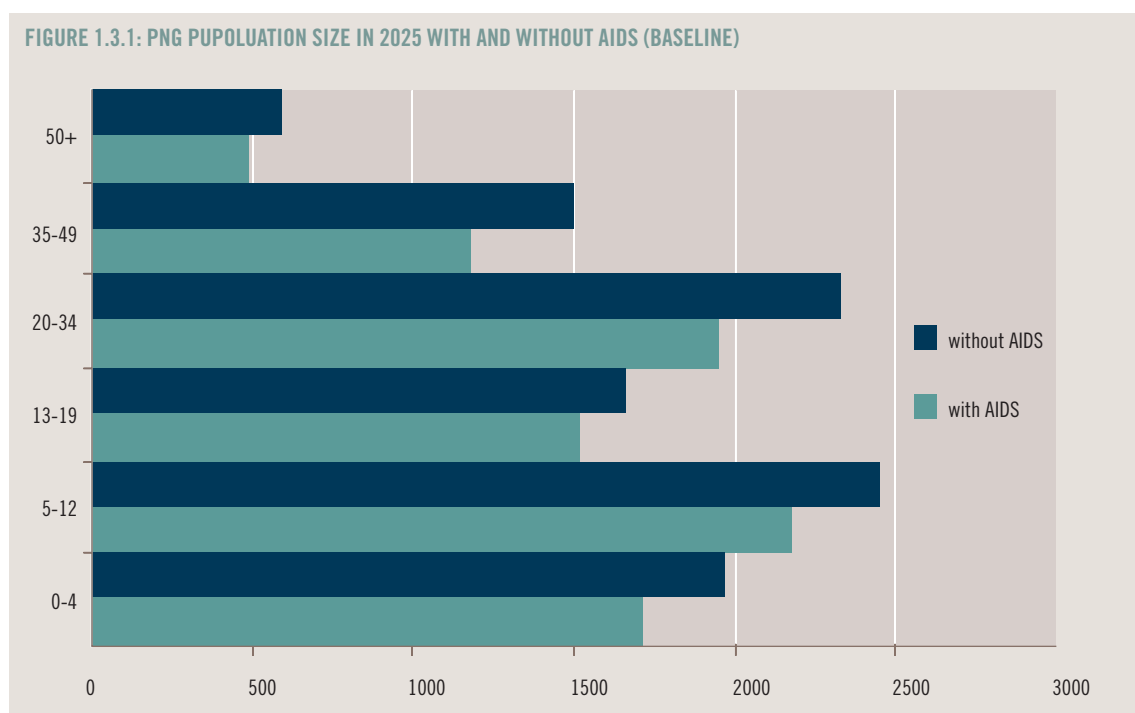
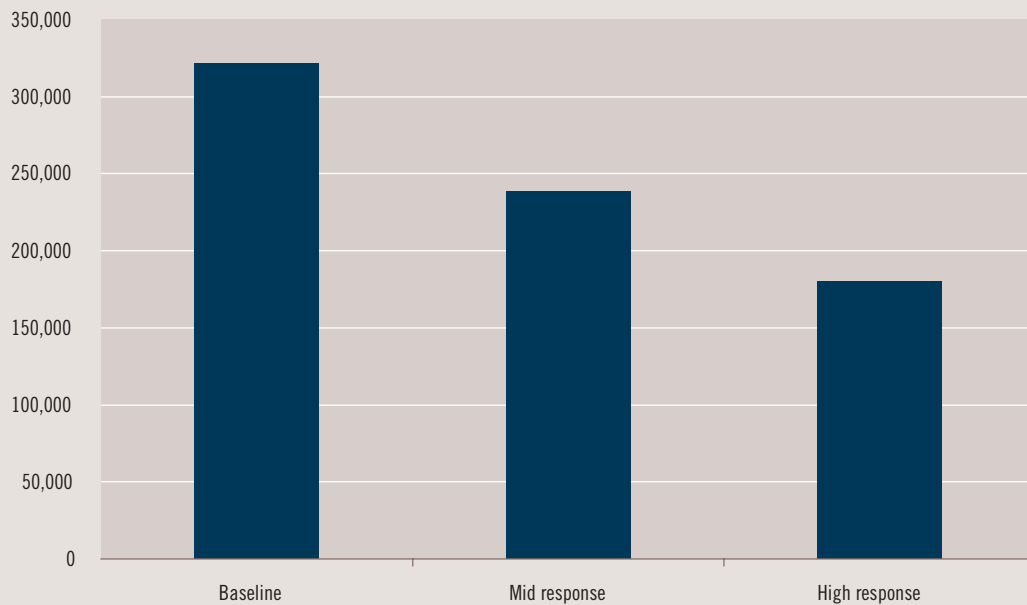


FIGURE 1.3.2: CUMULATIVE NUMBER OF DEATHS, 2005–2025, PNG



Note: in the baseline scenario there are 1.8 times the number of deaths in the working age group than in the high response scenario

old, against those in the working age group (15–49 years old). In 2010 the dependency ratio between the three scenarios is similar, at 1:1.08. It is not until 2025 that the impact of the epidemic is seen on the baseline dependency ratio, which increases to 1:1.11, in contrast with the high-response scenario, which does not change. This means that, under the baseline scenario, there will be fewer people of working age to provide for the children and those over 50 years old.

Maternal orphans

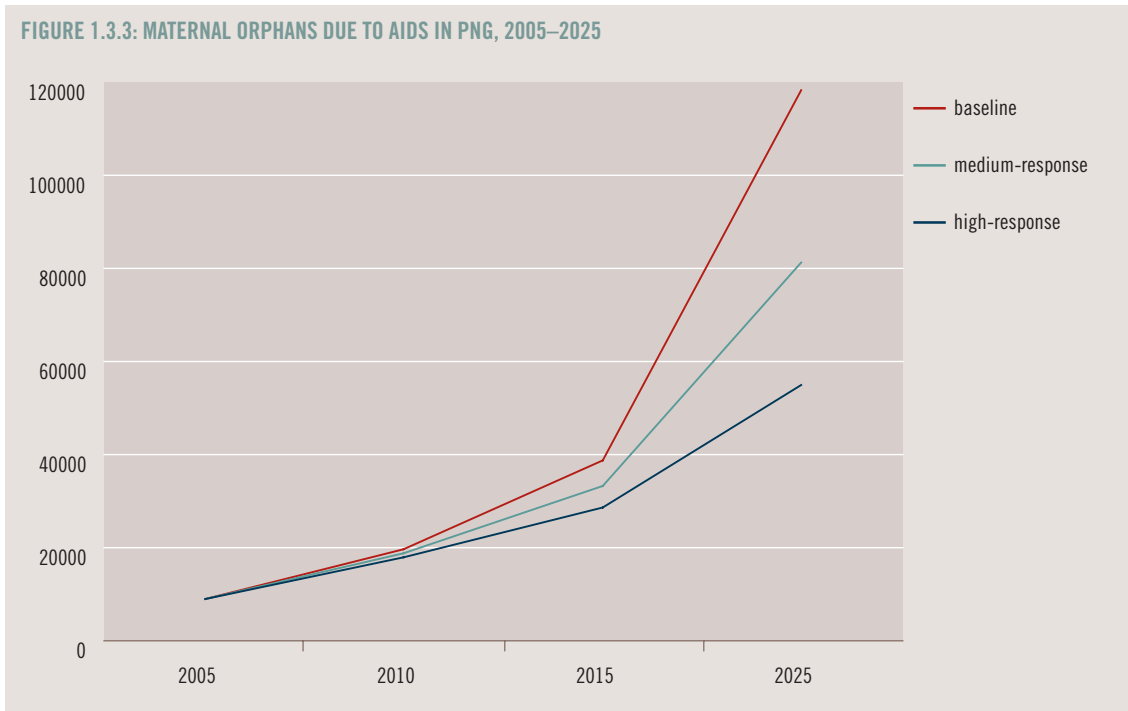
In Papua New Guinea the large numbers of people of reproductive age who die as a result of the AIDS pandemic will leave behind a trail of orphans. Under the baseline scenario, maternal orphans will number just under 20,000 in 2010, rising to 117,000 in 2025 (see Figure 1.3.3). This number will decrease under the high-response scenario at 2025, where we project half the number of orphans (high-response, 55,000; medium-response, 81,000). It should be noted, however, that orphan numbers, even under the medium and high response scenarios do not begin strongly to diverge between the scenarios until after 2015.

In Tanzania, with a current prevalence rate similar to that projected for PNG in 2020 under the baseline scenario, 3 per cent of children have lost

their mothers to HIV (Bicego et al., 2003) and this has produced considerable stressors on surviving families. The possible large number of maternal orphans will provide Papua New Guinea with an enormous set of challenges. The consequences of such large-scale orphaning are without doubt negative. UNICEF has measured the increase in poverty caused by deaths of parents from AIDS, finding that food consumption dropped by 41 per cent in AIDS-orphaned children (UNICEF/UNAIDS/USAID, 2004). Children may also lose their housing and their inheritances (Meier, 2003). As well, the stigma of HIV means that children orphaned by AIDS are a marginalised group.

One of the challenges that PNG will face is to ensure that orphans become well-adjusted and valuable members of their village. However, there are a number of obstacles to achieving this outcome. The psychological impact of parent/teacher illness and death on children should not be underestimated (Gachuhi 1999). There is good evidence to suggest that traditional mechanisms and strategies cope well with orphaning, but there is growing concern about the resilience of these systems (Foster, 2003). In addition, there are reports that children cared for by extended family members, or fostered out, are stigmatised and

FIGURE 1.3.3: MATERNAL ORPHANS DUE TO AIDS IN PNG, 2005–2025



discriminated against; for example, they receive less food than other children and are given more chores (UNICEF, nd). Other studies have found that children raised without sound role models are more likely to engage in antisocial behaviour, with repercussions for society at large (eg Pharoah, 2004).

1.4 MACROECONOMIC IMPACT

Over the past 15 years PNG has experienced instability and negative economic growth. While the economy grew well in the early 1990s due to the petroleum and mining sectors, by the mid 1990s growth again declined with the impact of the drought (DFAT, 2004). Since 2000, economic growth has fluctuated, with contractions between 2000 – 2002 (see table 1.4.1 below). The economy has seen a return to positive growth in 2003, with real GDP growth estimated at 2.8 per cent in 2003 and projections of 2.6 per cent and 2.9 per cent for 2004 and 2005 (GoPNG, 2005). However, these growth rates are only marginally above population growth rates and so will need to increase to translate into any increases per capita. With an observable deterioration in public services and infrastructure, and stagnation in per capita growth, many believe living standards

have declined since 1990 (GoPNG and United Nations in PNG, 2004).

TABLE 1.4.1: GDP GROWTH RATES 1999–2009

Year	GDP real growth rate	GDP real growth rate (non-mining)
	per cent	
1999	7.6	6.9
2000	-1.2	-0.5
2001	-2.3	-4.1
2002	-1.0	1.5
2003	2.8	1.7
2004	2.6 p	2.8 p
2005	2.9 p	2.8 p
2006	1.7 p	3.0 p
2007	2.6 p	3.1 p
2008	2.9 p	3.3 p
2009	3.8 p	3.5 p

p = projected, (GoPNG 2003; GoPNG 2004; GoPNG 2005)

The current economic situation in PNG is not favourable. GDP per capita already lags behind that of many of PNG’s neighbours, i.e. Fiji, Indonesia, Solomon Islands, Vanuatu and Samoa (United Nations Development Program, 2005). PNG’s Gini

index is the worst in the Asia–Pacific. The majority of the population is rural; it is estimated that more than one third live in poverty.

Understanding the current budget position allows subsequent analysis of the financial impact on the health sector of both scaling up a response and of increasing costs of rising HIV prevalence. For over 10 years Government expenditure has exceeded revenues. The budget for 2004 projected a turnaround in the central government’s fiscal position – the first time in many years the government has been able to reduce its debt. The budget moved from a deficit of 1.5 per cent of GDP to a surplus of 1.1 per cent (GoPNG, 2005). The government’s current fiscal strategy includes a continued commitment to reducing the deficit with a surplus from 2008, and phased reallocation of spending to high priority programs, including maintenance of transport, infrastructure, basic education, primary and preventive health (GoPNG, 2005).

PNG government revenues rely on donor assistance and taxes from the mining and petroleum sectors. While taxes from these sectors increased in 2003–04 and contributed to 19 per cent of all tax revenues, they are projected to decline in 2004–05 (GoPNG, 2005). These shifts in tax revenue from mining and petroleum are due to changes in commodity prices and illustrate the volatility the government faces

in stabilising its revenue base. As earnings in the mining and petroleum sectors do not rely greatly on human capital (with only 0.4 per cent of 15–49 year olds employed in the sector) they are largely immune to the effects of loss of workforce because of an HIV epidemic (GoPNG National Statistical Office of Papua New Guinea, 2005). However, if the epidemic harms the investment climate for these sectors government tax revenues may be affected.

The government also receives substantial donor assistance, estimated at about 19 per cent of all taxes and grants in 2004. The total development budget, including loans and grants, ranged from about 8.3 per cent of GDP in 2003 to 13 per cent in 2005 (GoPNG, 2005). The education and health sectors receive high levels of support from donors, at 20 per cent and 30 per cent of total expenditure to each sector respectively (DFAT, 2004).

Potential macroeconomic impacts to PNG will be illustrated through analysis of the potential reduction in GDP growth rate and decreases in the workforce.

1.4.1 THE POTENTIAL IMPACT OF HIV ON GDP AND GDP PER CAPITA

The International Labour Organisation (ILO) developed a model of the relationship between HIV prevalence and the reduction in GDP and GDP per capita growth rates, through analysing data from 41

TABLE 1.4.2 CURRENT ECONOMIC INDICATORS

Characteristics of the workforce		Source of information
Labour force participation	73 per cent aged 15–49	GoPNG National Statistical Office of Papua New Guinea 2005
Monetary sector	15 per cent largely in urban and mining areas	GoPNG National Statistical Office of Papua New Guinea 2005
Agricultural sector	Subsistence: 67.4 per cent of labour force, 80 per cent of population; Fishing and agriculture, 71 per cent of labour force	DFAT 2004; GoPNG National Statistical Office of Papua New Guinea 2005
Unemployment	2.8 per cent overall, 40 per cent amongst young urban males. High underemployment.	GoPNG National Statistical Office of Papua New Guinea 2005
Living in rural areas	87 per cent	GoPNG and United Nations in PNG 2004
Living below poverty line	30–37 per cent	GoPNG, UN in PNG 2004
Gini index	51	UNDP, 2005
GDP per capita (US)	523	UNDP, 2005

countries. PNG's projected HIV prevalence under the three scenarios can be used to estimate potential GDP and GDP per capita impacts.

Using the ILO model to project reduction in growth, Figure 1.4.1 shows how the projected increasing prevalence of HIV in PNG will reduce GDP growth rates and to a lesser extent GDP per capita. Under the baseline scenario, HIV will potentially cause a reduction in annual GDP growth reaching 1.3 per cent in 2025. Many complex factors will play a role in a largely subsistence economy like PNG.

Efforts to change the course of the epidemic, as represented through the medium and high response scenarios, represent an alternative. Under the medium response, by 2025 the reduction in annual GDP growth rate is estimated at about 1 per cent and about 0.6 per cent for the high response.

1.4.2 THE IMPACT OF HIV ON THE WORKFORCE

Where the macroeconomic impact of HIV and AIDS becomes measurable, the reduction in the size of the workforce is a primary driver. The scenarios created under this analysis (Table 1.4.3) project a potential loss of close to 13 per cent of the workforce by 2025 under the baseline scenario, and under the more

optimistic mid- and high-response scenarios, the workforce size is reduced by 10 per cent and 9 per cent respectively. These figures illustrate the loss of the size of the workforce against the size of the workforce if AIDS had not entered the population.

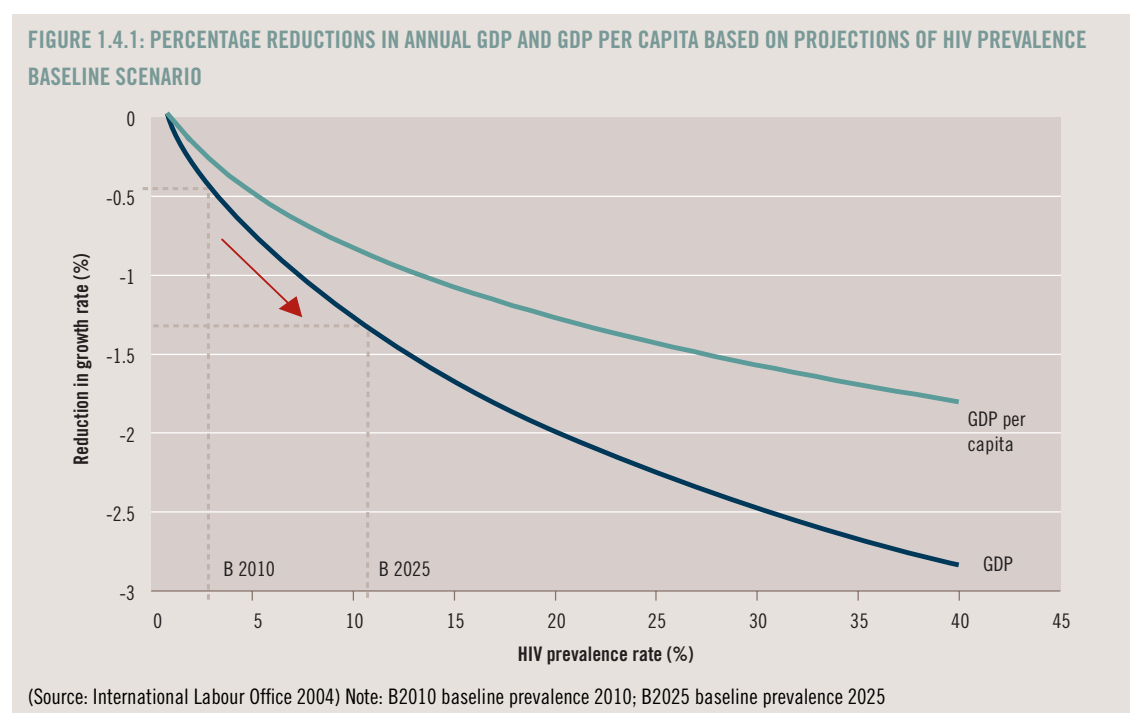
TABLE 1.4.3: REDUCTION IN THE SIZE OF THE WORKFORCE IN PNG

	Baseline	Medium response	High response
2010	3.9 per cent	3.8 per cent	3.8 per cent
2015	6.2 per cent	5.8 per cent	5.5 per cent
2025	12.5 per cent	10.5 per cent	9.1 per cent

Note: Assumes 8.6 year time lag between infection and death.

The reduction in the size of the workforce translates to an economic cost because of the early death of those in the workforce age group and decreased productivity in their final years of life.

The cost of the loss of productive Papua New Guineans of working age can be measured by approximating the value of each year of life lost as: the GDP per worker times (the number of years of life lost due to premature death, plus the decreased productivity in their final years of life)¹ (Fox, Rosen et al., 2004; GoPNG, 2005). See Appendix 3, Technical



1 For simplicity the loss of life years are all recognised in the year a person dies, rather than spread across future years. This compresses the value of the lost productivity into the time period of analysis.

Notes for more details. Using this as one measure of economic impact, the cost to the economy of the loss of the productive working population under the baseline scenario is over AUD1.5 billion dollars in 2025, while under the high response this is about AUD600 million.

The purpose of this analysis is to illustrate the differences between the scenarios of the potential loss to the economy due to ill-health and death of the workforce. This method does not take into account lost productivity through the loss of subsequent generations, which would increase the cost to the economy. However it also ignores the possibility that labour can be replaced, which would reduce the cost to the economy.

Economic conditions are already fragile in PNG and the projections are that more of the workforce will be lost to AIDS, leading to further reduction in the growth rate of GDP. There may be other impacts to the economy such as loss of revenue for government as growth slows.

1.4.3 AGRICULTURAL SECTOR

The economic impact of HIV on the agricultural sector will be felt through the substantial loss of human capital. Agriculture and fishing are important sectors for PNG's workforce, and the Medium Term Development Strategy prioritises agriculture, forestry and fisheries as the sectors through which to drive economic growth (Papua New Guinea Department for National Planning and Monitoring, 2004). Seventy-one per cent of adults in the labour force are employed in fishing or agriculture, and most of those (67.4 per cent of the labour force) are in subsistence agriculture, (GoPNG National Statistical Office of Papua New Guinea 2005). However, if HIV prevalence reaches 8 per cent by 2025 in rural areas, as projected under the baseline scenario, many households in the agricultural sector will be affected by HIV.

In five years time adult deaths in rural areas are projected to reach over 3000 per year under the baseline scenario. By 2025 this will climb to 20,000 deaths per year. Associated with these adult deaths is loss of the productivity of thousands of land plots and market gardens ordinarily producing food for consumption and cash. The medium and high response scenarios somewhat reduce these losses.

TABLE 1.4.4 : PROJECTED NUMBER OF AIDS DEATHS PER YEAR AMONG ADULTS IN RURAL AREAS

	Baseline	Medium-response	High-response
2010	3300	3100	3000
2011	3800	3600	3300
2012	4400	4000	3600
2013	5000	4400	3900
2014	5700	4900	4300
2015	6500	5400	4600
2016	7400	6000	4900
2017	8400	6600	5300
2018	9500	7300	5700
2019	10700	8000	6000
2020	12000	8800	6500
2021	13500	9700	7000
2022	15200	10600	7400
2023	16900	11600	7900
2024	18900	12600	8400
2025	20900	13800	9000
Cum. total (2010–2025)	162,000	120,000	91,000

While it is difficult to predict the exact economic impact of the loss of people in the agricultural sector, there will be long-term effects because of a loss of knowledge passed between generations. Further, as the prevalence of HIV has risen in other countries, the problem of inheritance has been raised as a major issue (UNAIDS/UNICEF/USAID, 2004). In PNG, too, the problem of inheritance is likely to generate conflict and further exacerbate tensions around land ownership. The farm may survive as an entity if management responsibilities are dispersed rather than centralised; otherwise ownership of land may be transferred (Cohen, 2002).

Family-based farmers face constraints in replacing labour. Human labour is a key input to subsistence production, and such labour can be seasonally critical. If labour is unavailable during high labour demand periods, the farm's annual production cycle can be affected (Barnett, Blas et al. 2000). However, extended families or community members may compensate for the loss of a working adult by providing assistance, but their ability to do so in peak times can be constrained. If children take on the farming responsibilities, with less skills and experience than adults, they are unlikely to reap the same output as adults – so both quantity and quality of output are affected (Barnett and Whiteside 2002). However, this impact may be tempered somewhat by the decreased food requirement for the household when a family member dies.

HIV will diminish the ability of subsistence agriculture to provide food security for villages and families. The depletion of the working-age population through illness and death and the diversion of female agricultural labour to caring roles will test the capacity of villages to produce enough food and other basic necessities of life. In the absence of cash incomes, many people in PNG, particularly women, are dependent on subsistence agriculture. Reduced access to the cash economy will exacerbate the already-huge gendered imbalances of domestic economic and social life.

Agriculture is an important sector for PNG and was the largest contributor to economic growth in 2004 (38 per cent) (GoPNG, 2005). However such gains could be undermined by the loss of a productive workforce. Furthermore, the priority of the Medium

Term Development Strategy, that agriculture, forestry and fishing be the engines of growth, may be jeopardized to the extent that the sectors rely on a productive and healthy workforce.

Nevertheless, while unemployment and underemployment are high, there is scope for labour replacement in the sector to reduce the extent of any negative economic impact on the agricultural component of GDP.

1.4.4 HUMAN DEVELOPMENT INDICATORS: IMPACTS

Human development indicators assess the level of people's long-term well-being, the background against which people can develop their full potential and lead productive, creative lives. The most basic capabilities for human development are to lead long and healthy lives, to be knowledgeable, to have access to the resources needed for a decent standard of living and to be able to participate in the life of the community (Human Development Report, 2005). Indicators of human development include the Human Development Index, the Gender-Related Development Index, the Gender Empowerment Measure and the Human Poverty Index.

TABLE 1.4.5: HUMAN DEVELOPMENT, PNG AS AT DECEMBER 2004

Demographic data	Year	Estimate	Source
Human Development Index value	2003	.523	UNDP
Human Poverty Index value	2003	40.5 per cent	UNDP
Gender-Related Development Index value	2003	.518	UNDP

Source: Human Development Report, 2005

At present Papua New Guinea is ranked 137th of 177 countries in its Human Development Index, 78th of 103 developing countries in the Human Poverty Index and 103rd of 140 countries in its Gender-Related Development Index (Human Development Report, 2005). Because PNG will have the highest prevalence of HIV in the subregion, these indicators are likely to deteriorate over the 20-year period. As

the Human Development Report (2005) argues, ‘the [HIV] epidemic is generating multiple human development reversals, extending beyond health into food security, education and other areas’ (p. 22).

1.5 EDUCATION

A functioning education sector is also central to HIV prevention interventions and it could be expected that HIV-prevention messages would have their first impact among the educated (Glynn & Carael, 2004). The early literature on educational attainment and the risk of HIV infection was oddly inconclusive. A systematic review (Hargreaves & Glynn, 2002) showed that large studies in four areas of Africa found a greater burden of infection among the more educated while, among Thai army conscripts, longer duration of schooling was found to be protective against HIV infection. However, that report concluded that the association between HIV and schooling might be expected to change over time in those populations in which people of higher socio-economic status and level of education were at particularly high risk of infection (Hargreaves & Glynn, 2002). Later studies (Glynn & Carael, 2004) found no evidence of the increased risk of HIV infection associated with higher education that was identified in the earlier studies, concluding that the most educated may be responding more readily to health education programs. It may be that, at first, the most educated are infected due to better mobility and more sexual freedom but that, as the epidemic progresses, they are the first to pick up HIV prevention messages and change risky behaviours.

Papua New Guinea is ranked as a middle-income country but its education status is lower than that of most low-income countries.

Education may or may not be a social protective against HIV, but it is clearly an important measure of social and economic well-being. It is critical to the generation and maintenance of human capital and to sustainable development. There are two major aspects to the impact of HIV on education: first, the loss of children to schooling and, second, the loss of teachers through illness and death.

Currently education services face challenges because funds allocated at the national level frequently get diverted, budgets are consumed by wages and the little that remains for goods and services is eroded by administrative costs or mismanagement. In rural areas some schools have already been abandoned by teachers and students because of lack of services and opportunities (AusAID, 2002). With the support of AusAID, the PNG government is implementing education reform which aims to, among other things, provide access to 9 years of relevant basic education for all children, expand access to secondary and vocational education, and improve teacher education programs. However, the impact of HIV will severely hamper these plans.

1.5.1 CHILDREN IN SCHOOL

The cost of sending a child to a public school in Papua New Guinea is one of a number of factors that keep many children from going to school. Education is not free, even at community schools with a range of fees (from K1–K100) for primary students. Over two-thirds of children attend primary school, but in 1995 only 57 per cent of students completed Grade 6. Only 20 per cent attend secondary school and the average number of years of schooling is nine (Barro & Lee, 1993). Retention at secondary school is lower for girls than it is for boys. Those

TABLE 1.5.1: PNG EDUCATION STATISTICS AT 31 DECEMBER 2004

Education data	Year	Estimate	Source
Public expenditure on education (per cent GDP)	2000–2002	2.3 per cent	UNDP, HDP
Net primary enrolment ratio	2002–03	66 per cent	UNDP, HDP
Total adult literacy rate (per cent15+)	2000	57.3	UNDP, HDP
Adult male literacy rate	2003	63.4	UNESCO
Adult female literacy rate	2000	50.9	UNESCO

who complete secondary school are encouraged through government scholarships to attend one of two universities, or technical and teacher-training colleges, throughout the country. These figures are likely to worsen, particularly under the baseline scenario, as the death of parents will mean that children, particularly girls, will be kept out of school because of the growing inability to pay for the luxury of education and the need for them to work in subsistence agriculture.

Continuing education is a major issue for AIDS orphans; children whose parents become ill with AIDS-related conditions are often forced to leave school and do not return when the parents die. A survey in Kenya found that 52 per cent of orphaned children were not in school compared to 2 per cent of parented children (Human Rights Watch, 2001). As the epidemic progresses, we can expect access to education to be undermined as children are forced out of schooling to try to find work to provide for their families.

1.5.2 TEACHERS

The already severely incapacitated education services in PNG will suffer from loss of trained personnel to HIV deaths. At present, with little available in the way of material resources, such personnel are all that sustains many services (Hammar, forthcoming).

The 2000 Census identified over 41,000 15–49 year olds as teachers or associated support staff (GoPNG National Statistical Office of Papua New Guinea, 2005). Projections of the impact of the HIV epidemic on these adults sees the death of over 5000² teachers and associated support staff between 2005 and 2025 under the baseline scenario. Further, it is estimated that in 2025, under the baseline scenario, over 8,000 teachers and associates will be HIV-positive. Even the high-response scenario will see over 3000 teachers and associates gone from the sector and close to 3000 HIV-positive.

Additional teacher training costs needed to cope with teacher attrition due to HIV sickness and AIDS-related death will have significant implications for resource allocation within the education sector. At the same time a reduction in investment in educational infrastructure might be expected as resources are diverted to health.

1.6 HEALTH SECTOR IMPACTS³

Increases in HIV sickness and death will impact severely on the health sector, reducing capacity through the loss of trained staff and diminishing human capital at the same time as demands for services increase. Even well-resourced health systems (such as that of Botswana) have encountered difficulties due to the increasing demand for health care as a result of growing rates of HIV. Currently PNG struggles to provide its people with a basic health service.

Health indicators illustrate the poor and in some cases declining health status of Papua New Guineans and provide a base from which to examine the future potential impacts of HIV and AIDS on the sector. In the past five years the number of children presenting with malnutrition has increased and the prevalence of malaria and TB has shown very little improvement (PNG Department of Health, 2003). In 1999, 25 per cent of under-5-year-olds who presented at health clinics were severely to moderately malnourished; by 2003 this had grown to 27 per cent (PNG Department of Health, 2003). In 2003, 27 per cent of the population presented with malaria (unchanged from 1999), with 40 per cent in West Sepik presenting with malaria (PNG Department of Health, 2003). See Tables 3 and 4 in Introduction Section for further health indicators.

A decline in accessibility and quality of health services is associated with these stagnant or declining health outcomes. This is illustrated by the number of visits to health centres, which dropped from 1.72 per person per year in 1999 to 1.49 per person per year in 2003. Only 54 per cent of health

² Assumes that the prevalence of HIV among adults in the general population applies equally to teachers and associated staff.

³ See Appendix 2 for details on inclusions and potential future changes to cost components of the HIV/AIDS budget. See Appendix 4 for details of how the HIV/AIDS budget calculations link to the epidemiological model. See Appendix 3 for technical notes

facilities were adequately stocked in 2003, down from 58 per cent in 2000 (PNG Department of Health, 2003). Many health centres lack vehicles, medical supplies and essential drugs. Because of stigma, discrimination and misinformation, doctors and nurses are reluctant to attend to HIV-positive people who require any kind of medical treatment (Hammar, forthcoming).

When factoring in population growth and inflation, total PNG health appropriations and expenditure have declined over the period 2001–2005. In 2004 health represented 11 per cent of the total government and development expenditure, with development partners (donors) contributing about 30 per cent (GoPNG, 2005). Donors have historically contributed about 30 per cent to the sector (DFAT, 2004). Health expenditure in 2004 was AUD218 million, with expenditure on hospitals accounting for close to 20 per cent of that amount (AUD43 million) (GoPNG, 2005; GoPNG, 2005). In 2005 expenditure on HIV and AIDS represents about 9 per cent (excluding Global Fund monies) of the total health budget (McKay and Warner, 2005).

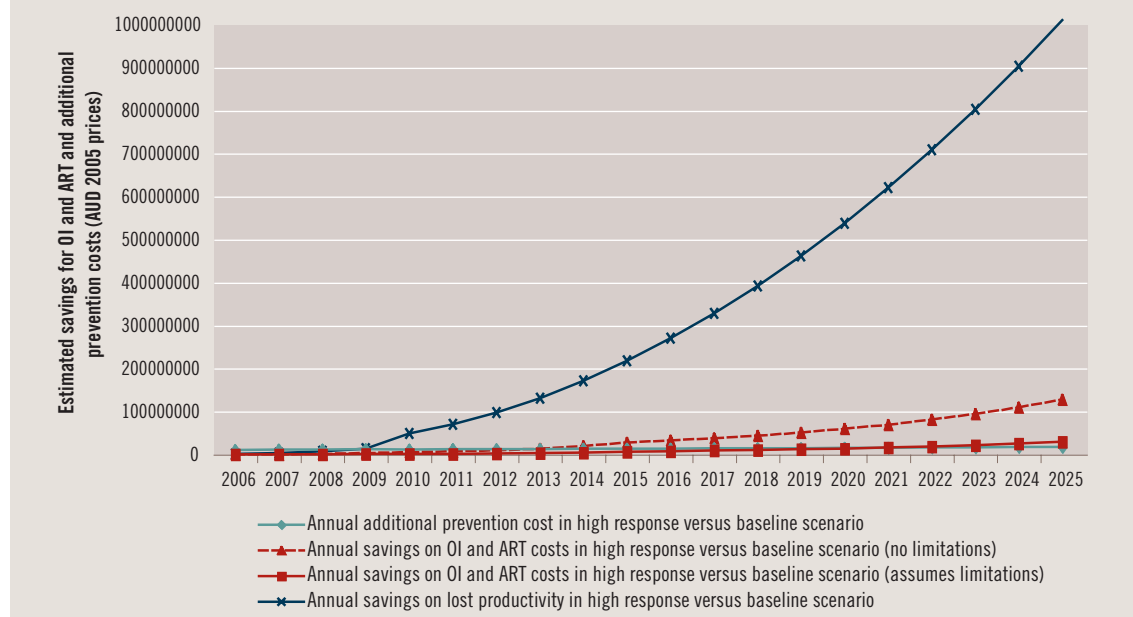
Inadequacies in accessibility, quality of health care and spending on health services highlight the

real possibility that the sector will face increasing capacity constraints in both its ability to respond to the increasing demands of people living with HIV and AIDS, and the viability of pursuing a scaled-up response.

While it is difficult to determine the economic impact to the health sector of HIV, we can make some assumptions to illustrate the potential differences between the baseline and high response scenarios. If the epidemic continues without an increased prevention effort, the costs of caring for those with opportunistic infections and providing ART will continue to rise and the health sector will be placed under significant strain. In particular, by 2025⁴:

- > costs of opportunistic treatment, health care and hospital admissions would rise to AUD21 million per annum,
- > medical hospital beds would be over 70 per cent capacity with AIDS patients,
- > even when assuming limited availability, costs of antiretroviral drugs would climb to over AUD28 million per annum,
- > doctor to HIV and AIDS patient ratios would reach 1:260.

FIGURE 1.6.1 : SAVINGS ON OI AND ART COSTS AND LOST PRODUCTIVITY, AND ADDITIONAL PREVENTION EXPENDITURE (SAVINGS THAT FLOW FROM A HIGH RESPONSE AS COMPARED TO BASELINE)



4 All in 2005 prices.

The medium and high-response scenarios provide an alternative to this baseline future (the current situation projected forward). What would the impact be if we scaled up the prevention response? These alternatives also come at a cost. The high-response prevention scenario is estimated to cost in the order of an additional AUD12–18 million per annum over the 2010–2025 period. However, as illustrated throughout the analysis of the impact of HIV on PNG, even this high-response scenario does not create a decline in the prevalence of HIV by 2025.

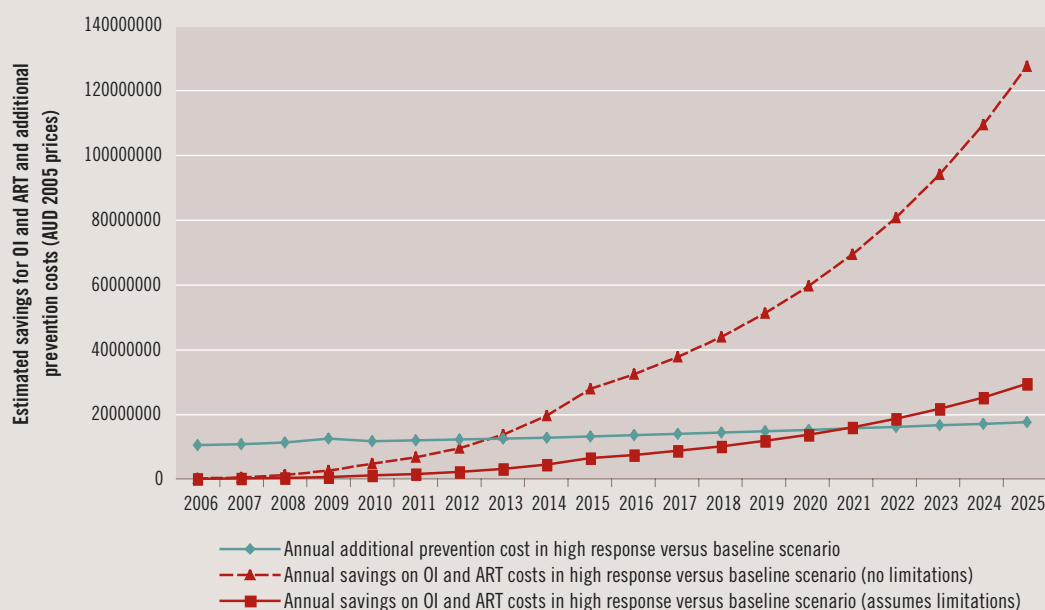
Figures 1.6.1 and 1.6.2 illustrate the potential savings in lost productivity, treatment and ART costs between the baseline and high response and the potential additional costs required for the prevention budget to achieve those savings.

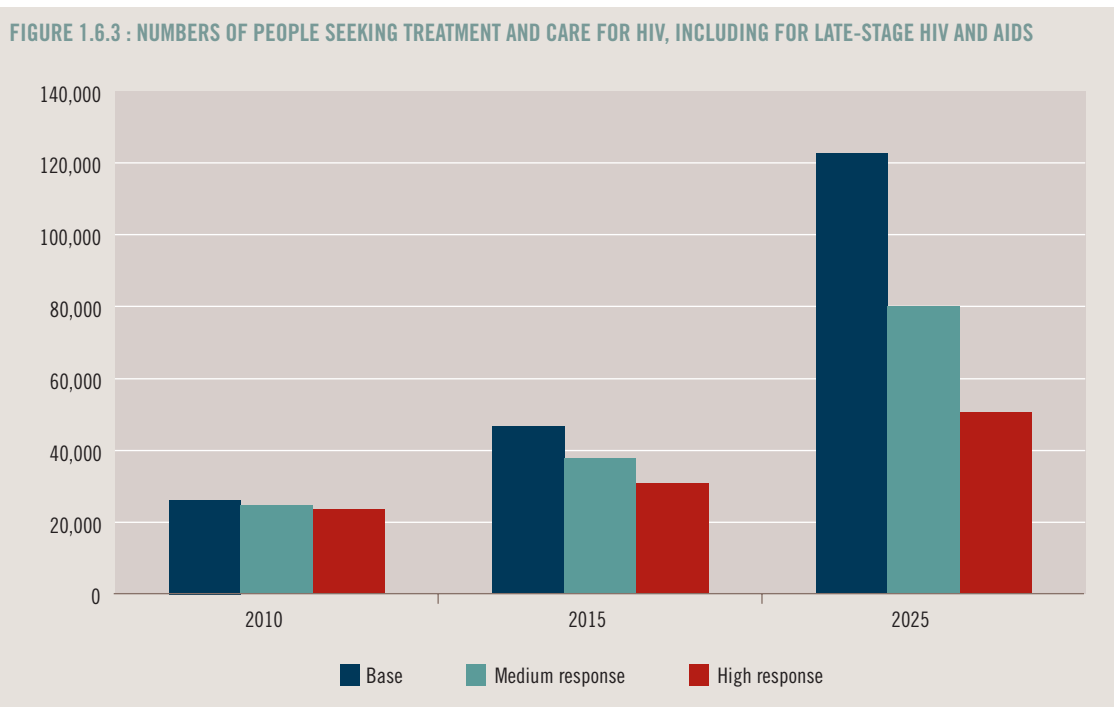
Estimating projected costs of care and treatment is difficult, especially projecting forward 20 years and determining access to health care. So here we illustrate the costs assuming limitations to health care and then the costs if those limitations were removed. (Both shown as red curves in Figures 1.6.1 and 1.6.2). The direction of the savings curves illustrate that the savings between the baseline and high response scenarios will continue to rise while additional prevention costs plateau. The key message here is that the savings on care, treatment and ART

costs of enacting an increased prevention response will continue to climb as the difference between the baseline and high response epidemic unfolds. This is essentially because the care, treatment and ART costs under the baseline scenario continues to rise as more people become infected as opposed to the reduced prevalence rate of HIV under the high response scenario. The savings achieved depends on many factors, as illustrated here they could be above AUD30 million by 2025, although they could potentially be much higher at AUD120 million depending on treatment coverage and access to health care.

This poses a policy choice: to invest further now in prevention efforts to gain future savings in productivity and through reduced care and treatment costs. Achieving these savings comes at a cost. While we cannot accurately determine the costs associated with prevention in 10 or 20 years time, here we can illustrate that the potential high response prevention costs are less than the savings by 2013 or 2020 depending on access to health care. The second point is the direction of the additional prevention expenditure – the curve rises much less steeply. Analysis of these figures is explored below.

FIGURE 1.6.2 : SAVINGS ON OI AND ART COSTS AND ADDITIONAL PREVENTION EXPENDITURE (HIGH RESPONSE AND BASELINE)





1.6.1 INCREASING DEMANDS ON THE HEALTH SECTOR

The future financial impacts of HIV on the health sector will be driven by the number of people living with HIV and AIDS. The baseline scenario for Papua New Guinea projects that by 2025 there will be over 94,000 people with late-stage HIV and over 28,000 with AIDS. This will result in increased demand for health services as people seek treatment and care.

The baseline scenario projects a very significant impact on the health sector, with the differences between the baseline, medium- and high-response scenarios magnified over the 20-year time period. As prevalence rises, so does the number of people with HIV and AIDS seeking care and treatment. However, not all of these people will have access to care and treatment. Here we assume about 53 per cent of people have access to care and only 20 per cent have

access to treatment. (See Appendix 3 technical notes for details on access to treatment and care). Under the baseline scenario over 25,000 people will be seeking treatment for opportunistic infections in 2025 who would not normally be demanding health services. This will place the health system under considerable strain.

1.6.2 IMPACTS ON MEDICAL STAFF UNDER THE BASELINE SCENARIO

Recent data (2000) indicate that there are five doctors and 53 nurses per 100,000 head of population in PNG (World Health Organisation 2004). Medical staff are key to provision of care, treatment and HIV preventive services, like STI treatments. Rising HIV prevalence rates will increase the number of people seeking services and treatments from medical staff.

TABLE 1.6.1 : BASELINE SCENARIO: ESTIMATED NUMBERS OF DOCTORS AND NURSES, AND NUMBERS OF PEOPLE NEEDING TREATMENT AND CARE FOR OPPORTUNISTIC INFECTIONS

	2005	2010	2015	2025
Baseline number of doctors	295	330	370	460
Baseline number of nurses	3100	3500	3900	4900
Baseline number of people needing treatment and care for opportunistic infections	19,500	26,000	46,000	122,000

To illustrate the projected future impact of this on medical staff numbers, the following table shows the current numbers of doctors and nurses (which are held constant in the projections) against the baseline number of people seeking opportunistic treatment and care.

This table illustrates that doctor to AIDS-patient ratios climb from about 1:46 to 1:260 by 2025. This demonstrates the enormous pressure to the health system and the significant demands placed on medical staff that will result if staff to population levels remain unchanged.

1.6.3 THE IMPACT OF HIV ON MEDICAL STAFF

While above we have dealt with the increased in demand for medical staff and the training and recruitment aspect of the supply side issue, there remains to consider the impact of HIV infection on reducing the number of health sector staff. In Table 1.6.2 the adult prevalence rates under the three scenarios are applied to the numbers of doctors and nurses to determine the numbers of medical staff with HIV and AIDS and the resulting number of deaths. This analysis also assumes there would be more medical staff under the medium and high response scenarios.

