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# AIDS and the Elderly of Thailand: Projecting Familial Impacts

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**Abstract**

We apply computer microsimulation and aggregate demographic analysis to project the numbers of older Thais who will lose children to AIDS during their own lifetimes and to assess involvement with an ill child though caregiving and coresidence. Despite only 2 percent HIV prevalence, 11 percent of Thais over age 50 as of 1995 are likely to experience the loss of at least one adult child to AIDS and 13 percent of these will lose multiple children. The chance of losing an adult child during one's lifetime will be 76 percent higher than if there were no AIDS epidemic.

KEY WORDS: HIV/AIDS, Aging, Microsimulation, Thailand

Datasets used:
1995 Survey of the Welfare of the Elderly in Thailand, 1995.
National Statistical Organization Survey of Elderly in Thailand, 1994.
National Statistical Organization Survey of Population Change, Thailand, 1995-1996.

# 1 Introduction

On the outskirts of Chiang Mai City in northwest Thailand, a handsome new condominium tower rises into the sky. Eerily, because, in the wake of Asia's financial crisis, it stands empty, except for one elderly man. Mr. Choroen [1] remains to keep guard against vandals, as grass pushes up into the newly laid concrete. Why, in a country where older persons generally retire and children care for their retired parents, was Mr. Choroen taking such employment? He explained. His three sons had died of AIDS, and so he must work although he was old, patiently guarding the decaying tower.

Is Mr. Choroen a rare, dramatic case, or will his tragedy be repeated for thousands of older people in Thailand? Or for tens of thousands? Much has been written about the direct impact of the AIDS pandemic on the sufferers themselves, and there are some studies of the impact on spouses and children. But little attention has been given to impacts on the older generation, the parents whose children are infected and die and who often bear the responsibility for caregiving and must endure much of the emotional sorrow. Recent systematic analysis of almost 1000 individual cases obtained from a sample of key informants in Thailand provides information on the patterns of impact that AIDS is having on members of the older generation (Knodel et al. 2000). In this study, we project the demographic magnitude of these human situations.

What proportion of people presently over age 50 in Thailand can be expected to have lost a child to AIDS during their lifetimes? What proportion will lose two children or three? How many are likely to reside with sick and dying children and how many to provide care for them? How old will parents be when they assume the burdens of care-giving and sorrows of loss? How much longer may they expect to live with the consequences of these losses? How much of an increase will AIDS produce in the chances of parents losing one or more adult children during their lifetimes? We propose answers to these questions based on combining and extrapolating partial information from complementary sources. The calculations, involving as they do the joint timing of events across generations and within families, pose certain complications. We pursue two approaches, using aggregate demographic measures for periods and cohorts and using computer microsimulation.

[1] This instance describes an actual encounter experienced by two of the authors; the name is altered to protect confidentiality.

Thailand is a natural choice for this first attempt to project impacts of AIDS on older persons because well-suited surveys and key informant information are both at hand. The Thai epidemic is one of the best-documented in the world, and it resembles in important respects the main epidemics in other parts of the developing world. Experience gained with Thailand may facilitate parallel studies for populations in Africa and elsewhere with sparser data but epidemics that are more severe.

# 2 The Epidemic in Thailand

Thailand's AIDS epidemic began around 1985, later than those in Africa, Europe, and North America, but once HIV was introduced into key sub-populations it spread rapidly. These sub-populations included intravenous drug users in the early years, and commercial sex workers and their clients later on. Much of the epidemic has been driven by commercial sex patronage. Infected men are increasingly spreading the virus to their wives and non-commercial partners who in turn transmit HIV perinatally to their infants (Brown et al. 1994; Brown and Xenos 1994; Ford and Koetsawang 1991; Weniger et al. 1991). UNAIDS (1998) estimates 2 percent of the adult Thai population to be HIV positive. For comparison, the figure for the U.S. is less than half a percent; for Haiti 4 percent; for South Africa, 12 percent. As in most developing countries, and in contrast to the West, heterosexual intercourse is the overwhelming route of HIV transmission in Thailand, accounting, according to the website of the Thai Ministry of Public Health, for over 90 percent of cases reported through 1999.

Recent declines have occurred in risk-taking behaviors and in incidence among key transmission groups (Mason et. al. 1995; Mills et al. 1997; Hanenberg and Rojanapithayakorn 1998; UNAIDS 1998). However, barring breakthroughs in the search for potent affordable treatments, the effects of the epidemic will be felt long into the future.

Research on the sexual dynamics underlying the Thai AIDS epidemic is extensive. But implications for the families and relatives of people with AIDS and for society as a whole are not well-documented. Palloni and Lee (1992) broke ground in examining widowhood and orphanhood in the wake of AIDS in Africa, and several studies examinated orphanhood for Thailand, including Boonchalaksi and Guest (1993) and Brown and Sittitrai (1995). Some attention has begun to focus on the economic costs of the epidemic to Thai

families (Pitayanon et al. 1998), and the importance of family caregiving for persons with AIDS in other parts of the world has recently been taken up by Ntozi and Nakayiwa (1999) and by Sankar et al.(1998). However, overall, the older population, as a group that will be particularly hard hit by the indirect effects of the epidemic, has received scant attention.

# 3 Impacts on the Older Population

Impacts of AIDS on older persons, particularly as parents of adult children who contract the disease and die from it, occur through numerous routes. These include strains of care-giving, associated opportunity costs, requirements for financial and material support, responsibilities for raising grandchildren, emotional stress, and loss of old-age support (VanLandingham et al. forthcoming).

The study by Knodel et al. (2000) illuminates a number of these impacts. Their work is based on information collected systematically from community health workers and other key informants during 1999 in provinces drawn from each of the regions of Thailand. It is extremely common for older parents to care for their AIDS-afflicted adult children. Nearly two thirds of all cases of adults reported to have died of AIDS had lived with or next to a parent while ill, and a similar proportion had been cared for by a parent. Among those with a living parent, these proportions exceeded three out of four. In half of all cases, a parent, usually the mother, was the principal caretaker. A number of these parents were themselves in poor health or straitened economic circumstances. Both rural and urban informants reported that adult children who have left home for the cities generally move back home after becoming ill, sometimes in the face of impending death. Clearly an adult child's illness frequently places major responsibilities upon aging parents in Thailand.

This high level of parental involvement with adult children contrasts sharply with the situation in the U.S. and probably in other western countries. According to a 1990 U.S. national study, only 13 percent of AIDS caregivers were 50 or older and only 6 percent were at least 60 (Turner, Catania