TABLE 1.6.2 : ESTIMATED TOTAL NUMBER OF DEATHS—DOCTORS AND NURSES, CUMULATIVE, 2005–2025⁵

Deaths of doctors and nurses, 2005–2025	Doctors	Nurses
Baseline	16	170
Medium-response	17	180
High-response	14	150

Under the baseline scenario, when there is increased pressure on doctors and nurses to care for those with opportunistic infections, it is estimated the sector will lose 16 doctors and 170 nurses to AIDS over the 20 years from 2005.

1.6.4 IMPACT ON HOSPITAL BEDS

Currently there are 4,908 hospital beds in Papua New Guinea, with 900 in Port Moresby General Hospital. A recent seven-day census of the medical inpatient beds at Port Moresby General Hospital, by Wai et al. (2005), found that TB and AIDS patients stayed in hospital for 40 and 34.5 days respectively, and that the number of people with AIDS in the wards of Port Moresby General Hospital was already having a significant impact on hospital bed capacity. Assuming there are no future capital works projects at the hospital, nor any reductions in the number of hospital beds in the country in the next 20 years, the following graph illustrates the projected impact of AIDS on the number of people seeking inpatient care and hospital beds. This projected analysis uses an estimated number of total hospital medical beds as the base. See Appendix 3 for technical note details.

The analysis in Figure 1.6.4 shows that, under the baseline scenario, in 20 years it is estimated that over 70 per cent of all hospital medical beds will be occupied by people with AIDS. This analysis is based on only 53 per cent of the population having access to health care facilities and an average length of stay of 34.5 days per person with AIDS. It also assumes no changes in the availability of hospital beds over the next 20 years (see Appendix 3 technical notes for calculations). With such increases in demand for bed space, there are limited options for health care providers, they include: others with health care needs (like maternity and emergency) turned away from the health care system; AIDS patients turned away or their length of stay decreased; increases in bed capacity to over 100 per cent or hospital bed capacity expanded. Exclusion of other patients from hospital beds will contribute to decreases in Papua New Guinea's already low and, in some cases declining, health indicators, while the over-extension of bed capacity will see resources diverted into the hospital component of the health budget. This represents a real policy and financial dilemma. Even the high-response scenario, with 30 per cent of medical bed capacity taken by people with AIDS, will be detrimental to the health care system.

⁵ Assumes that the prevalence of HIV among adults in the general population applies equally to medical staff.

FIGURE 1.6.4 : IMPACT OF AIDS PATIENTS ON HOSPITAL BED CAPACITY OVER THE NEXT 20 YEARS

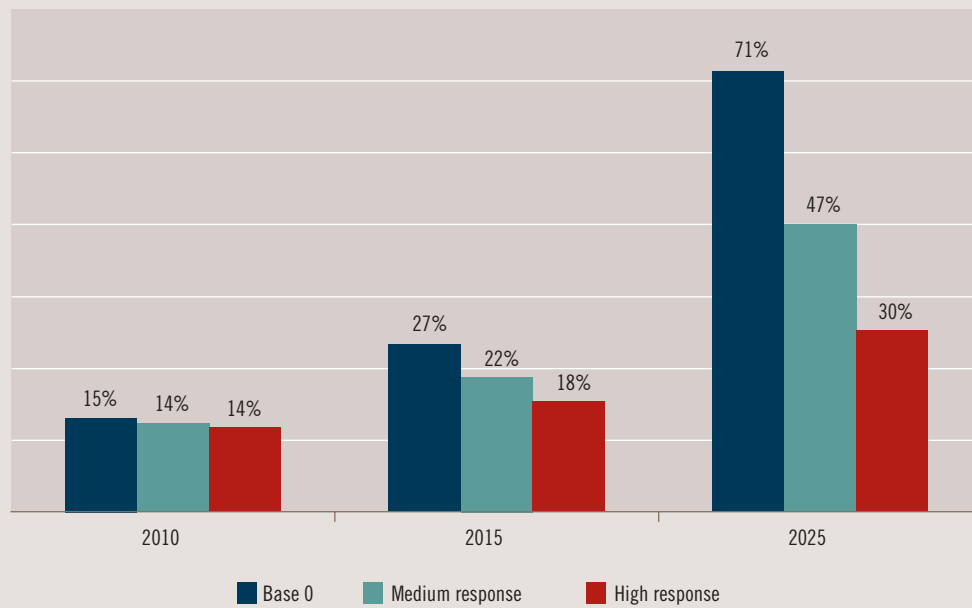
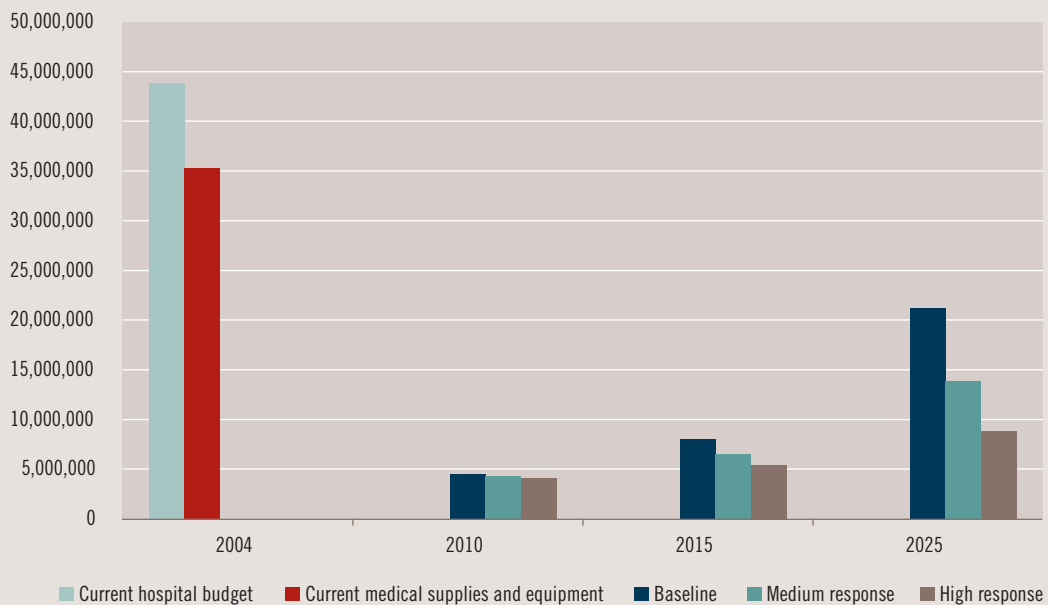


FIGURE 1.6.5: CURRENT HOSPITAL EXPENDITURE AND PROJECTED COSTS OF CARE AND TREATMENT FOR OPPORTUNISTIC INFECTIONS



Source: GoPNG, 2005 for current expenditure. Note: Excludes costs of ART and is based on limited access to health care facilities.

1.6.5 HOSPITAL EXPENDITURE DUE TO HIV AND AIDS

Figure 1.6.5 illustrates the rising costs of caring for people in the later stages of HIV and AIDS, as they seek care.

The left-hand columns illustrate current expenditure on hospital and medical supplies and equipment (2004), and the projected figures (for 2010, 2015 and 2025) illustrate the total costs of hospitalisation and treatment for those with opportunistic infections. By 2025 the projected health care costs for providing treatment and care (excluding the costs of ART) are estimated to be over AUD21 million per annum under the baseline scenario. If more people seek access to health care facilities than estimated here, costs could go as high as AUD57 million per annum in 2025, under the baseline scenario. Either way these costs are very significant.

Given difficulties in determining accurate unit costs, the costs provided in Figure 1.6.5 should be taken only as indicative. They are provided here as a means of alerting the health system to the hospital, care and treatment costs associated with opportunistic infections.

1.6.6 POTENTIAL FINANCIAL IMPACTS OF ANTIRETROVIRAL THERAPY (ART)

As providing antiretroviral treatment is a significant expense, the analysis provides three options for projecting potential future costs. One of these options is discussed below (for a discussion of cost implications if ART was more widely available see Appendix 5).

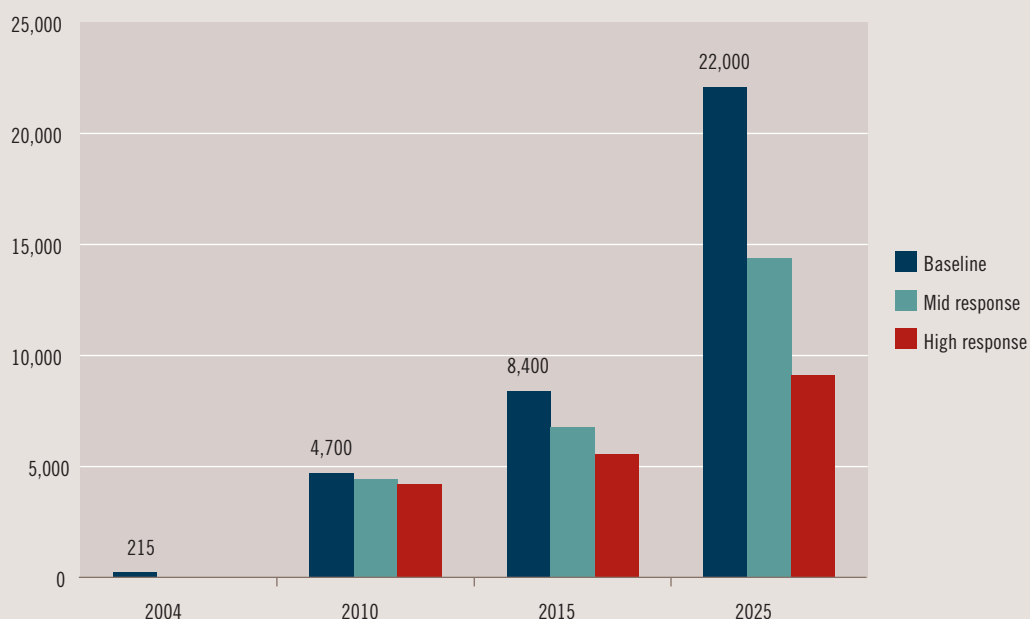
Option for treatment: ART for only 18 per cent of late-stage HIV and AIDS patients

This option demonstrates the treatment costs incurred if 18 per cent of all late-stage HIV and AIDS patients received treatment under the baseline scenario. This equates to about 3,000 people receiving ART in 2006, as in Papua New Guinea's Global Fund to Fight AIDS, Tuberculosis and Malaria proposal (GoPNG, 2004).

TABLE 1.6.3: ESTIMATED COSTS OF TREATING 18 PER CENT OF THOSE WITH LATE-STAGE HIV AND AIDS

Costs of ART (AUD 2005 prices)	2010	2015	2025
Baseline	6,000,000	10,900,000	28,600,000
Medium-response	5,700,000	8,700,000	18,600,000
High-response	5,400,000	7,200,000	11,800,000

FIGURE 1.6.6: NUMBER OF PEOPLE ON ART IF 18 PER CENT OF THOSE WITH LATE-STAGE HIV AND AIDS ARE TREATED



Note: that treatment rates are held constant at 18 per cent across the scenarios.

Figures 1.6.6 and Table 1.6.3 illustrate the effects of changing the prevention components of the epidemiological model in the case of each of the high, medium and baseline responses. This shows that adopting the high-response scenario and increasing prevention efforts reduces the number of people who require treatment and the associated costs.

The total costs of treatment can vary significantly. However, even with a small proportion of people on ART, costs quickly escalate as prevalence rises. With only 18 per cent of people with late-stage HIV and AIDS receiving treatment, ART will still cost around AUD28 million by 2025. If ART were available more widely, to 100 per cent of people with late-stage HIV and AIDS (about 20 per cent of all of those with HIV), the cost increases to over AUD160 million. Future treatment costs are therefore significant (see Appendix 5 for further details).

Tables 1.6.3 and Figure 1.6.6 (potential costs of ART) demonstrate that prevention efforts can save a significant proportion of the future costs of ART. The size of these savings is determined by how extensively antiretroviral treatment is prescribed and the success of prevention efforts. For example:

- > If treatment regimes are available for all those with late-stage HIV and AIDS from 2010 through to 2025, by 2025 the high-response scenario represents a total saving, above the cost of the baseline response, of AUD630 million.
- > If treatment regimes are available for only 18 per cent of people with late-stage HIV and AIDS from 2010 through to 2025, by 2025 the high-response scenario represents a total saving, above the cost of the baseline response, of AUD110 million.

1.6.7 HIV PREVENTION COSTS

The projected impact on the prevention component of the HIV budget under each of the three scenarios is estimated using a number of key inputs including the epidemiological population projections and analysis of 2005 HIV expenditure undertaken (McKay and Warner, 2005). (Details of calculations are available in Appendix 3 Technical Notes).

The prevention budget component includes:

- > prevention of mother to child transmission
- > blood safety
- > voluntary counselling and testing
- > community education, workplace and youth mobilisation
- > programs targeted at sex workers– STI treatment, distribution of condoms, and peer education and marketing programs
- > distribution of condoms.

The total baseline, medium- and high-response projections are shown in Table 1.6.4.

By 2025, the high response prevention costs an additional AUD18 million above the baseline.

Measured against the baseline, the changes in emphasis in the prevention budget in the medium- and high-response scenarios are as follows:

- > Expenditure on condoms increases, driven by increases in coverage and reach targets
- > Prevention of mother to child transmission programs increase from the baseline to the high-response scenario, driven by increases in coverage
- > There are more program costs associated with targeting sex workers, driven by increased coverage and reach for condoms and STI treatment, including supporting peer outreach

TABLE 1.6.4: ESTIMATED TOTAL HIV PREVENTION BUDGET, PNG

AUD 2005 prices	2005	2010	2015	2025
Baseline	11,490,000*	18,000,000	21,000,000	28,500,000
Medium-response		26,000,000	30,000,000	41,000,000
High-response		30,000,000	34,000,000	46,000,000

*The 2005 figure excludes Global Fund contributions (McKay and Warner 2005).

Note: Includes community education, workplace and youth mobilisation, with 25 per cent increase for medium- and high-response scenarios.

- > There are increases in community education and youth mobilisation.

This analysis illustrates potential costs of prevention under the baseline, medium- and high-response scenarios. While they are not intended to be an exact projection of the future costs, they illustrate the order of magnitude of the costs associated with HIV prevention policy responses. The real costs will only be known as better information becomes available and policy choices are made. Further information on how potential changes may affect costs is outlined in Appendix 2.

This analysis shows that a high response prevention scenario is an alternative. However, it comes not only at a cost but is dependent on appropriate policy responses which are not limited to the health sector, but require a truly multi-sectoral approach, reaching into education and infrastructure. Such wide scale change will not be possible without broad political support at all levels. However, if change is enacted now, policy makers can not only limit future treatment and care costs, but save the lives of many Papua New Guineans.

1.7 GENDER RELATIONS

1.7.1 GENERAL POSITION OF WOMEN

Women in PNG are subject to marked gender discrimination on all global indicators. Income and educational levels are below that of men, and PNG is one of the few countries in the world where women have a lower life expectancy than men (Dugue, 2004). Women in PNG suffer disproportionately from malnutrition, have poor access to health care and reproductive services and have high maternal

mortality rates. Women are almost entirely absent from parliament and senior positions in the public service and private sector, and women's incomes are significantly below those of men.

PNG has been described as 'the most masculine country on the face of the earth' (Denoon, 1989). The rise of the Church and Western influence has seen the dissolution of traditional customs, which maintained a distance between men and women due to beliefs in gender pollution and codes of heterosexual avoidance (Hughes, 2002; Wardlow, 2002). With these customs dissolved, the gendered social realities of daily life in PNG have evolved into a dual, but unequal, economic relationship where cash is a predominantly male preserve and women have become items of exchange.

1.7.2 SEXUAL RELATIONS

Sexual relations lie at the heart of the HIV epidemic in PNG. Women's lack of social or economic authority is underwritten by the sexual economy and enforced largely by violence. Current attitudes to sex pose serious barriers to the effectiveness of HIV interventions.

Women in general, and those involved in sex work in particular, are blamed for HIV infection in PNG. A public scapegoating of sex workers has further entrenched the view that HIV can be attributed to dirty and immoral women. Cross sectional surveys in some parts of PNG have identified low levels of condom use and high levels of STIs, which are recognized as having the potential to increase the risk of HIV transmission. In 2000, a survey in a Highlands community found the prevalence of gonorrhoea, chlamydia and syphilis to be around 15 per cent, 26 per cent and 4 per cent respectively

TABLE 1.7.1: DATA ON GENDER INEQUALITIES IN PNG

Data	Year	Estimate	Source
Maternal mortality ratio (per 100,000 births)	2000	300	HDR, 2005
Female/male literacy rate (percentages 15+)	2003	50.9/63.4	HDR, 2005
Female/male est. earned annual income (USD)	2003	1896/3305	HDR, 2005
Gender-Related Development Index value	2003	.518	HDR, 2005
Female primary school net enrolment ratio (per cent)	2002/3	68	UNESCO
Female economic activity (per cent of male rate, 15+)	2003	79	HDR, 2005

(WHO, National AIDS Council, National Department of Health, Papua New Guinea, 2000).

Young women often have traumatic first sexual encounters, or have been subject to sexual use by older men and family members. A common response is for the woman to marry her abuser, thus containing her shame (Wardlow, 2002; Hammar, 2005). Several studies point to the extremely high levels of rape and violence directed at women and girls, much of which goes unreported and which increases the likelihood of the spread of HIV in PNG. The prevalence of rape both inside and outside marriage is among the highest in the world (Zimmer-Tamakoshi, 2004).

Married women, a particularly vulnerable population

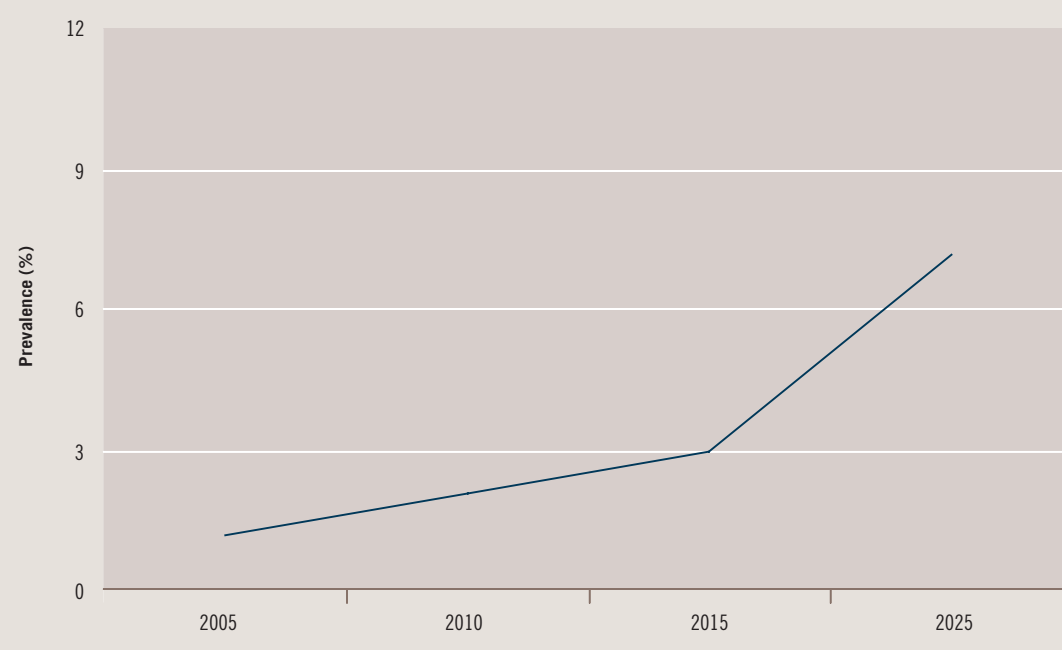
Within a context of male privilege, sex outside of marriage and violence, married women are at risk of contracting HIV. Polygyny is common in many areas of Papua New Guinea and is generally considered to be a right attached to personal power, status and wealth (Garap, 1999; Luker, 2002). Scarce access to economic resources and minimal social or family support, often combine to keep women in violent marriages (Morley, 1994; Garap, 1999; Sturzenhofecker, 1998; Wardlow, 2002, 2002a). As Wardlow argues:

... who is more at risk, the sex worker in a brothel who has multiple partners but may also have some institutional support for demanding condom use, or the monogamous wife who fears repercussions for even intimating the possibility of her husband's extramarital escapades, let alone for requesting condom use? (Wardlow, 2002b, p. 166).

Condoms are thought not to be needed in the intimate sphere of marriage, and condom use within marriage is uncommon. A married woman cannot refuse to have sex with her husband even if she knows that he is infected (Hughes, 2002), or insist on condoms, and is likely to be beaten even for trying. Similarly, the many women who also engage in sexual transactions for goods or services, but are not considered prostitutes, are not considered to pose a risk of infection. Condoms are rarely used in these encounters (Hughes, 2002).

HIV-related interventions, largely involving condom promotion, have appropriately addressed the risk of transmission in female sex workers and their clients (Passey et al., 1998; Gare et al., 2005). It is much more difficult to promote condom use in marital settings, even though married women are potentially at high risk of infection if their husbands engage in unprotected sex outside the marriage. Further, the AB components of the ABC (Abstain, Be faithful,

FIGURE 1.7.1: PREVALENCE OF HIV IN ADULT WOMEN IN PNG WHO ARE NOT SEX WORKERS, 2005–2025 (BASELINE)



use Condoms) HIV interventions do not offer any strategies to protect women who are faithful to their husbands but who may have no option to refuse sex or to insist on condom use.

By 2010, under the baseline scenario, there will be over 25,000 non-sex-worker adult women infected with HIV, and this figure will rise to over 120,000 by 2025, by which time the prevalence rate will be over 7 per cent amongst this group (see Figure 1.7.1). This figure will be considerably lower if there is a high response (53,000 in 2025).

The high prevalence of HIV amongst women who are not sex workers, most of whom are married, indicates the vulnerability of this group.

1.7.3 SEX WORK

As in many countries, the increasing mobility of male labour has meant a sharp increase in the number of women earning their living from transactional sex. Some studies indicate that almost 50 per cent of unemployed women in urban areas are engaged in some form of sex work, most of them concentrated in the urban centres and along the Highlands highways or around development enclaves.

Based on limited PNG data, we estimate that in 2005 there are up to a quarter of a million women who trade sex in PNG. However, sex work is far from a straightforward category of activity in PNG, and there is little that is stable about it. Women might exchange sex for access to a variety of things, from educational and health services to food (see Hammar, forthcoming), while not believing themselves to be sex workers. This is apposite to the manner in which the economy of daily life in PNG is dual and gendered, whereby men have access to cash and women function largely outside the cash economy, and are dependent on marriages, clan relations, food gardens and transactional sex of one sort or another.

Figure 1.7.2 shows the prevalence of HIV amongst sex workers in PNG from 2005–2025 using baseline, medium- and high-response scenarios.

Under the high-response scenario, the prevalence of HIV amongst sex workers rises from just over 5 per cent to 8 per cent. However, under the baseline scenario, HIV prevalence escalates to nearly 25 per cent in 2025. This has potentially devastating consequences for these women, who are not only sex workers but partners and mothers and carers of the elderly.

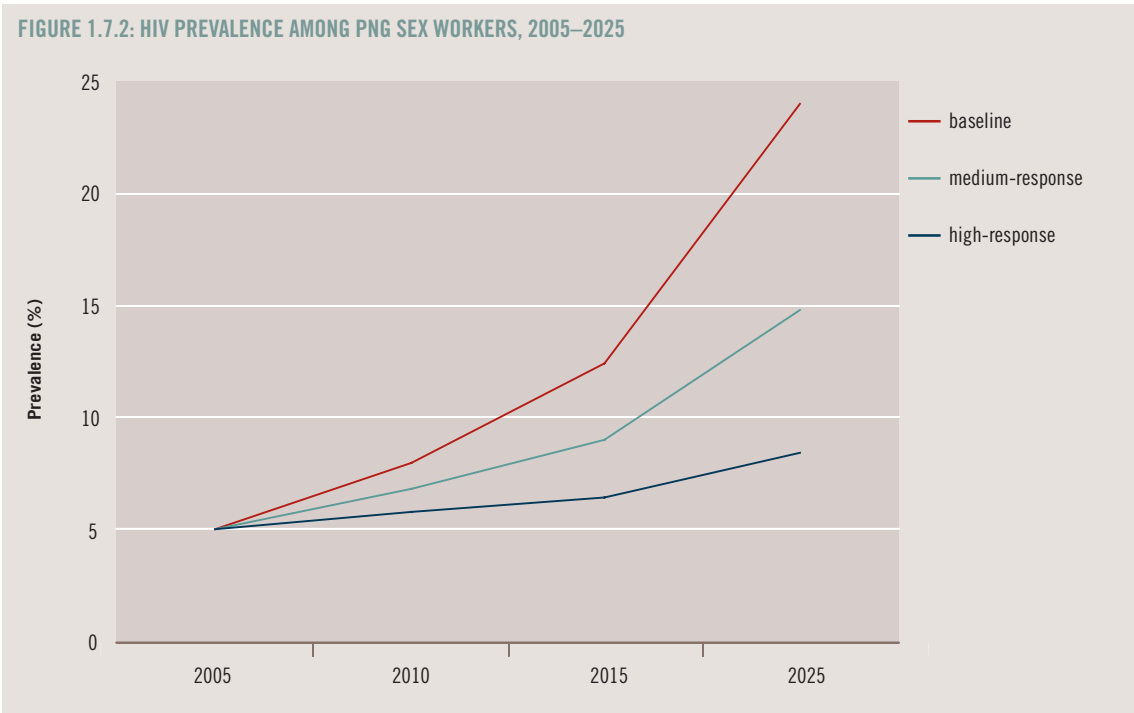
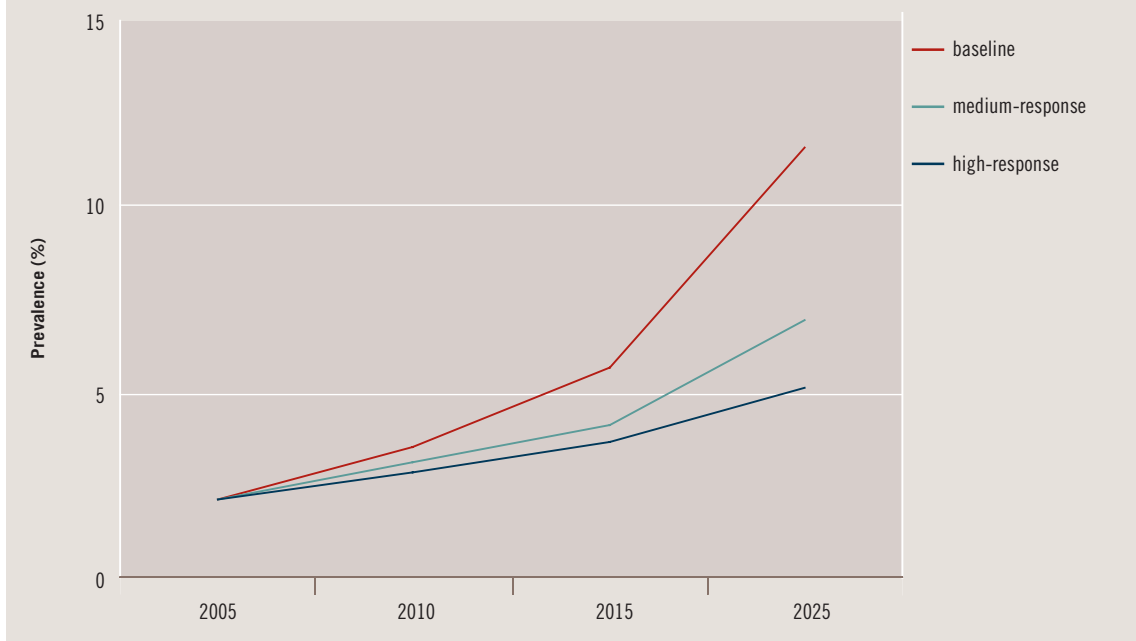


FIGURE 1.7.3: HIV PREVALENCE AMONG CLIENTS OF SEX WORKERS, 2005–2025



1.7.4 CLIENTS OF SEX WORKERS

Again, based on limited data, we estimate that almost half of PNG men pay for sex at some time each year. This is confirmed by the large number of women who trade sex (see above).

Under the baseline scenario, Figure 1.7.3 indicates that by 2025 the HIV prevalence rate amongst the clients of sex workers will be over 11 per cent, although this can be halved with a high response. This prevalence of HIV has deleterious consequences for their wives and girlfriends.

1.7.5 MEN WHO HAVE SEX WITH MEN (MSM)

Although homosexual acts are a criminal offence in PNG, there is a substantive body of anthropological literature on such male-to-male sexual practices (Stewart, 2004). Expatriate homosexuals have in the past been blamed for introducing HIV to Papua New Guinea (Stewart, 2004; Herdt, 1984). Recent anthropological work does suggest that traditional rituals involving male-to-male sex disappear as tribal people's desire for modernisation includes the adoption of a Christian, hetero-normative and less fluid sexual identity (Knauff, 2003). At the same time, evidence from Port Moresby shows that a more

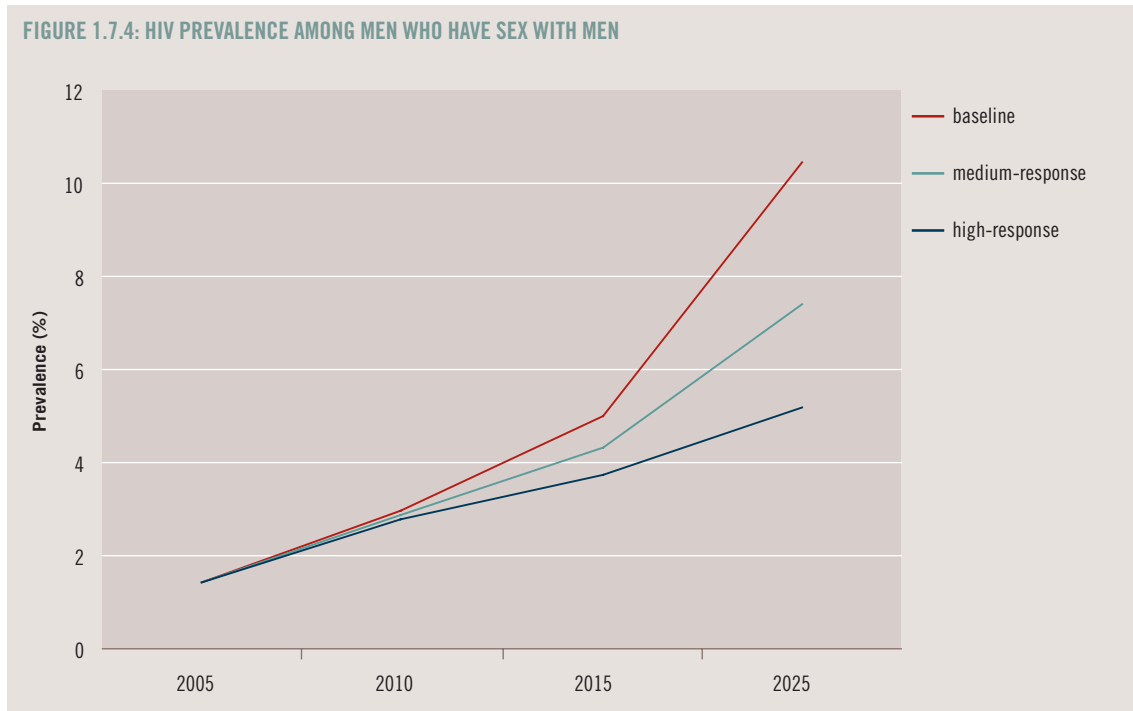
'modern' form of homosexual practice has developed among some men in urban areas at least.

A behavioural study of men who have sex with men in Port Moresby by Family Health International found that many study participants both pay for and are paid for sex, and are also likely to have sex with women. Rates of condom use were 16.2 per cent (with non-paying male partners) and 34.8 per cent with male sex workers. Another study (NSRRT, Jenkins, 2004) found that 12 per cent of males in rural and peri-urban areas reported having at some time had sex with another male, and that the sex was anal.

Figure 1.7.4 indicates that rates of HIV amongst men who have sex with men will increase substantially from 2005–2025, from 2 per cent in 2005 to over 10 per cent under the baseline scenario (reducing to 5 per cent under the high-response scenario).

If this group of men has sex with women, either in or outside of marriage, these increases will also have an impact on heterosexual transmission of HIV. The sexual mixing between groups in PNG makes the country more vulnerable to spread within and between groups.

FIGURE 1.7.4: HIV PREVALENCE AMONG MEN WHO HAVE SEX WITH MEN



1.8 RELIGION

Papua New Guinea is a Christian country with approximately 150 different sects, missions and churches (Hauck et al., 2005, p. v). The churches play a very important role in PNG society (Stewart & Strathern, 1999), particularly in health and education, other social services (Luker, 2004), building social capital and peace building (e.g. Bougainville). The churches have also been in the forefront of the civil society response to HIV and as the epidemic grows will no doubt play an even greater role.

Because of their importance in PNG and the diversity of religious beliefs they espouse, the churches can be both a force for a progressive response to HIV and also a conservatising influence around marriage and women's sexual role. While in some provinces Christian Churches have promoted a reduction in polygyny (Morley, 1994), some also emphasise the importance of staying within marriage even when they are violent (Stewart & Strathern, 1999; Hammar, 2005). Church organizations have also been reported to discourage the use of condoms on the basis that they encourage promiscuity, and some have propagated the view that condoms cause HIV (Hammar, 2005).

More traditional animist beliefs are still current in remote rural areas, including those on the power of sorcery and witchcraft. There have been recent increases in HIV-related attacks on accused witches in the Southern Highlands. Anthropologist Nicole Haley (Council for World Mission, 2004) has linked a series of witch trials by torture around Lake Kapiago to the first local AIDS deaths. Growth in witchcraft and sorcery accusations has been linked to increasing HIV prevalence in other countries. For example, Paul Farmer (1990) has described how Haitian Christians turned to sorcery as an explanation for HIV when first confronted with it. Richard Eves argues this could also form part of the response to a growing epidemic, in PNG, where beliefs about the malevolent magic remain strong despite the influence of Christianity and modernity, and where deaths that occur before "old age" are looked on suspiciously as having their origins in sorcery or witchcraft (Eves, 1998; 2004).

1.9 MIGRATION

Papua New Guinea has a great deal of internal circular migration, i.e. from village to town and back, and from village to development enclave such as a mine or forestry. This migration is not new, although

it has increased dramatically and will continue to increase over the next twenty years. Certain regions such as the Southern Highlands Province have a long history of male absence from the community, since men have had to move to other provinces to find work. Lucrative mining work and jobs on urban areas have meant that male wage earners are usually separated from non-wage-earning women who remain in villages and settlements. These increasing rates of male migration to urban centres and other rural enclaves of development have led to marked changes in cultural practices and meanings.

This pattern of labour migration facilitates the transmission of STIs and HIV because men are recognized as being more likely to engage in extramarital sexual relations while they are away (Jorgensen, 1998), especially when mining camps refuse to provide living quarters for spouses (Wardlow 2002, 2002a). This leads to the growth of sex work enclaves, which exacerbates the likelihood of the spread of HIV. These men are at the most sexually active period of their lives and engage in increased sexual encounters beyond traditional social constraints of their own communities. Migration also contributes to polygyny as some migration is undertaken by men for the purpose of cash-raising for brideprice.

Unemployed men, as another mobile and marginal population, may also be at higher risk of STIs and HIV, and act as a bridging population between urban and rural areas, moving in cycles between the cities and their villages looking for work.

1.10 GOVERNANCE, CONFLICT AND SECURITY IMPACTS

The acuity of projections of the social and security impact of HIV relies on accounting for the particular social and structural characteristics of PNG society that will be affected by changing rates of HIV infection and AIDS deaths.

Similarly, assessing the impact of disease on specific areas of social life is always a rough calculation, arising from piecemeal small qualitative studies, incomplete demographic data and data from other regions. However, despite a lack of data on the social impact of HIV in PNG to date, the literature related

to social co-factors provides a substantive platform on which a picture of social impacts can reasonably be constructed.

PNG's political system is characterised as having inherent volatility, due to the strength of local clans as the primary unit of social organisation in many parts of the country. There is also a low level of development of formal civil-society organisations (apart from churches) between the local community and the state. The on-flow of loss of institutional capacity due to the increasing HIV rates in PNG promises to seriously undermine institutions of governance and increase poverty in the community.

1.10.1 NATIONAL LEVEL AND STATE CAPACITY IMPACTS

In some parts of the developing world where high levels of HIV infection have occurred, there can be expected to be an impact on economic progress, but also an undermining of the social fabric and reduced state capacity (Price-Smith, 2002; Dupont, 2001). Given the general association of unstable states and civil unrest with transnational crime, the proliferation of HIV and AIDS in PNG may become an issue of wider regional security:

[T]here is a growing awareness of the circular relationship between HIV/AIDS and security. The disease is a root cause of instability and insecurity, but it is also a byproduct of poverty, conflict and weak states (Dupont, 2001).

In PNG nation-building remains a major challenge. The process is complicated and inhibited by the diversity of Papua New Guineans, who communicate in over 800 different languages, live in isolated areas with few external links or bonds, and whose identities tend to be defined within community and kinship relations rather than as citizens of a nation state. Protracted internal conflict and poor infrastructure in some areas threatens national cohesion (ASPI, 2004). In this context, HIV infection rates are one of several major problems that have the potential to provoke serious challenges to government stability (ASPI, 2004).

Price Smith (2002) demonstrates that these increasing levels of infectious disease exert a negative

impact on state capacity and reduce the 'country's ability to maximize its prosperity and stability, to exert *de facto* and *de jure* control over its territory, to protect its population from predation, and to adapt to diverse crises' (Price-Smith 2002). Thus there is a negative and self-reinforcing feedback loop (Price-Smith 2002). One particular challenge faced by government as HIV rates rise is that the diversion of funds that may be needed to respond directly to HIV will lead to further deterioration in the very infrastructure that is necessary for the delivery of HIV interventions and for the relief of poverty and human security.

In rural areas many schools and health centres lack the most basic resources and are sometimes deserted; over large areas there may be no effective police presence; and roads do not exist or are impassable (ASPI, 2004). Rural households and communities therefore have little assistance to improve their participation in the cash economy. This situation will be exacerbated if more resources are diverted to a struggling and centralised health sector.

1.10.2 POVERTY

Studies detailing the poverty impact of HIV in Cambodia, India, Thailand and Vietnam show that significant numbers of households that are not poor are being pushed into poverty, and households that are already poor are being rendered destitute particularly in provinces and areas where the epidemic is more advanced (ADB/UNAIDS, 2004). In PNG we estimate that the HIV prevalence rate will be well above those of the countries mentioned above and therefore the impact potentially much greater.

In PNG, a growing HIV rate is doubly implicated in poverty and infrastructural failure as already compromised institutions of government will be put under further strain. It has been contended that '[t]he emergence of poverty in hitherto self-sufficient communities is related to the general deterioration of government services and national transport and communication infrastructure, and the inequitable distribution of development benefits' (O'Collins, 1999).

1.11 HOUSEHOLD IMPACTS

1.11.1 SECURITY IMPACTS AT FAMILY AND HOUSEHOLD LEVEL

The majority of Papua New Guineans remain dependent on subsistence farming and live in small villages with traditional social structures. Social units are based on extended family, clan and tribe, and fundamental to society are notions of reciprocity and family obligation. Ownership of material wealth is vested in the household and controlled by a male elder. Responsibility for the day-to-day work of gardening and caring for children and animals still lies with women.

HIV deaths extinguish existing human capital; the death of parents and loss of household income destroys mechanisms that generate human investment in children and young people. In turn those children are themselves both less educated and less able to transmit human capital to the next generation. Apart from the emotional loss of family members, children and partners, these deaths will jeopardise the levels of care that family members receive, care which is primarily carried out by women.

AIDS deaths are associated with an increase in household dissolution and child migration (Zaba et al., 2004). Analysis of national household surveys in Sub-Saharan Africa (Monasch & Boerma, 2004) suggests a negative association between orphanhood and education among older children.

1.11.2 ECONOMIC IMPACTS AT A HOUSEHOLD LEVEL

Increasing health costs combined with declining income streams will put significant financial strain on households. While Russell (2004) found that direct costs of HIV and AIDS borne by households was between 50–100 per cent of household income, the size of this expenditure is determined by factors including the availability of free health services. In PNG, 88 per cent of health expenditure is borne publicly. This is higher than in the countries where expenditure was found to be 50–100 per cent of household income (World Health Organisation 2004). Thus, indicating the financial burden for households in terms of direct medical costs may

be somewhat offset by provision of publicly funded health care, if it is accessible. However, it is the indirect costs that will be the most significant for households—diversion of activities, loss of income from labour, declining agricultural inputs, reduced food-crop production and household assets and rising malnutrition (Russell, 2004).

Impoverishment will increase, resulting both directly from loss of individual and household income through sickness and death and indirectly through the effects of failing infrastructure and systems of governance on households and communities. A South African study (Hosegood et al., 2004) concluded that an increase in adult mortality and household poverty attributable to AIDS would increase the number of households that do not survive as a functional and cohesive social group.

1.12 VILLAGE AND COMMUNITY LEVEL IMPACTS

Security impacts at village and community level

Human security presumes freedom from want and from fear, as well as access to and control of resources and opportunities. The basic elements of human security include survival, safety, opportunity, dignity, agency and autonomy. These preconditions for human security are essential in reducing vulnerability to HIV infection and in reducing its impact. Those most deprived of these needs are themselves most highly vulnerable to HIV infection and most disadvantaged in coping with its impact. The human security impact of HIV in PNG in the next 20 years will be felt most at village and community level. Internal rural–urban migration will flow in both directions as sick people return home to villages for care, and depleted village resources encourage movement to urban centres in search of services and opportunity.

A concentration of unemployed young people in urban areas is already contributing to individual and social despair, increasing crime rates and growing civil unrest (Windybank & Manning, 2003). For urban relatives, the burden of providing for impoverished village kin may itself be a risk factor for poverty (O’Collins, 1999).

Crime related to economic hardship is not only an urban phenomenon. The incidence of thieves stealing from plantations and village gardens, and bandits ambushing villagers taking products to the market, can be expected to increase as poverty does. The resulting hardships will further undermine traditional village life and fuel urban drift. (Windybank & Manning, 2003).

Furthermore, incidents of violence toward HIV-positive women by their village communities (see Hammar, forthcoming) indicate that family support and compassion, traditionally characteristic of Papua New Guineans and their communities, may dissipate in the face of HIV. As village life comes under strain, the compassionate and caring aspects of those communities will be further eroded. Focus groups carried out for a situational analysis for AusAID indicated that many villagers would want to isolate HIV-positive people from the village (NHASP, 2003). Attitudes to women infected with HIV, and sex workers in particular, can be expected to deteriorate. In particular, the sickness and poverty associated with the projected rates of HIV may accelerate the impact of crime, lack of resources and dearth of opportunity on the disintegration of village support systems.

Poverty will work to further devalue women and may also encourage sex work through pure economic need.

1.13 HUMAN RIGHTS

PNG has enacted HIV legislation aimed at protecting and upholding human rights (see Stewart, 2004). Nevertheless there remain documented instances of violations of human rights, especially those of female sex workers. Human rights violations by police, including against women, are cited in a recent Amnesty International report (2005) on PNG.

The personal security and human rights of people stigmatised by HIV infection or association with HIV infection, or blamed for HIV (such as sex workers, alleged sex workers, those accused of sorcery, and women abandoned by their husbands) cannot be guaranteed by legislation alone.

1.14 PNG CONCLUSION

Given the size of the projected epidemic in PNG, in the future a large number will become directly touched by the epidemic. The increasing prevalence of HIV is likely to inflict damage on cultural traditions. When large numbers of people in a clan die, it will weaken the ability to pass down traditions to young people. On the other hand, in some cases cultural tradition may be an impediment to HIV prevention. Particular beliefs about illness may impact on HIV prevention efforts. Inability to talk about sex may hinder young people's ability to be open about sexuality. The response to HIV must be grounded in Papua New Guineans' cultural and social understandings of the dynamics of HIV as they experience it.

If the current (baseline) response to HIV in Papua New Guinea continues, the country will be facing an adult prevalence rate of nearly 11 per cent by 2025. In the next 20 years over 300,000 adults will die of AIDS related illness. GDP growth rate will be reduced by up to 1.3 per cent as prevalence reaches 10 per cent in the adult population. There will be around 117,000 maternal orphans. The agriculture, education and health sectors will be negatively impacted. In the health sector, rising demands for treatment and care of those with opportunistic infections and provision of ART will place enormous strain on an already struggling system. The majority of hospital medical beds will be taken by those with AIDS related illnesses. The financial burden to the government of the health care costs associated with treating and caring for these people will present government and policy makers with few and mostly unpalatable policy options. As a consequence, provision of other health services will suffer, further reducing already low health outcomes. The impacts of the financial burden on the health sector will have consequences for funding available for other sectors. Undoubtedly other sectors (education, justice, infrastructure) may suffer further as funds are diverted into health.

The social cost of a prevalence rate as high as many countries in Africa will be great. HIV will impact particularly at the family and community levels, and women may bear a disproportionate burden

of that impact. Immense pressure will be placed on families to cope with illness and death –both in terms of caring work and coping financially. This, in turn, will place pressure on village systems. These systems will be undermined by the loss of social capital that comes with widespread illness. The major governance and security impacts will also be felt at village level, with difficulties likely to arise in sustaining viable local governance systems in the face of HIV.

HIV carries with it tremendous stigma because, unlike many other illnesses, it is transmitted through sexual practices. This is one of the major challenges that PNG will face in the next two decades; how to fight HIV while at the same time supporting those living with the virus. This will require wide scale social change, and understanding at all levels and in all sectors of society. Boys and men must be central to HIV prevention, as the burden of HIV must not continue solely to fall on or be attributed to women. And the general place of women and girls in PNG society must improve.

Under a high response scenario outlined here, with appropriate political support, legislative, social and policy changes, and financial resources, the rapidly expanding HIV epidemic in PNG can be somewhat tempered. But this will rely on a policy and fiscal environment that increases prevention programs and integrates HIV prevention into a health sector-wide approach. This integration is about more than financial management. It must be about improving health services and integrating HIV prevention activities with those health services. Every time a person has contact with the health sector, the health sector needs to be able to provide appropriate information and tools to Papua New Guineans to enable them to protect themselves from HIV. HIV prevention must be integrated into every contact social services have with the people. Sex education in schools must teach young people about safe sex, and girls must be taught how to take control of their sexuality. In any response to HIV, Papua New Guineans are integral to a genuinely PNG solution. Prevention and care cannot succeed if 'implanted' from outside.

These suggestions are not offered lightly or as an easily achievable objective, but the alternative consequences are dire. PNG is, as Windybank and Manning (2003) argued, “on the brink”.

2 The social and economic impact of HIV in Indonesia other than Papua, 2005–2025

2.1 INTRODUCTION

In Indonesia the HIV epidemic will be concentrated in a few sectors of the population. However without an increased response it will creep over the 1 per cent threshold in the general adult population by 2025, marking a transition to a generalised epidemic. This movement toward a generalised epidemic is due to those groups most affected by the epidemic not living their lives in isolation; their many relationships and roles overlap with each other and also with the general population. The complexity and lack of containment of sexual networks ensures that HIV will spread more widely through the heterosexual population, especially given low levels of condom use and sensitivities about women's sexual health issues.

Although the projected prevalence rates in the general population are low, the overall numbers of people involved are large – by 2025 there will be nearly 1.7 million deaths due to AIDS-related conditions if the response is not significantly stepped up. The social and economic impacts of projected rates of HIV in Indonesia will be felt most strongly at household level, and these household changes will increase the vulnerability to HIV of the women within them. Indonesia currently has a significant proportion of households functioning just above the poverty line (Gol, 2004). Small reductions in household income will be sufficient to force huge numbers of households and individuals into poverty. Greater economic pressure to internal and international migration

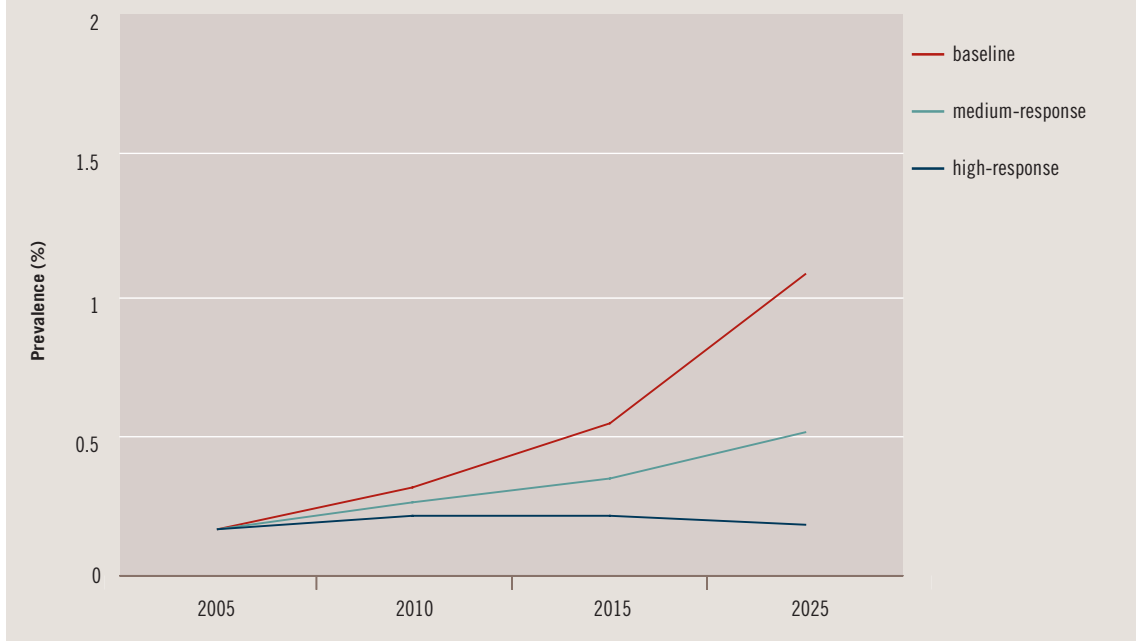
will be exerted – particularly on women. The economic imperative to undertake sex work will also increase. High rates of sickness and death among sex workers will increase the vulnerability to impoverishment among households supported by remittances forwarded from sex worker mothers.

2.2 HIV PREVALENCE IN INDONESIA 2005–2025

Indonesia is characterised as a country with a concentrated HIV epidemic, with a particularly high prevalence amongst its injecting drug user population. Figure 2.2 indicates that under the baseline scenario HIV will increase in the adult population from 0.17 per cent to 1.08 per cent over the next twenty years. Sexual transmission will have become sufficient to sustain the epidemic outside the populations at highest risk (sex workers, men who have sex with men and injectors), such that HIV will become, without an increased response, a generalised epidemic. However, with a high response the prevalence of HIV in the general population 15–49 years of age will rise slightly and then begin to decline.

The prevalence will be far higher among men than women. The baseline rate at 2025 for women is 0.44 per cent. HIV prevalence may decline if Indonesia enacts a high response scenario as suggested by the epidemiological modelling. However, under all scenarios, the prevalence rate will be high amongst

FIGURE 2.2: INDONESIA – ADULT HIV PREVALENCE, 2005–2025



the injecting drug use population and amongst sex workers.

2.2.1 HIV AMONGST INJECTING DRUG USERS

Since the late 1990s there has been a marked increase in HIV diagnoses in Indonesia among the burgeoning injecting drug using population. In late 2000 several ad hoc surveys of IDUs detected sharply increasing HIV prevalence. There is now a highly concentrated epidemic amongst this group, and one in which the rates will continue to rise steeply over the next twenty years unless a highly effective harm reduction response is undertaken. IDUs are a marginalised group. Low visibility led to a perception of low risk and a low prioritisation. Indonesia will see a concentrated epidemic amongst injectors (see Figure 2.2.1) under the baseline scenario with nearly 40 per cent (146,422 people) of all injectors infected with HIV or with AIDS related conditions.

The reasons for the large increase in prevalence amongst injectors are varied and cannot be considered separately from Indonesia’s historical, political, economic and social context. It is important when addressing the problem of HIV and AIDS in Indonesia (as anywhere else) to link economic

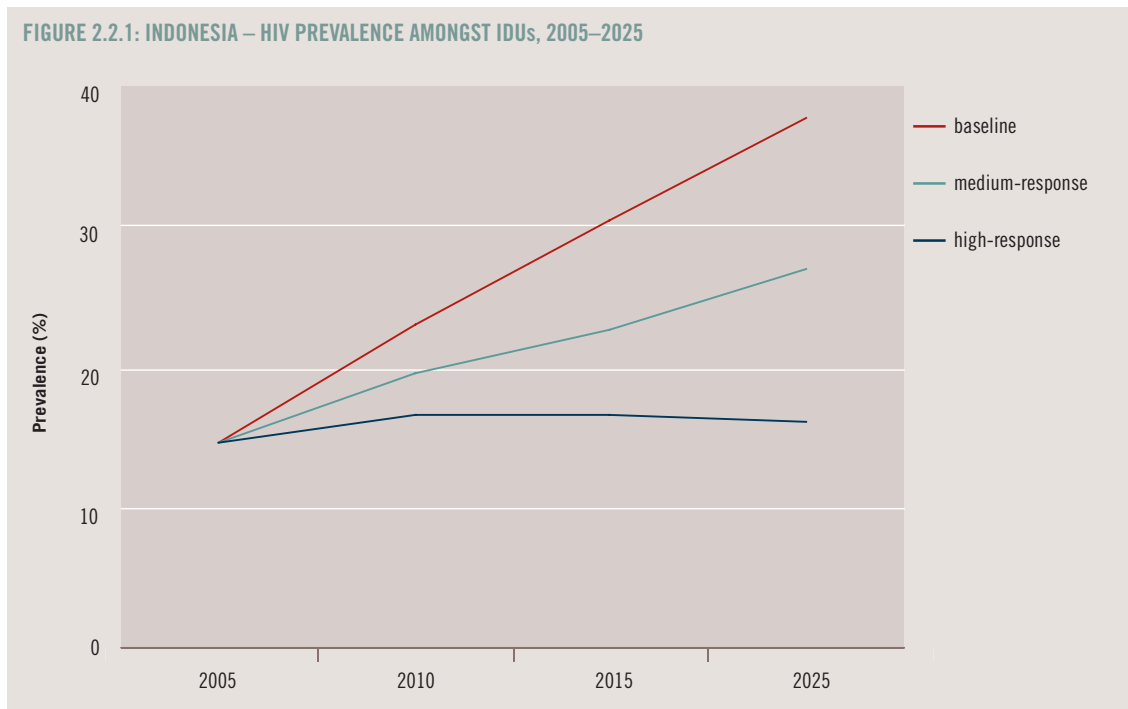
trends, government policies and social norms with individual risk (Scott and Rosko, 1999, see also Rhodes et al., 1999).

Prisoners also have a high prevalence rate for HIV. A 2002 study placed one in ten prisoners with HIV (Padmohoedjo, 2004) while over half the prisoners in Bali were found to be seropositive (Setiawan, 2002). Prisoners describe having one needle to share between many for several months; “sharpening the needle until it is totally used up before another needle will appear in the jail for use” (Setiawan et al., 1999:114).

Syringe sharing amongst injecting drug users in Indonesia is common with one study reporting that 88 per cent of injecting drug users questioned had shared equipment in the past week (MAP, 2004). The sharing of needles and syringes is motivated by a number of factors. Ignorance of HIV risk does not seem to be one of these, with close to 100 per cent injectors in Indonesia aware that sharing needles can transmit HIV (MAP, 2004).

The projected impact of the epidemic amongst injectors in Indonesia over the next 20 years is extremely high, but this concentrated epidemic is not a restricted one. Injecting drug users cannot be seen as a discrete group, whose increasing HIV prevalence

FIGURE 2.2.1: INDONESIA – HIV PREVALENCE AMONGST IDUs, 2005–2025



poses little threat to the general population. The borders between injectors and the general population are porous, and the virus may also spread from this group to their sexual partners and their children – a starting point for a major national epidemic (Crofts, 1999). For example, sex workers and IDUs, groups that were largely separate in the 1990s, have been steadily merging (Crofts, 1999; Setiawan, 2002). Selling sex is one way for injecting drug users to pay for their drugs and sex workers have increasingly started to inject as heroin becomes more available (Setiawan, 2002).

Although the National HIV/AIDS Strategy endorses harm reduction as an HIV prevention strategy, the concept that drug users should be helped, not hindered, remains a contentious issue (Montlake, 2003; Riono and Jazant, 2004). Needle exchanges in Indonesia are scarce with only two reported as operating in 2003. However, as of 2003, six exchanges were earmarked to open round the country (Montlake, 2003).

Injecting drug users in Indonesia come from all socio-economic backgrounds (Riono and Jazant, 2004), their infection poses a risk to their partners and children and, with the merging of injecting drug use and sex work, to the general population through their clients. However, if Indonesia enacts a high

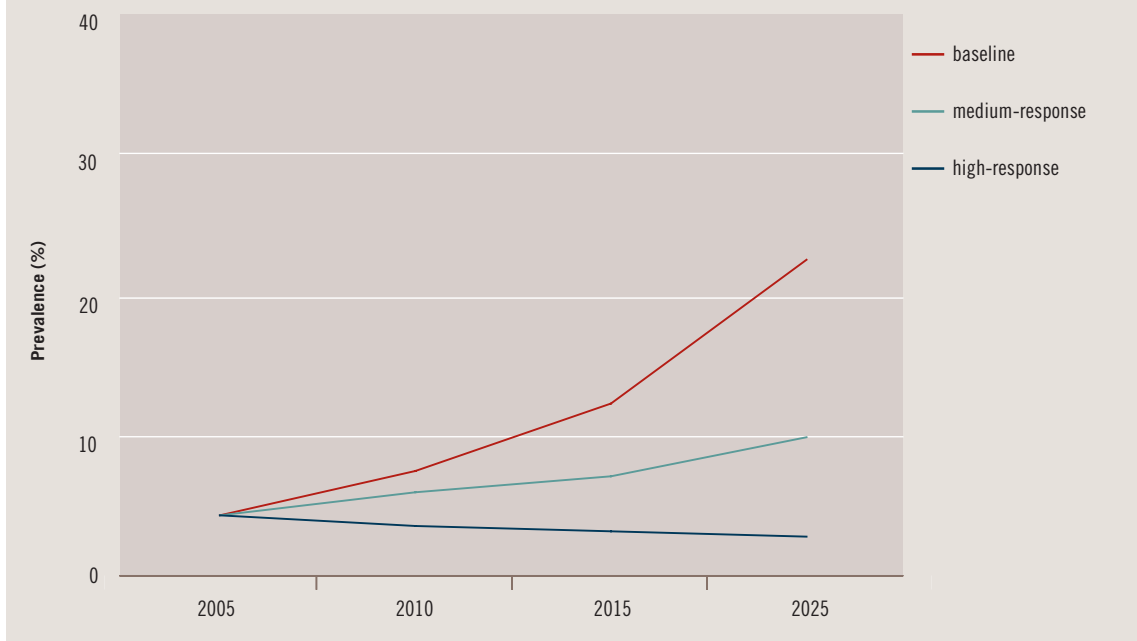
response to the epidemic – through addressing harm reduction policies and wider social issues such as unemployment and marginalisation, the prevalence of HIV amongst injectors will show a decline by 2025 to its present level.

2.3 HIV AMONG SEX WORKERS

2.3.1 SEX WORK

Sex workers are a vulnerable group even in areas of low HIV prevalence. Poverty, arranged marriages at a young age, early and repeated divorce and low levels of education have been associated with women who take up sex work. However, the backgrounds of, attitudes of and reasons for women taking up sex work in Indonesia are extremely broad and varied. Some sex workers foresee no other employment for themselves, yet for others sex work is a short term prospect. For some it is a relatively (psychologically) comfortable identity while others conceal the nature of their employment from husbands and family. A history of impoverishment, rape and physical abuse underlies some women's decisions to take up sex work, but middle class family debts and support obligations might also precipitate sex work for some women (Sedyaningsih- Mamahit, 1999).

FIGURE 2.3.1: INDONESIA – HIV PREVALENCE AMONGST FSWs, 2005–2025



As in most countries, Indonesian society displays an ambivalent attitude to sex work which is considered shameful and sex workers are labelled immoral and in need of rehabilitation. HIV knowledge is low and misinformation is rife amongst sex worker communities. Many sex workers employ ineffective prevention practices such as genital cleansing in the mistaken belief that they are protective measures. Such practices are frequently considered by sex workers and their clients to be more appropriate, more accessible and readily available than condoms. Early HIV preventions programs relied more on persuading women to change their profession than on emphasising safer sex behaviours (Sedyaningsih-Mamahit, 1999).

Research into rates of STIs among sex workers in Central Java found a low rate of condom use, and rates of syphilis infection were high (Sugihantono et al., 2003; see also Basuki et al., 2002). Condom use is low among female, male and transgender sex workers and there is considerable sexual mixing between these groups (Riono and Jazant, 2004) who participate in a variety of sexual and other relationship networks beyond that of commercial sex (Wolffers, Subarniati et al., 1999).

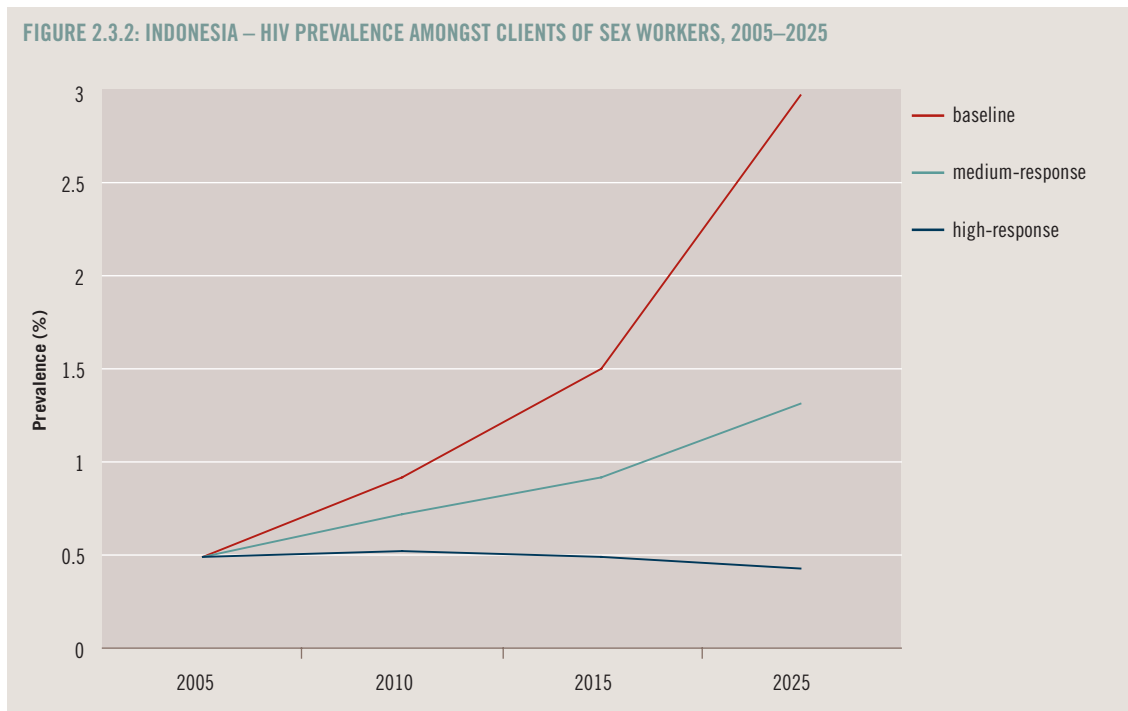
Amongst female sex workers, under the baseline scenario, HIV prevalence increases from 4.18 per

cent to 22.66 per cent. While the prevalence rate rises steeply (from 4 per cent to over 22 per cent) under a baseline response, the trend will reverse almost immediately under a high response scenario to 2.6 per cent amongst sex workers in 2025 (see Figure 2.3.1).

2.3.2 CLIENTS OF SEX WORKERS

The Government of Indonesia estimates there are between 7 to 10 million male clients of sex workers in Indonesia (Gol, 2004) while other sources suggest nearly half of all Indonesian men visit sex workers each year (Utomo & Dharmaputra, 2001). Clearly there is serious potential for HIV transmission through the clients of sex workers. Sailors and truck drivers are common client groups, and are associated with high levels of premarital and extramarital sexual activity and also with relatively low levels of condom use (Sugihantono et al., 2003). Syphilis in combination with frequent unprotected sex with highly mobile men from areas of higher prevalence renders sex workers particularly vulnerable over time to infection from clients. Figure 2.3.2 shows that there will be an increasing HIV prevalence amongst clients of sex workers over the next twenty years,

FIGURE 2.3.2: INDONESIA – HIV PREVALENCE AMONGST CLIENTS OF SEX WORKERS, 2005–2025



which will increase under the baseline scenario from 0.49 per cent to 2.96 per cent in 2025.

Figure 2.3.2 highlights the importance of HIV prevention efforts targeting this group. While clients are generally unwilling to use condoms, higher levels of HIV knowledge in male clients of sex workers are positively associated with condom use (Ford et al., 2002). Under the high response scenario not only will prevalence be cut to one fifth of that under a baseline response, but even shows a downward trend.

2.4 MEN WHO HAVE SEX WITH MEN

Homosexuality, while not a criminal offence, is considered to be a violation of public morality despite traditional tolerance for certain forms of male transgender behaviour such as that of ‘waria’ (Katjasungkana & Wieringa, 2003).

Research shows the diversity of sexual networks in these subpopulations. Like other Asian countries, many men who have sex with men (MSM) also have sex with women. A Jakarta study (Pisani et al., 2004) showed that MSM are not isolated from other heterosexual networks. Risk behaviour is high and sex with women as well as men is common behaviour (Pisani et al., 2004). Eighteen per cent of

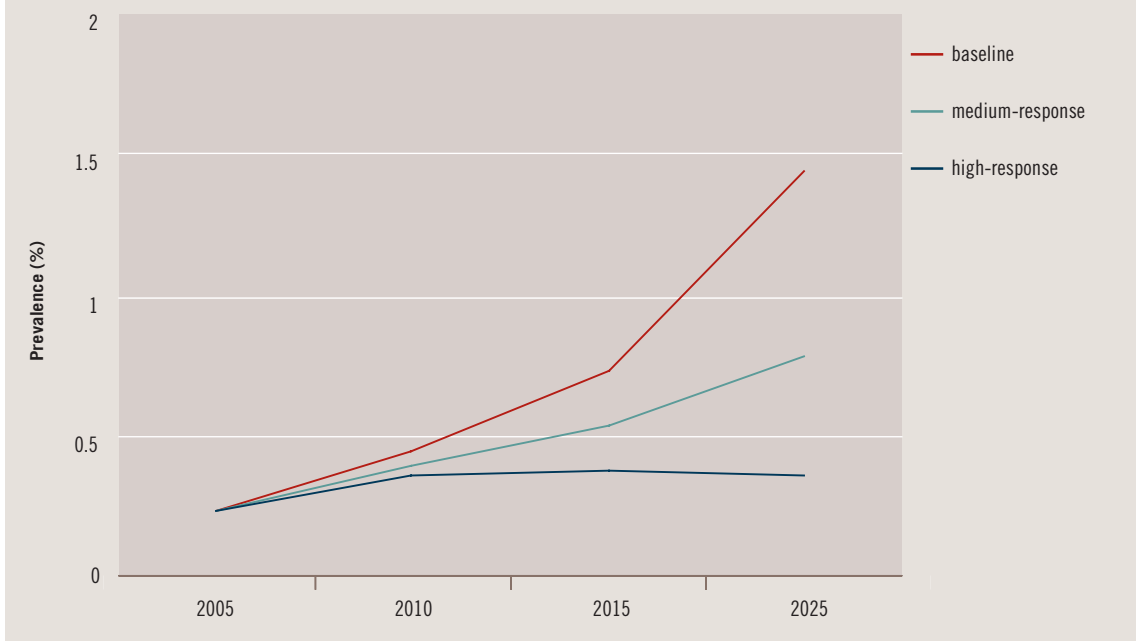
self recognised MSM also had sex with women in the previous 12 months. The bisexual behaviour of these subpopulations implies that HIV infection spread through risky male-male sex will also be passed on into heterosexual networks, contributing to a wider HIV epidemic in Indonesia. Very few sexual health services are available for these populations.

The prevalence of HIV amongst Indonesian men who have sex with men is low, even under the baseline scenario. As Figure 2.3.2 indicates, the rate increases from 0.23 per cent in 2005 to 1.45 per cent in 2025. Given a high response at 2025 the prevalence rate will be less than 0.4 per cent.

While the projected prevalence rate is not high by international standards among this group, HIV may not be contained within this population. However, Figure 2.3.2 indicates that with a high response to HIV the prevalence in this population can be stabilised and even reduced.

However, our data do not distinguish prevalence among transgenders (waria), particularly those who do sex work, from other men who have sex with men. According to recent studies the HIV prevalence was between 6.4 per cent (MAP 2004) and 3.6 per cent among male sex workers (Pisani et al., 2004). In that study syphilis prevalence was 19.3 per cent among

FIGURE 2.4: INDONESIA – HIV PREVALENCE AMONGST MSM, 2005–2025



transgender sex workers. Many male transvestites in Jakarta engage in unprotected receptive anal and oral intercourse with homosexual and bisexual men for pay, putting them clearly at risk. In one study only 12 per cent of waria stated that they consistently used condoms during any sex act.

The baseline scenario will see the highest number of adult deaths, with over 1.2 million by 2025 in the urban centres as indicated in Figure 2.5.2.

However, the nature and size of the epidemic in Indonesia means that under the three scenarios there is no change in the dependency ratio.

2.5 DEMOGRAPHIC IMPACTS

Because Indonesia has such a large population and total prevalence is low, the population pyramid does not skew significantly (see Figure 2.5.).

Furthermore, the nature and size of the epidemic in Indonesia means that there is no change projected in the dependency ratio.

However, the numbers of deaths will be large as illustrated in figures 2.5.1 and 2.5.2 below. Under the baseline scenario, by 2010 over 300,000 people will have died and will rise to nearly 1.5 million people by 2025 (adults & children).

Figure 2.5.1 indicates the difference in the number of lives saved between the baseline and high response scenarios over the course of the next 20 years. The majority of these deaths will be felt in urban centres.

2.5.1 MATERNAL ORPHANS

In Indonesia even though the prevalence rate amongst women is not high, by 2025 an estimated 260,000 women will die under the baseline scenario. There are also an estimated 110,000 maternal orphans by 2025 under the baseline scenario (see Figure 2.5.3), but only a third of that number under the high response scenario.

The consequences of orphaning are without doubt negative to Indonesia's future. The large number of maternal orphans will provide Indonesia with a number of challenges as many of these orphans will be those of sex worker mothers. As sex work is often the last option for some women to provide financial support for children, these children will be particularly vulnerable.

FIGURE 2.5: INDONESIA 2025 POPULATION SIZE WITH AND WITHOUT AIDS (BASELINE SCENARIO, 000s)

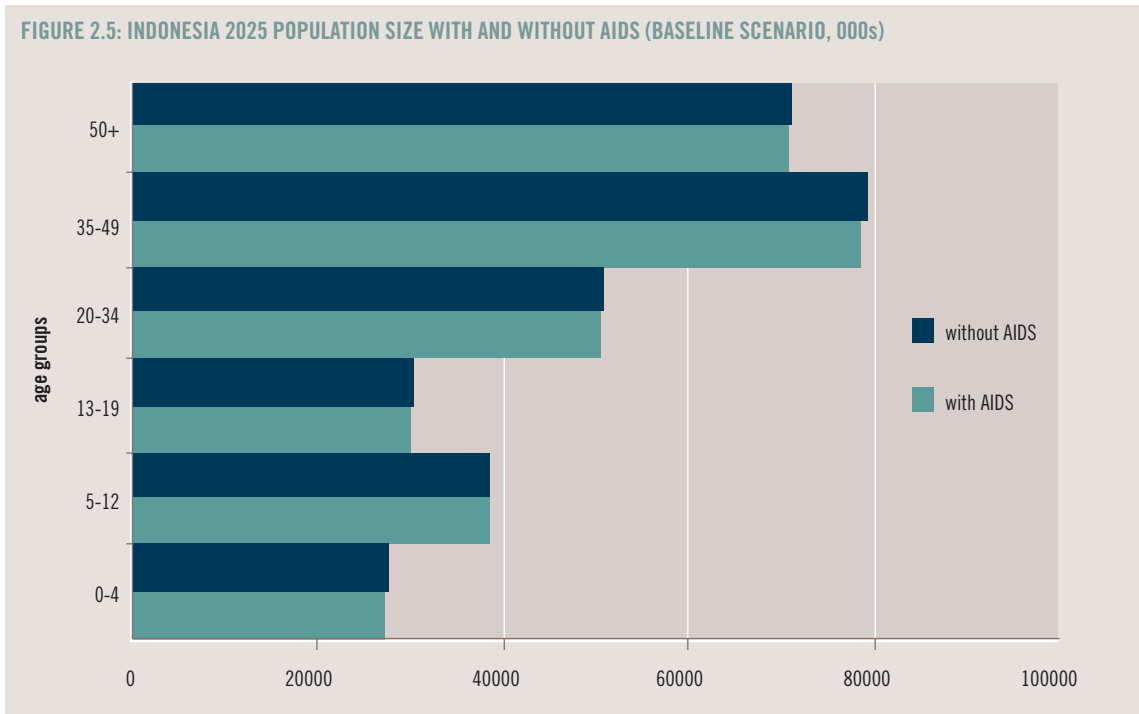


FIGURE 2.5.1: TOTAL NUMBER OF ADULT DEATHS PROJECTED BETWEEN 2005 AND 2025

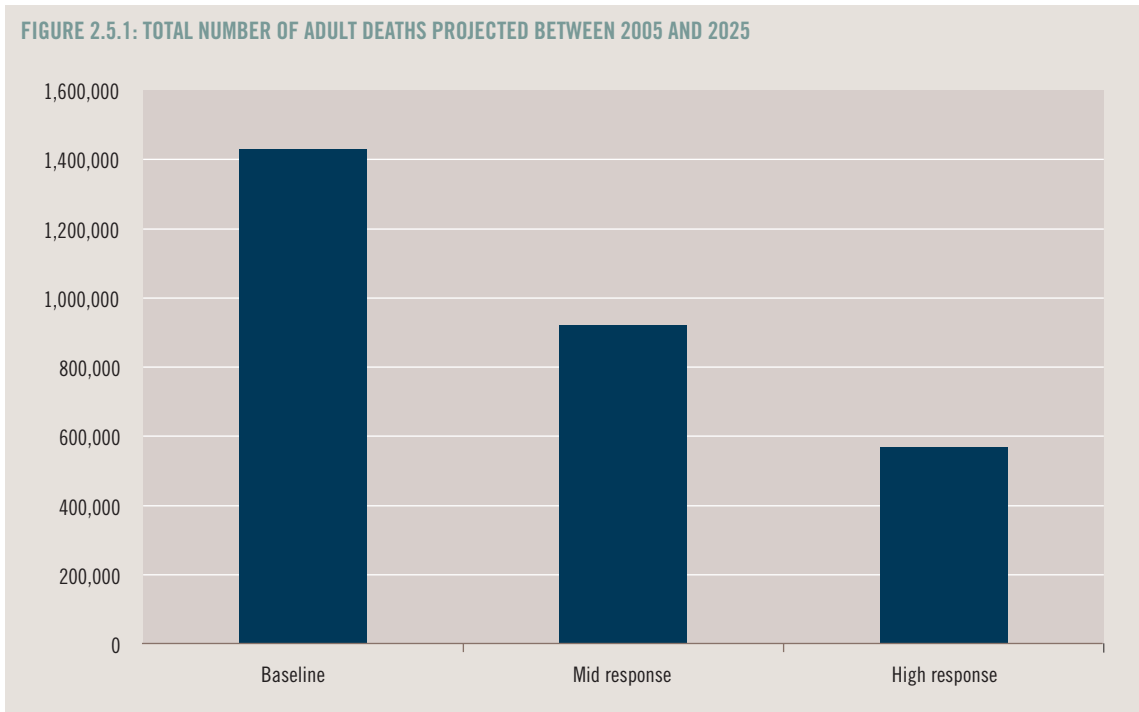


FIGURE 2.5.2: RURAL AND URBAN ADULT DEATHS CUMULATIVE, 2005–2025

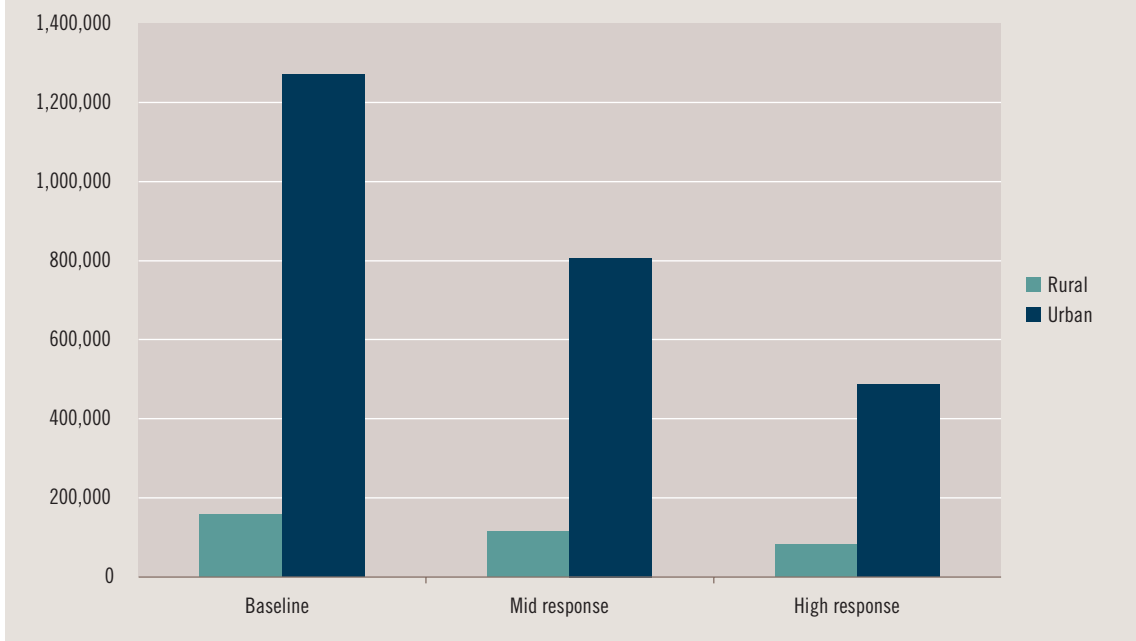
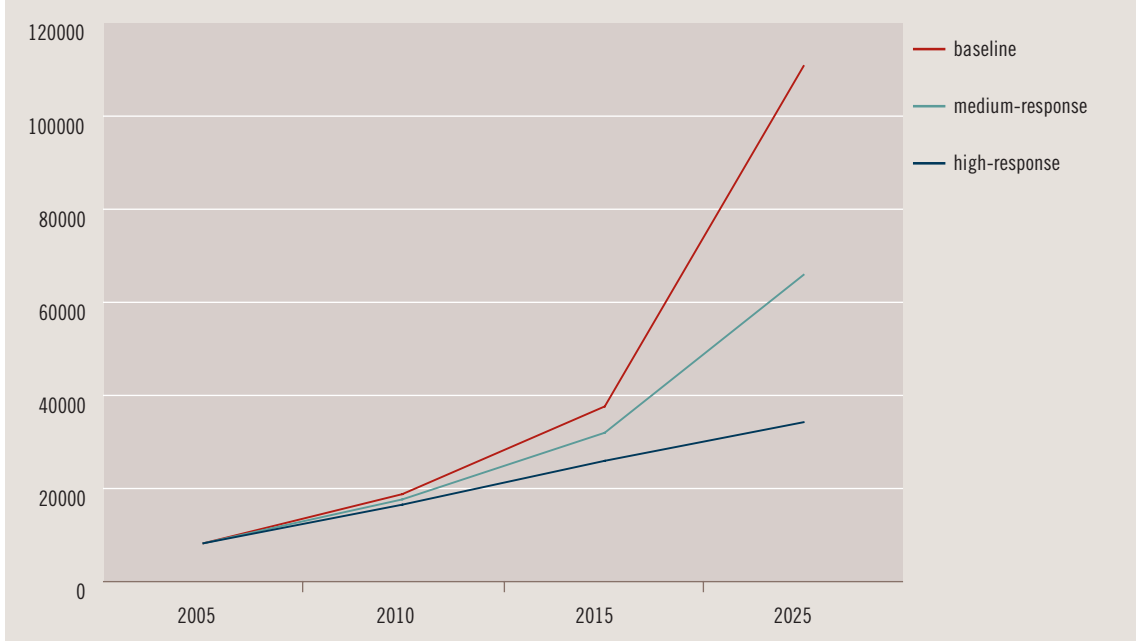


FIGURE 2.5.3: MATERNAL ORPHANS DUE TO AIDS, 2005–2025



2.6 MACROECONOMIC IMPACTS

Given the low HIV prevalence levels projected for Indonesia and the concentration of the epidemic there will be no measurable effect at the macro level. To assess the impact we examine potential reductions in GDP and GDP per capita growth rates and the size of the reduction in the workforce. This analysis is combined with an understanding of the current structure of the economy and why there will be negligible impact at a macro level. This then feeds into understanding the impacts on the individual households affected by AIDS and the health sector.

Indonesia is the fourth most populous country in the world, and such size brings social and economic diversity. Economic conditions and poverty vary between the regions, with the concentration of wealth in Sumatra, Java and Bali. In the eastern provinces development over the last decades has been slow (GoI 2004).

Between 2002 and 2005 the proportion of the population living below the national poverty line has fluctuated between 18 per cent and 15 per cent, with 16.6 per cent the most recent figure for 2004 (GoI 2004; Statistics Indonesia 2005). The national poverty line is defined at USD1.5 per day (World Bank, 2004). In 2002, only 7 per cent of the population lived on less than \$1 a day, but over 110 million people (54 per cent of population) lived on

less than \$2 a day, dropping only slightly in 2003 to 53 per cent (World Bank, 2004).

Most of these poor live in rural areas (78 per cent) and 68 per cent of poor householders derive their income from farming or agricultural work. However, only 50 per cent of this income is from farming and 8 per cent from agricultural wage work. Therefore off-farm rural income is becoming a more important income source. The urban poor comprise 22 per cent of the poor, for them poverty is based on unemployment.

2.6.1 THE POTENTIAL IMPACT OF HIV ON GDP AND GDP PER CAPITA

Since the impact of the Asian economic crisis the economy has returned to modest growth, but poverty levels remain a challenge.

TABLE 2.6.2: GDP GROWTH RATE

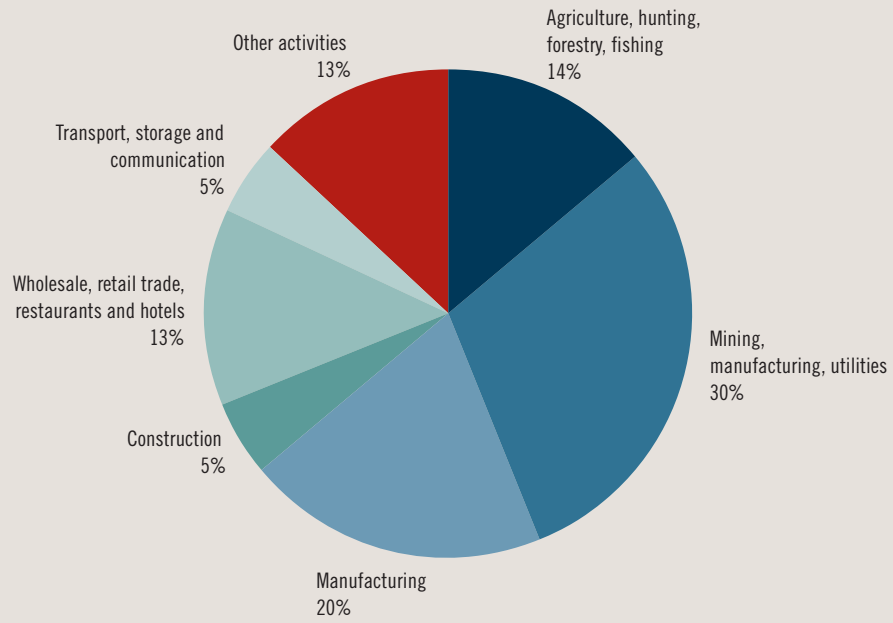
Period	Rate per cent
1998	-13.1
1999	0.8
2000	4.9
2001	3.4
2002	3.7
2003	4.1

United Nations 2005

TABLE 2.6.1: CURRENT ECONOMIC INDICATORS

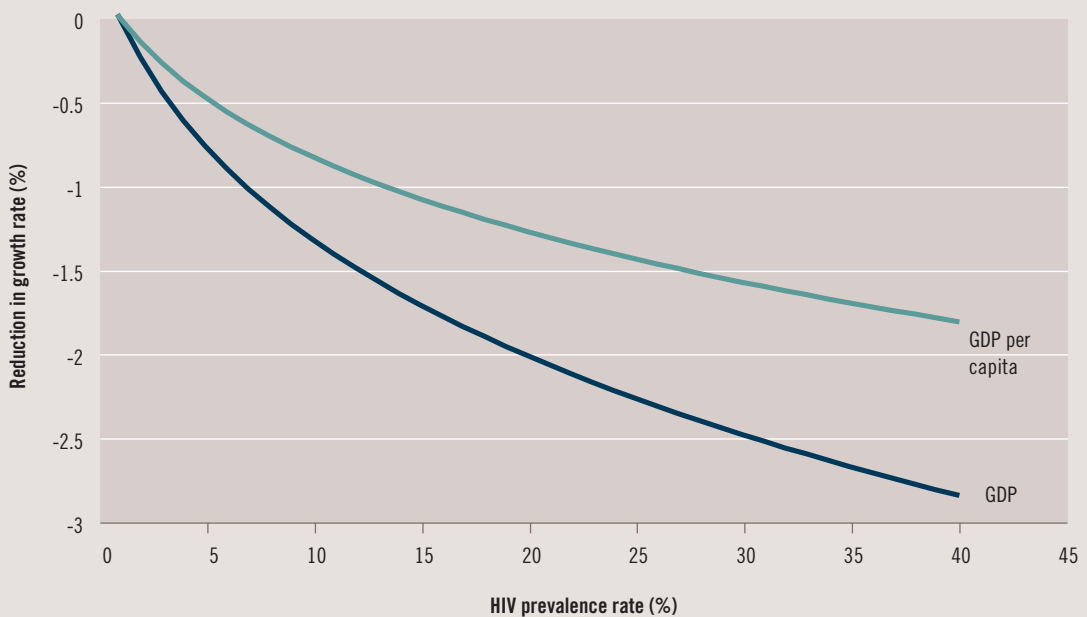
Workforce characteristics	Currently available data	Source
Labour force participation	65 per cent	Statistics Indonesia 2003
Unemployment	National unemployment is 9.6 per cent, rising to 14.86 per cent for Jakarta.	Statistics Indonesia 2005
Rural		
Percentage living in rural areas	56 per cent	
Poverty and inequality		
Percentage below the poverty line	16.6 per cent	GoI 2004
Gini index	30	UNDP 2005
GDP per capita (US)	817	UNDP 2005

FIGURE 2.6.1: GDP BY ECONOMIC ACTIVITY – PERCENTAGE DISTRIBUTION



United Nations, 2005

FIGURE 2.6.2: GDP AND GDP PER CAPITA REDUCTION IN GROWTH RATE, INDONESIA



International Labour Office, 2004

Figure 2.6.1 illustrates the relative diversification of the Indonesian economy with mining and utilities the major contributors to GDP.

Will HIV have an impact on Indonesia’s GDP growth rates? To measure the potential impact of HIV on GDP and GDP per capita this analysis employs the modelling tool developed by the International Labour Organisation (2004). Based on analysis of 41 countries, the tool measures the reduction in growth of GDP and GDP per capita given levels of HIV prevalence. Figure 2.6.2 indicates that the impact on the growth of GDP and GDP per capita is not felt until the prevalence rate climbs above 2 per cent and with only minimal impact until prevalence reaches above 4 per cent. As Indonesia’s HIV prevalence is projected to climb to 1 per cent in 2024, we can conclude that there is no measurable impact on GDP or GDP per capita within this time frame.

While there is no measurable impact on GDP or GDP per capita, there will be millions of households affected. It is projected that there will be close to one and half million adult deaths under the baseline scenario by 2025.

2.6.2 THE IMPACT OF HIV ON THE WORKFORCE

A key determinant to the macroeconomic impact is the degree to which the workforce will be affected and the location of the workforce that is impacted. In Indonesia, HIV is and will likely remain predominantly urban, and concentrated amongst IDUs and sex workers.

Table 2.6.3 illustrates the potential loss of workforce against a no AIDS baseline.

TABLE 2.6.3: REDUCTION IN THE SIZE OF THE WORKFORCE IN THE ABSENCE OF HIV

	Baseline	Mid response	High response
2010	0.2 per cent	0.2 per cent	0.2 per cent
2015	0.3 per cent	0.3 per cent	0.2 per cent
2025	1.0 per cent	0.6 per cent	0.3 per cent

It is difficult to predict how the loss of these urban adults will translate into any macroeconomic impact given the overall prevalence is low, the epidemic is concentrated in urban areas, and about 30 per cent of current GDP is derived from mining activities which employs relatively few (see Figure 2.6.3).

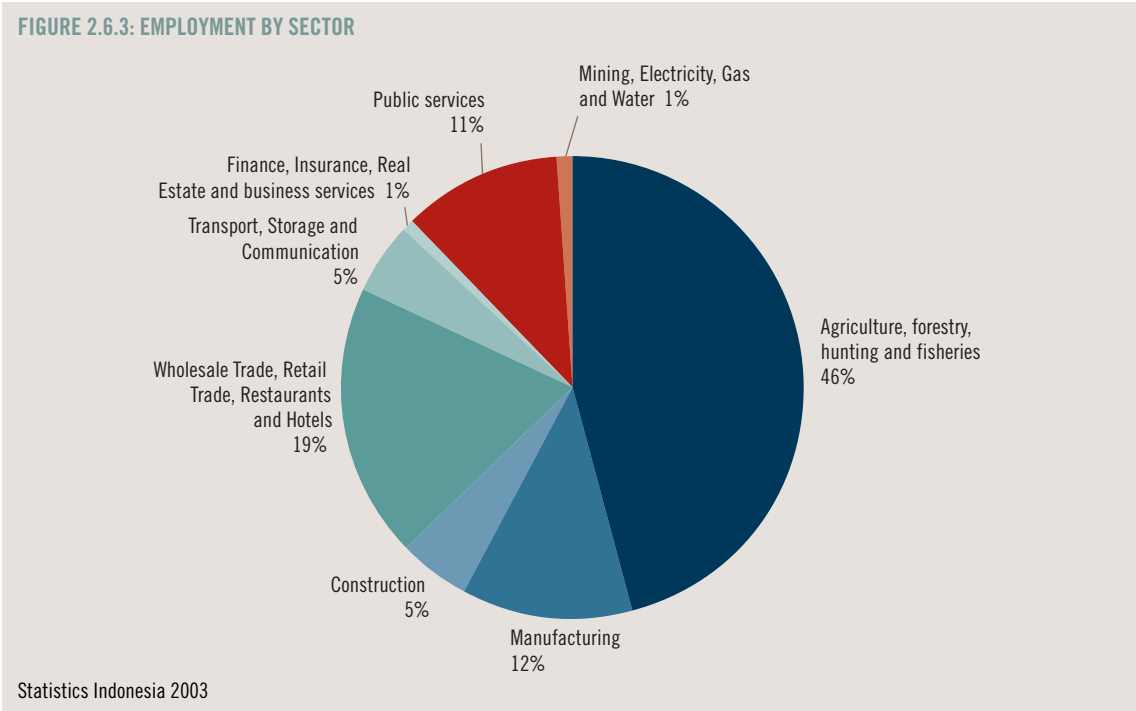


Figure 2.6.3 indicates that the mining sector (including electricity, gas and water) employs about 1 per cent of the total population. We would expect the sectors concentrated in urban centres to be more affected by the potential loss of workers due to AIDS. However, with high levels of unemployment in urban areas (15 per cent for Jakarta), replacement of workers is unlikely to translate into higher wages (Statistics Indonesia 2005).

Firms with employees who become HIV positive may see a reduction in productivity as staff become ill, and increased training and recruitment costs when HIV positive workers leave.

As discussed above, although the relative numbers of deaths of workers is not sufficiently significant to have any macroeconomic impact, the absolute numbers of workers is significant. Figure 2.6.4 illustrates the difference in number of adults from 2010 to 2025 under the no AIDS, baseline and mid and high response scenarios.

The difference between the size of the workforce if AIDS had not occurred and the baseline scenario is minimal – with less than 1 per cent difference projected in 2025. However in absolute terms this represents over 900,000 lives that could be saved if the high response scenario was brought to bear.

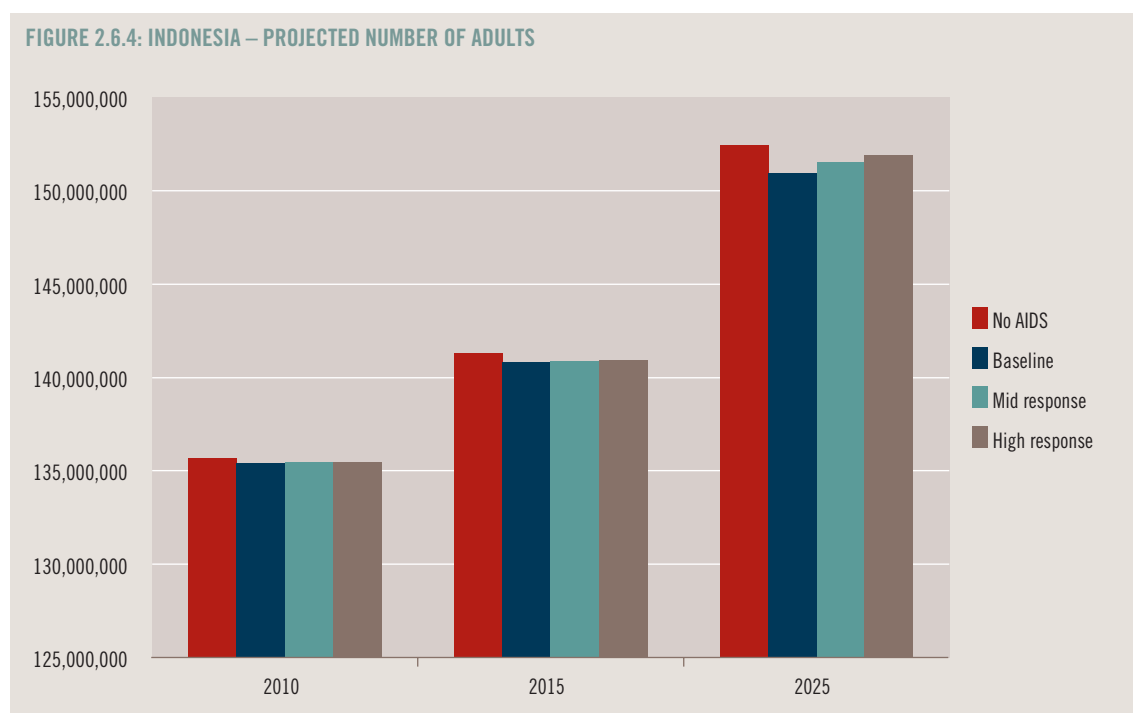
2.7 EDUCATION

Education standards are relatively high in Indonesia in general. The literacy rate in Indonesia (defined as proportion of the people aged 15 years or over who are able to read and write) was 89 per cent in 2002. Indonesians have 7.0 mean years of schooling, and school participation rate for the primary students is around 96 per cent, 79 per cent for the 13-15 age group, and 49 per cent for the 16-18 age group (UN Economic and Social Council, 2004).

The low prevalence of HIV means that, in general, children's education will not be significantly disrupted, nor will significant numbers of teachers fall ill from HIV or die from AIDS-related conditions. However, for the children of marginalised groups continued school attendance may become a real issue. Given that these children are from extremely poor backgrounds they may become street children with the attendant social problems that entails.

2.8 HOUSEHOLDS

Increasing health costs for Indonesian households' affected by HIV and AIDS will put them under significant financial strain. While Russell (2004) found that direct costs of HIV and AIDS borne



by households was between 50–100 per cent of household income, the size of this expenditure is determined by factors including the availability of free health services. In Indonesia health expenditure is predominantly borne by the individual – with 36 per cent of health expenditure covered by the Government, but 64 per cent of health expenditure covered privately. Over 79 per cent of that private expenditure is direct out-of-pocket expenses, as opposed to insurance coverage (WHO, 2004b). This indicates that the health related financial burden will be borne by households. Where this may vary is with the introduction of the Health Care Assurance for the Underprivileged Program, where 36.1 million poor and underprivileged Indonesians will have access to free health care (where actually accessible). Furthermore, the Ministry of Health is committed to partially subsidising the cost of ART. The difference between the full cost and the subsidy may be further subsidised by individual provincial governments (WHO 2004c).

The indirect costs to households will have large and long-term detrimental impacts. It is at the household level that the real costs of the disease will be borne and it is here that the state and multilateral agencies have difficulty in responding because the scale is too small and the variability too great (Barnett and Whiteside 2002). With more men infected, pressure to support the family will shift to the women.

2.9 HEALTH SECTOR IMPACTS⁶

Over the 1998 to 2004 period, health expenditure has fluctuated between 3 per cent and 8.6 per cent of the total national income and expenditure budget. In 2004, it was estimated at 7.7 per cent (GoI 2005). Utilisation of modern health care has been affected by the process of fiscal decentralisation beginning in 2001 where both authority and resources were transferred from national to local government for 11 sectors, including health. The health system is now highly decentralised and provincial and district

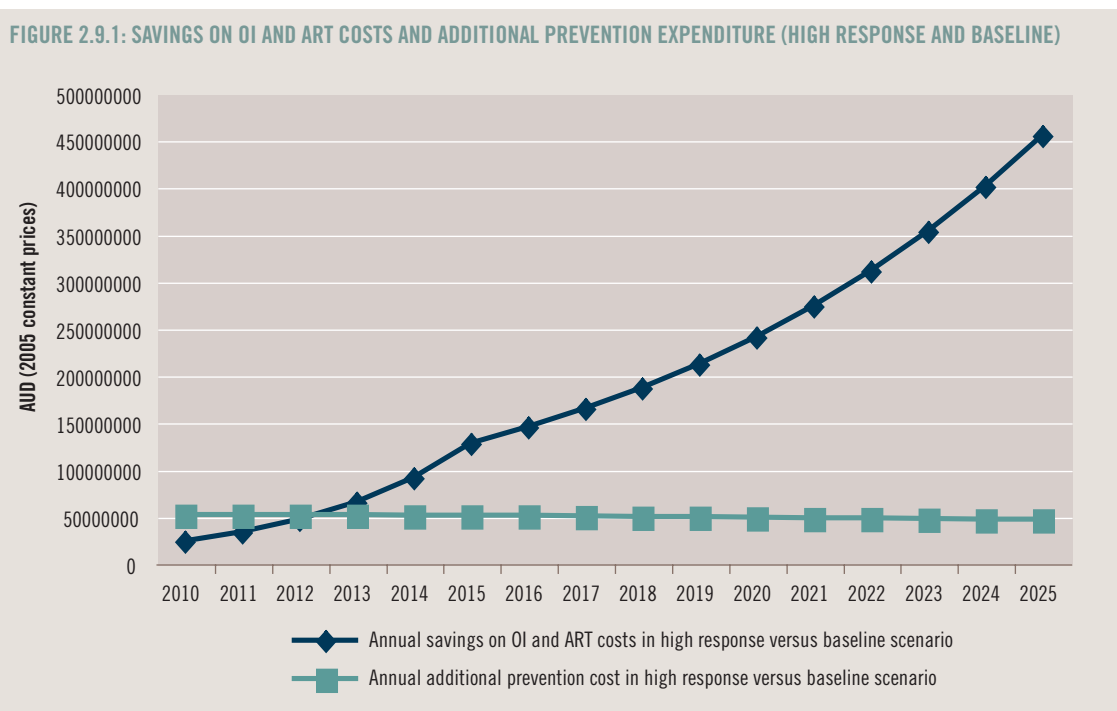
health services are determining priorities. As a result local initiatives exist for responding to HIV, including small scale programs targeting injecting drug users and sex workers, but coverage is inadequate. Most antiretroviral drugs are not available outside Jakarta, while future supply is expected to rely on local production (WHO 2004c). These features of the Indonesian health system may hamper abilities to scale up the response to HIV.

In 2005–06 HIV and AIDS expenditure represents about 10 per cent of the total national expenditure on health (McKay and Warner 2005). However, provincial expenditure is not included in the estimate of the proportion spent on HIV and AIDS. It is hard to predict the strain to the health sector due to the impact of HIV and AIDS. However, using a number of assumptions, we examine the potential increased costs required to enact a prevention high response and potential savings gained because there are less people requiring opportunistic infection (OI) treatment and ART under a high response scenario. Under the baseline scenario by 2025 OI treatment and care costs rise to AUD135 million, and ART costs rise to over AUD400 million.⁷ As expected these costs are considerably lower under the high response scenario. The difference between expenditure *estimates* for a high response to prevention and baseline response are significant – about AUD50 million per annum. Figure 2.9.1 indicates annual increased expenditure above the baseline scenario for high response to prevention and annual savings on OI and ART costs (see Appendix 7 for expenditure and analysis with lower ART coverage levels).

The early stage of the epidemic means potential additional prevention costs are above the projected OI and ART costs. However, in less than 10 years time OI and ART savings are above the additional prevention investments. Further, the additional prevention expenditure curve begins to decline as prevalence also declines.

⁶ See Appendix 2 for details on inclusion and potential future changes to cost components of the HIV/AIDS budget; see Appendix 6 for details on how the HIV/AIDS budget calculations link to the epidemiological model and see Appendix 3 technical notes for calculations, unit costs and access to health care analysis.

⁷ All in 2005 prices.



Thus long-term financial impacts on the health sector will be driven by the number of people living with HIV and AIDS. For Indonesia, the baseline scenario projects that by 2025 there will be over 362,000 with late stage HIV and over 103,000 with AIDS, with the vast majority in urban areas (325,000 with late stage HIV and 93,000 with AIDS). This will result in increased demand for health services as people seek treatment and care. The following sections will focus on assessing the impact under the baseline scenario, with comparisons to the mid and high response.

2.9.1 IMPACTS ON MEDICAL STAFF UNDER THE BASELINE SCENARIO

Current estimates indicate that there are 16 doctors and 43 nurses per 100,000 across Indonesia

(WHO, 2004d). To illustrate the impact of increased demand on medical staff the following table contains number of doctors and nurses, held constant for the projections and the growing number of people seeking treatment and care.

Demands on doctors and nurses from the number of people seeking treatment and care increase over the 20 year period. Doctor to patient ratios climb from 1 to 1.4 in 2005 to 1 to 10 by 2025, putting considerable pressure on the health system. How the health system might respond to these increases is unknown, but it certainly could result in lower health outcomes as staff struggle to cope with increased demands. Many in Indonesia are already struggling to access health care, especially the poor in more remote and border areas of the country.

TABLE 2.9.1: BASELINE SCENARIO – DOCTORS, NURSES AND NUMBERS OF PEOPLE NEEDING OI TREATMENT AND CARE

	2005	2010	2015	2025
Baseline number of doctors	38,000	40,600	43,000	47,000
Baseline number of nurses	102,000	109,000	115,700	127,500
Baseline number of people needing treatment and care for OIs	54,000	112,500	203,200	465,000

2.9.2 INCREASING DEMANDS ON THE HEALTH SECTOR

The health sector will be placed under pressure as the number of people seeking treatment for opportunistic infection rises in the next 20 years.

By 2025 over 400,000 people will be seeking treatment and care for opportunistic infections under the baseline scenario. The decline in HIV prevalence in the high response scenario by 2025 significantly reduces the number of people needing treatment and care.

Although the national rate of access to OI care and treatment is estimated at 79 per cent, health indicators show that basic health interventions are not reaching the poor – only 21 per cent of the poorest women are delivered with a trained attendant compared with 89 per cent amongst the wealthiest (Gwatkin et al cited in WHO 2003). (See Tables 3 and 4 in Introduction Section for further health indicators). Lack of access, caused by costs, distance and transportation is a significant contributor to this health status disparity. In an attempt to address this, the government recently introduced the Health Care Assurance for the Underprivileged Program, where the government will pay the costs for free access to treatment. 36.1 million poor and

underprivileged Indonesians now have access to a free health care scheme, where the government will pay the costs for their free access to treatment and supplies in hospitals and community health facilities. Up until the introduction of this scheme all health care facilities operated on a user pays system (Shields and Hartarti 2003). This point is returned to in discussion on the impact of medical costs for households.

2.9.3 IMPACT ON HOSPITAL BEDS

Hospital beds will begin to be taken by an increasing number of AIDS patients. Excluding Papua, there are over 62,000 hospital beds in Ministry of Health and provincial government hospitals. Literature suggests people living with AIDS may have a hospital stay of about 30 days (ADB and UNAIDS, 2004; Wai, Pale et al. 2005). Assuming there are no future hospital capital works projects or any reductions in the number of hospital beds in the country in the next 20 years, the following graph illustrates the projected impact of people with AIDS seeking inpatient care and hospital medical beds. This projected analysis uses Ministry of Health and Local Government hospital medical beds and excludes military, private and state-owned corporation hospital beds.

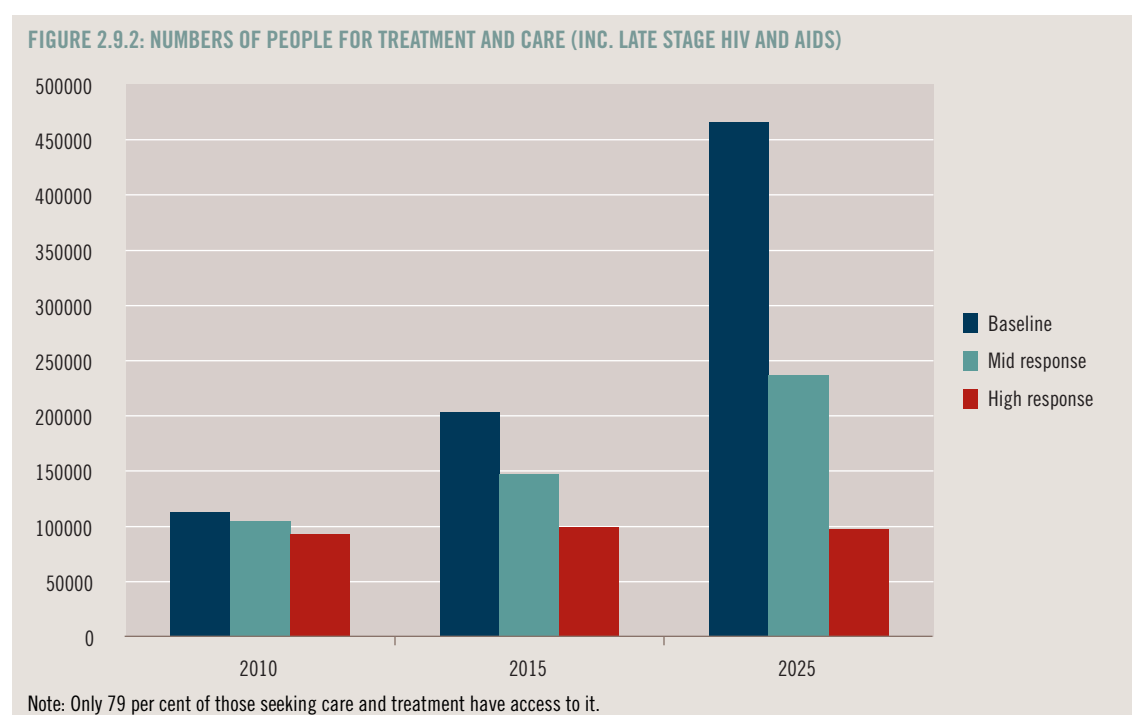


FIGURE 2.9.3: IMPACT ON HOSPITAL MEDICAL BED CAPACITY OVER THE NEXT 20 YEARS

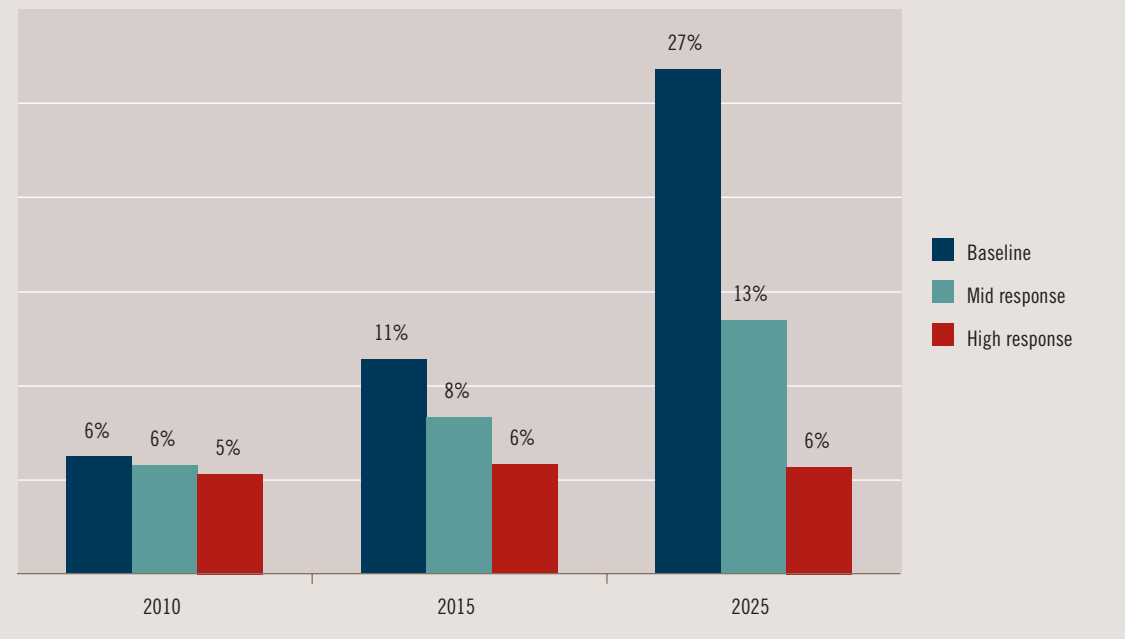


FIGURE 2.9.4: PROJECTED OPPORTUNISTIC INFECTION TREATMENT AND CARE COSTS

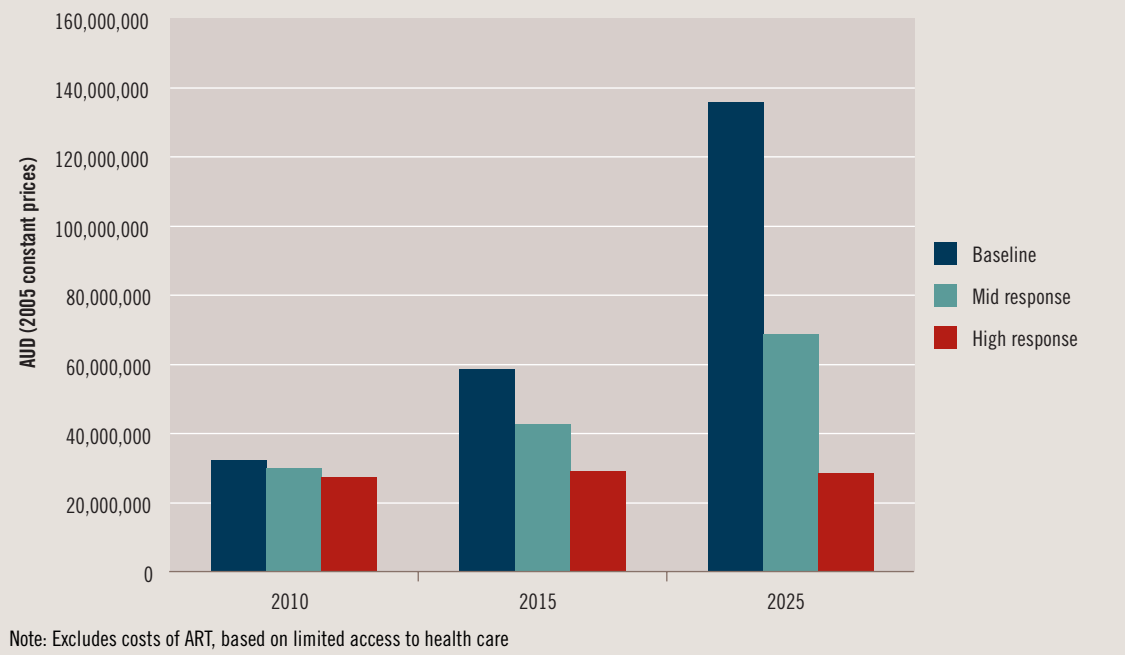


Figure 2.9.3 shows that under the baseline scenario, in 20 years an estimated 27 per cent of all hospital medical beds will be occupied by people AIDS.

2.9.4 HEALTH EXPENDITURE DUE TO HIV AND AIDS

Figure 2.9.4 illustrates the comparative costs of treatment and care for those with opportunistic infections between the three scenarios. Policy makers need to consider the implications of the increasing costs of this element of HIV expenditure as it will continue to rise as the number of people infected with HIV also rises.

Figure 2.9.4 illustrates the rising costs of caring for people as more people seek care in the later stages of HIV and AIDS under the baseline scenario. The baseline scenario costs four times the high response scenario by 2025, at over AUD 130 million. Given difficulties in determining accurate unit costs, the costs provided here should only be taken as indicative, and are provided as a means of alerting the health system of the costs associated with HIV and AIDS (see Appendix 3, technical notes for details).

2.9.5 ANTIRETROVIRAL TREATMENT POTENTIAL FINANCIAL IMPACTS

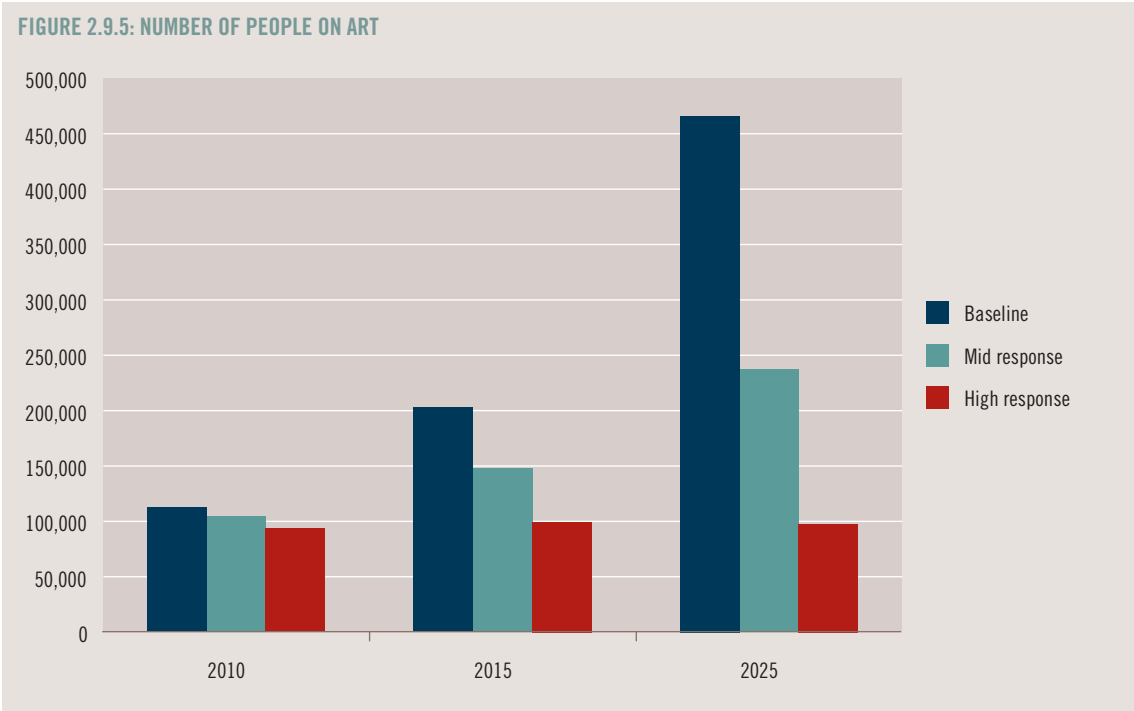
As the epidemic is relatively contained, here we assume 100 per cent of all late stage HIV and AIDS received treatment across the scenarios. For costs of treating less people see Appendix 7.

By 2025 in Indonesia, the effect of the increased prevention effort is starkly illustrated in the difference between the baseline and high response scenarios in the number of people needing antiretroviral therapy (Figure 2.9.5). The table below illustrates the potential costs associated with these levels of treatment provision.

TABLE 2.9.2: ESTIMATED COSTS OF ART FOR ALL OF THOSE WITH LATE STAGE HIV

AUD– 2005 prices	2010	2015	2025
Baseline	106,100,000	191,600,000	439,300,000
Mid response	98,300,000	139,190,000	223,400,000
High response	87,890,000	93,800,000	92,000,000

The table of potential ART costs demonstrates that increased prevention efforts can save future ART costs: If treatment regimes are available for 100



per cent of late stage HIV and AIDS from 2010 through to 2025, by 2025 the high response scenario represents a saving above the cost of the baseline response of AUD 347 million (see Appendix 3 technical notes for details; see Appendix 2 for details on how costs may vary; see Appendix 7 for costs of ART if less people are offered treatment).

2.9.6 HIV PREVENTION COSTS

Scaling up prevention efforts to affect a change in the course of the HIV epidemic requires additional resources. Here we examine the potential order of magnitude of those resources required to scale up a prevention response (details are available in Appendix 3 technical notes and Appendix 2).

The total baseline, mid and high response projections are shown in Table 2.9.3.

The prevention expenditure estimated here essentially focuses on costs associated with targeted programs. Given the size of the population in Indonesia, once costs associated with wide scale community programming are included, costs rise substantially. This provides further argument for policy makers to focus now on curbing the epidemic while it remains concentrated, thus allowing prevention expenditure to be mainly contained to targeted groups. These prevention budget estimates include:

- > PMTCT
- > Voluntary counselling and testing
- > Community education, workplace and youth mobilisation
- > Sex worker targeted programs – STI treatment, condom distribution and peer education and marketing programs.

- > Condoms (focusing on targeted programs for MSM with limited general programming) and
- > IDU programs.

Between 2010 and 2025 an estimated additional AUD50 million per annum is required to enact the high response scenario above the baseline. The scaling up of the response requires a change of emphasis in the prevention budget for the mid and high response from the baseline.

These changes include:

- > Increased expenditure on targeting sex workers (including STI treatment, condoms and peer outreach),
- > Increased expenditure on VCT,
- > Increases in community education,
- > Increases in condom distribution for MSM, and
- > Increases in coverage of programs for injecting drug users.

This analysis shows that a high response prevention scenario is an alternative. However, it comes not only at a cost but is dependent on appropriate policy responses, political support and social change. If change is enacted now policy makers can not only limit future treatment and care costs, but can also contain future prevention expenditure required once the epidemic becomes generalised.

2.10 GENDER RELATIONS AND HIV

Indonesian women are vulnerable to HIV for a variety of reasons. Existing social, religious and cultural norms recognize men as the head of the family and breadwinner. Early marital age, and restrictions on women's entitlement to divorce, ownership and inheritance of land, and access

TABLE 2.9.3: TOTAL PREVENTION BUDGET ESTIMATES

AUD 2005 prices	2005*	2010	2015	2025
Baseline	28,175,000	51,500,000	58,600,000	75,600,000
Mid response		77,280,000	87,800,000	102,990,000
High response		102,900,000	109,400,000	121,900,000

Notes: Excludes blood safety and any methadone programs. Includes some cost elements associated with general condom distribution. Includes community and workplace education and youth mobilisation proportional, with 10 per cent increase for mid and high response. *(McKay and Warner, 2005). All these figures should be seen as indicative only.

to loans and credits are also factors that increase women's vulnerability to HIV transmission. There is an absence of data on certain issues that are crucial to the well-being of women, such as the prevalence of violence against women.

Within the domestic sphere, women have reduced choices about matters relating to their sexual and reproductive health (Katjasungkana & Wieringa, 2003). Although women have benefited from some targeted reproductive health programs, including family planning, high maternal mortality remains. Abortion is illegal, is therefore often performed under unsafe conditions and is estimated to contribute around 15 to 30 per cent of the country's maternal deaths.

Cultural taboos inhibit communication about sex and underwrite what Indonesian sexologist Dr Whimpie Pangkahila (cited in Bennett, 2000) has called a 'culture of shame' which contributes significantly to the reluctance of Indonesian women, particularly those who are unmarried, to access reproductive and sexual health services (Bennett, 2000). Sex outside marriage and alternative sexualities or sexual practices are proscribed. Open discussion about condoms has been more inhibited than discussion about other traditional prevention practices (Sedyaningsih- Mamahit, 1999).

As wives, mothers and daughters, women also have a social obligation to contribute to household economies (Surtees, 2003). High unemployment rates among women, particularly those from female-headed households, wage disparities between female and male workers and job-segregation in the workforce exist in Indonesia, as elsewhere. The economic squeeze on households from lost income will exert added pressure on female family members.

Generally over the next ten years there will continue to be low HIV prevalence amongst women (0.44 per cent). However, over 332,000 women will be infected with HIV by 2025 under the baseline scenario, with approximately one third of these (134,000) infected through sex work or injecting drugs. This leaves a large number of HIV positive women outside so called 'risk group' populations. These data point to two important education targets amongst women: first, sex workers and drug injectors as discussed

above (Figures 2.2, 2.3) and second, the much broader target of women in the general population.

2.11 MIGRATION

Indonesia has become one of the world's major sources of unskilled migrants (Hugo, 2001). Migration for work, to cities, mining areas and overseas, has long been a necessary economic strategy for Indonesians (Surtees, 2003), and labour export extends back to colonial times (Hugo, 2001). In recent decades there has been not only a dramatic increase in Indonesian overseas migration for work but also a marked feminization of migration (Surtees, 2003). Migrant vulnerabilities, including those to HIV infection, may be exacerbated by their disenfranchisement in the country of destination.

There is little data on temporary labour migration within Indonesia but a 2001 study (Hugo) indicates that Indonesians' high level of mobility by international standards is increasing. Mobile workers are predominantly young male adults but women's migration has increased substantially in past decades (Hugo, 2001). Indonesia's rapid urbanisation and a sharp increase over the last 15 years in the number of young women moving to cities for factory work locates them as a potentially vulnerable group for HIV (Hugo, 2001).

The types of labour migration in Indonesia implicated in the spread of HIV infection are: migration to mines plantations and other areas of natural resource exploitation; rural to urban labour migration; the transfer of civil servants; and migration to particular border locations (Hugo, 2001). Workers with itinerant jobs such as fishermen, seafarers, seaport workers, transport workers and traders are also at elevated risk of infection. In Indonesia sex workers themselves frequently constitute a migrant labour population (e.g. to East Timor). Increasing rates of HIV would also be expected to result in increased rates of return migration as people seek access to family care in sickness. Increased risk is associated with young male adults in particular who are released from family and community strictures and who use the services of sex workers. The literature relating population mobility to the spread of HIV shows

that the relationship between mobile groups and the commercial sex industry is crucial, and sites associated with concentrations of both are to be considered 'hotspots' (Hugo, 2001).

Increasing HIV prevalence will impact on levels of both legal and illegal migration in that it offers a potential solution to income reduction and greater financial need for those millions of families and households affected. As well, literature indicates that refugee populations are also at high risk of HIV infection. Indonesia has a high number of internally displaced people, particularly since the tsunami, and this may have implications for the spread of HIV.

2.12 GOVERNANCE, CONFLICT AND SECURITY IMPACTS

2.12.1 INTERNAL CONFLICT

While major infrastructural and state service advancements have been achieved since independence, the Indonesian state has been highly centralised, with democratic institutions and state services not delivered equitably or adequately on the margins (Wilson, 2001). Recent decentralisation has the potential to address these challenges, although decentralisation has also brought its own series of problems and conflicts.

While it is not expected that defence force personnel in Indonesia have a higher prevalence of HIV than the general civilian population, there are reports of sexual violence by serving men as well as the simple fact that they are, on the whole, young and away from the social constraints of their families. This may place them at higher risk of HIV. Papua aside, projected rates of HIV should not be expected to have a marked impact on the nature of internal security issues, however. The bulk of the impact with regard to conflict in Indonesia will be that of the impact of conflict on aggravating HIV vulnerability, rather than HIV as a cause or contributor to conflict. Internal conflict may have exacerbated vulnerabilities to HIV.

2.13 CONCLUSION – INDONESIA

If the current response to HIV prevails, Indonesia will be facing a generalised epidemic by 2025. The majority of people infected will be urban and male. Governments and households will be faced with increasing care and treatment costs, and the rising demands on the health sector will place the system under pressure.

The greatest social and economic impacts will be felt at the household level. Health care costs will rise, and the structure of affected households will alter as male breadwinners become ill and die. Women will be put under considerable pressure, both in terms of caring for their families and financial pressure to support their households. The growing impact of HIV may lead more women into sex work or to migrate in search of employment.

The governance and security impacts of HIV will mostly be felt at community level. Given that the most vulnerable groups will be injecting drug users and sex workers, there is a risk of increasing stigmatisation and discrimination against these groups as the epidemic grows.

Alternatives exist. The high response scenario outlined here suggests that with the appropriate political support, legislative and policy changes, and the financial resources, the HIV epidemic in Indonesia can be halted. The shifts associated with halting the epidemic rely on a policy environment that allows increasing support for injecting drug users through the supply of clean needles, and increasing prevention programs targeting sex workers. To make an impact on the epidemic these targeted programs need to operate across Indonesia and move beyond small scale and ad hoc to wider coverage in the areas most needed.

3 The social and economic impact of HIV in Papua, Indonesia 2005–2025

3.1 INTRODUCTION

As noted above Papua has been presented within its own section because the epidemiology of the HIV epidemic and related risk factors are so markedly different from the rest of Indonesia.

There are over 250 linguistically distinct cultural groups in Papua, including isolated, nomadic, forest dwelling tribes of the interior of the province as well as people from the northern and southern shores where coastal trading, intermarriage and migration has occurred since the 17th century. As a part of the Suharto New Order regime and in response to the high population growth in other regions of Indonesia, there was a large transmigration to Papua.

While Papua is extremely resource rich, poverty is endemic; it was ranked the second lowest in the Indonesian Human Development Index of 2004. This is despite its GRDP being ranked the fourth highest in Indonesia based upon income from the trading of its rich natural resources (oil, mining, and forestry). Health services need boosting and on many health indicators those in Papua are worse off than in other parts of Indonesia. Programmatic responses to HIV in Papua have been primarily impeded by the lack of health system infrastructure. The level of sexual violence amongst indigenous Papuans is a particular concern.

These factors all point to the possibility of an explosive HIV epidemic in Papua. Our epidemiological projections see HIV prevalence

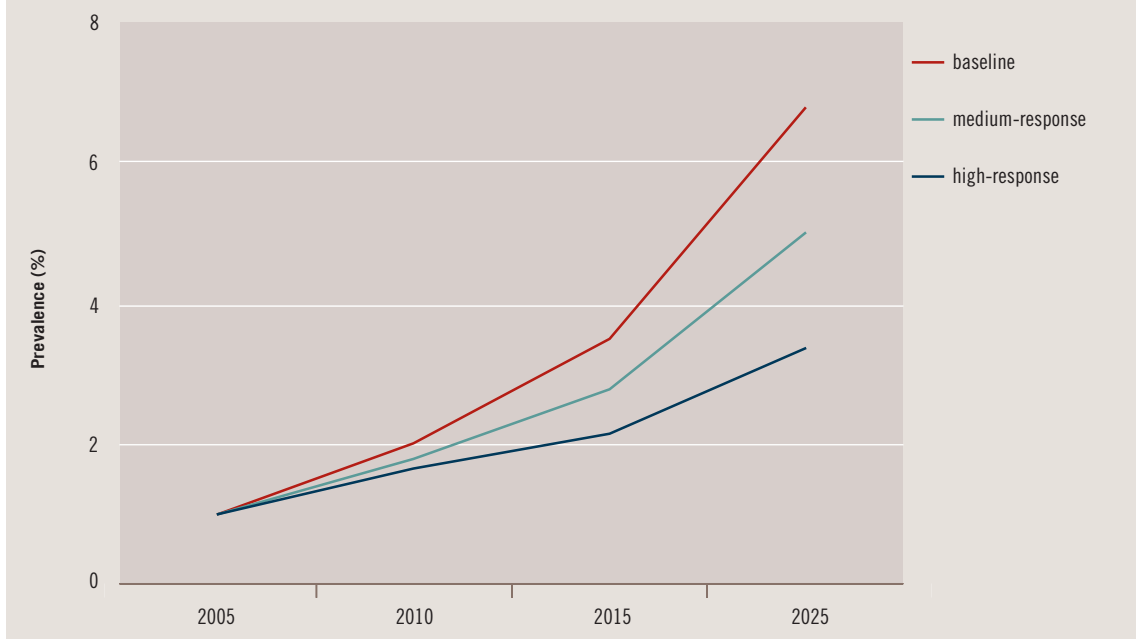
increasing throughout the province. HIV will impact most strongly at the level of Papua community and political life, taking a toll on women, men and young people. Indigenous Papuans face specific HIV-related risks, and HIV intervention efforts have been notably unsuccessful in reaching this group (Butt et al., 2002a). A lack of information rather than a lack of willingness may be the biggest barrier to effective HIV prevention among indigenous Papuans.

3.2 HIV PREVALENCE IN PAPUA 2005–2025

Increasing HIV prevalence in Papua will impact on individuals, families, and communities. By 2025 the overall prevalence rate will be 3.61 per cent. However, the group in which prevalence rates will have the greatest impact is in the 15–49 year old age cohort.

As Figure 3.2.1 indicates, adult HIV prevalence increases under the baseline scenario to almost 7 per cent in 2025. This indicates a prevalence rate similar to that currently in Kenya and Haiti, and much higher than those in the rest of Asia. Even Cambodia, which is considered to be the country with the highest HIV prevalence in Asia, peaked at 3% and now has around 2 per cent adult HIV prevalence. In Kenya, for example, high prevalence of HIV (currently 6.7 per cent) (UNAIDS, 2004) has resulted in sickness and mortality due to AIDS, dramatic depletion of savings, the loss of key skills and organizational capacity and a fall of up to 50 per cent in food production in

FIGURE 3.2.1: PAPUA – ADULT HIV PREVALENCE, 2005–2025



households where only one member was sick with AIDS (ILO, 2002). In Haiti, HIV prevalence has aggravated Haiti’s tuberculosis (TB) epidemic. With adult prevalence of 5.6 per cent (UNAIDS, 2004), the country has the highest infant, child, and maternal mortality rates in the hemisphere and the lowest life expectancy. These data indicate that the impact of HIV in Papua may be severe.

3.3 SEXUAL RELATIONS AND SEXUAL HEALTH

While we project a small number of injecting drug users will be HIV positive under the baseline (just over 1,000 but with a 44 per cent prevalence rate), the major source of transmission in Papua is sexual.

A major factor contributing to the high number of people infected is a lack of knowledge about HIV and methods of transmission and prevention. In addition, indigenous Papuans tend to distrust medicine and medical centres (Butt et al., 2002a). At some government and mission operated clinics Papuans diagnosed with an STD must pay a fee before they are provided with medication. There are very real logistical barriers to the delivery of services and information across areas of the province. For example, even in towns condoms are not readily available.

AIDS research in Papua has also identified indigenous Papuan youth as another group particularly vulnerable to infection with and transmission of HIV. Up to a quarter of the population aged between 16-29 are likely to be mobile, to drink, to have sex at a young age to have several sexual partners and to engage in what has been termed ‘secret sex’ (Butt et al., 2002).

It has been convincingly argued by other researchers that indigenous culture is not the critical problem in Papua (Butt et al., 2002) but that much needed information and services to the indigenous Papuan population are not yet adequate.

3.4 DEMOGRAPHIC IMPACT

Over the next twenty years, Papua will face increasing HIV prevalence and death rates due to AIDS-related conditions. The population growth rate will decline (although it is not projected to become negative).

Figure 3.4.1 graphs the population size by age group at 2025, with and without AIDS (and if the response to HIV is not scaled up). The pale bars indicate the increase in population size without AIDS. All age groups show some decline in size, however the percentage decrease is most noticeable in 20–49 year age groups. Under the baseline scenario, by 2010

FIGURE 3.4.1: PAPUA 2025 POPULATION SIZE WITH AND WITHOUT AIDS (BASELINE SCENARIO)

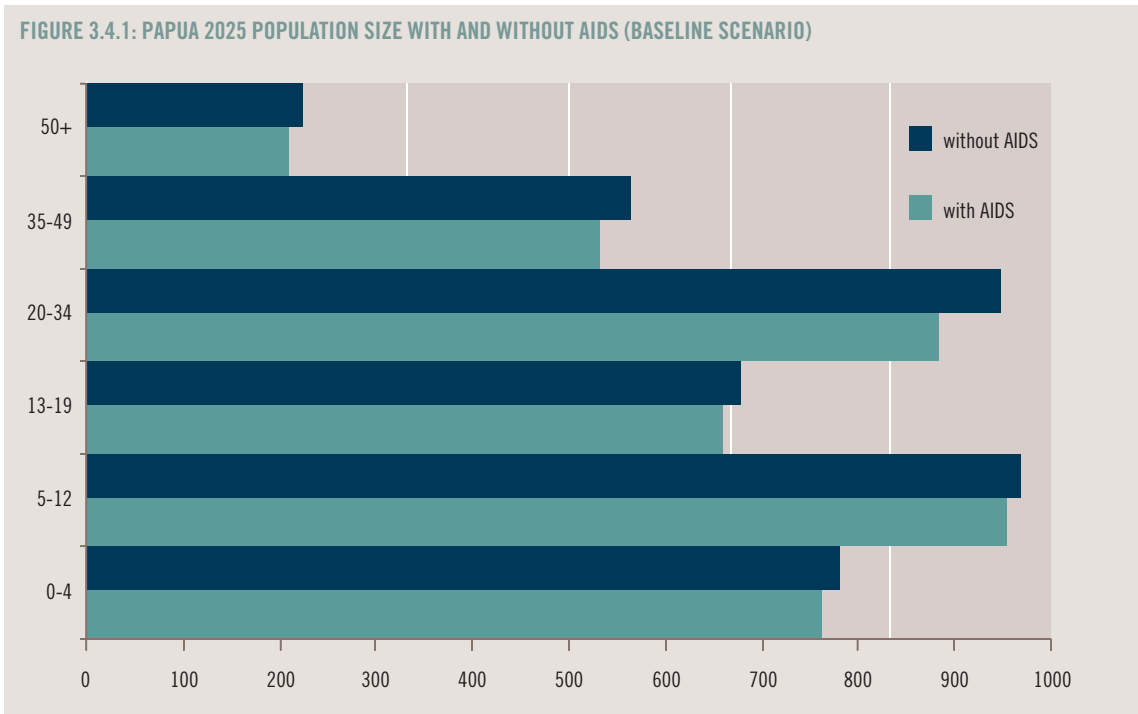


FIGURE 3.4.2: PAPUA: NUMBER OF ADULTS – NO AIDS, BASELINE, MID AND HIGH RESPONSE

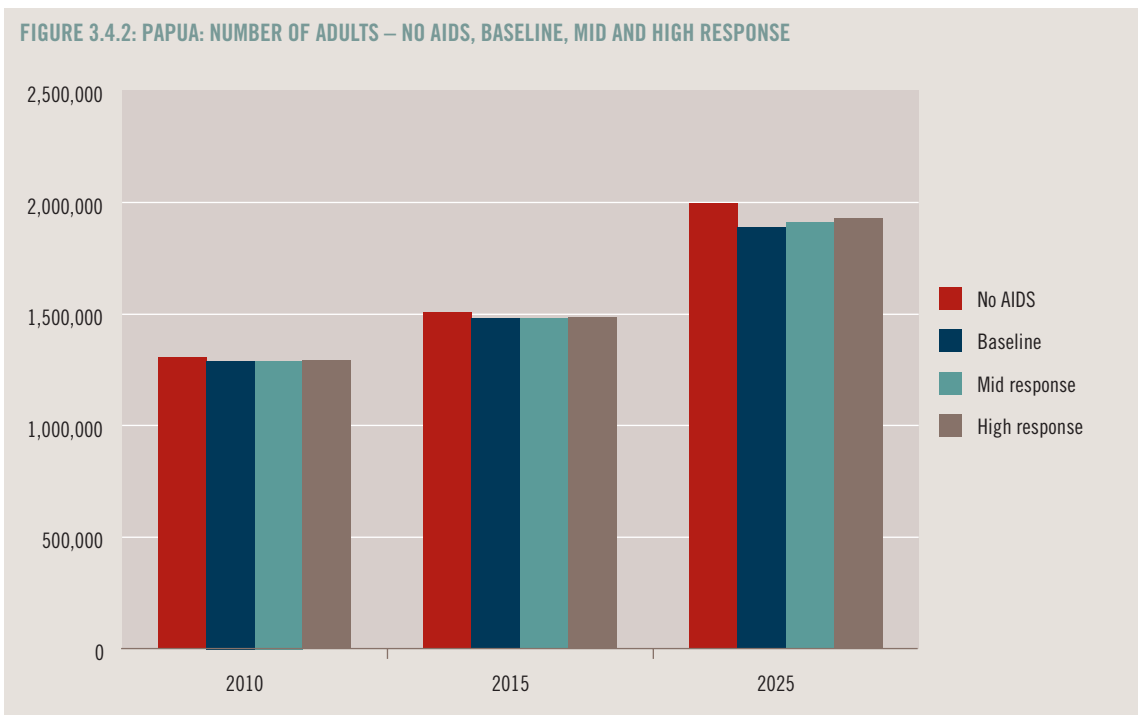
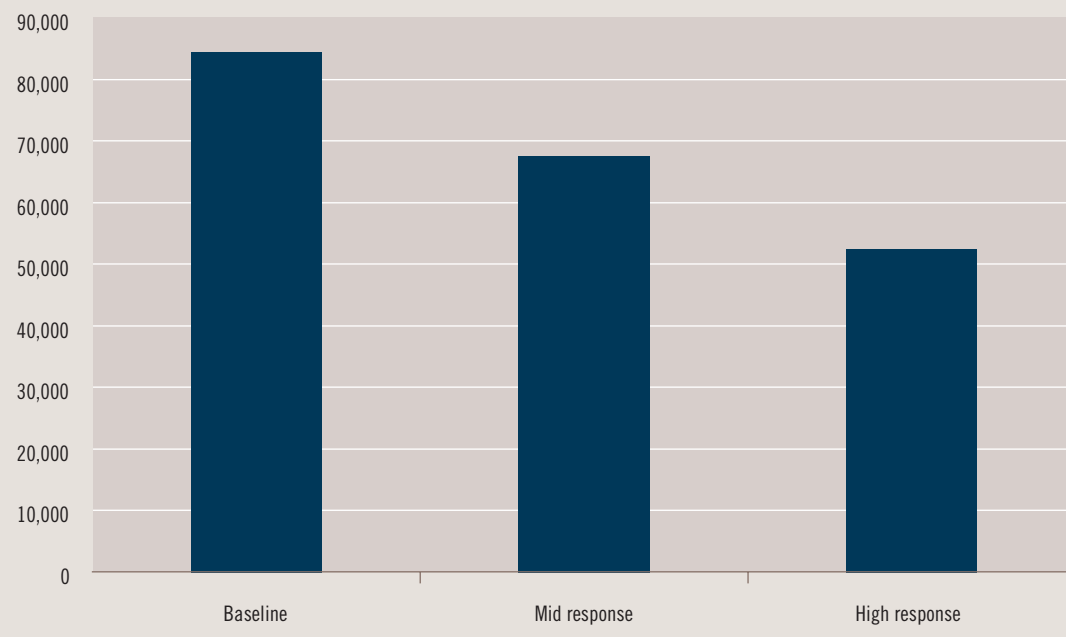


FIGURE 3.4.3: PAPUA – CUMULATIVE TOTAL NUMBER OF ADULT DEATHS, 2005–2025



over 23,000 people will have died, rising to nearly 97,000 people by 2025. Deaths will mostly be in the 15–49 year old age group and will considerably skew the population pyramid. Of these deaths just under a third will be adult women. At present, birth rates are around three births per mother but the illness and deaths of women will cause a loss in reproductive capacity, and fertility rates will also decrease.

The impact of deaths will be felt in families, communities, the workforce, and social service provision, and may have a flow-on effect to the nation as a whole.

Deaths will affect children, grandparents, family relationships, community cohesion, farming and food production. The death of parents and loss of household income damages human capital – the mechanisms that generate human investment in children and young people, a cycle which further damages the next generation. The loss of family members, children and partners will jeopardise the levels of care that family members receive, care which is primarily carried out by women.

The difference between the size of the workforce if AIDS had not occurred and the baseline scenario is significant. Projections to 2025 show the baseline number of adults is 5 per cent smaller than if AIDS

had not occurred. If a high response is brought to bear, there would be a total of 32,000 fewer adult deaths (between 2005–2025) (see Figure 3.4.3 below). Taking into account, however, the reduced number of births from the adults who died, plus the children with AIDS who don't make it into adulthood, the real figure of lives saved with a high response to HIV is 42,000.

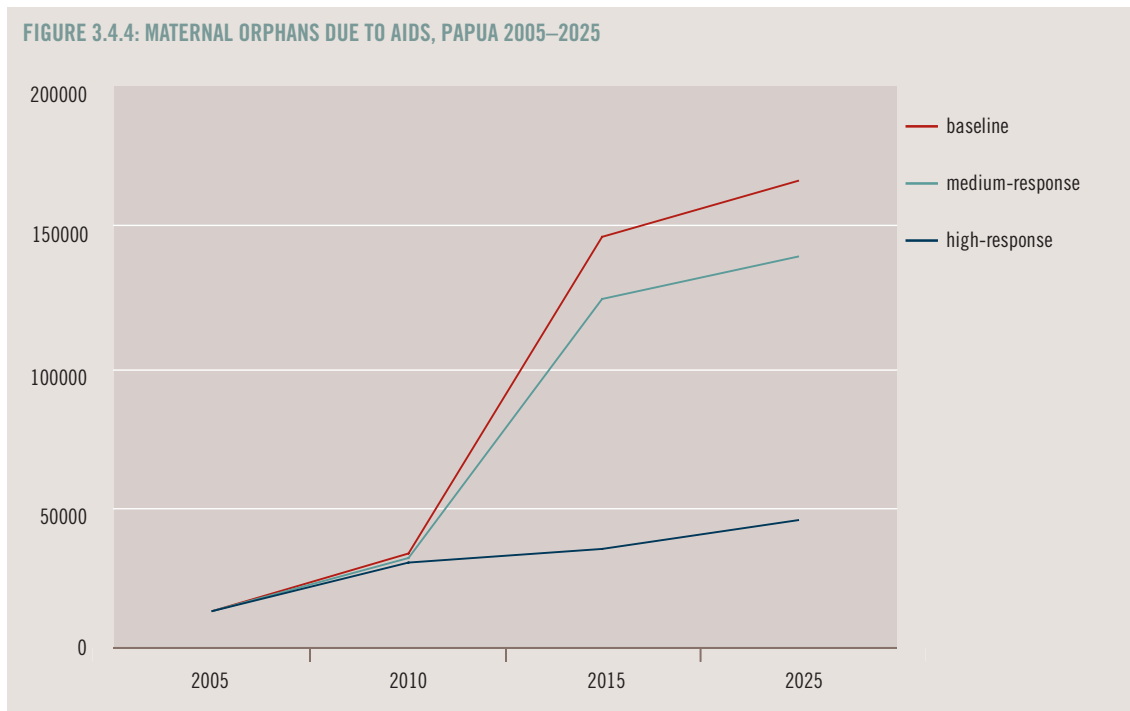
Under the baseline scenario by 2025 the total number of AIDS related adult deaths will be over 84,000. Most of these deaths will be felt in the agricultural sector.

3.4.1 MATERNAL ORPHANS

Under the baseline scenario, there will be over 33,000 maternal orphans by 2010, rising to over 166,000 in 2025 (see Figure 3.4.4). This number will decrease dramatically under the high response scenario, particularly at 2025, where we project almost a quarter the number of orphans.

The possible large number of maternal orphans will provide Papua with an enormous set of challenges. Given indigenous Papuans are heavily reliant on subsistence agriculture, under the baseline scenario children may be taken out of school in order to tend gardens. In Haiti, an FHI report showed that

FIGURE 3.4.4: MATERNAL ORPHANS DUE TO AIDS, PAPUA 2005–2025



between 5 and 7 per cent of children had lost one or both parents to HIV, and over 7 per cent live in families with an HIV-positive member. They state, “as a result, Haiti has and will continue to have a growing number of disadvantaged young people and an ominous threat to the country’s future economic development” (FHI, 2000:1). In Papua, as in countries with a high number of orphans, land inheritance may become an issue, and the stigma of HIV may marginalise Papuan children orphaned by AIDS. Education standards may suffer and orphaning tends to reduce school attendance.

3.5 PROVINCIAL ECONOMIC IMPACTS

By the 1990s, Papua had become integrated into the Indonesian economy, with transportation and communication links established. Papua enjoyed economic growth during the 1990s attributable to high population growth, high levels of public expenditure and diversification of the economy. The special autonomy law of 2001 saw increased government revenues pass to the provincial government, further boosting the economy (McGibbon, 2004).

However, the effects of this growth are experienced differentially both within and outside Papua. While the Papuan economy has grown, and Papua has the fourth highest GRDP per capita in the country, it also has the highest headcount measure of poverty in Indonesia (53.4 per cent in 1999) (Booth, 2004). The number of people living below the poverty line in Papua was estimated at 41 per cent in 2002 (GoI, 2004), dropping to 38 per cent by 2004 (Statistics Indonesia, 2005). Papua’s high GRDP per capita is explained by the large mining sector, which contributed to over half Papua’s GDP in the mid 1990s (Booth, 2004). The district of Fak-Fak in Papua can be characterised as an enclave, where there is a large US-based mining company operating. In enclaves local natural wealth generally does not transform into increased community welfare (Tadjoeddin, et al. 2001). The enclave activity and tiny proportion of people employed in the mining sector is projected to largely protect the province’s GRDP from the impact of HIV and AIDS – see Figure 3.5.2, below ‘Employment by sector’.

TABLE 3.5.1: REDUCTION IN THE SIZE OF THE WORKFORCE COMPARED TO WITHOUT HIV/AIDS

	Baseline	Mid response	High response
2010	1.0 per cent	0.9 per cent	0.9 per cent
2015	1.9 per cent	1.7 per cent	1.5 per cent
2025	5.4 per cent	4.3 per cent	3.3 per cent

Table 3.5.1 suggests that the economically active proportion of the population would be 5 per cent lower in 2025 in the baseline scenario. The mid and high response scenarios somewhat negate that loss. The focus of impact here is on the agricultural sector where the majority of Papuan's are employed.

3.5.1 AGRICULTURAL SECTOR

While Papua is rich in mineral and gas reserves, with large copper and gold mines and a major natural gas reserve, and therefore is a major contributor to commodity exports for Indonesia, the workforce is essentially rural.

The population is predominantly rural, with over 90 per cent of working age people living in rural areas. The majority of people are employed in the agriculture and fishing sectors.

Close to 80 per cent of Papuans are employed in the agriculture, fisheries, forestry and hunting sectors, while less than 1 per cent are employed in mining, electricity, gas and water (Statistics Indonesia, 2003). Agriculture contributes to a little under 20 per cent of the gross regional domestic product (Statistics Indonesia, 2005). The vast majority of Papuans are engaged in subsistence agriculture, and the majority of their household income (63 per cent) is derived from agricultural holdings (Booth, 2004). There is an economic differentiation between indigenous Papuans and transmigrants in the agricultural sector, whereby transmigrants are more likely to participate in the formal economy, producing crops for markets (McGibbon, 2004).

The impact to the agricultural sector in Papua will be felt through the reduction in the size of the rural workforce rather than an impact on the province's GRDP. By 2010, under the baseline scenario rural adult HIV prevalence reaches 2 per cent, and by 2025 it reaches close to 7 per cent. These prevalence rates in the adult rural population result in the following estimated annual deaths.

The cumulative total number of adult deaths under the baseline scenario by 2025 is over 78,000, dropping to 48,000 under the high response scenario. To those families and communities

FIGURE 3.5.1: URBAN AND RURAL WORKFORCE PROPORTIONS (BASELINE SCENARIO)

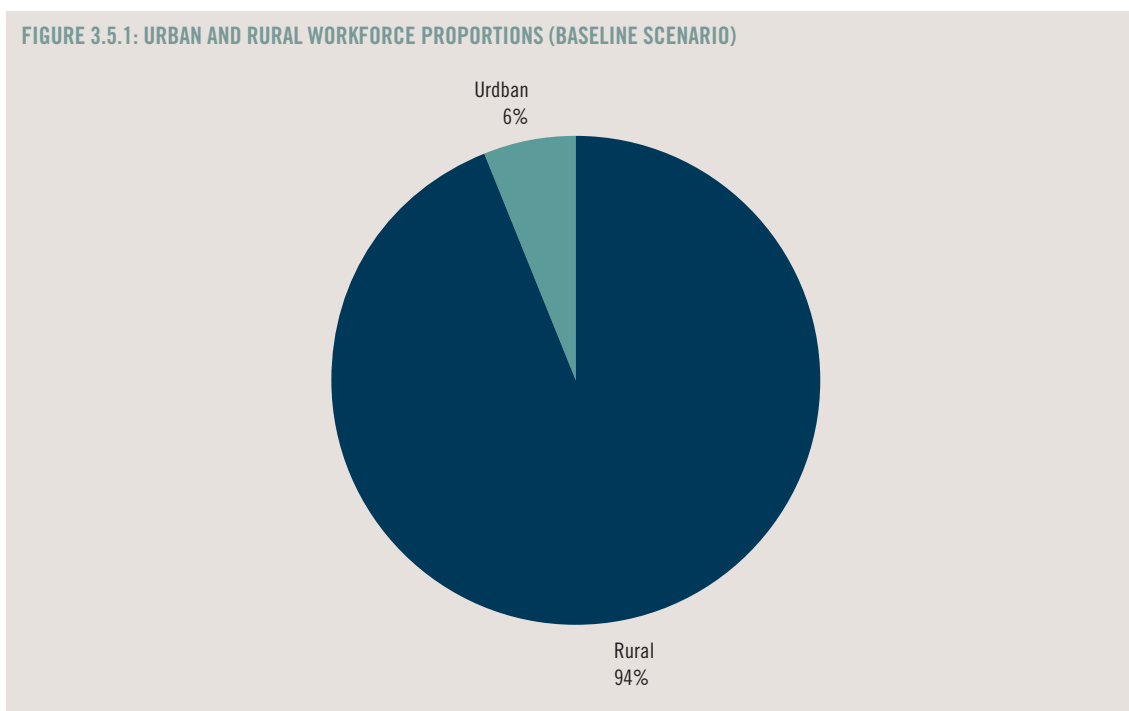
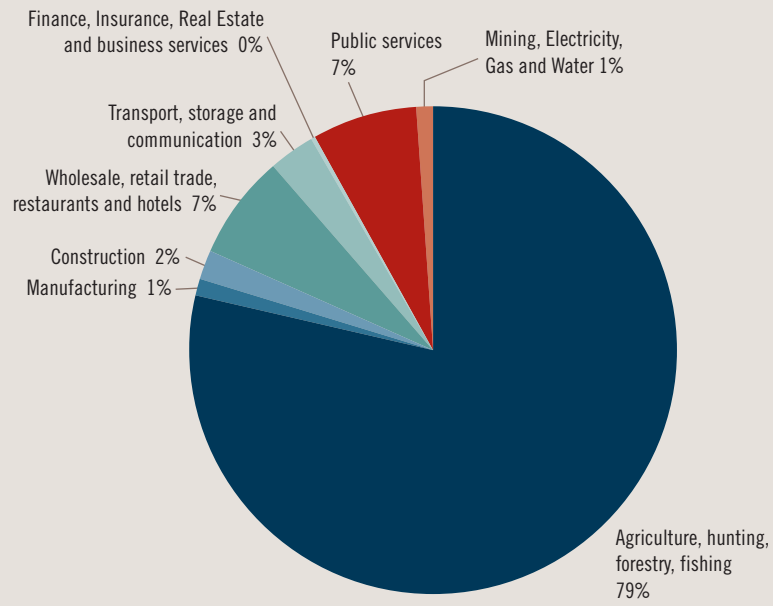
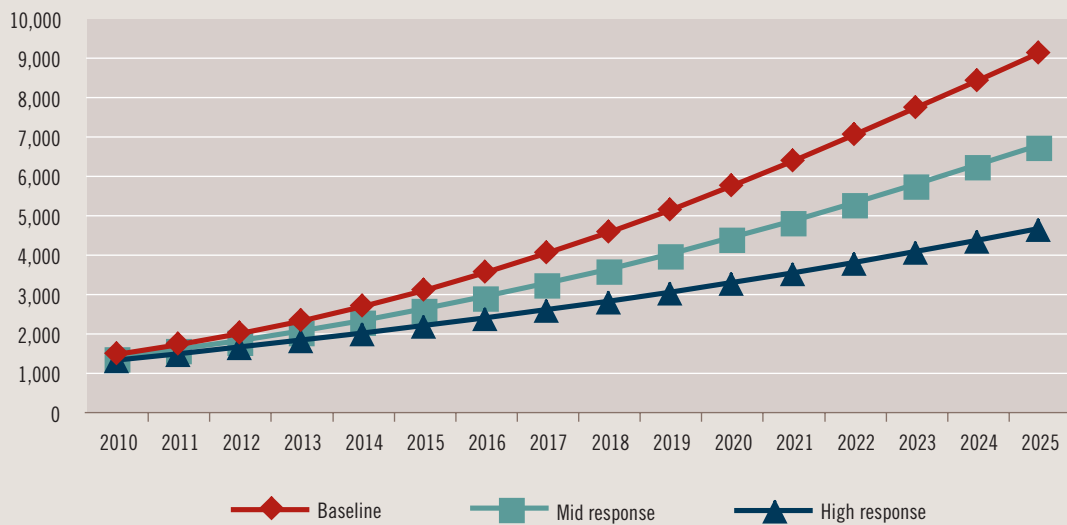


FIGURE 3.5.2: EMPLOYMENT BY SECTOR, PAPUA 2003



Statistics Indonesia 2003

FIGURE 3.5.3: PROJECTED ANNUAL RURAL AIDS-RELATED DEATHS, PAPUA 2005–2025



living in rural areas and working their agricultural holdings, the high response scenario represents a saving of nearly 30,000 adult lives over the 20-year period. Similarly to Papua New Guinea, the loss of rural adults will heavily impact farming families, as effort is diverted away from farming activities to caring for family members living with HIV and AIDS. Human labour is a key input to subsistence production, and such labour can be seasonally critical. If labour is unavailable during high labour demand periods the farm's annual production cycle can be affected (Barnett et al., 2000).

It is difficult to predict the long term impact of the loss of these people, however there will be a cumulative loss of knowledge as parents die before being able to pass knowledge on to the next generation. Children who are forced to take on farming responsibilities do not have the skills or experience to reap the same output as adults – so both quantity and quality of output are affected (Barnett & Whiteside, 2002). However, this impact is tempered by the decreased food requirement for the household when a family member dies.

3.5.2 HUMAN DEVELOPMENT INDICATORS

Development indicators clearly portray the extent of disadvantage in Papua:

- > In 1999, infant mortality was 64.7 per 1,000 births compared with 52.2 in the whole of Indonesia.
- > The maternal mortality rate is three times greater in Papua than in the rest of Indonesia.
- > The literacy rate is 44 per cent for women, and 58 per cent for men
- > Only 10 per cent of Papuans have a high school education

Most importantly, basic services are not yet available in remote communities. Moreover, tribes in remote areas have had fewer improvements in health, education, and other basic services in recent years. The Marind and Asmat tribes of the south have enjoyed virtually no access to public services (McGibbon, 2004). These services will be crucial to any stepping up of HIV prevention, education,

care and support necessary for a high response to the epidemic.

3.6 EDUCATION

The vast majority of indigenous Papuans remain at the margins of the modern economy. The participation rate of the Papuans in education is generally poor, and the annual increase of participation is very small. Only fifty per cent of Papuans have received any formal education or have graduated from primary school and only 10 per cent are high school educate. Papua has the lowest ranking by over 10 percentage points on a number of different educational indexes. Various barriers remain to increasing participation in education, including infrastructure, recruiting high quality teachers and providing better welfare for them.

A major impediment that accounts for low indigenous Papuan participation in modern economic activities is their lack of education and vocational skills. Indigenous Papuans are simply unable to compete with settlers in the rapid-growth sectors of the economy owing to an enormous gap in education and skill levels.

3.7 HOUSEHOLD IMPACTS

The livelihoods of many already poor rural families will be put under stress when somebody in the house is sick with AIDS. Already surviving solely on their own family's efforts, change in the composition of the effort available can have a lasting affect on the viability of the household. The indirect costs to these households will have large and long-term detrimental affects. As off-farm income and farming output declines and assets are sold to cover health care costs, the viability of the household comes under threat.

The exact impact on household expenditure of increasing health care costs associated with HIV is unclear. There are a number of forces at play. Some Papuans may qualify for the Health Care Assurance for the Underprivileged Program, as a high proportion of Papuans are living below the poverty line. However, actually having health services available to access is another matter. For those not eligible under the health care scheme, health care

costs are to be borne predominantly by the individual – with 64 per cent of health expenditure covered privately. Over 79 per cent of that private expenditure is direct out-of-pocket expenses (WHO, 2004b). A final factor influencing the size of medical expenses for Papuan households is the extent to which the cost of ART is both available and subsidised. While the Ministry of Health is committed to partially subsidising the cost of ART, the difference between the full cost and the subsidy may be further subsidised by individual provincial governments (WHO, 2004c).

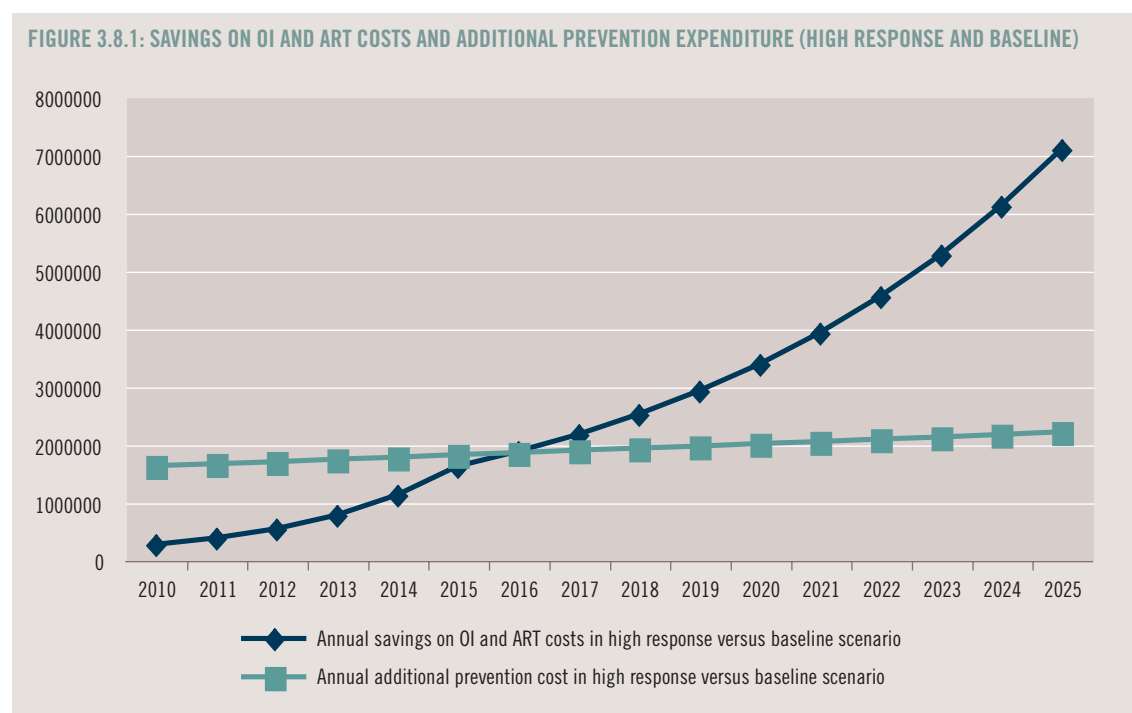
3.8 HEALTH SECTOR IMPACTS⁸

Under the baseline scenario the epidemic will place the health system under stress as it tries to cope with increasing numbers of people with opportunistic infections. It is hard to predict just how much stress the sector will be put under, because this depends in part upon explicit or implicit policy decisions about how to respond to increased demand for services. To illustrate the potential magnitude, we have looked at

costs under a couple of assumptions about how the system might respond to demands for treatment of OIs and ART.

If the epidemic continues without an increased prevention effort, the costs of caring for those with opportunistic infections and providing ART will continue to rise. By 2025 OI costs are estimated to be above AUD9 million, and ART costs are over AUD5 million. In addition, hospitals will be filled with AIDS patients and doctors' and nurses' workloads will be stretched. An alternative is to invest greater effort into prevention now. If prevention spending were to be increased by about AUD2 million per annum, OI and ART costs would be AUD7 million less in 2025⁹.

Figure 3.8.1 demonstrates the potential OI and ART cost savings if the high response is enacted by 2010. While prevention costs are for the present above the savings expected, this changes within 10 years and savings climb well above the additional prevention costs.



⁸ See Appendix 2 for details on inclusion and potential future changes to cost components of the HIV/AIDS budget; see Appendix 8 for details on how the HIV/AIDS budget calculations link to the epidemiological model and see Appendix 3 technical notes for calculations, unit costs and access to health care analysis.

⁹ All in 2005 prices.

With the process of decentralisation, the health sector is now one of 11 sectors that provincial governments manage. Health statistics reflect the poverty levels and disadvantages of living in remote and border areas. For example, Papua has the highest proportion of underweight 5 year olds of any province, with 41 per cent of those in urban centres underweight (GoI, 2004) and infant mortality rates are the seventh highest in Indonesia (McGibbon, 2004).

These current health indicators combined with the remoteness of the population and poverty levels represent significant barriers to the health sector's ability to scale-up a response to HIV. As HIV prevalence climbs in Papua the health sector will see increasing demand in the number of people seeking opportunistic treatment and care. These people represent an additional burden to the health sector.

3.8.1 IMPACTS ON MEDICAL STAFF UNDER THE BASELINE SCENARIO

The health sector is already constrained with limited numbers of doctors and nurses. Data available from Bappenas for 2003 (GoI, 2003), indicates that there were over 360 doctors and 4000 nurses in the Province of Papua. The rising numbers of people with opportunistic infections between now and 2025, assuming doctor and nurse ratios to population do not change, will see medical staff to patient ratios put under significant pressure.

Table 3.8.1 shows that in 2005 there is one doctor for every six people seeking OI treatment and care, but this climbs to 1:22 by 2015 and to 1:48 by 2025. This will undoubtedly put significant pressure on a fragile health system, and potential result in declines in already low health indicators.

3.8.2 INCREASING DEMANDS ON THE HEALTH SECTOR

Access to health care in Papua is limited. These figures illustrate those who will need OI treatment regardless of whether they have access to those services. With an additional 31,000 people needing treatment and care in 2025 the health sector will come under enormous pressure. Figure 3.8.2 shows how the impact of the mid and high response scenarios somewhat reduces this pressure, with half the number seeking treatment and care in the high response scenario by 2025.

3.8.3 IMPACT ON HOSPITAL BEDS

In the province of Papua, there are over 1,300 hospital beds in Ministry of Health and provincial government hospitals (GoI, 2003). Literature suggests people living with AIDS may have a hospital stay of about 30 days (Asian Development Bank and UNAIDS, 2004; Wai et al., 2005), although it could be as high as 80 days (Mpundu, 2000). Our analysis assumes there are no future hospital capital works projects nor reductions in the number of hospital beds available in the province in the next 20 years. The impact of people with AIDS staying in hospital medical beds capacity is illustrated in Figure 3.8.3 below. This projected analysis uses a proportion of all Ministry of Health and Local Government hospital beds to demonstrate the impact on medical beds. It excludes beds in military, private and state-owned corporation hospitals (see Appendix 3, technical notes for details).

As Figure 3.8.3 illustrates, under the baseline scenario, in 20 years over 80 per cent of medical hospital beds will be occupied by people with late stage HIV and AIDS. This analysis is based on 79 per

TABLE 3.8.1 BASELINE SCENARIO – DOCTORS, NURSES AND NUMBERS OF PEOPLE NEEDING OI TREATMENT AND CARE

	2005	2010	2015	2025
Baseline number of doctors	380	440	500	640
Baseline number of nurses	4,250	4,850	5,530	7,100
Number of people needing treatment and care for OIs	2,300	5,300	11,200	31,300

FIGURE 3.8.2: NUMBERS OF PEOPLE REQUIRING TREATMENT AND CARE (INC. LATE STAGE HIV AND AIDS)

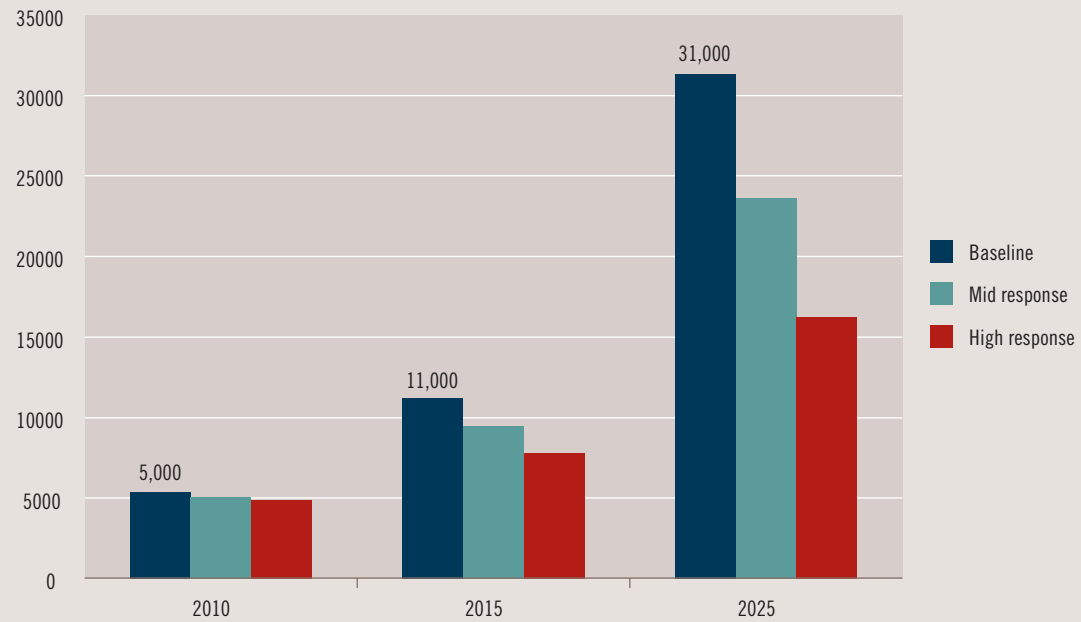
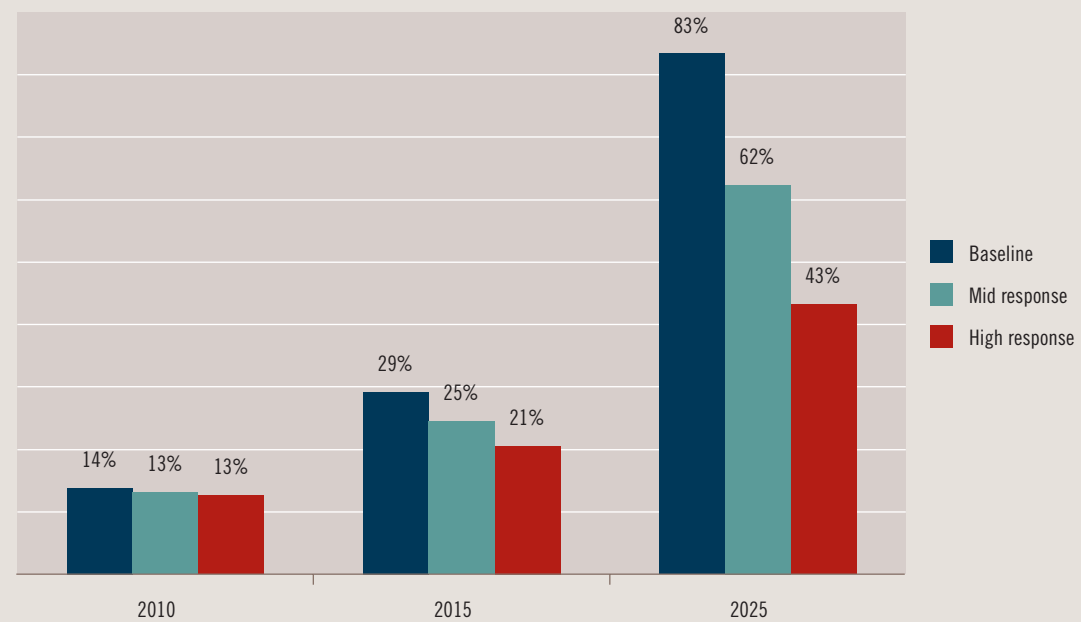


FIGURE 3.8.3: IMPACT ON PAPUA HOSPITAL BED CAPACITY OVER THE NEXT 20 YEARS



cent of the population having access to health care facilities, and an average length of stay of 30 days per person with AIDS (see Appendix 3 technical notes for calculations). These calculations illustrate the increases in demand that the health sector will feel as a result of the HIV epidemic over the next 20 years.

If the baseline scenario continues there are limited choices for health service providers: the duration of stay in hospital can be shortened; more hospitals built, and therefore more beds can be made available; beds designated for other purposes (for example, those for people with maternity or surgical needs) can be made available by displacing those with these health care needs; or hospitals will need to expand capacity to over 100 per cent.

3.8.4 PROJECTED OPPORTUNISTIC INFECTION CARE AND TREATMENT COSTS

Figure 3.8.4 illustrates both the rising cost of care and treatment of those with opportunistic infections and the difference in cost between the high and baseline scenarios.

Figure 3.8.4 illustrates the rising costs of caring for people as they seek care in the later stages of HIV and AIDS. The baseline scenario care and

treatment costs (over AUD9 million in 2025) are well above the costs of the mid and high response. These costs can represent future savings if the mid or high response to the epidemic is adopted. A note of caution, given difficulties in determining accurate unit costs, the costs provided here should only be taken as indicative, and are provided as a means of alerting the health system of the costs associated with HIV and AIDS (see Appendix 3, technical notes for details).

3.8.5 ANTIRETROVIRAL TREATMENT POTENTIAL FINANCIAL IMPACTS

Treating people with ART is a significant expense. In our analysis we focus on illustrating the cost of treatment if 18 per cent of all people with late stage HIV and AIDS receive treatment. This is reflective of a constraint on the health sector to provide ART.

Figure 3.8.5 shows the effect of changes in the prevention components of the epidemiological model between the high, mid and baseline responses. This shows that increased prevention efforts between the baseline and the high response reduces the number of people required for treatment. This also reduces costs significantly.

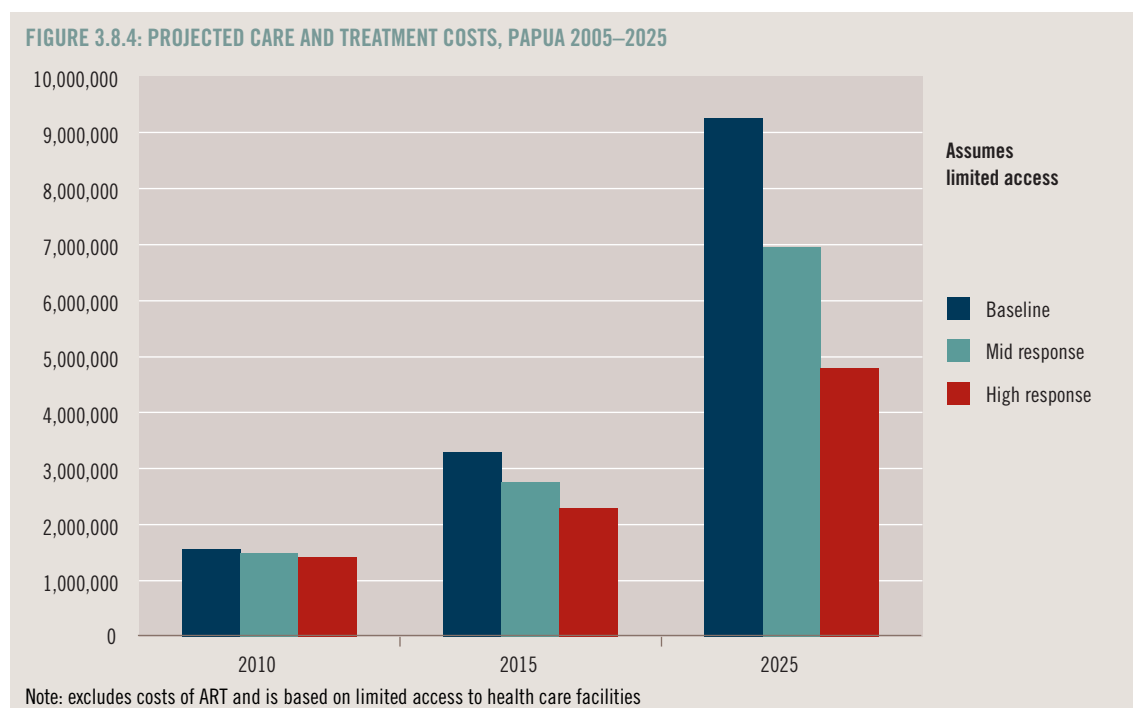


FIGURE 3.8.5: NUMBERS OF PEOPLE ON ART – 18 PER CENT

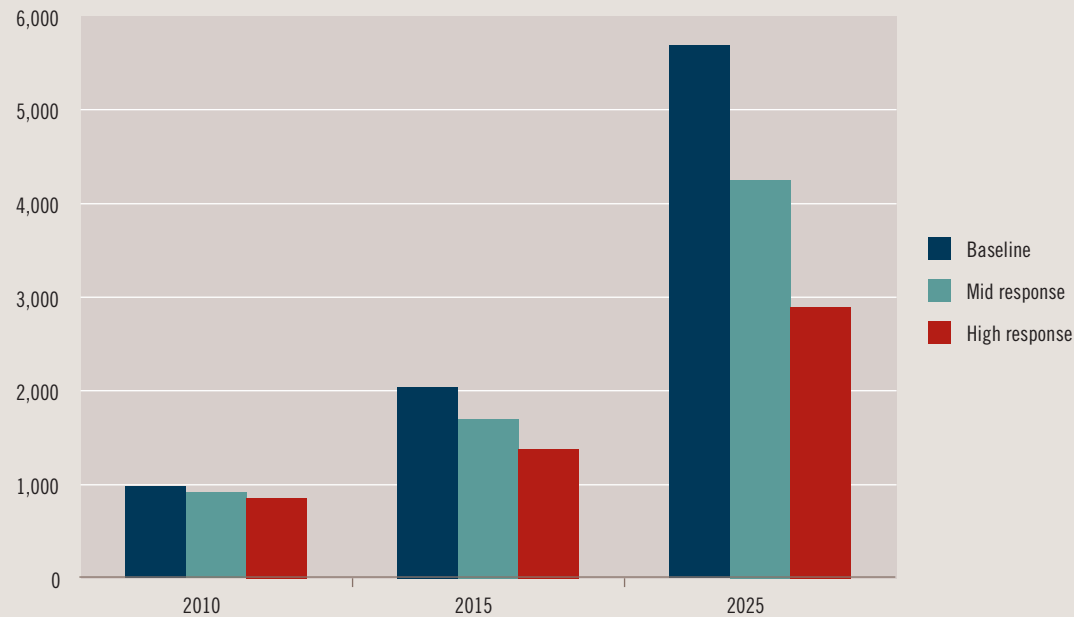


TABLE 3.8.2 ANTIRETROVIRAL THERAPY COSTS, PAPUA 2010–2025

AUD– 2005 prices	2010	2015	2025
Baseline	920,000	1,920,000	5,360,000
Mid response	860,000	1,600,000	4,000,000
High response	800,000	1,300,000	2,700,000

Table 3.8.2 demonstrates that prevention efforts now can save future ART treatment costs. If treatment regimes are available for 18 per cent of late stage HIV and AIDS from 2010 through to 2025, in 2025 the high response scenario represents a total saving above the cost of the baseline response of AUD2.6 million. Changes in coverage rates significantly influence costs, for example, if treatment was available for 100 per cent of those with late stage HIV and AIDS, costs would blow out to over AUD29 million under the baseline scenario in 2025. Thus, policy decisions now on treatment coverage need to consider long-term financial implications.

3.8.6 THE IMPACT OF HIV ON MEDICAL STAFF

While the above demonstrates the demand side impacts in the health sector, HIV will also affect the supply side, as HIV infects doctors and nurses. Table 3.8.3, illustrates the potential impact on the workforce of the disease – the figures under the mid and high response scenarios assume that the workforce would need to increase.

TABLE 3.8.3 ESTIMATED TOTAL NUMBER OF DEATHS DOCTORS AND NURSES, CUMULATIVE 2005–2025¹⁰

	Doctors	Nurses
Baseline	13	140
Mid response	14	160
High response	13	140

Under the baseline scenario when the pressure to meet the increasing demand from those with opportunistic infections, the sector is estimated to lose an additional 13 doctors and over 100 nurses to AIDS related illnesses over the next 20 years.

¹⁰ Assumes that the prevalence of HIV among adults in the general population applies equally to medical staff.

3.8.7 HIV PREVENTION COSTS

The potential alternative scenarios have associated costs, here we examine those costs over the 20 year time horizon (details of calculations are available in Appendix 3).

TABLE 3.8.4: TOTAL PREVENTION BUDGET ESTIMATES

AUD 2005 prices	2010	2015	2025
Baseline	2,180,000	2,810,000	4,465,000
Mid response	3,200,000	4,000,000	6,084,000
High response	3,800,000	4,600,000	6,674,000

Note: excludes blood safety and any methadone programs, includes community, workplace education and youth mobilisation proportional, with 25 per cent increase

The high response comes at an increased cost, ranging from an additional AUD1.6 million in 2010 up to AUD2.2 million in 2025. Included in these costs are:

- > PMTCT
- > Voluntary counselling and testing
- > Community and workplace education, youth mobilisation
- > Sex worker targeted programs – STI treatment, condoms distribution and peer education and marketing programs.
- > Condoms (including provision of condoms for MSM)
- > IDU programs

Changes in the emphasis in the prevention budget from the baseline are:

- > Slight increases in PMTCT driven by increased coverage,
- > Increases in community education and condom distribution,
- > Programs targeting sex workers are increased, driven by greater coverage and reach, for condoms and STI treatment including supporting peer outreach, and
- > Programs for injecting drug users are also increased, although this is a small component.

3.9 GENDER RELATIONS AND HIV

3.9.1 GENERAL POSITION OF WOMEN

Labour arrangements associated with the mining industry’s monetarisation of local economies are transforming definitions of masculinity and femininity and the distribution of the power between men and women in Papua (Robinson, 2002). Indigenous Papuan women are more likely to suffer impoverishment and bear the highest risk of personal violence. Compensation or royalties paid by mining companies are only negotiated with and paid to men (Simatauw, 2002). In this way, women have been stripped of their traditional means of acquiring wealth and status and become more dependent on men who have more access to and control of the benefits of mining development.

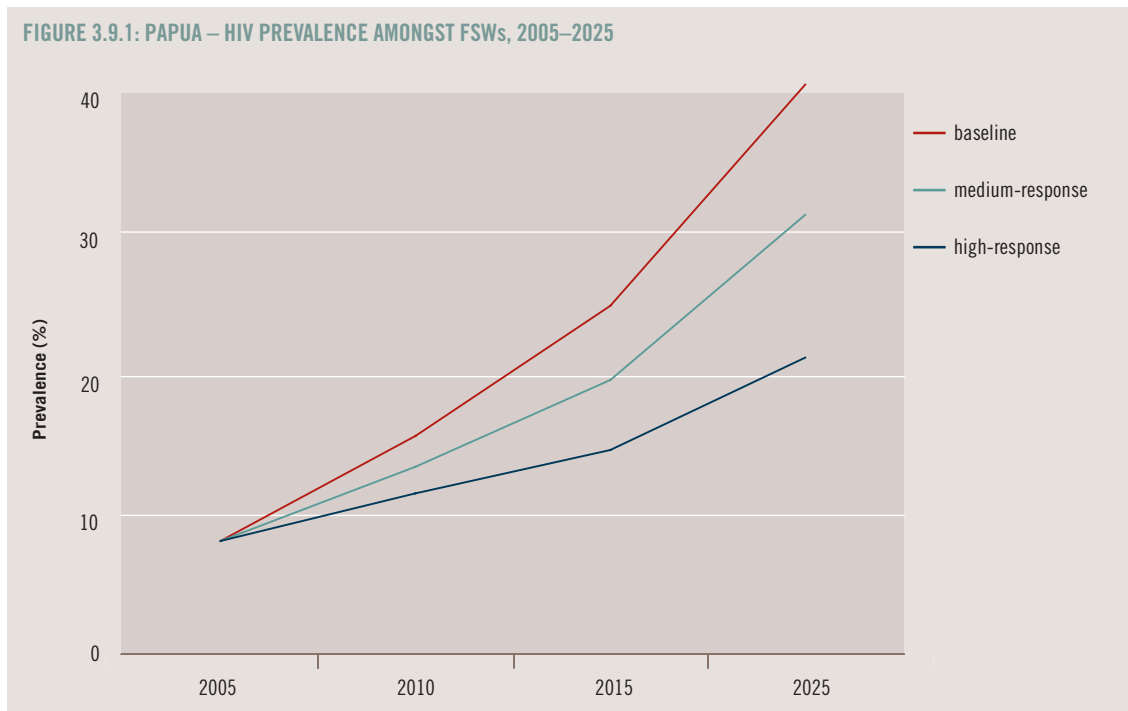
Due to economic development, the risks to women of other STIs, family violence, rape and prostitution – often fuelled by alcohol abuse and a transient male workforce – are increasing. Indigenous Papuan women in mining towns are especially vulnerable as they have low levels of literacy and knowledge about HIV and there are increasingly high levels of alcohol related violence, infidelity, rape and prostitution as large inflows of money pour into once remoter regions (Silitonga, 2002). Women deprived of the opportunity to eke out a livelihood from traditional subsistence production need to undertake sex work for income.

We would expect the position of women to further deteriorate with a high prevalence of HIV. By 2025, under the baseline scenario, non-sex workers will account for two-thirds of all HIV in women. 40,610 Papuan women will be HIV-positive, with a prevalence rate of 4.3 per cent among this group, and 21,000 women will have died.

3.9.2 SEX WORK

The newfound economic prosperity of some areas together with development activities throughout the province has resulted in a proliferation of brothels and sex workers, exacerbating the growing HIV problem in the area. The majority of sex workers in Papua are women (Butt et al., 2002a). It has

FIGURE 3.9.1: PAPUA – HIV PREVALENCE AMONGST FSWs, 2005–2025



been estimated that there are approximately equal numbers of regulated sex workers, street sex workers and women who engage in more informal or ‘secretive’ sexual exchange (Butt et al., 2002a). Few women are full-time sex workers, they are generally driven by family pressures or survival need and often engage in sex work on a casual or temporary basis (Butt et al., 2002a).

Because of lack of access to services and the near absence of knowledge about condom use, street sex workers are particularly vulnerable to HIV infection.

In the next twenty years, under the baseline scenario, female sex workers will account for a third of the HIV infections amongst women, but the prevalence of HIV amongst this group will reach over 40 per cent. Even under a high scenario, the prevalence rate stays extremely high (21 per cent).

The extremely high prevalence even under the high response scenario in the sex industry is due to the poor conditions faced by many sex workers. For example, most Indigenous Papuan street workers have sex in ‘open sites’, i.e. outdoors, on the beach, behind buildings, in unsafe temporary shelters or rural makeshift locations. They receive less money and access fewer state services than their non-Indigenous counterparts, many of whom

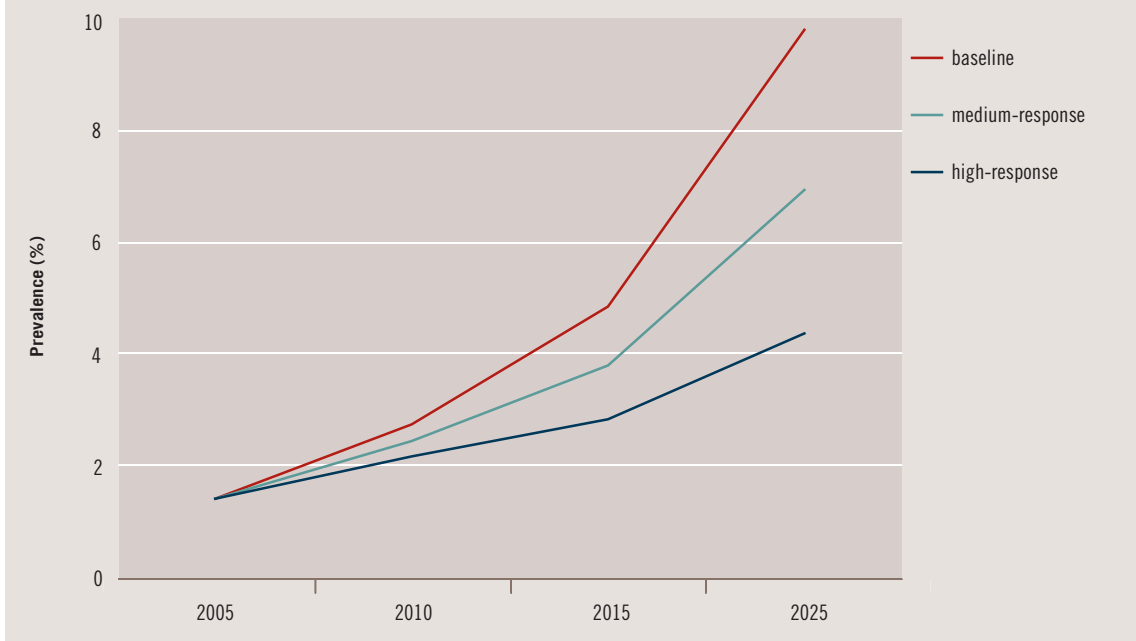
work in regulated brothels or hostess bars. Sex work proliferates beyond large urban centres and extends to all rural and semi-urban centres in the province. Many sex workers have no financial alternative. Husband supported or family brokered sex work is also an important pattern in Indigenous Papuan street sex work (Butt et al., 2002). It is not uncommon for young women to have sex in exchange for food and protection, and these women would not consider themselves sex workers.

3.9.3 CLIENTS OF SEX WORKERS

Sex worker clients come from all walks of life; from military personnel to dock workers to rural tribesmen. Street sex workers provide services to men from a wide range of socio economic backgrounds. Indigenous Papuan clients are less likely to use condoms (Butt et al., 2002).

Figure 3.9.2 indicates that the HIV prevalence rate amongst clients of female sex workers will increase rapidly under the baseline scenario, to close to 10 per cent by 2025. While it will be halved under the high response scenario, a prevalence rate of 5 per cent puts the non-paying partners of these clients (girlfriends and wives) at great risk of HIV.

FIGURE 3.9.2: PAPUA – HIV PREVALENCE AMONGST FSWs, 2005–2025



Transvestites (*waria*) have been identified as being at heightened risk of HIV infection because of involvement in sex work. Indigenous Papuan *waria* are increasingly prominent on urban streets, although indigenous men do not tend to use *waria* sexual services. Clients often have poor knowledge about the risks of unprotected sex with *waria* (Butt et al., 2002; 2002a).

3.10 MIGRATION

The introduction of a cash economy, high rates of migration into the province and with this the introduction of different values to those of traditional society all constitute factors that may lead to the spread of HIV.

The great mobility of many young men and women puts them outside the geographic scope of tribal and elder influence. HIV and condom use education interventions should be aggressively targeting young men and women in both urban and rural sites (Butt et al., 2002). Not only have youth been identified as a vulnerable group, but they are the group that carries knowledge, beliefs and practices into the next generation. The impact of a growing HIV prevalence will be first, increased movement into towns as people seek treatment and, second, migration of

those in towns to go home to their villages to die. This second type of migration will place immense strain on families and communities in coping with sick and dying relatives.

3.11 GOVERNANCE CONFLICT AND SECURITY IMPACTS

Approximately 40 per cent of the Papuan population is living in poverty in remote areas where government aid does not reach. Hospital facilities are rudimentary at best and indigenous Papuans tend to distrust official medicine and medical centres. The development of HIV responses and interventions offers an opportunity to enhance the participation of indigenous Papuans in the planning and delivery of health services. If HIV prevalence increases as projected to levels approaching 10% of the adult population there is likely to be a destabilising impact on communities.

3.12 CONCLUSION – PAPUA

Under the current (baseline) response to HIV in Papua, by 2025 prevalence will be high by world standards, at nearly 7 per cent amongst adults 15–49 years and nearly 100,000 deaths. HIV is mainly

sexually transmitted in Papua, thus affecting both men and women, with the majority of those with HIV living in rural areas. There will be around 150,000 maternal orphans. The health sector will be placed under increasing stress as it copes with increasing AIDS-related morbidity. Social and economic impacts will be felt most at the rural household level, and the structure of the household will alter as family members die. Women will be put under considerable pressure, both in terms of caring for their families and financial pressure to support their households.

However, under a high response scenario outlined here, with appropriate political support, legislative and policy changes, and the financial resources, the rapidly expanding HIV epidemic in Papua can be tempered. But this will rely on a policy and fiscal environment that increases prevention programs not only targeting sex workers and their clients but the general population. To make an impact these must move beyond small scale and ad hoc to wide-scale coverage.

4 The social and economic impact of HIV in East Timor 2005–2025

4.1 INTRODUCTION

East Timor is the poorest nation in Asia and ranked among the least developed in the world. Approximately 40 per cent of the population lives in income poverty. The IMF has found that poverty is highly correlated with family size and lack of education (Valdiserri, 2001). East Timor has high levels of unemployment (International Monetary Fund, 2005; Lundahl & Sjöholm, 2005), with subsistence farmers producing non-traded goods in rural areas making up the majority of those not in the workforce. The population is very young with forty per cent of the population under the age of 15, 54 per cent under 20, and this proportion will increase (National University of East Timor, 2002).

Traditional kinship and governance structures, influences from both Portugal and Indonesia, plus post-colonial, Western democratic values make for mixed cultural values in Timor. As well, 90 per cent of the country is Roman-Catholic, and the Catholic Church has enormous social power and influence in the community.

Women have traditionally had a very low status, with traditional law reflective of a patriarchal belief system, and traditional values viewing the role of women as household and family managers and men as bread-winners (Micato, 2001).

The international community and external donor assistance have played a significant role in the development of East Timor since then. At the end

of 1999 Development Partners pledged US\$522 million for three years for reconstruction, and in May 2002 another US\$360 million was pledged for three years to support the budget and development. However, external assistance is now declining, and will continue to do so. The 2004–05 Budget papers indicates external direct budget expenditure will decline from US\$31 million in 2004–05 to US\$1 million in 2008–09 (GoTL and Ministry of Planning and Finance 2005).

Current health indicators for East Timor are low: both the maternal mortality rate and infant mortality rate for East Timor are above those for PNG and Indonesia. However, the government has placed health as a high priority, and as such is in the process of implementing a decentralised health system focusing on primary and preventive health care services.

Late in 2005 East Timor's proposal for funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria was accepted. This provides an additional AUD3 million in the first year and about AUD2 million in subsequent years to expanding the response to HIV and AIDS. The objectives and targets outlined in this proposal represent the enactment of a high response scenario under which low prevalence continues over the next 20-years. Under this scenario, the social, security and economic impacts of HIV and AIDS at village, community and national levels are negligible. Here

we assess the social, security and economic impacts in light of this high response.

4.2 HIV PREVALENCE IN EAST TIMOR 2005–2025

The prevalence of HIV in the adult population is low in East Timor at present (0.03 per cent). HIV has not spread to significant levels in sex workers or men who have sex with men. Under the baseline scenario there is an increase in adult HIV prevalence to about 0.6 per cent (see Figure 4.2.1), while under a high response the adult prevalence rates will remain stable reaching 0.04 per cent in 2025. This indicates that, even under a baseline scenario in the 20 year time span, the epidemic in East Timor will not become a generalised one. However, the epidemic will take on the characteristics of a concentrated epidemic, with high HIV prevalence among sex workers particularly in urban areas.

Of those adults infected with HIV, under all the scenarios, only a quarter are women. This is common early in HIV epidemics, as a result of men becoming infected through sex with sex workers. As the epidemic progresses, though, there would be a gradual evening out of the sex ratio.

4.3 SEX WORKERS

While prostitution has historically been part of Timorese life it is often condemned as morally repugnant. As the Alola Foundation Report states, “while on some level it is culturally acceptable, evidenced by the ample numbers of clients, there is also consistent public condemnation. Prostitution exists in a confused netherworld of legality, illegality, acceptance and rejection” (2004).

The arrival of international peacekeeping troops in East Timor in 1999 brought with it an increase in the number of foreign and local sex workers. By 2005 most of the foreign sex workers had left East Timor, but there are still a substantial number of Timorese women (over 100 in Dili alone) as well as a few Indonesian women doing sex work. Village chiefs have the power to allow sex work in their town, regardless of the national laws on the issue, and recognise that these women have few economic alternatives to support their families (Alola Foundation, 2004). In addition, it is estimated Dili has 100 Timorese male sex workers.

For East Timorese women working in brothels and on the streets, prostitution is their sole means of economic livelihood. The Alola Foundation Report states that the majority said that they would leave

FIGURE 4.2.1: EAST TIMOR – ADULT HIV PREVALENCE, 2005–2025

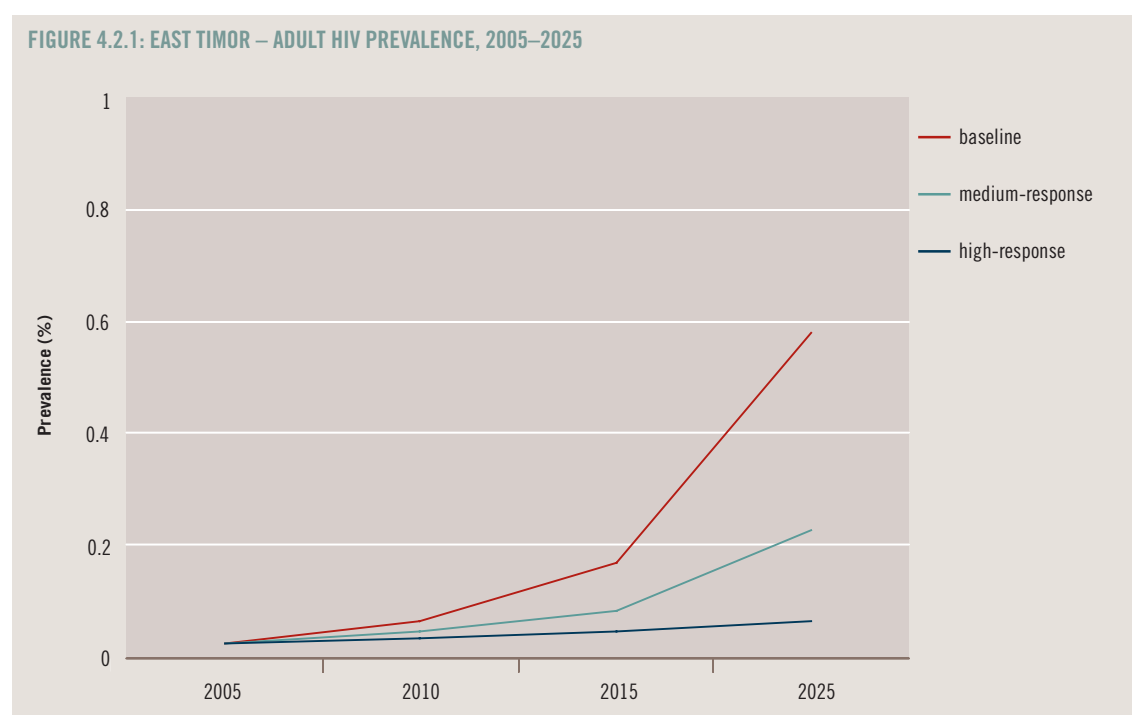
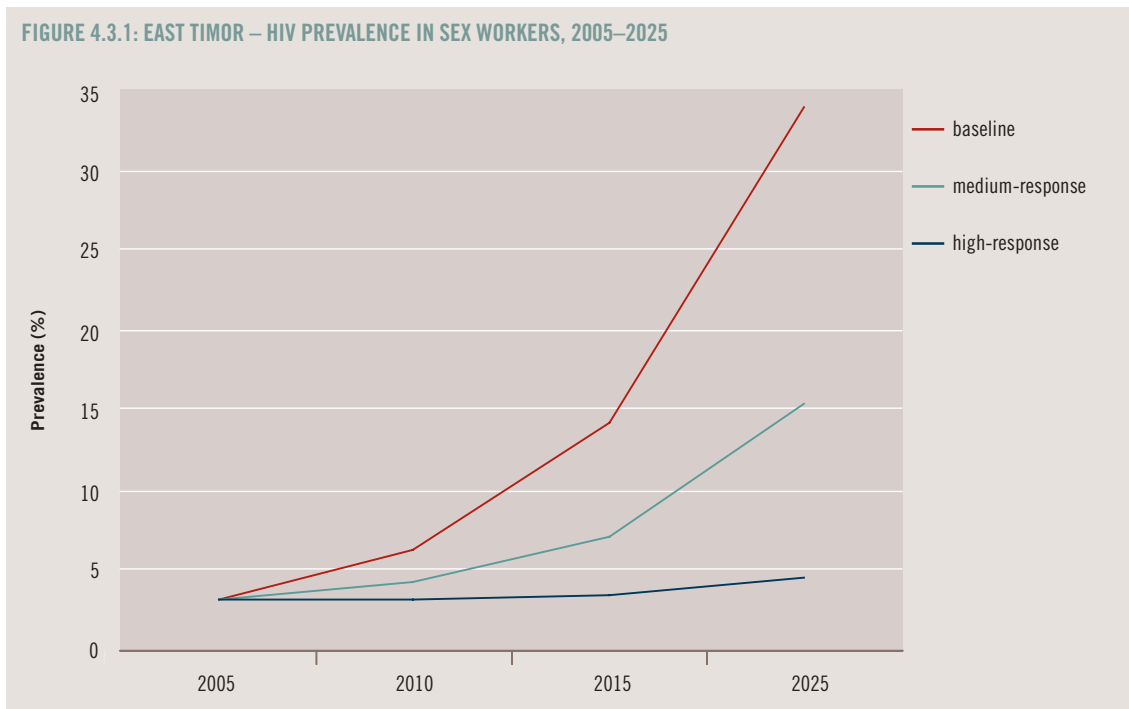


FIGURE 4.3.1: EAST TIMOR – HIV PREVALENCE IN SEX WORKERS, 2005–2025



sex work if they could find alternative employment; however, most fear that they are not skilled to do other work. It also found that for only half of the men, sex work is their exclusive source of income. Unlike their female counterparts, the male sex workers have more freedom and less economic pressures to remain in the profession.

As the Dili STI survey results indicate (Pisani et al 2004), there are high levels of STIs amongst sex workers (between 14 per cent and 16 per cent in a number of STIs, and 60 per cent with HSV-2); accurate condom knowledge is extremely low (21 per cent) and none always used condoms in the last month for commercial sex. These data point to a high risk situation for these women, their clients and their regular non-paying partners. Without a high response, the HIV epidemic will become a highly concentrated one in the sex worker population (see Figure 4.3.1).

HIV prevalence among sex workers increases dramatically under the baseline scenario from just over 3 per cent in 2005 to 34 per cent in 2025, while under a high response prevalence remains relatively stable. The literature indicates that these kinds of prevalence rates will set the stage for a late (after 2025), but severe heterosexual epidemic if HIV prevention programs targeting this group are

not implemented. The Global Fund proposal seeks to reduce HIV transmission through targeting prevention services to the small numbers of people with high-risk behaviours, including sex workers (GoTL Ministry of Health, Rock et al. 2005).

4.4 CLIENTS OF SEX WORKERS

Male clients of sex workers will also see a substantial rise in prevalence in that group to over 1 per cent in the baseline scenario.

The Dili STI survey indicated that men’s use of sex workers was high; 41 per cent of taxi drivers and 54 per cent of soldiers surveyed had used sex workers in the past year. Sixty four per cent of the taxi drivers were married, and both the soldiers and the taxi drivers had high levels of multiple partners in the year prior to the survey (Pisani et al, 2004).

Together these data indicate that the frequency and nature of links between highly infected sub-populations and a substantial portion of the adult male population create the setting for the possible spread of HIV to their regular and casual (non-commercial) female partners, particularly given the lack of condom use in the general population. HIV prevention work must target both sex workers and their clients.

FIGURE 4.4.1: EAST TIMOR – HIV PREVALENCE IN CLIENTS OF FEMALE SEX WORKERS, 2005–2025

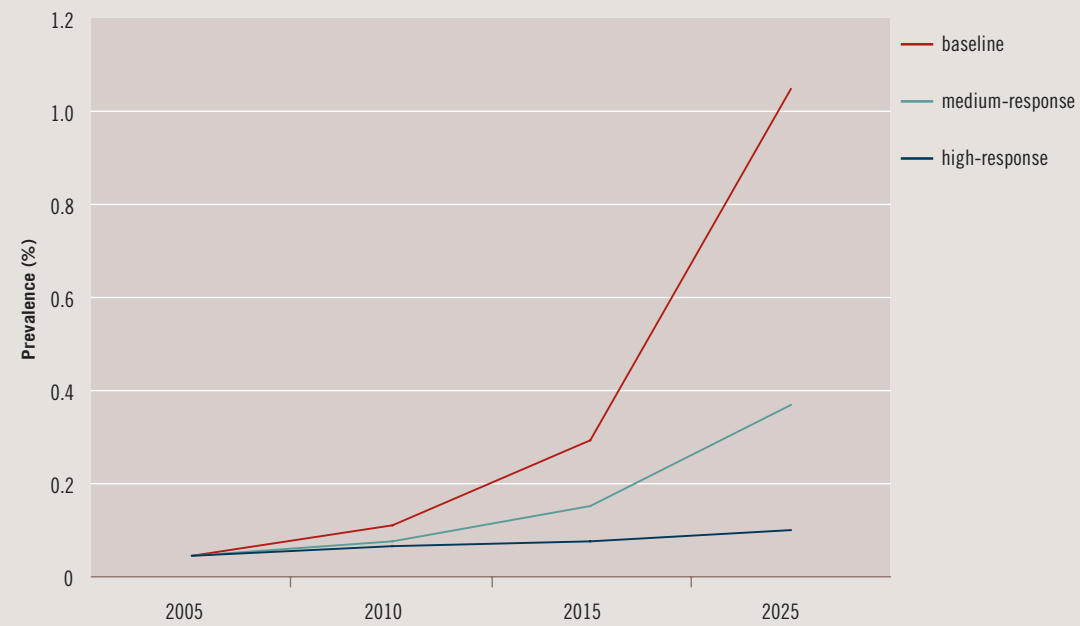
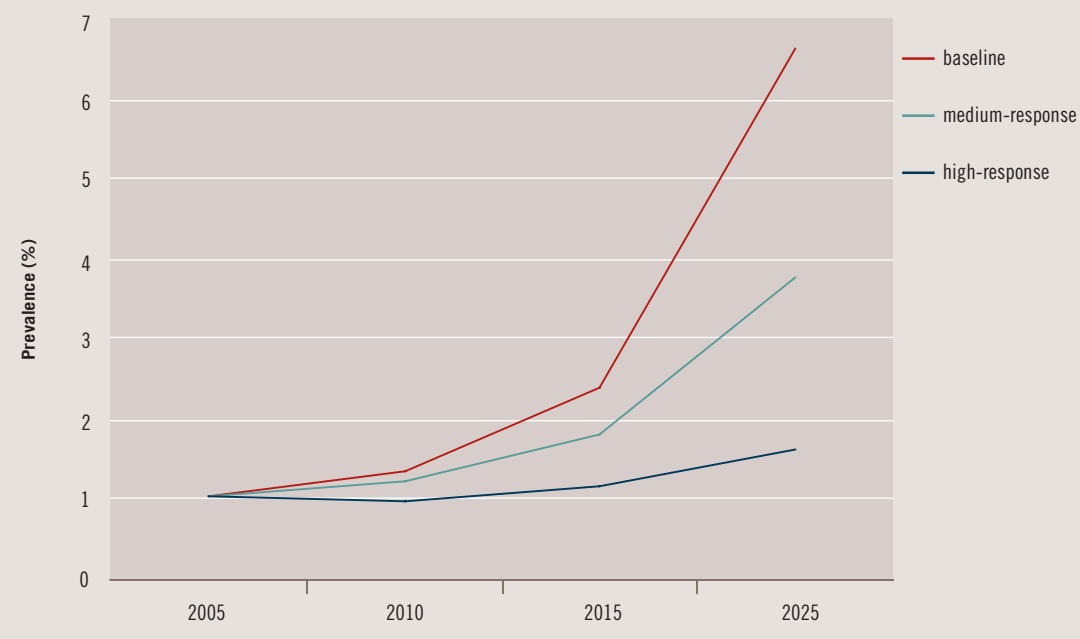


FIGURE 4.5.1: EAST TIMOR – HIV PREVALENCE IN MEN WHO HAVE SEX WITH MEN, 2005–2025



4.5 MEN WHO HAVE SEX WITH MEN

Sex between men is not uncommon in East Timor. The Dili STI survey (Pisani et al., 2004) indicated that 12 per cent of the soldiers and taxi drivers, and 5 per cent of the male students had had anal sex with another man in the past year. Over 40 per cent of those men also had recently had sex with a woman.

Figure 4.5.1 above indicates that there will be a substantial epidemic amongst men who have sex with men by 2025 under the baseline scenario. However, with a high response, the epidemic can be stabilised.

4.6 DEMOGRAPHIC IMPACTS

If East Timor is committed to HIV prevention amongst vulnerable populations, it will not face a rapidly increasing HIV epidemic over the next twenty years. The demographic impact and number of deaths will be small in the high response scenario. The epidemic is predominantly urban, with about 80 per cent of infections occurring in urban areas in 2010.

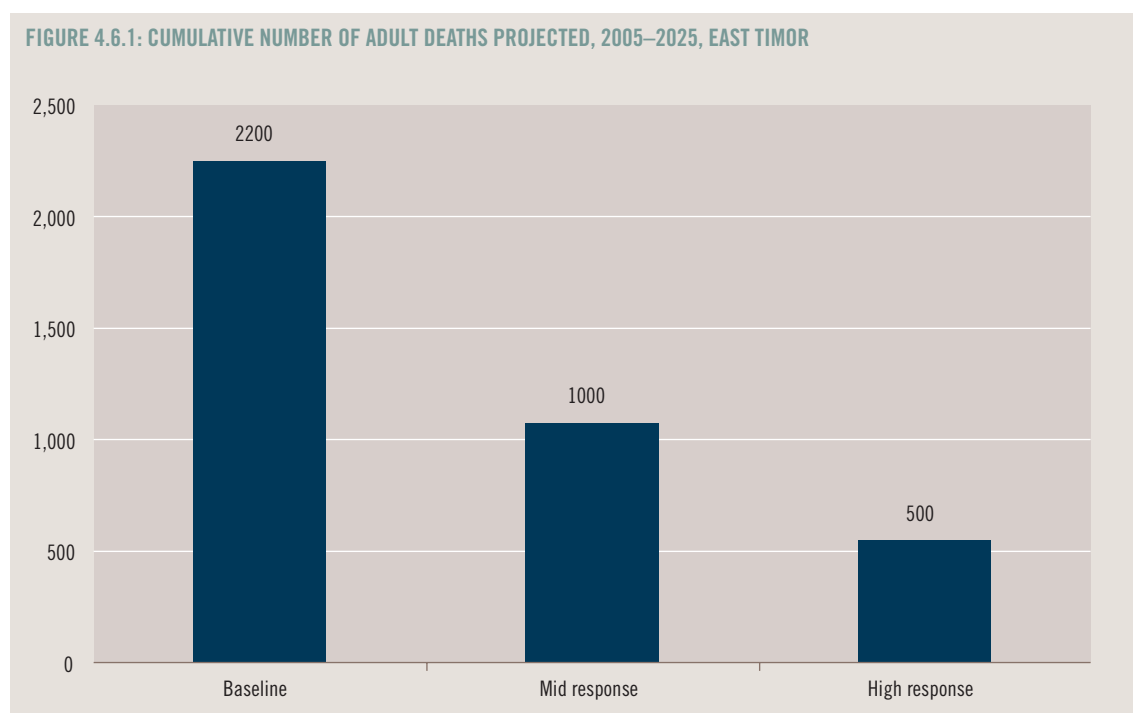
The difference between the baseline and high response do not translate into any changes in the dependency ratio over the 20-year period. However,

with the enactment of the high response scenario the number of adult deaths is limited to just a little over 500 (a quarter of those under the baseline response) in the next 20 years.

There will be around four hundred maternal orphans under the baseline scenario with less than a quarter of that number if there is a high response. This indicates that with a high response the impact of HIV on those most vulnerable (such as children) will be minimised.

4.7 ECONOMIC IMPACTS

For a number of reasons our analysis suggests that economic impacts of HIV, beyond those individual households affected, will be negligible. The awarding of the Global Fund monies to undertake a comprehensive response to HIV and AIDS means East Timor will be able to enact the high response scenario so as to limit the size of the impact. As illustrated in Figure 4.2.1 prevalence remains below 1 per cent until 2025, and is stable at around 0.03-0.04 per cent between now and 2025 under the high response scenario. As well, the majority of people live in rural areas and agriculture, forestry and fishing are their prime economic activities, employing about 80 per cent of those in the labour force. This



activity contributes about 26 per cent to GDP (GoTL and Ministry of Planning and Finance 2005). The concentration of the epidemic in urban areas is away from the prime area of economic activity for most Timorese, namely rural agriculture. Furthermore, with unemployment in urban areas currently high (20 per cent for Dili and Baucau, and 43 per cent for urban youth (World Bank and International Development Association 2005)) any reductions in workforce due to AIDS will not impact employers in the sense of labour constraints. Oil production will become a very significant component of GDP over the next 5 years, providing large petroleum revenues to the state. These state revenues will contribute to poverty reduction through job creation (GoTL and Ministry of Planning and Finance 2005). This revenue stream is essentially independent of the workforce, and so is not affected by any change in the size of the workforce due to HIV.

For these reasons our assessment indicates that there will be very little impact at a sectoral or macro level for the Timorese. However, the impact for those individual households affected by AIDS will be significant.

4.8 HUMAN DEVELOPMENT INDICATORS

The Human Development Index measures the average progress of a country in human development. It combines three measurable dimensions: living a long and healthy life, school enrolment, literacy and income. All these indicators will be impacted if HIV prevalence increases beyond the levels projected here. Other indicators which also add to our understanding of the impact of HIV on East Timor are the Human Poverty Index and the Gender-related Development Index.

TABLE 4.8: HUMAN DEVELOPMENT, EAST TIMOR

Demographic data	Year	Estimate	Source
Human Development Index value	2003	.523	UNDP
Human Poverty Index value	2003	40.5 per cent	UNDP
Gender-related Development Index, value	2003	.518	UNDP

UNDP, Human Development Reports 2005.

Table 4.8 indicates that, at present, East Timor is ranked 137th of 177 countries in its HDI, 78th of 103 developing countries in the Human Poverty Index and 103rd of 140 countries in its Gender-related Development index. More than 50 per cent of Timorese are illiterate. Only 31 per cent of primary school graduates go on to secondary school, and of those only 9 per cent go on to university level-education (National University of East Timor, 2002). Given the necessities to relieve poverty, increase the human development value and increase gender equity, it is imperative that East Timor does not allow HIV to become a factor in slowing or even reversing positive trends in development in the next twenty years.

4.9 GENDER RELATIONS

The position of women in East Timor places them in a vulnerable position in terms of HIV susceptibility. The high level of poverty in East Timor particularly affects women, who also fare poorly compared to men in a number of indicators. Women have less access to schooling than men and two-thirds of women are illiterate. Women often have little voice in community and national affairs, and are underrepresented in occupations such as teaching and administration. The division of labour at the household and community level is quite rigid, and women have less decision-making power than men in the home and at village level. Traditional bride price (barlaque) is still in place (Tanaja, 2000). Traditionally this built relationships between families, but it can also be used to deny women rights in the home. In terms of productive labour outside the home, women engage in farming and micro-economic activity. Labour force participation is poor (40 per cent compared with nearly 60 per cent of men (UNDP, 2002), and women earn less than men when engaged in paid employment.

Violence has been a part of Timorese women's lives for a long time. Unfortunately, violence against women has not ended with the birth of the new nation – a culture of violence has become embedded in Timorese culture (East Timor Judicial System Monitoring Programme, 2005a). There have been reports of discrimination against women by the police, particularly that police do not take seriously

the high levels of domestic violence reported (East Timor Judicial System Monitoring Programme, 2005b). Physical and sexual violence are intimately interrelated with the spread and impact of HIV. If women do not have power to say no to sex or to insist on condom use they are placed in a vulnerable position with regard to HIV. There are estimated to be 14 per cent of households headed by women (USAID, 2004). Female headed households tend to be poorer and have less access to services.

The average Timorese woman bears more than seven children in her lifetime (Hull, 2004), with about a third bearing a child each year (USAID, 2004). A recent Timorese survey found that over 60 per cent of women and 70 per cent of men failed to recognise any method of common contraception methods. Along with a general lack of knowledge of methods of birth spacing and birth limiting, 75 per cent of women had no knowledge of where to obtain a method (East Timor DHS, 2003). However, most women did not see a need for family planning. The Catholic Church has had a conservatising influence on the rights of women, not just around contraception but also on the rights and roles of women generally (USAID, 2004). At the same time, sexually transmitted infections are common and existing reports show about 35 STI cases per week, mostly in Dili and Baucau districts.

Poor access to reproductive health services is a major determinant of high maternal mortality, with increasing incidence of teenage pregnancies and short gaps between pregnancies. The 2002 Multiple Indicator Cluster Survey indicated that less than 10 per cent of married women use any form of contraception and only 43 per cent of women giving birth within the past 12 months had access to antenatal care (UNICEF, 2002). Maternal mortality has been estimated to be as high as 800 per 100,000 live births (East Timor National Development Plan 2002, p.51). Providing health care for these women is an important priority for the country, and linked to prevention of HIV.

While few women who are not sex workers will be infected with HIV in the next twenty years (under the baseline scenario), the issues raised are ones which make women more vulnerable to HIV and which must be tackled over the next decade under

a high response to HIV. This group still must be a target for HIV prevention through sex education in schools and through work to improve the general lot of women, especially around sex and women's ability to control their sexuality.

4.10 HEALTH SECTOR IMPACTS

Health is a high priority for the Government of East Timor, with the government seeking to implement a decentralised health care system focusing on primary and preventive health care services. Close to 11 per cent of the budget is spent on health, for 2005-06 this is estimated at about USD14 million (GoTL and Ministry of Planning and Finance, 2005). The most urgent health needs are on preventing communicable diseases, which requires strengthening of primary health care and associated facilities. The Government has placed a cap on hospital expenditure at no more than 40 per cent of the recurrent health care budget (GoTL Ministry of Health, GoTL Ministry of Education et al., 2005). On average hospitals comprise about 30 per cent of total government health expenditure.

Health has been one of the sectors supported by external assistance. However, this is projected to steadily decline over the next 4 years (GoTL and Ministry of Planning and Finance, 2005).

Health indicators for Timor are low: for example, both maternal and infant mortality ratios are high. The reasons for this are caught up in both supply and demand issues. On one hand the population has poor and unequal access to health services, with many inexperienced health workers. While on the other hand demand for health services is low. Poor reproductive health is a significant issue and maternal and child malnutrition are commonplace. There is high incidence of preventable communicable diseases like malaria, tuberculosis and diarrhoeal diseases, and leprosy is endemic (GoTL Ministry of Health, GoTL Ministry of Education et al., 2005). In this context those working in health in both front line and planning capacities face many challenges, of which HIV is only one.

Currently, there are no cost recovery mechanisms within the public health care system, and public expenditure per capita is estimated to be around

USD28 per capita in 2004, rising to an average of USD30 per capita over the next 4 years (GoTL Ministry of Health, GoTL Ministry of Education et al., 2005). User fees, greater reliance on the private sector and the introduction of health insurance schemes are options the government has put forward for the future in order to maintain financing of health (GoTL Ministry of Health, GoTL Ministry of Education et al., 2005).

4.10.1 ENACTING A HIGH RESPONSE FOR HIV AND AIDS

Currently spending on HIV and AIDS is estimated at AUD1.5 million per annum for 2005–06 (McKay and Warner 2005). This represents about 12 per cent of the total health budget. The recent approval of the 5th round funding for HIV from the Global Fund provides an additional AUD3 million in the first year and about AUD2 million per annum for the subsequent four years (GoTL Ministry of Health, Rock et al. 2005). Given the other health priorities in the country, HIV/AIDS receives a high proportion of health spending.

Our assessment of the Global Fund to Fight AIDS, Tuberculosis and Malaria proposal indicates that if the prevention responses are enacted this will result

in a ‘high response’ scenario (see Appendix 9 for analysis).

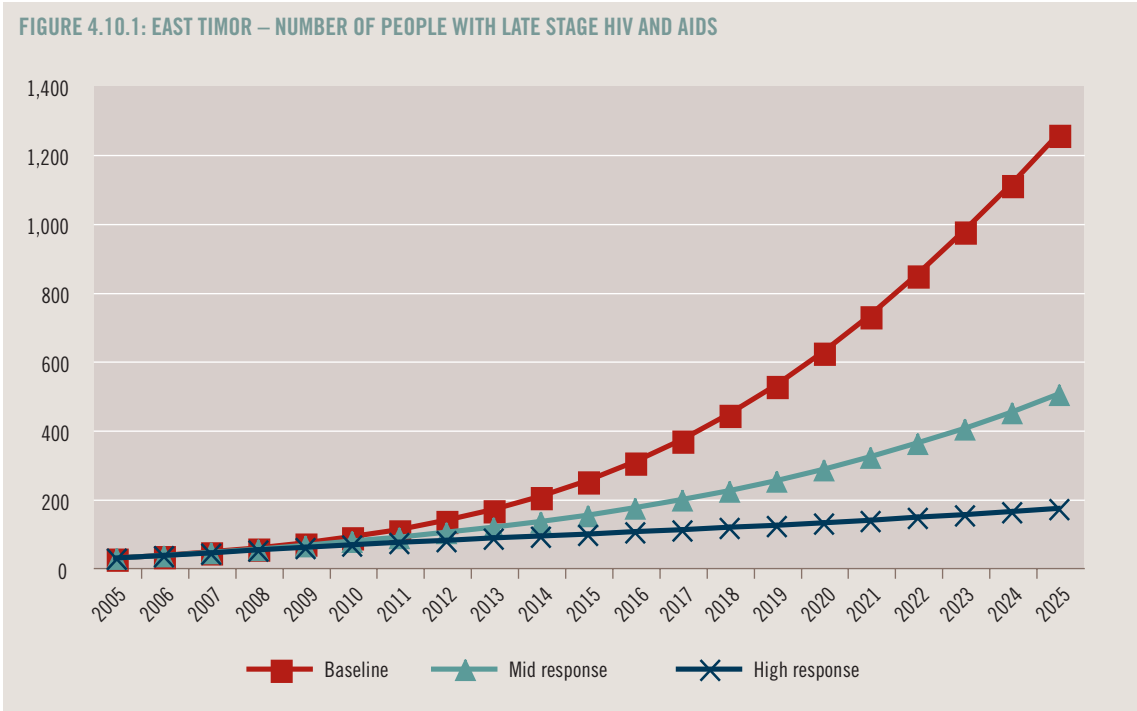
The proposal focuses on addressing five critical gaps:

1. Improve and increase coverage of strategic HIV and STI prevention services
2. Strategic information
3. To strengthen and expand HIV and AIDS treatment and care
4. To strengthen health systems relating to STI, HIV and AIDS
5. To promote a multisectoral response to HIV and AIDS (GoTL Ministry of Health, Rock et al. 2005)

The fourth gap ‘to strengthen health systems relating to STI, HIV and AIDS’, is essential for successful implementation of HIV preventive programs.

Analysis here has shown the reliance HIV prevention programs have on a functioning health system. (See Figure 4.10.1)

The current limitations of the health system, in staffing, accessibility and the host of other health needs of the population will constrain the ability of the sector to increase the prevention response. While the proposal plans to offer HIV testing for all pregnant women who come into contact with health care providers, the national average for



births attended is only 18 per cent (World Bank and International Development Association 2005). Outpatient visits are low (2.11 per annum per capita) (GoTL Ministry of Health, GoTL Ministry of Education et al. 2005), limiting the opportunities to conduct face-to-face HIV preventive activities.

There are also current limits on the number of doctors available in the country, and on the number who are skilled in HIV medicine. However, the Global Fund to Fight AIDS, Tuberculosis and Malaria proposal outlines plans to address human resource training needs in HIV and AIDS. Its limitations like these that mean the HIV response needs to be integrated to health sector wide programs to ensure the whole health system is able to support the HIV response and targets are achieved.

Figure 4.10.1 indicates less than 200 people will have late stage HIV and AIDS by 2025 under the high response scenario.

With 170 people projected to have late stage HIV or AIDS by 2025 under the high response scenario, it is expected there will be very little impact on hospital beds. Estimates suggest that people with AIDS seeking care may occupy about 2 per cent of medical beds in 2025.

Antiretroviral treatment provisions are included in the proposal, with the intention to treat 100 per cent of those who need treatment. While the enactment of the high response significantly reduces the number of people requiring treatment (see figure 4.6.1), the figure does climb from current estimates of around 10, to over 150 by 2025. The financial commitment of offering treatment regimes goes beyond the time horizon of the Global Fund to Fight AIDS, Tuberculosis and Malaria proposal, and as such needs to be carefully considered.

Analysis of the links between the Global Fund to Fight AIDS, Tuberculosis and Malaria proposal and the epidemiological modelling is available in Appendix 9.

4.11 HOUSEHOLD IMPACTS

Every household with a person with HIV or AIDS will be affected. Implementation of the Global Fund proposal represents an opportunity to reduce the number of households affected. Figure 4.10.1 above indicates the cumulative number of adult deaths of under the high response scenario is close to 500, while it is well over 2000 under the baseline scenario.

There are no cost recovery mechanisms in the public health care system. In the future the government may introduce user fees and health insurance schemes in order to maintain financing of public health. This means that for Timorese choosing to access public health care for HIV and AIDS related care and treatment their individual direct health costs are minimised. However, when the main income earner dies or other household members divert activities to caring, the household income or subsistence agricultural output will decline, putting pressure on other household members to divert activities to finding alternative sources of income.

4.12 GOVERNANCE, CONFLICT AND SECURITY IMPACTS

Conflict can propel a country toward an epidemic. Aspects of East Timor's recent past that may have helped to seed the epidemic include the presence of peacekeeping forces, destruction of public buildings and infrastructure, displacement of populations, and violence against women (both physical and sexual) during conflict (Kiernan, 2003; East Timor Judicial System Monitoring Programme, 2005).

DFAT and ASPI analysis suggests that there is ongoing concern over gang violence, street crime, and poverty in East Timor. Violence and the fragility of East Timor as a new state is a potential threat to peace and stability in the country. A lack of stability may become a factor in the spread of the virus. Democracy and good governance initiatives are central to a multi-sectoral high response to HIV, because they engender the conditions that keep HIV in check.

4.13 CONCLUSION

East Timor is a new nation that is coming to terms with a difficult and violent past, and which is preparing to redress its large-scale poverty and lack of health infrastructure. While having a low HIV prevalence, East Timor has many aspects which makes its population vulnerable to the epidemic.

With the availability of monies from the Global Fund to Fight AIDS, Tuberculosis and Malaria and the conclusion of the 2002-2005 HIV/AIDS/STI National Strategic Plan, East Timor is now at a critical junction and poised to translate lessons learnt from the previous strategic plan, and the additional funding, to maintain its current low HIV prevalence and reduce the spread of HIV. The Global Fund monies will be spent on HIV and STI prevention, monitoring of trends in the epidemic and on treatment and care services, strengthening the health system, and promoting a multi-sectoral response to HIV. This amounts to a high response scenario and as such should be applauded. However, HIV prevention, care and treatment programs need to be incorporated into a sector-wide approach to health to ensure their success. It is important that all efforts should not be concentrated on so-called 'high-risk groups'. In the long term, young people, and women in particular, must be aware of and have the power and the skills to be able control their own sexuality.

Part 2: References

- Altman D. (1999). 'A framework for conceptualizing the international response to HIV/AIDS'. ICASO Update, 16 (www.icaso.org).
- ADB/UNAIDS (2004) Impact of HIV/AIDS on poverty in Cambodia, India, Thailand and Viet Nam. *ADB/UNAIDS Study Series: Paper 1*
- Ainsworth, M. & Teokul, W, (2000), *Breaking the silence: setting realistic priorities for AIDS control in less-developed countries in Lancet*; 356: 55–60
- Alola Foundation (2004). Trafficking in East Timor A Look into the Newest Nation's Sex Industry Dili, T-L: Alola Foundation
- Amnesty International. (2005). Papua New Guinea: Covering events from January–December 2004. URL: <http://web.amnesty.org/web/web.nsf>
- Anderson, Benedict (1983). *Imagined Communities: Reflections on the Origin and Spread of Nationalism*. New York: Verso.
- Appleton, J. (2000). 'At my age I should be sitting under that tree': the impact of AIDS on Tanzanian lakeshore communities. *Gender and Development*, 8 (2), 19–27
- Asian Development Bank and UNAIDS (2004). Costing Guidelines for HIV/AIDS Intervention Strategies. *ADB UNAIDS Study Series: Tool 1*
- ASPI, Australian Strategic Policy Institute (2004) *Strengthening Our Neighbour: Australia and the Future of Papua New Guinea*.
- AusAID (2006) *Impacts of HIV/AIDS 2005–2025 in Papua New Guinea, Indonesia and East Timor: Synopsis Report of the HIV Epidemiological Modelling and Impact Study*, Canberra: AusAID
- AusAID. (2002). Potential Economic Impact of an HIV/AIDS epidemic in Papua New Guinea. Prepared for AusAID by the Centre for International Economics. URL: <http://www.ausaid.gov.au/publications/pdf/hivaidspng.pdf>
- Australian Agency for International Development (2005). Scoping of Issues: Future Australian Support for HIV/AIDS in Papua New Guinea
- Australian Agency for International Development, (2000), *Social and economic indicators, Papua New Guinea*.
- Barnett, T. and A. Whiteside (2002). *AIDS in the Twenty-First Century: Disease and Globalisation*. Hampshire, Palgrave Macmillan.
- Barnett, T., Blas, E. and Whiteside, A. (2000a), *AIDS Briefs: Integrating HIV/AIDS into Sectoral Planning*, USAID.
- Barnett, T., Whiteside, A. and UNAIDS (2000c), *Guidelines for Studies of the Social and Economic Impact*, September UNAIDS.
- Barnett, T., Whiteside, A., Desmond, C. and UNAIDS (2000b), *The Social and Economic Impact of HIV/AIDS in Poor Countries: a review of studies and lessons*, UNAIDS.
- Barro, R. & Lee, J. (1993) Barro-Lee Data Set: International Measures of Schooling Years and Schooling Quality. World Bank Group. URL: <http://www.worldbank.org/research/growth/ddbarle2.htm>

- Basuki, E., Wolffers, I., Deville, W., Erlaini, N., Luhpuri, D., Hargono, R., Maskuri, N., Suesen, N. and van Beelen, N. (2002). Reasons for not using condoms among female sex workers in Indonesia. *AIDS Education and Prevention*, 14(2), 102–116
- Bazergan, R., (2004) *HIV/AIDS: Policies and programmes for blue helmets* ISS Occasional Paper 96, November.
- Bell, C., Devarajan, S. and Gersbach, H. (2003) 'The Long-run Economic Costs of AIDS: theory and an application to South Africa' *World Bank Research Policy Research Working Paper*, No. 3152.
- Bennett, L. (2000). Sex talk, Indonesian youth and HIV/AIDS. *Development Bulletin*, 52, 54–57.
- Bennett, Olivia, (1990), *Triple Jeopardy: Women and AIDS* (Panos Dossier), London: Panos Institute
- Bicego, G.; Rutstein, S. & Johnson, K. (2003). Dimensions of the emerging orphan crisis in sub-Saharan Africa. *Social Science and Medicine*, 56, 1235–1247
- Booth, A. (2004). Africa in Asia? The Development Challenges Facing Eastern Indonesia and East Timor. *Oxford Development Studies* 31(1): 19–35.
- BPS Statistics Indonesia & the Ministry of Health. (2002–3) *Behavioral Surveillance Survey (BSS) Result in Indonesia*.
- Brundige, E., King, W., Vahali, P., Vladeck, & Yuan, X. (2003). Indonesian human rights abuses in West Papua: application of the law of genocide to the history of Indonesian control. Paper prepared for the Indonesia Human Rights Network.
- Butt, L. (2005). "Lipstick Girls" and "Fallen Women" AIDS and conspiratorial thinking in Papua, Indonesia. *Cultural Anthropology* 20(3), 412–442.
- Butt, L. Numbery, G. & Morin J. (2002). Preventing AIDS in Papua. Revised research report. Dec 2002
- Butt, L. Numbery, G. & Morin, J. (2002a). The smokescreen of culture: AIDS and the indigenous in Papua, Indonesia. *Pacific Health Dialog*, 9 (2), 283–289
- Campbell C. (2003). *Letting Them Die: Why HIV Interventions Fail*. International African Association in association with James Currey
- Cohen, D. (2002) 'Human capital and the HIV epidemic in sub-Saharan Africa: Working paper 2'. Geneva, ILO.
- Cohen, D. The Economic Impact of the HIV Epidemic: Issues Paper No. 2. *HIV and Development Programme, UNDP*.
- Council for World Mission. (2004). Papua New Guinea: 'Witches' scapegoated as AIDS spreads. 7 September 2004. URL: http://www.cwmission.org.uk/news/view_news.cfm?FeatureID=2084
- Cowan, F., Hargrove, J., Langhaug, L., Jaffar, S., Mhuriyengwe, L., Swarthout, T., Peeling, R., Latif, A., Bassett, M., Brown, D., Mabey, D., Hayes, R. & Wilson, D. (2005). The appropriateness of core group interventions using presumptive periodic treatment among rural Zimbabwean women who exchange sex for gifts or money. *Journal of Acquired Immune Deficiency Syndromes*, 38(2): 202–207.
- Crofts, N. (1999). Bali high? Intravenous drug use in Indonesia – when will we ever learn? (Editorial). *International Journal of Drug Policy*, 10, 79–81.

- de Wagt, A. (2005). Comprehensive strategies to prevent HIV infection in children in East Asia and the Pacific, UNICEF EAPRO
- Denoon, D. (1989). *Public health in Papua New Guinea: Medical possibility and social constraint 1884–1984*. Cambridge: Cambridge University Press
- Department of Foreign Affairs and Trade (2004). Papua New Guinea: The Road Ahead. DFAT, Economic Analytical Unit
- Directorate of Policy and Planning Ministry of Health (2005), *National Health Workforce Plan: Democratic Republic of East Timor 2005–2010*, May Dili.
- Donaldson C & Shackley P., (1997), Economic evaluation in Detels R, Holland WW, McEwan J and Omenn GS (eds) *Oxford Textbook of Public Health* (Third edition). Oxford, Oxford University Press
- Dugue, M (2004) PNG: A Man's World? ADB Review, January - February www.adb.org/Documents/Periodicals/ADB_Review/2004/vol36_1/world.asp
- Dupont, A. (2001). 'HIV/AIDS: A major international security issue' in *HIV/AIDS and development in Asia and the Pacific – A Lengthening Shadow*. Asia Pacific Ministerial Meeting Canberra: AUSAID
- East Timor Judicial System Monitoring Programme (2002a). Statistics on Cases of Violence against Women in East Timor Dili, T-L: February
- East Timor Judicial System Monitoring Programme (2002b). Police Treatment of Women in East Timor. Dili, T-L: January
- Eves, R. (1998). *The Magical Body: Power, Fame and Meaning in a Melanesian Society*. Studies in Anthropology and History Vol. 23. Amsterdam: Harwood Academic
- Eves, R. (2004). The play of powers made visible: magic and dance in New Ireland. *Anthropology*, 69 (3), 341–362
- Family Health International. (2000). Final Report for the AIDSCAP Program in Haiti. URL: <http://www.fhi.org/en/HIVAIDS/pub/Archive/aidscapeports/finalreportAIDSCAPhaiti/index.htm>
- Farmer, E. (1996). AIDS and the community. *Papua New Guinea Medical Journal*, 39, 214–217
- Farmer, P. (1990). Sending Sickness: sorcery, politics and changing concepts of AIDS in rural Haiti. *Medical Anthropology Quarterly*, 4, 6–27
- Ford, K., Wirawan D. & Muliawan P. (2002). Social influence, AIDS/STD knowledge, and condom use among male clients of female sex workers in Bali. *AIDS Education and Prevention*, 14(6), 496–504
- Ford, K., Wirawan, D. N., Sumantera, G. M., Sawitri, A. A. & Stahre, M. (2004). Voluntary HIV testing, disclosure and stigma among injection drug users in Bali, Indonesia. *AIDS Education and Prevention*, 16(6), 487–489.
- Fox, M. P.; Rosen, S.; MacLeod, W. B.; Wasunna, M.; Bii, M.; Foglia, G. & Simon, J. L. (2004). The impact of HIV/AIDS on labour productivity in Kenya. *Tropical Medicine and International Health* 9 (3): 318–324
- Garap, S. (1999). The struggles of women and girls in Simbu Province. *Development Bulletin* 50, 47–50
- Gare, J.; Lupiwa, T.; Suarkia, D.; Paniu, M.; Wahasoka, A.; Nivia, H.; Kono, J.; Yeka, W., Reeder, J. and Mgone, C. (2005). High prevalence of sexually transmitted infections among female sex workers in the Eastern Highlands province of Papua New Guinea: Correlates and recommendations. *Sexually Transmitted Diseases* 32(8), 466–473
- Ghys, P., Bazant, W., Monteiro, M., Calvani, S. & Lazzari, S. (2001). The epidemics of injecting drug use and HIV in Asia. *AIDS*, 15(suppl 5), 91–99.

Gillett, J. (1990). The health of women in Papua New Guinea. Monograph No. 9. Goroka, Papua New Guinea: Papua New Guinea Institute of Medical Research

Glynn, J. R. & Carael, M. (2004). Does increased general schooling protect against HIV infection? A study in four African cities. *Tropical Medicine and International Health*, 9 (1), 4-14

Gordon, P. and Crehan, K. (nd) 'Dying of Sadness: gender, sexual violence and the HIV epidemic' SEPED Conference Paper Series, Contribution to the five year review of the Fourth World Conference on Women and the World Summit for Social Development. URL: <http://www.undp.org/seped/publications/dyingofsadness.pdf>

GoTL (2003) East Timor Demographic and Health Survey (DHS): Dili

GoTL and Ministry of Planning and Finance (2005). The Democratic Republic of East Timor Combined Sources Budget 2005-06: Draft Budget/ Background paper

GoTL Ministry of Health, GoTL Ministry of Education, Culture and Sports, et al. (2005). Health Care: Priorities and proposed sector investment program. Sector Investment Program

GoTL Ministry of Health, J. Rock, et al. (2005). Expanded comprehensive response to HIV and AIDS in Timor-Lest: Global Fund Fifth Call for Proposals

Government of Indonesia (2004). Indonesia: Progress report on the Millennium Development Goals.

Government of Indonesia (2005). Government Budget for Health, BAPPENAS.

Government of Indonesia. (2003). Department of Health workforce figures 2003, BAPPENAS.

Government of Indonesia. (2003). Total number of hospitals and beds by ownership and province, Indonesia, BAPPENAS.

Government of Indonesia. (2004). Indonesia: Progress report on the Millennium Development Goals.

Government of Papua New Guinea & United Nations in PNG (2004). *Millennium Development Goals: Report for Papua New Guinea* Port Moresby: Government of Papua New Guinea

Government of Papua New Guinea (2003). 2003 Budget

Government of Papua New Guinea (2004). 2004 Budget

Government of Papua New Guinea (2004a). Scaling up HIV/AIDS prevention, care and treatment through intensified multi-sectoral community based programme in Papua New Guinea

Government of Papua New Guinea (2005). 2005 Budget

Government of Papua New Guinea (2005a). PNG Public Health Sector Expenditure Report 2001-2005

Government of Papua New Guinea (2005b). PNG Public Health Sector Expenditure Report 2004

Government of Papua New Guinea (2005c). Labour Force Indicators. National Statistical Office of Papua New Guinea 2005

Government of Papua New Guinea (2005d). Papua New Guinea 2000 Census. Port Moresby. National Statistical Office of Papua New Guinea. 2005

Government of PNG Department of Health (2003). Performance monitoring indicators 1999-2003.

Government of PNG Department of Health and G. Hiawalyer (2005). *Mid term review of NHP 2001-2010 and annual sector review 2003-2004*.

Government of East Timor Directorate of Policy and Planning Ministry of Health (2005). *National Health Workforce Plan: Democratic Republic of East Timor 2005-2010*. Dili.

- Government of East Timor Ministry of Health (2005). Health budget and expenditure papers. Dili.
- Government of East Timor Ministry of Health, GoTL Ministry of Education, Culture and Sports, et al. (2005). *Health Care: Priorities and proposed sector investment program*. Sector Investment Program. Dili.
- Haacker, M. (ed) (2004). *The Macroeconomics of HIV/AIDS*, Washington DC: International Monetary Fund.
- Hammar, L. (2005). The double whammy: STDs and sexually transmitted dis-ease in Papua New Guinea. In Eve, R.; Hammer, L. & Luker, V. (Eds) *Talking AIDS, Talking Place: Challenges for Papua New Guinea's response to HIV/AIDS*. In press
- Hammar, L. (forthcoming) Fear and loathing in Papua New Guinea: Sexual health of/in a nation under siege. In Butt, L. & Eves, R. (Eds.). *AIDS in Oceania*
- Hargreaves, J. R., & Glynn, J. R. (2002). Educational attainment and HIV-1 infection in developing countries: A systematic review. *Tropical Medicine and International Health*, 7(6), 489–498
- Harvey, Paul (2003) 'HIV/AIDS: What are the Implications for Humanitarian Action? A Literature Review' Humanitarian Policy Group, ODI, London.
- Hauck, V., Mandie-Filer, A. and Bolger, J. (2005) *Ringing the church bell: the role of churches in governance and public performance in Papua New Guinea: Discussion Paper Number 57E* Maastricht: European Centre for Development Policy Management
- Herd, G. H. (1984). Ritualized homosexual behavior in the male cults of Melanesia, 1862-1983: an introduction. In Herdt, G. H. (Ed). *Ritualized Homosexuality in Melanesia*, Berkley: University of California Press
- Hogan, D. R. & Salomon, J. A. (2005). Prevention and treatment of human immunodeficiency virus/acquired immunodeficiency syndrome in resource-limited settings. *Bulletin of the World Health Organisation* 83(2), 135–143
- Holmes, K.; Levine, R. & Weaver, M. (2004). Effectiveness of condoms in preventing sexually transmitted infections. *Bulletin of the World Health Organisation* 82(6), 454–461
- Holtgrave, David R. (ed) (1998), *Handbook of Economic Evaluation of HIV Prevention Programs*, New York: Plenum Press
- Hosegood, V.; McGath, N.; Herbst, K. & Timaeus, I. M. (2004). The impact of adult mortality on household dissolution and migration in rural South Africa. *AIDS*, 18, 1585–1590
- Howe, M. (2002). Papua New Guinea faces HIV epidemic. *The Lancet* 2, 386
- Hughes, J. (2002). Sexually transmitted infections: a medical anthropological study from the Tari Research Unit 1990–1991. *Papua New Guinea Medical Journal* 45(1–2), 28–133
- Hugo, G. (2001). Indonesia internal and international population mobility: Implications for the spread of HIV/AIDS. November 2001. UNDP/ ILO/ UNAIDS.
- Hull, T (2004). Fertility after the conflict and during the famine: The case of East Timor. Unpublished paper, Australian Population Association, 12th Biennial Conference, Canberra: 15–17 September
- Human Development Report. (2005). Country Sheet: Papua New Guinea. URL: <http://hdr.undp.org/statistics/data/countries.cfm?c=PNG>
- Human Rights Watch (2001). Kenya: In the Shadow of Death: HIV/AIDS and children's rights in Kenya. June, Vol. 13, (4A), pp1-35
- Husain, I. (2005). *Health and Development: IEAN Special Session: Interactions of Development and HIV/AIDS*. Cape Town, South Africa.

- Indonesia Social Indicators, World Bank Estimate. <http://siteresources.worldbank.org/INTINDONESIA/Resources/Country-Data/SocialIndicators.pdf>
- International Finance Corporation against AIDS. (2003). Working with clients to protect people and profitability. URL: http://www2.ifc.org/sustainability/docs/IFC_against_AIDS.pdf.
- International Labour Office (2004), *HIV/AIDS and work: global estimates, impact and responses* Geneva: The ILO Programme on HIV/AIDS and the World of Work
- International Labour Organisation. (2002). Implementing the ILO Code of Practice on HIV/AIDS and the world of work: an education and training manual. Geneva, Switzerland.
- International Monetary Fund (2005). Democratic Republic of East Timor: Poverty Reduction Strategy Paper IMF Country Report No. 05/246. Washington: IMF
- Jenkins, C. (1996) AIDS in Papua New Guinea. (Editorial) *Papua New Guinea Medical Journal*, 39, 164–165
- Jenkins, C., *Final Report to UNAIDS: Police and Sex Workers in Papua New Guinea*. 1997.
- Jorgensen D. (1988). From sister-exchange to daughter- as-tradestore: money and marriage in Telefomin. *Catalyst*, 18, 255–80
- Kassum, J.-u.-d., Zhu, X., Kharas, H., Atinc, T. M., Bidani, B. and Richter, K. (2003), *East Timor: Poverty in a New Nation: Analysis for Action*, May 2003 Poverty Assessment Project, Government of East Timor, World Bank, Asian Development Bank, Japanese International Cooperation Agency, United Nations Development Program, United Nations Children's Fund, United Nations Mission of Support in East Timor.
- Katjasungkana, N. & Wieringa, S. E. (2003). Sexual Politics and Reproductive Rights in Indonesia. *Society for International Development*, 46(2), 63–67.
- Kiernan, B (2003). The Demography of Genocide In Southeast Asia: the death tolls in Cambodia, 1975–79, and East Timor, 1975–80. *Critical Asian Studies* Vol. 35 (4), pp. 585–597
- Kirsh S. (2002) Rumour and other narratives of political violence in West Papua. *Critique of Anthropology*.22 (1), 53–79.
- Knauft, B. M. (2003). What ever happened to ritualized homosexuality? Modern sexual subjects in Melanesia and elsewhere. *Annual Review of Sex Research* 2003.
- Koczberski, G. (2000). The sociocultural and economic context of HIV/AIDS in Papua New Guinea. *Development Bulletin* 52, 61–63.
- Kongsin, S and C. Watts (2000). *Conducting a household survey on economic impact of chronic HIV/AIDS morbidity in rural Thailand: Methodological Issues*. AIDS and Economics Symposium, IEAN Symposium, IEAN.
- Kulsudjarit, K. (2004). Drug Problem in Southeast and Southwest Asia. *Annals New York Academy of Sciences*, 1025, 446–457.
- Lee, K. and A.B. Zwi, (1996) 'A global political economy approach to AIDS: ideology, interests and implications'. *New Political Economy*, Vol 13, pp. 355–373.
- Lewis, M. and Center for Global Development (2005), *Addressing the Challenge of HIV/AIDS: Macroeconomic, Fiscal and Institutional Issues: CGD Working Paper*, April 26 Center for Global Development.
- Luker, V. (2004) 'Civil society, social capital and the churches: HIV/AIDS in Papua New Guinea'. *State Society and Governance in Melanesia Project, Working paper 2004/1*. Canberra: ANU
- Luker, V. (2002). Gender, women and mothers: HIV/AIDS in the Pacific. Working Paper No. 7. Gender Relations Centre, The Australian National University.

- Lush, L.; Walt, G. & Ogden, J. (2003). Transferring policies for treating sexually transmitted infections: what's wrong with global guidelines? *Health Policy and Planning* 18(1), 18–30.
- Mann, J. and D. Tarantola, (1996). *Aids in the world II: global dimensions, social roots, and responses*. 1996, New York: Oxford University.
- McCoy, C., McCoy, V., Lai, S., Yu, Z., Wang, X. & Meng, J. (2001). Reawakening the dragon: changing patterns of opiate use in Asia with particular emphasis on China's Yunnan province. *Substance Use and Misuse*, 36(1&2), 49-69.
- McGibbon, R. (2004). *Plural Society in Peril: Migration, Economic Change, and the Papua Conflict*. Policy Studies 13. Washington, East-West Center.
- McGreevey, W. & The Futures Group International (2003). *Resource Flows and National HIV/AIDS Accounts*.
- McKay, J. & B. Warner (2005). Relative cost effectiveness of current interventions directed at limiting the spread of HIV/AIDS in PNG, Indonesia and East Timor.
- Médicins Sans Frontières (2005). *Untangling the web of price reductions*. 8th edition, June 2005. URL: www.accessmed-msf.org
- Meier, E. (2003). The Growth of AIDS Orphans and Policy Solutions. *Paediatric Nursing* 29(1), 75–76.
- Mgone, C.; Passey, M.; Anang, J.; Peter, W.; Lupiwa, T.; Russel, D.; Babona, D. & Alpers, M. (2002). Human Immunodeficiency Virus and other sexually transmitted infections among female sex workers in two major cities in Papua New Guinea. *Sexually Transmitted Diseases* 29(5), 265–270.
- Micató M., (2001) 'East Timor: Build Women's Power: Development at the Rural Community Level' Detroit: Against the Current
- Ministry of Health, East Timor, (2004). Data HIV/AIDS in East Timor until 2004.
- Ministry of Planning and Finance Democratic Republic of East Timor (2005), *The Democratic Republic of East Timor Combined Sources Budget 2005–2006*, April.
- Mitchell, W. (1990). Why Wape men don't beat their wives: Constraints toward domestic tranquillity in a New Guinea Society. *Pacific Studies* 13(3), 141–150
- Monasch, R. & Boerma, J. T. (2004). Orphans and child care patterns in Sub-Saharan Africa: An analysis of 40 national surveys. *AIDS*, 18 (Suppl. 2), S 55–65.
- Monitoring the AIDS Pandemic (MAP) Network (2004). *AIDS in Asia: Face the facts*. MAP Report.
- Montlake, S. (2003). Strict Indonesia backs free needles for drug users: AIDS transmitted by drug use has led the government to allow needle-exchange clinics. *Christian Science Monitor*, (May 8 2003), 7.
- Morley, R. (1994). Wife beating and modernisation: The case of Papua New Guinea. *Journal of Comparative Family Studies* 25(1), 25
- Mpundu, M. (2000). The burden of HIV/AIDS on the Zambian health system. *AIDS Analysis Africa* 10 (5).
- National, The (4 April, 2006) 'AIDS Cases to Rise to over 11,800 in Q1', Port Moresby: Newspaper report: np.
- National HIV/AIDS Support Project (NHASP) (2003). *Milestone 57: Situational Analysis for Strategic Planning at District Level. Morobe Province Pilot Social Mapping Project*, December. Port Moresby
- National HIV/AIDS Support Project (NHASP), (2004), *The 2004 National Consensus Workshop of Papua New Guinea – Draft report*.

National Sex and Reproduction Research Team (NSRRT) and Carol Jenkins (1994). *National Study of Sexual and Reproductive Knowledge and Behaviour in Papua New Guinea*. Goroka: Papua New Guinea Institute of Medical Research.

National University of East Timor (2002). Key Statistics Lorosae Library Project. http://untl.labor.net.au/background/key_statistics.html

Noonan, M., King, P. & Wing, J. (2004). Peace building and development in West Papua – Dialogue versus violence: hearing other voices. The West Papua Project, Position paper No 5, November 2004.

O'Collins, M. (1999). Isolation, vulnerability and governance: Reflections on poverty assessments in Papua New Guinea, Fiji and Vanuatu. *Pacific Economic Bulletin*, 14(1). URL: <http://rspas.anu.edu.au/melanesia/maev.html>

Over, M., Heywood, P. Gold, J., Gupta, I., Hira, S., and Marseille, E., (2005), HIV/AIDS Treatment and Prevention in India, Modelling the Cost and Consequences, World Bank Report [Electronic], Available: <http://siteresources.worldbank.org/INTINDIA/Resources/IndiaARTReport1.pdf>

Padmohoedjo, P. (2004). Reducing HIV vulnerability from drug abuse. United Nations Office on Drugs and Crime, Regional Centre for East Asia and the Pacific.

Papua New Guinea Department for National Planning and Monitoring (2004), *The Medium Term Development Strategy: 2005–2010 'Our Plan for Economic and Social Advancement'*, November. Port Moresby: Papua New Guinea Department for National Planning and Monitoring.

Papua New Guinea Department of Health (2003). Health performance data 2003.

Parker, R.G., (1996). 'Empowerment, community mobilization and social change in the face of HIV/AIDS'. *AIDS*, 1996. 10 (suppl III): p. s27–s31.

Passey, M; Mgone, C.; Lupiwa, S.; Suve, N.; Tiwara, S.; Lupiwa, T.; Clegg, A. & Alpers, M. (1998). Community based study of sexually transmitted diseases in rural women in the highlands of Papua New Guinea: prevalence and risk factors. *Sexually Transmitted Infections* 74, 120–127.

Patterson, David (2001). 'Political Commitment, Governance, and HIV/AIDS' Canadian HIV/AIDS Policy and Law Review Volume 6, Number 1/2, .www.aidslaw.ca/Maincontent/otherdocs/Newsletter/vol6nos1-22001/politicalcommitment.htm

Pisani E, and Dili Survey Team, (2004), *HIV, STIs and Risk Behaviour in East Timor: A historic opportunity for effective action*. USAID, FHI.

Pisani E., Girault, P., Gultom M., Sukartini N., Kumalawati, J., Jazan S. & Donegan E. (2004). HIV, syphilis, infection, and sexual practices among transgenders, male sex workers, and other men who have sex with men in Jakarta, Indonesia. *Sex Trans Infections*, 80, 536–540.

Pisani, E., and Dili survey team (2004). HIV, STIs and Risk Behaviour in East Timor: an historic opportunity for effective action. Dili, T-L: USAID, FHI

Policy Project (2003). *The Socioeconomic Impact of HIV/AIDS in the Socialist Republic of Viet Nam*.

Price-Smith, A. T. (2002) *The Health of Nations: Infectious Disease, Environmental Change, and Their Effects on National Security and Development*, Cambridge: MIT Press.

Rabasa, A., Hosek, J. R. (2002). *The Military and Democracy in Indonesia: Challenges Politics Power*. Santa Monica CA: RAND.

Rhodes, T., Ball, A., Stimson, G., Kobyscha, Y., Fitch, C., Pokrovsky, V., Bezruchenko-Novachuk, M., Burrows, D., Renton, A. & Andrushchak, L. (1999). HIV infection associated with drug-injecting in the Newly Independent states, Eastern Europe: the social and economic context of epidemics. *Addiction*, 94(9), 1323–1336.

- Riono, P. & Jazant, S. (2004). The current situation of the HIV/AIDS epidemic in Indonesia. *AIDS Education and Prevention*, 16(Suppl A), 78–90.
- Robinson, K. (2002). Gender orders in some societies of the Indonesian Archipelago. *Jurnal Kultur*, 2(2)
- Robinson, K. (2002). Labour, love and loss: mining and displacement of women's labour. In *Tunnel Vision: Women Mining and Communities*. I. Macdonald & C. Rowland (Eds) Oxfam Community Aid Abroad.
- Rock, J. and Family Health International (2005). *Global Fund to fight AIDS, Tuberculosis and Malaria: Proposal East Timor*, June.
- Russell, S. (2004). 'The Economic Burden of Illness for Households in Development Countries: A review of studies focusing on malaria, tuberculosis, and human immunodeficiency virus/acquired immunodeficiency syndrome' *American Journal of Tropical Medicine and Hygiene* 71 (S2):147–155.
- Saltford, J. (2003). The United Nations and the Indonesian takeover of West Papua, 1962–1969: the anatomy of betrayal. Routledge.
- Schwartzlander, B.; Stover, J.; Walker, N.; Bollinger, L.; Gutierrez, P.; McGreevey, W.; Opuni, M.; Forsythe, S.; Kumaranayake, L.; Watts, C. & Bertozzi, S. (2001). Resource Needs for HIV/AIDS. *Science* 292(5526), 2434–2436.
- Scott, A. & Rosko, M. (1999). In search of community action on HIV/AIDS in Asia. UNESCO 1999, 377–387.
- Sedyaningsih- Mamahit Endang, R. (1999). Female commercial sex workers in Kramat Tunggak, Jakarta. *Indonesia Social Science & Medicine* 49, 1101–1114.
- Setiawan, I. M. (2002). Fighting AIDS in Indonesia. *Far Eastern Economic Review*, 165(12), 24.
- Setiawan, I. M., Patten, J., Triadi, A., Yulianto, S., Adnyana, T. & Arif, M. (1999). Report on injecting drug use in Bali (Denpasar and Kuta): results of and interview survey. *International Journal of Drug Policy*, 10, 109–116.
- Shields, L. & Hartarti, L. (2003). Nursing and health care in Indonesia. *Journal of Advanced Nursing*, 44(2): 209–216.
- Silitonga, N., Ruddick, A. & Wignall, F. (2002). Mining, HIV/AIDS and women – Timika, Papua Province, Indonesia. In *Tunnel Vision: Women Mining and Communities*. I. Macdonald & C. Rowland (Eds) Oxfam Community Aid Abroad 2002
- Simatauw, M. (2002). The Polarisation of People and the State in the Interest of the Political Economy and Women's Struggle to Defend their Existence; a critique of mining policy in Indonesia. trans. L. Bailey. In *Tunnel Vision: Women Mining and Communities*. I. Macdonald & C. Rowland (Eds) Oxfam Community Aid Abroad.
- Simpson, B (2005). 'Illegally and Beautifully': The United States, the Indonesian Invasion of East Timor and the International Community, 1974–76. *Cold War History*, Vol. 5, (3), August, pp. 281–315
- Spencer J. (2000). On not becoming a "Terrorist": Problems of memory, agency, and community in the Sri Lankan conflict. In V. Das, A. Kleinman, M. Ramphela and P. Reynolds (Eds) *Violence and Subjectivity* Berkeley: University of California Press. pp120–140.
- Stasch, R. (2001). Giving up homicide: Korowai experience of witches and police (West Papua). *Oceania* 72, 33–52.
- Statistics Indonesia (2003). 2003 National Labor Force Survey. Jakarta.
- Statistics Indonesia (2005). Brief information about BPS and Statistical Highlights: Selected Indicators of Indonesia. Jakarta.
- Steinberg, M., Johnson, S., Schierhout, G. and Ndegwa, D. (2004). *Hitting home: How households cope with the impact of the HIV/AIDS epidemic: A survey of households affected by HIV/AIDS in South Africa*. Health Systems Trust and the Kaiser Family Foundation available at: <http://www.eldis.org/static/DOC12590.htm>

- Stewart, C. (2004). Towards a climate of tolerance and respect: Legislating for HIV/AIDS and human rights in Papua New Guinea. *Journal of South Pacific Law* [online] 8(1). URL:<http://easol.vanuatu.usp.ac.fj/jspl/current>
- Stewart, P & Strathern, A. (1999). Engendering the millennium in Papua New Guinea. *Journal of Millennial Studies*, Summer 1999, 1–6.
- Stiglitz J. 1998. 'Towards a new paradigm for development: strategies, policies and processes'. World Bank, 1998 (www.worldbank.org/html/extdr/extme/jssp101998.htm).
- Stover, J.; Bollinger, L.; The Futures Group International; Bertozzi, S.; Gutierrez, J. P. & Instituto Nacional de Salud Publica (2004). Resource Needs for HIV/AIDS: Model for Estimating Resource Needs for Prevention, Care and Mitigation.
- Sturzenhofecker, G. (1998). *Times Enmeshed: Gender, space and history among the Duna of Papua New Guinea*. Stanford, California: Stanford University Press.
- Sugihantono, A., Slidell, M., Syaifudin, T. & Mayer, K. (2003). Syphilis and HIV prevalence among commercial sex workers in Central Java, Indonesia: risk-taking behavior and attitudes that may potentiate a wider epidemic. *AIDS Patient Care and STDs* 17(11), 595–600.
- Sumarto, S., Wetterberg, A. & Pritchett, L. (unpublished manuscript). The social impact of the crisis in Indonesia: results from a nationwide Kacamatan survey.
- Surtees R. (2003). Cultural Traditions. In R. Rosenberg (Ed.), *Trafficking of Women and Children in Indonesia*. Jakarta, Indonesia: ICMC, ACILS and USAID.
- Surtees, R. (2003). Female migration and trafficking in women: the Indonesian context. *Society for International Development* 46(3), 99–106.
- Tadjoeddin, M. Z., W. Suharyo, I, et al. (2001). Regional disparity and vertical conflict in Indonesia. *Journal of the Asia Pacific Economy* 6 (3): 283–304.
- Tanaja, V., (2000). East Timor: Women Fight An Uphill Battle, *Green Left Weekly* <http://www.greenleft.org.au/back/2000/430/430p25b.htm>
- Tanzania Commission for HIV/AIDS. (2003). National Multi-Sectoral Strategic Framework on HIV/AIDS 2003–2007. URL: <http://www.tanzania.go.tz/pdf/tacaidnsmf.pdf>
- The MAP report. (2004), *AIDS in Asia: Face the Facts*.
- The World Bank/ Australian Agency for International Development/ The Asian Development Bank, (2004), *Control of HIV/AIDS in Papua New Guinea: A situation assessment and proposed strategy (draft)*.
- U.S. Agency for International Development, *Papua New Guinea Country Profile: HIV/AIDS*.
- UN Regional Taskforce on Mobility and HIV Migration (2004) Building Good Governance and HIV resilience. Dili, T-L. United Nations Development Programme, Canadian International Development Agency, UNAIDS
- UNAIDS, (2000), *The Transex Project: Sex and Transport Workers, Police and Security Men in Papua New Guinea, in Female Sex Worker HIV Prevention Projects: Lessons Learnt from Papua New Guinea, India and Bangladesh*.
- UNAIDS, (2005), *A scaled-up response to AIDS in Asia and the Pacific*. Preliminary Population Projection
- UNAIDS. (2004) Papua New Guinea: Country HIV and AIDS estimates, end 2003. UNAIDS/WHO Epidemiological Factsheet.
- UNAIDS/ WHO, (2004), *Papua New Guinea, 2004 Update, in Epidemiological Fact Sheets on HIV/AIDS and STIs*.
- UNAIDS/UNICEF/USAID (2004) *Children on the Brink 2004: A joint report of new orphan estimates and a framework for action*. Population, Health and Nutrition Information Project UNAIDS/UNICEF/USAID.

- UNAIDS/WHO (2004). Case study on estimating HIV infection in a concentrated epidemic: Lessons from Indonesia. UNAIDS/WHO Working Group on Global HIV/AIDS/STI surveillance. Geneva, Switzerland.
- UNICEF (2002), *Multiple Indicator Cluster Surveys (MICS) East Timor, 2002* UNICEF.
- United Nations (2004). *The Impact of AIDS*. New York.
- United Nations (2005). National Accounts Main Aggregates Database 1998–2003 Papua New Guinea, United Nations.
- United Nations Development Program (2005). *Human Development Reports 2005*. Geneva: United Nations Development Program.
- United Nations Development Programme (2002) East Timor Human Development Report. Ukun Rasik A'an: the way ahead. Dili, East Timor: UNDP
- United Nations Economic and Social Council (2004). Economic and Social Commission for Asia and the Pacific. Sub Committee on Statistics, First Session 18–20 February 2004, Bangkok.
- US State Department (2000). East Timor: Country Reports on Human Rights. Washington: Bureau of Democracy, Human Rights and Labor
- USAID (2004). Gender Assessment for USAID/East Timor Country Strategy Plan FY 2004-2009 DevTech Systems, Inc. USAID Contract #: GEW-I-01-02-00019-00 Valdiserri, L (2001). Staff Statement, Asia and Pacific Department of the IMF at the Donors' Meeting for East Timor. Canberra: IMF
- Utomo, B. & Dharmaputra, N. (Eds) (2001). Findings of the Behavioral Surveillance Survey (BSS 1996–2000) on female commercial sex workers and adult male respondents. The Centre for Health Research, University of Indonesia, Jakarta.
- Utomo, I. (2003). Adolescent and Youth Reproductive Health in Indonesia: Status, Issues, Policies and Programs. Policy Project, January 2003. Futures Group International, Research Triangle Institute and Centre for Development and Population Activities.
- Vidanapathirana, J.; Abramson, M. J.; Forbe, A. & Fairley, C. (2005). Mass media interventions for promoting HIV testing. *The Cochrane Database of Systematic Review* 3.
- Wai, K., Pale, M. and Sims, P. (2005) 'Seven Days Census of the Medical Inpatient beds at Port Moresby General Hospital' Unpublished paper.
- Walker, D. (2003), *Cost and cost-effectiveness of HIV/AIDS prevention strategies in developing countries: is there an evidence base?* in Health Policy and Planning; 18 (1):4–17
- Wardlow, H. (2002). Giving birth to Gonolia: "Culture" and sexually transmitted disease among the Huli of Papua New Guinea. *Medical Anthropology Quarterly*, 16 (2), 151–175.
- Wardlow, H. (2002a). Passenger-women: changing gender relations in the Tari Basin. *Papua New Guinea Medical Journal* 45(1-2), 142–146.
- Wardlow, H. (2002b). Public Health, Personal Beliefs: Battling HIV in Papua New Guinea. *Cultural Survival Quarterly Issue* 26, 3.
- Wardlow, H. (2004). Anger, economy and female agency: problematizing "prostitution" and "sex work" among the Huli of Papua New Guinea. *Signs* 29(4), 1017–1040.
- Whiteside & de Waal, (2004). 'That's resources you see!': Political economy, ethics and the HIV/AIDS epidemic. *New Political Economy*, 9 (4), 581–594.

- Wilson C. (2001). Internal conflict in Indonesia: Causes, symptoms and sustainable resolution. Research Paper 1 2001–2002. Foreign Affairs Defence and Trade Group. Australian Government Canberra.
- Windybank, S. and Manning, M. (2003) 'Papua New Guinea on the Brink' *Independent Studies* 30: 1–16.
- Wolffers I., Subarniati T., Basuki E., Yudhi D., Deville W. & Hargono R. (1999). Pacar and Tamu: Indonesian women sex workers' relationships with men. *Culture Health and Sexuality*, 1(1), 39–53.
- Workshop Report, (2002), *Estimates of Adult HIV infection, Indonesia*.
- World Bank (2004). Indonesia Country Assistance Strategy. Washington DC
- World Bank (2005). *World Bank Development Indicators*, World Bank. 2005
- World Bank and International Development Association (2005). Country Assistance Strategy, Dili, International Development Association.
- World Bank, (1997) *Confronting AIDS: Public priorities in a global epidemic*. New York: Oxford University Press.
- World Health Organisation – Regional Office for South-East Asia & Regional Office for the Western Pacific, (2001), *The Condom Situation Assessment in 11 Asian and Western Pacific Countries*.
- World Health Organisation (1993), Safe Blood and Blood Products. Distance Learning Material. WHO/GPA/CNP/93.2A-E. Geneva, World Health Organisation.
- World Health Organisation (2002), WHO Statistical Information, Vol. Accessed: July, WHO.
- World Health Organisation (2003), *Increasing Investments in Health Outcomes for the Poor: Second consultation on Macroeconomics and Health: Indonesia*, October World Health Organisation
- World Health Organisation (2004a). *World Health Report 2004: Changing History*. Geneva: WHO. URL: <http://www.emro.who.int/PDF/whr2004en.pdf>
- World Health Organisation (2004b). Country Health Profiles.
- World Health Organisation (2004c). Summary Country Profile for HIV/AIDS Treatment Scale-up: Indonesia. WHO. 2005. Geneva
- World Health Organisation (2004d). Global Atlas of Health Workforce, World Health Organisation, accessed: 8 June 2005, <http://www.who.int/GlobalAtlas/DataQuery> Geneva.
- World Health Organisation (2004e). Global Atlas, World Health Organisation, accessed: 8 June 2005, <http://www.who.int/GlobalAtlas/DataQuery> Geneva.
- World Health Organisation and UNAIDS (2005). '3 by 5' Progress report December 2004.
- World Health Organisation/ National AIDS Council / National Department of Health, (2000), *Consensus Report on STI, HIV and AIDS Epidemiology, Papua New Guinea*
- Zaba, B.; Whiteside, A. & Boerma, J. (2004) Demographic and socioeconomic impact of AIDS: taking stock of the empirical evidence. *AIDS*, 18 (Suppl. 2), S1–S7.
- Zimmer-Tamakoshi, L. (2004). 'Rape and other sexual aggression'. In C. Ember & M. Ember (Eds.). *The encyclopedia of sex and gender*. Amsterdam: Kluwer.
- Zwahlen M, Vlahov D. Commentary, (2003): Modelling and understanding differences in human immunodeficiency and hepatitis C virus epidemiology in injection drug users. in *International Journal of Epidemiology* 2003;32:715–716
- Zwi, A., (1993). 'Reassessing priorities: identifying determinants of HIV Transmission', *Social Science and Medicine*, 36 (5): iii–viii (editorial).

Appendix 1: National counterparts

NATIONAL COUNTERPARTS

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2. INDONESIA

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Directorate General of Communicable Disease
Control and Environmental Health
Department of Health

Mr Arum Atmawikarta

Director of Health and Nutrition
BAPPENAS (National Development Planning Board)

Mr Bram Brotodiningrat

Directorate of East Asia and Pacific
Department of Foreign Affairs

Dr Suharto

National AIDS Commission, Coordinating Ministry
for People's Welfare

3. EAST TIMOR

Mr Luis Lobato

Vice-Minister for Health

Mr Carlos Tilman

Director of Health Services

Ministry of Health

Appendix 2: Health policy budget assumptions

While not within the scope of this work to explicitly map out policy responses some policy assumptions are inherent in formulating the health sector budget for each of the countries. Table A1 below outlines these assumptions, but also draws out the limitations of those assumptions in regard to current or future developments.

The table below is split by each element of an HIV/AIDS policy program response.

TABLE A2: POLICY RESPONSES – WHAT IS INCLUDED AND POTENTIAL ALTERNATIVES

Program responses	Policy characteristics inherent in responses and financial analysis:	Potential policy alternatives or future developments, noted but not included in financial analysis:
Treatment		
ART	Includes provision of simplified first line regimes and some monitoring tests.	As coverage expands a broader spectrum of drugs will be required to provide effective alternatives if resistance develops (Hogan and Salomon 2005). These are likely to be more expensive.
		Prices of some first-line treatments have significantly fallen over the last few years. However, prices for second and third-line drugs are more expensive, and six to twelve times more expensive in Least Developed Countries which includes East Timor. (Medicins Sans Frontieres 2005).
		Indonesia is expecting to rely on local production of three antiretroviral drugs approved by the Food and Drugs Control, and the Ministry of Health has committed to subsidizing the treatment of 4000 people in 2004 (WHO 2004c).
		New data are showing that a public health approach as opposed to a physician-oriented approach has been yielding high adherence rates in South-Africa (WHO and UNAIDS 2005), as such costs may be further reduced.
Prevention		
Prevention of mother to child transmission (PMTCT)	Includes testing and drugs to reduce transmission late in pregnancy, during labour and breastfeeding. (For PNG includes breast milk substitute.)	UNICEF proposes a 4-pronged approach that is broader than the current focus on secondary prevention. The 4-pronged approach combines primary prevention (prong 1) with secondary prevention (prong 3), family planning (prong 2) and care and support for those that are HIV positive (prong 4). UNICEF recommends in low prevalence settings (HIV prevalence <1%), the approach should focus on prongs 1-2 across the country, and on 3-4 in referral settings. Where prevalence is >1%, all four prongs should be offered (de Wagt 2005).
Blood safety	Adhering to WHO recommendations the number of blood unit required is based on 2% of the population.	As for ART, prices for the drug component of PMTCT may also change.
Mass media and community education	Included in the mid and high impact response is the assumption that there is an increase in mass media effort that contributes to increasing use of VCT (Vidananpathirana, Abramson et al. 2005), increasing use of condoms and health services. Awareness is a function of both frequency and reach – how many people are reached with the message and how frequently they are told the message.	

Program responses	Policy characteristics inherent in responses and financial analysis:	Potential policy alternatives or future developments, noted but not included in financial analysis:
VCT	Testing and staff for counselling.	With the advent of rapid test kits, VCT does not always need to occur in a formal clinic setting. Further, there are instances where AIDS cases are being clinically diagnosed instead of relying on VCT. However, increases in VCT are also dependent on reductions in stigma (Hogan and Saloman 2005).
STI treatment	Syndromic management and treatment of STIs does not rely on laboratory tests which are costly, time consuming and can be inaccessible (Lush, Walt et al.2003). The analysis focuses on STI treatment of those in the broadly defined category of sex workers. Both increasing the frequency of treatment of STIs and increasing the use of condoms has an impact on STI rates.	Decreasing STI prevalence is dependent on people not assuming symptoms are normal, and overcoming the reluctance to seek treatment.
Condoms	Cost of reaching people with condoms, logistics and associated condom promotion.	This analysis does not include the distribution and use of female condoms, although it is acknowledged that can play a role in prevention.

CALCULATING THE HEALTH BUDGET

Research by Schwartlander, Stover et al (2001) and HIV/AIDS resource needs analysis tools developed by Stover, Bollinger et al (2004) provides the foundation for the health budget analysis. Together these materials provide details on coverage targets, formulas and unit costs for calculating HIV/AIDS prevention, care and treatment budgets. These data combined with population and sub-population size data from the epidemiological modelling for the 20 year time period for the three scenarios provides the foundation for calculating the health budget. In addition, unit costs have been determined by the team (McKay and Warner 2005). The health budgets calculated here are indicative of the financial impact on the health sector. They are not intended to provide accurate figures, rather to illustrate the potential size both of the response to the future epidemic (under the baseline scenario), and potential cost differences in scaling up the response. These budget estimations are comprised of program response components, for example, the cost of prevention of mother to child transmission, condom costs and provision of ART. Appendix 3 *Technical notes* explains the calculations in detail.

PREVENTION COMPONENT

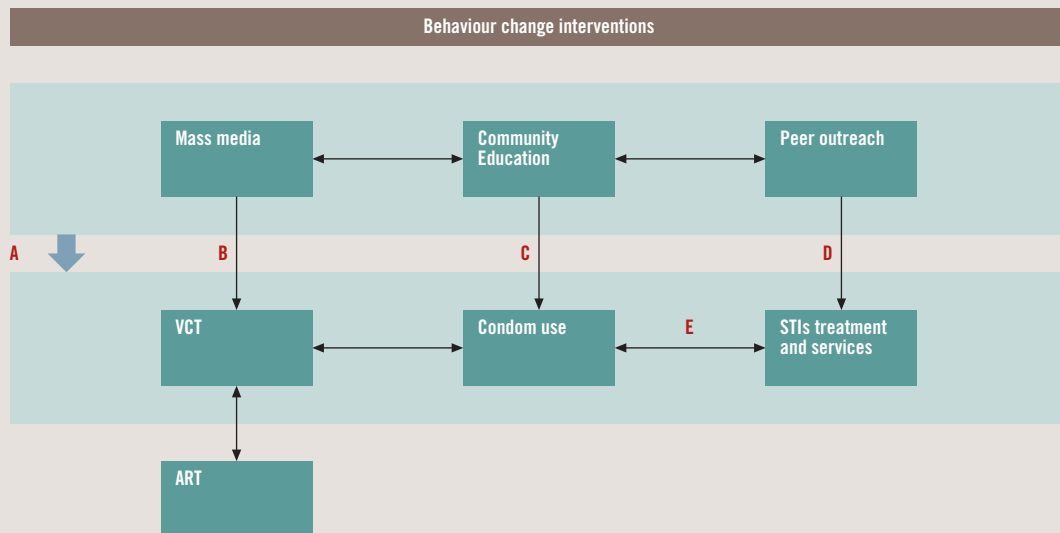
Literature indicates that HIV incidence does not show a decline unless a critical mass of people changes their behaviour. For all three countries this means safe sexual behaviour, and for Indonesia, and a lesser extent Timor this means less needle sharing. Prevention can be viewed as a public good that needs to be financed by governments or donors. The argument is that a 'public good', as it is consumed, yields benefits to those other than the consumer. Since the individual does not capture all the benefits, the individual is likely to underspend on this. So government spends to ensure that such goods are purchased and consumed to bring benefits and costs into balance (McGreevey and the Futures Group International 2003).

There are two elements that need to be considered in developing prevention budgets: reach and coverage. Reach is the number or proportion of people who need to be reached with a particular program

response. Coverage is the number of people who change their behaviour. There is no standard ratio of people reached to coverage rates. Behaviour is influenced by social norms and values. Effort to affect behaviour change varies widely in intensity and quality and is not an absolute that is consistent like a drug or vaccine intervention. However, costs are incurred based on reach - not on actual coverage or behaviour change. The medium and high intensity responses are driven by changes in coverage. In order to determine prevention budgets we therefore need to make assumptions about the reach - coverage relationship. In order to achieve a behaviour change as many people as possible need to be reached. Methodology devised by ADB suggests two options: the first is assume an 80-100% reach of the sub-population and the second is to have a reach that is 10-20% higher than behaviour change target (Asian Development Bank and UNAIDS 2004). Given that the key input to the epidemiological model is a coverage rate, analysis here applies a 20% increase on that coverage rate as the reach.

The prevention component of the health budget is calculated based on unit costs, population targets and reach. This analysis recognises the links between the different components of a prevention program. The linkages between components of prevention programs are illustrated below.

FIGURE A2: RELATIONSHIPS BETWEEN ELEMENTS OF PREVENTION POLICY RESPONSES



A - Behaviour change interventions include peer outreach, mass media campaigns and community education programs. Underlying this is the assumption that behaviour change is more than awareness and requires new and reinforcing messages through repeated interactions (Asian Development Bank and UNAIDS 2004). These behaviour change interventions influence the use of prevention tools (condoms) and take up of services (VCT and STI treatment).

B – Mass media campaigns have an impact on increasing the level of voluntary counselling and testing (Vidanapathirana, Abramson et al. 2005).

C – Mass media campaigns play a role in making condom use acceptable

(Ainsworth and Teokul 2000), and controlling the spread of STIs (Holmes, Levine et al. 2004).

D – Peer outreach programs influence the use of prevention tools

E – STI rates decrease as condom use increases; and STI services increases condom use (Ainsworth and Teokul 2000).

Appendix 3: Technical notes

A. CALCULATIONS – HEALTH BUDGET ESTIMATIONS

The Resource Needs Model developed by Stover, Bollinger et al. (2004) provide the foundation for estimating the financial impact of HIV/AIDS. It should be noted that figures based on these formulations are indicative only.

TREATMENT AND CARE COMPONENT

1. ARV costs = unit cost per annum x number of people on treatment
Coverage rate as specified in epidemiological model.
2. Opportunistic infection treatment and care costs
 - > % of people with access to palliative care (median of: access to DOTS, % of cases detected under DOTS, DPT immunisation 1 and 3, attended births) (see Stover, Bollinger et al. 2004)
 - b. % of people with access to opportunistic infection treatment ((median of: access to DOTS, % of cases detected under DOTS, DPT immunisation 1 and 3, attended births) to the power of 2.5) (see Stover, Bollinger et al. 2004)
 - c. People needing opportunistic infection palliative care = % of people with access to palliative care x all late stage HIV and all AIDS per annum (last two years of life)
 - d. Opportunistic infection palliative care costs = $2c \times$ unit cost per annum of opportunistic infection palliative care
Assume all of those with late stage HIV and AIDS need some palliative care during their time with the disease regardless of whether on ARV or not.
 - e. People needing opportunistic infection treatment = % of people with access to opportunistic infection treatment x all late stage HIV and all AIDS per annum (last two years of life)
 - f. Opportunistic infection treatment costs = $2e \times$ unit cost per annum of opportunistic infection treatment and prophylaxis
3. Cost of hospitalisation
 - a. Cost per bed day = total hospital budget divided by total number of beds divided by 365 days
 - b. Number of bed days for late stage HIV and AIDS per annum x number of people with AIDS
 - c. Cost of hospitalisation = $3a \times 3b \times$ % of people with access to health care
Note: unit costs available for opportunistic infection and palliative care may include some home-base care and hospitalisation costs (Bertozi, personal communication, see Stover, Bollinger et al 2004). However, the costing tool developed by Asian Development Bank and UNAIDS suggests providing both costs to illustrate to the health sector the cost of the burden of disease (2004). Furthermore with knowledge of the hospitalisation costs the unit cost data available seems too low.
4. Percentage of hospital medical beds days taken with AIDS cases
 - a. Number of bed days for AIDS case per annum x % with access to health care divided by total number of bed days x 40% (assume 40% of hospital beds are medical beds, the rest are surgical, psychiatric, obstetric and gynaecology) (personal communication and information provided by Hospital Adviser PNG)

PREVENTION COMPONENT

1. PMTCT = unit cost of PMTCT x number of pregnant women who are HIV positive x coverage rate taken from epidemiological model
2. Community education, mass media, peer outreach = percentage of current prevention budget applied to projected prevention budget.
3. Condom distribution = unit cost of male condom x reach (assumed to be 20% above coverage (Asian Development Bank and UNAIDS 2004) as specified in epidemiological model) of sex acts
4. VCT = unit cost of VCT x sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5 (Stover, Bollinger et al. 2004)
5. Blood safety = unit cost of blood testing x 2% of the population (the number of blood units required) (WHO 1993)
6. Sex workers
 - a. STI treatment component = unit cost of STI treatment x number of treatments per annum
 - b. Condoms = unit cost of male condom x reach (assumed to be 20% above coverage as specified in epidemiological model) of sex acts of sex worker population
 - c. Cost of targeting sex workers = unit cost of targeting sex workers x reach (assumed to be 20% above coverage as specified in epidemiological model) of sex workers

B. UNIT COSTS AND ACCESS TO HEALTH CARE – HEALTH BUDGET COMPONENT

UNIT COSTS

In AUD	PNG	Indonesia
ART per person, per year ^	1297	943
OI treatment per year*	195	195
OI prophylaxis per year*	33	33
Palliative care per year*	48.75	48.75
Hospital bed per day (excluding medical supplies)#	24	24
PMTCT ^	438	369
VCT, per session per person^	18	33
Sex worker:		
> STI treatment, per treatment^	> 17	> 17
> Peer outreach, per person*	> 20 urban, 27.7 rural	> 20 urban, 27.7 rural
> Condoms, per condom*	> 0.13 urban, 0.18 rural	> 0.13 urban, 0.18 rural
Blood safety, per unit of blood tested^	12	11
Condom per male condom * (adjusted)	0.1	0.1
IDU, per person per year ^	n/a	145

References for unit cost data include:

(*Schwartlander, Stover et al. 2001; #GoPng 2005b; ^McKay and Warner 2005)

Access to health care	PNG	Indonesia	Timore-Leste
Palliative care			
Access to DOTS	46%	98%	78%
DPT immunization 1	60%	88%	65%
DPT immunization 3	54%	70%	70%
Antenatal care		97%	
Attended delivery	53%	66%	24%
Case detected under DOTS	15%	33%	53%
	53%	79%	65%
OI treatment			
Access to DOTS	46%	98%	78%
DPT immunization 1	60%	88%	65%
DPT immunization 3	54%	70%	70%
Antenatal care		97%	
Attended delivery	53%	66%	24%
Case detected under DOTS	15%	33%	53%
	53%	79%	65%
raised to 2.5	20%	55%	34%

WHOb and WHOe are the key references for the above data. Methodology based on Stover, Bollinger et al. (2004)

NUMBER OF DAYS STAY IN HOSPITAL

	PNG*	Indonesia	East Timor
Number of days stay	34.5	30	30

(Asian Development Bank and UNAIDS 2004; *Wai, Pale et al.2005)

C. LOST PRODUCTIVITY COST ESTIMATIONS

- a. Average number of life years lost = difference between life expectancy less 5 years and average age of AIDS related death times number of AIDS related deaths
- b. Reduced productivity = (decreases in productivity in second to last year of life x late stage HIV cases) + (decreases in productivity in last year of life x AIDS cases)
- c. $(Ca + Cb) \times \text{GDP per worker excluding any gas, mining and petroleum portion as proxy for value of productivity or output}$

Appendix 4 : PNG – links between model and health sector costs

To determine the impact on the health sector, this analysis outlines the links between the epidemiological model and the characterisation of the HIV response in terms of the health sector (refer also to Appendix A which outlines how each element of the HIV response may change over the 20-year time period).

TABLE A4: PAPUA NEW GUINEA: CHARACTERISTICS OF THE BASELINE, MID AND HIGH IMPACT RESPONSES
IMPLICATIONS FOR ESTIMATING THE HIV/AIDS HEALTH BUDGET

Response component	Baseline scenario	Medium-response scenario	High-response scenario	Included in the epidemiological model
Treatment and care				
Costs of ART – urban and rural	Assumes either 18% or 100% of all late stage HIV and AIDS cases receive ART	Assumes either 18% or 100% of all late stage HIV and AIDS cases receive ART	Assumes either 18% or 100% of all late stage HIV and AIDS cases receive ART	<input type="checkbox"/> These ART percentages are used to calculate costs and differ from the epidemiological model so to show savings possible with a high prevention response.
Costs of treatment and care for opportunistic infection	Assume those with late-stage HIV infection and AIDS require opportunistic care and treatment. Assumes access is limited.	Decrease as prevalence of HIV declines.	Decrease as prevalence of HIV declines.	N/A
Cost of hospitalisation	Assume AIDS cases have stay in hospital, Assumes stay is limited to those with access.	Decreases as prevalence of HIV declines.	Decreases as prevalence of HIV declines.	N/A
Prevention				
Prevention of mother to child transmission – urban	From 2010 50% of all pregnant women with AIDS receive prevention treatment. From 2015, 50% of all pregnant women who are HIV-positive receive prevention treatment. These figures are above those in the Global Fund proposal, but reflect the intention to offer treatment to as many women positively diagnosed as possible. This may over estimate costs of the baseline scenario from 2015.	25% of all pregnant women who are HIV-positive receive prevention treatment	50% of all pregnant women who are HIV-positive receive prevention treatment	<input checked="" type="checkbox"/>
Prevention of mother to child transmission – rural	No treatment	15% of all pregnant women who are HIV positive receive prevention treatment	25% of all pregnant women who are HIV positive receive prevention treatment	<input checked="" type="checkbox"/>
Blood safety	Assume follows WHO standards: number of blood units equivalent to 2% of population (WHO, 1993). Estimates indicate about 0.5% is currently tested.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	<input type="checkbox"/>

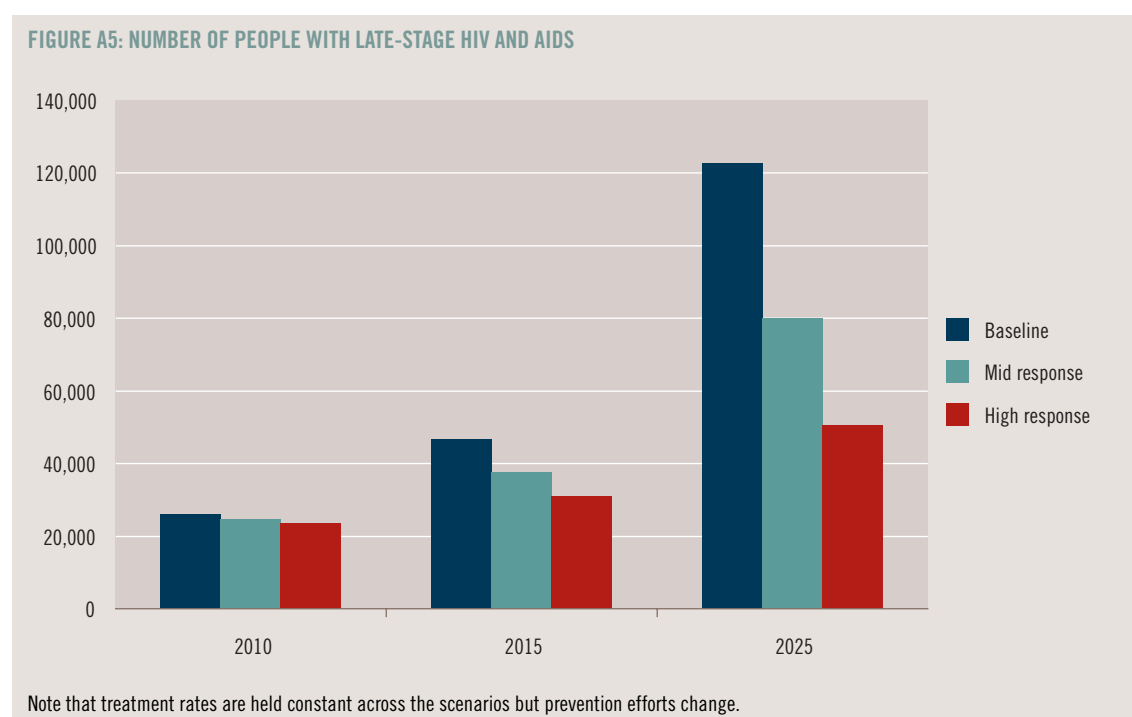
Response component	Baseline scenario	Medium-response scenario	High-response scenario	Included in the epidemiological model
Community education, youth mobilisation and workplace prevention activities	Assume these prevention activities influence behaviour change and encourage the use of condoms and VCT. Assume proportion of prevention expenditure held constant from 2005 HIV/AIDS budget for community education, workplace, and youth mobilisation.	While the literature acknowledges there is a link between education and behaviour change, the expenditure required to affect the change is not able to be determined as there are many social and cultural variables. Therefore the analysis assumes and illustrates an increase of 25% above the baseline.	Assumes and illustrates a 25% increase above the baseline.	<input type="checkbox"/>
VCT	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years.	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years. Assume no increases.	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years. Assume no increases.	<input type="checkbox"/>
Prevalence of STIs among female sex workers – urban	33% urban 16% rural PNG has low usage of STI treatment and services (Australian Agency for International Development 2005).	24% urban 12% rural The mid point between increases in condom use (50%) from base to mid and changes in STI prevalence from mid to base (27.7%) is 38%. Assume 38% increase in number of treatments from base to mid.	16% urban 8% rural The mid point between increases in condom use (100%) from base to high and changes in STI prevalence from mid to high (50%) is 75%. Assume 75% increase in number of treatments from base to high.	✓ There is a relationship between changes in STI prevalence, treatment and condom use. The literature shows increasing the frequency of treatment reduces prevalence (Cowan, Hargrove et al. 2005). The epidemiological model uses reduced STI prevalence as input and the health budget uses increases in number of STI treatment services provided.
Reach of condom distribution – sex workers – urban	20% of all acts are covered, equates to 40% reach. Associated with this are the costs of peer outreach programs.	30% of all acts are covered, equates to 50% reach	40% of all acts are covered, equates to 80% reach	✓ coverage rate included
Reach of condom distribution – sex workers – rural	10% of all acts are covered, equates to 30% reach	15% of all acts are covered, equates to 35% reach	20% of all acts are covered, equates to 40% reach	✓ coverage rate included
Reach of condom distribution – general population – urban	14% of all acts are covered, equates to 34% reach	22% of all acts are covered, equates to 42% reach	30% of all acts are covered, equates to 50% reach	✓ coverage rate included
Reach of condom distribution – general population – rural	7% of all acts are covered, equates to 27% reach	11% of all acts are covered, equates to 31% reach	15% of all acts are covered, equates to 45% reach	✓ coverage rate included

Appendix 5: PNG – alternative coverage rates for ART

ALTERNATIVE OPTION:

ART FOR EVERYONE WITH LATE-STAGE HIV AND AIDS

This option demonstrates the number of people who will be on treatment and the costs incurred if all late-stage HIV and AIDS cases receive treatment under the baseline scenario.



This illustrates that by 2010 20,000 people would be receiving treatments and by 2025 over 120,000 would be receiving treatments.

TABLE A5: ESTIMATED COSTS OF ART FOR EVERYONE WITH LATE-STAGE HIV AND AIDS

Costs of ART (AUD 2005 prices)	2010	2015	2025
Baseline	33,900,000	60,600,000	159,000,000
Medium-response	31,900,000	48,800,000	103,800,000
High-response	30,000,000	40,000,000	65,500,000

As this option treats everyone who presents with late-stage HIV and AIDS under each of the three scenarios, the ultimate cost of ART is reduced in the medium-response and high-response scenarios, because of the lower prevalence of HIV.

Appendix 6:Indonesia – links between model and health sector costs

The following table illustrates the linkages between the projected epidemic and the estimations for the HIV/AIDS budget. Appendix 2 outlines what is included in each of the HIV/AIDS response components and how it may change in the future.

TABLE A6: INDONESIA: CHARACTERISTICS OF THE BASELINE, MID AND HIGH IMPACT RESPONSES – IMPLICATIONS FOR CONSTRUCTING THE HIV/AIDS ESTIMATED EXPENDITURE

Response component	Baseline response	Mid response	High response	Included in the epidemiological model
Treatment and care				
ART costs – urban and rural	Assumes all those with late stage HIV and AIDS receive treatment (alternative also provided with 18%).	Assumes all those with late stage HIV and AIDS receive treatment (alternative also provided with 18%).	Assumes all those with late stage HIV and AIDS receive treatment (alternative also provided with 18%).	<input type="checkbox"/> These ART percentages are used to calculate costs and differ from the epidemiological model so to show savings possible with a high prevention response.
Opportunistic infection care and treatment costs	Assume all of those who have access to health services and have late stage HIV infection and AIDS in given year require opportunistic care and treatment.	Decreases as HIV prevalence declines.	Decreases as HIV prevalence declines.	N/A
Cost of hospitalisation	Assume all of those who have access to health services have some hospital to stay in.	Decreases as HIV prevalence declines.	Decreases as HIV prevalence declines.	N/A
Prevention				
Prevention of mother to child – urban	10% of all pregnant women who are HIV positive receive PMTCT.	35% of all pregnant women who are HIV positive receive PMTCT	65% of all pregnant women who are HIV positive receive PMTCT	<input checked="" type="checkbox"/>
Prevention of mother to child – rural	No treatment	15% of all pregnant women who are HIV positive receive PMTCT	25% of all pregnant women who are HIV positive receive PMTCT	<input checked="" type="checkbox"/>
Blood safety	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	<input type="checkbox"/>
Community education, youth mobilisation and workplace prevention activities	Assume these prevention activities influence behaviour change and impact on the use of condoms and VCT. Assume proportion of prevention spend held constant from 2005 HIV/AIDS budget for community education, workplace, and youth mobilisation.	While the literature acknowledges there is a link between education and behaviour change the spend required to affect the change is not able to be determined as there are many social and cultural variables. Therefore the analysis applies the same proportion as the 2005 HIV/AIDS budget and then applies an increase of 10% above the baseline.	As for mid response: illustrates a 10% increase above the baseline.	<input type="checkbox"/>

Response component	Baseline response	Mid response	High response	Included in the epidemiological model
VCT	Assume VCT is sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years (Stover, Bollinger et al. 2004). This may overstate the case although testing numbers are unknown (WHO 2004c).	As for the baseline, but assume additional targeting of sex workers and IDUs.	As for the baseline, but assume additional targeting of sex workers and IDUs.	<input type="checkbox"/>
Prevalence of STIs among female sex workers – urban and rural	21% urban 26% rural	15% urban 19% rural The mid point between increases in condom use (73%) from base to mid and changes in STI prevalence from mid to base (29%) is 51%. Assume 51% increase in number of treatments from base to mid.	10% urban 13% rural The mid point between increases in condom use (177%) from base to high and changes in STI prevalence from mid to high (51%) is 114%. Assume 114% increase in number of treatments from base to mid.	<input checked="" type="checkbox"/> There are limitations to determining the exact relationship between increasing STI treatment costs, and decreases in STI prevalence. However, literature shows increasing the frequency of treatment reduces prevalence (Cowan, Hargrove et al. 2005). The epidemiological model uses reduced STI prevalence as input, the health budget uses increases in number of STI treatment services provided.
Reach of condom distribution – sex workers - urban	23% of all acts are covered, equates to 43% reach. Associated with this are the costs of peer outreach programs.	40% of all acts are covered, equates to 60% reach	60% of all acts are covered, equates to 80% reach	<input checked="" type="checkbox"/> coverage rate included
Reach of condom distribution – sex workers – rural	17% of all acts are covered, equates to 27% reach	30% of all acts are covered, equates to 50% reach	50% of all acts are covered, equates to 70% reach	<input checked="" type="checkbox"/> coverage rate included
Reach of condom distribution – general population – urban and rural	Some costs included in line with current expenditure.	Limited increments reflective of coverage rates in epidemiological model. Limited inclusions as prohibitive costs, rather there is a need to focus on targeted programs.	Limited increments reflective of coverage rates in epidemiological model. Limited inclusions as prohibitive costs, rather there is a need to focus on targeted programs.	<input type="checkbox"/>
Reach of condom distribution – MSM – urban	33% of all acts are covered, equates to 53% reach	45% of all acts are covered, equates to 65% reach	60% of all acts are covered, equates to 80% reach	<input checked="" type="checkbox"/> coverage rate included
Reach of condom distribution – MSM - rural	16% of all acts are covered, equates to 36% reach	20% of all acts are covered, equates to 40% reach	30% of all acts are covered, equates to 50% reach	<input checked="" type="checkbox"/> coverage rate included
IDU rural	12% of all acts are covered, assume reach needs to be 32%.	24% of all acts are covered, assume reach needs to be 44%.	36% of all acts are covered, assume reach needs to be 56%.	<input checked="" type="checkbox"/> coverage rate included
IDU rural	12% of all acts are covered, assume reach needs to be 32%.	18% of all acts are covered, assume reach needs to be 38%.	24% of all acts are covered, assume reach needs to be 44%.	<input checked="" type="checkbox"/> coverage rate included

Appendix 7: Indonesia – alternative coverage rates for ART

ALTERNATIVE OPTION: ART FOR 18% WITH LATE-STAGE HIV AND AIDS

As the cost implications in regards to antiretroviral therapy are significant, here we outline the impacts if treatment levels are reduced and less people are offered antiretroviral therapy (18% of late stage HIV and AIDS).

In the first instance the lower costs of ART means it will take a few more years to see the potential savings kick in above the prevention expenditure. Secondly, the savings curve does not rise as sharply. Importantly, the direction of the curves is unchanged. The message remains the same: if a high response scenario is enacted the savings on OI treatment and ART costs are significant and will continue to rise over the decades.

Figure A7.1 illustrates that the savings on OI and ART expenditure climb above the prevention expenditure in about 10 years time. The savings continues to climb steadily up until the end of the period examined.

The coverage of 18% of late stage HIV and ART results in the following numbers of people receiving treatment (see Figure A7.2 on the following page).

The country's target under the 3 by 5 initiative is to have 10,000 people on ART by 2005 (WHO 2004c). A coverage rate of 18% of late stage HIV and AIDS is double this figure by 2010.

FIGURE A7.1: SAVINGS ON OI AND ART COSTS AND ADDITIONAL PREVENTION EXPENDITURE (HIGH RESPONSE AND BASELINE)

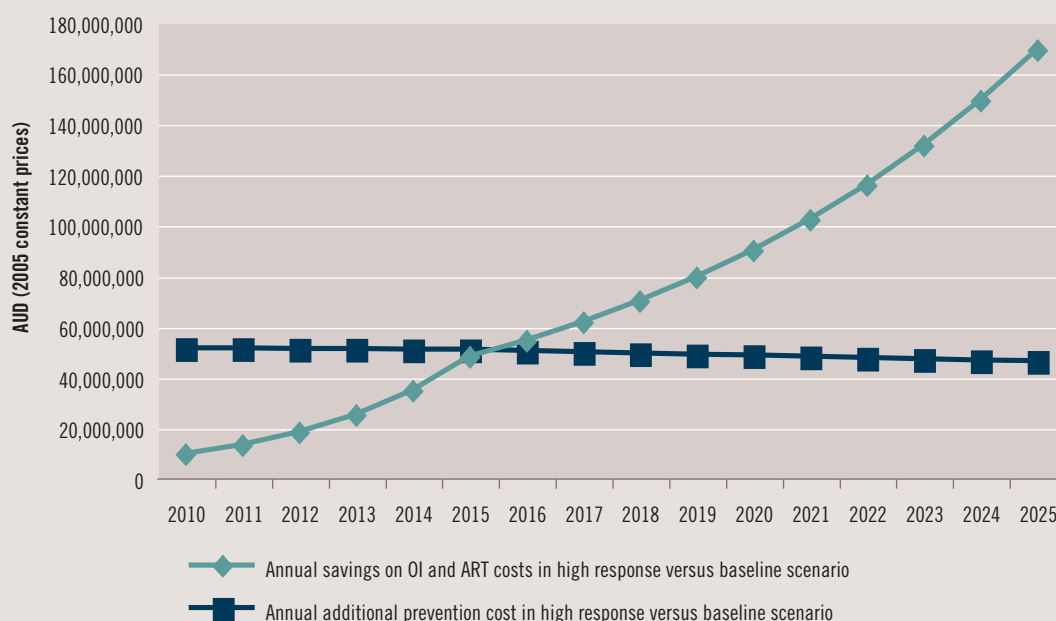
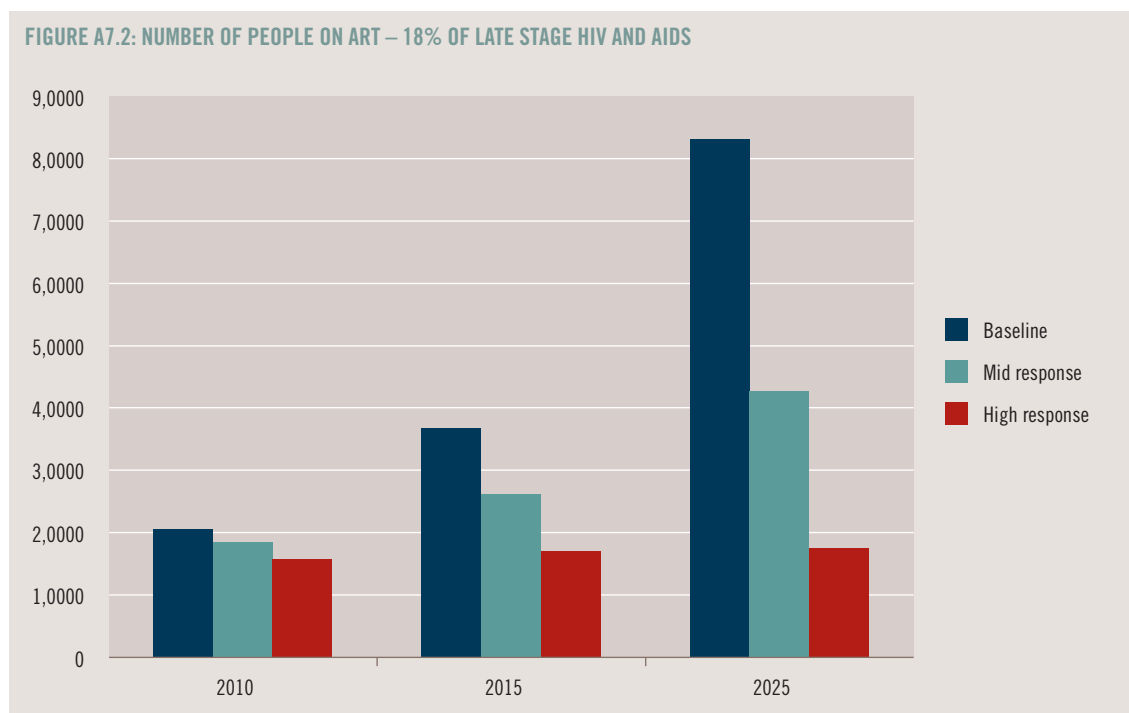


FIGURE A7.2: NUMBER OF PEOPLE ON ART – 18% OF LATE STAGE HIV AND AIDS



The projected costs of supporting these people on ART are:

TABLE A7: ESTIMATED COSTS OF ART FOR 18% OF THOSE WITH LATE STAGE HIV AND AIDS

AUD 2005 prices	2010	2015	2025
Baseline	19,300,000	34,650,000	78,400,000
Mid response	17,400,000	24,760,000	40,200,000
High response	14,900,000	16,000,000	16,500,000

While these estimated costs are significantly lower than for coverage of all those with late stage HIV and AIDS, the important message is that the baseline response remains well above the high response given there are simply less people requiring ART.

By enacting a prevention response the number of people requiring treatment is reduced, and the associated costs are reduced. This analysis provides policy makers with the information needed to make informed policy choices.

Appendix 8: Papua – links between model and health sector costs

The following table illustrates the linkages between the projected epidemic and the estimations for the HIV/AIDS budget. Appendix 2 outlines what is included in each of the HIV/AIDS response components and how it may change in the future.

TABLE A8: PROVINCE OF PAPUA: CHARACTERISTICS OF THE BASELINE, MID AND HIGH IMPACT RESPONSES – IMPLICATIONS FOR CONSTRUCTING THE HEALTH BUDGET

Response component	Baseline response	Mid response	High response	Included in the epidemiological model
Treatment and care				
ART costs – urban and rural	Assume 18% of all late stage HIV and AIDS.	Assume 18% of all late stage HIV and AIDS.	Assume 18% of all late stage HIV and AIDS.	<input type="checkbox"/> These ART percentages are used to calculate costs and differ from the epidemiological model so to show savings possible with a high prevention response.
Opportunistic infection care and treatment costs	Assume of those who have access to health services and have late stage HIV infection and AIDS in given year require opportunistic care and treatment.	Decreases as HIV prevalence declines.	Decreases as HIV prevalence declines.	N/A
Cost of hospitalisation	Assume of those who have access to health services have some in hospital stay.	Decreases as HIV prevalence declines.	Decreases as HIV prevalence declines.	N/A
Prevention				
Prevention of mother to child – urban	No treatment	25% of all pregnant women who are HIV positive receive PMTCT	50% of all pregnant women who are HIV positive receive PMTCT	<input checked="" type="checkbox"/>
Prevention of mother to child – rural	No treatment	15% of all pregnant women who are HIV positive receive PMTCT	25% of all pregnant women who are HIV positive receive PMTCT	<input checked="" type="checkbox"/>
Blood safety	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	Assume follows WHO standards, with number of blood units equivalent to 2% of population.	<input type="checkbox"/>
Community education, youth mobilisation and workplace prevention activities	Assume these prevention activities influence behaviour change and impact on the use of condoms and VCT. Assume proportion of prevention spend held constant from 2005 HIV/AIDS budget for community education, workplace, and youth mobilisation. To create an estimate for Papua, assume the same proportion as for Indonesia.	While the literature acknowledges there is a link between education and behaviour change the spend required to affect the change is not able to be determined as there are many social and cultural variables. Therefore the analysis applies the same proportion as the 2005 HIV/AIDS budget and then applies an increase of 25% above the baseline.	As for mid response. illustrates a 25% increase above the baseline.	<input type="checkbox"/>

Response component	Baseline response	Mid response	High response	Included in the epidemiological model
VCT	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years.	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years. Assume no increases.	Sexually active population (assume 100% of 15–49 year olds) x HIV prevalence/100 x 2/5. Assumes: people perceive themselves at risk at twice the prevalence rate, and want to be tested every 5 years. Assume no increases.	☐
Prevalence of STIs among female sex workers – urban and rural	25% urban 16% rural	18% urban 12% rural The mid point between increases in condom use (73%) from base to mid and changes in STI prevalence from mid to base (29%) is 51%. Assume 51% increase in number of treatments from base to mid.	12% urban 8% rural The mid point between increases in condom use (177%) from base to high and changes in STI prevalence from mid to high (51%) is 114%. Assume 114% increase in number of treatments from base to mid.	✓ There are limitations to determining the exact relationship between increasing STI treatment costs, and decreases in STI prevalence. However, literature shows increasing the frequency of treatment reduces prevalence (Cowan, Hargrove et al. 2005). The epidemiological model uses reduced STI prevalence as input, the health budget uses increases in number of STI treatment services provided.
Reach of condom distribution – sex workers – urban	36% of all acts are covered, equates to 56% reach. Associated with this are the costs of peer outreach programs.	40% of all acts are covered, equates to 60% reach	60% of all acts are covered, equates to 80% reach	✓ coverage rate included
Reach of condom distribution – sex workers – rural	10% of all acts are covered, equates to 30% reach	15% of all acts are covered, equates to 35% reach	20% of all acts are covered, equates to 40% reach	✓ coverage rate included
Reach of condom distribution – general population – urban	14% of all acts are covered, equates to 34% reach. Includes social marketing costs.	17% of all acts are covered, equates to 37% reach. Includes social marketing costs.	20% of all acts are covered, equates to 40% reach. Includes social marketing costs.	✓ coverage rate included
Reach of condom distribution – general population – rural	7% of all acts are covered, equates to 27% reach. Includes social marketing costs.	8.5% of all acts are covered, equates to 28.5% reach. Includes social marketing costs.	10% of all acts are covered, equates to 30% reach. Includes social marketing costs.	✓ coverage rate included
Reach of condom distribution – MSM – urban	33% of all acts are covered, equates to 53% reach. Includes social marketing costs.	45% of all acts are covered, equates to 65% reach. Includes social marketing costs.	60% of all acts are covered, equates to 80% reach. Includes social marketing costs.	✓ coverage rate included
Reach of condom distribution – MSM – rural	16% of all acts are covered, equates to 36% reach. Includes social marketing costs.	20% of all acts are covered, equates to 40% reach. Includes social marketing costs.	30% of all acts are covered, equates to 50% reach. Includes social marketing costs.	✓ coverage rate included
IDU urban	12% of all acts are covered, assume reach needs to be 32%.	24% of all acts are covered, assume reach needs to be 44%.	36% of all acts are covered, assume reach needs to be 56%.	✓ coverage rate included
IDU rural	12% of all acts are covered, assume reach needs to be 32%.	18% of all acts are covered, assume reach needs to be 38%.	24% of all acts are covered, assume reach needs to be 44%.	✓ coverage rate included

Appendix 9: East Timor – links between model and global fund proposal

While all of the gaps area identified in the Global Fund proposal contribute to enacting a higher response to HIV in East Timor, here we will focus on those elements that directly correspond to the epidemiological modelling for the mid and high responses. These are:

- > Making antiretroviral treatment available for HIV positive pregnant women
- > Reducing the prevalence of STIs (amongst female sex workers)
- > Increasing the coverage of condom usage by female sex workers
- > Increasing the coverage of condom usage in the general population
- > Increasing the coverage of condom usage in male to male sexual contact

The table below outlines how the global fund objectives are more than reflected in the epidemiological modelling to enact the high response. This analysis suggests that if the global fund proposal were enacted, this would probably equate to a 'high response' and as such we would see a decline in HIV incidence and prevalence by 2025.

TABLE A9: COMPARISON OF GLOBAL FUND PROPOSAL AND EPIDEMIOLOGICAL MODELLING

Global Fund proposal elements:	Epidemiological modelling and assumptions
Prevention of mother to child transmission rises from 0 to 100% (by 2008) of all HIV infected women receiving a complete course of antiretroviral prophylaxis.	Increases the percentage of HIV infected pregnant women receiving antiretroviral prophylaxis from 0 in the baseline scenario to 50% of urban and 25% of rural.
Reduce prevalence of STIs (gonorrhoea and active syphilis) among sex workers from 14% and 16% respectively to less than 5%.	Reduce the prevalence of STIs from 24% urban and 12% rural (baseline) to 12% urban and 6% rural (high response)
Behavioural change communications to people with high risk behaviours, coupled with increases in the number of freely available condoms. Condoms freely distributed to those with high risk behaviours rise from current levels of 100,000 to 500,000 per annum by 2010. <i>Using data available through the epidemiological modelling suggests that 100,000 would cover about 60% of all sex worker and MSM sex acts in 2005. Increasing the number of condoms freely available in 2009 to 500,000 condoms would cover more than 100% of sex worker and MSM sex acts.</i>	Increase condom coverage from only 1% of all sex worker sex acts to 30% of urban and 15% of rural sex worker sex acts by 2010. Increase condom coverage from 5% of urban and 2.5% of rural MSM sex acts to 30% and 15% of urban and rural in the high response.

In addition, there are behaviour change programs for youth and the general population and an additional number of condoms freely available (500,000 per annum by 2008).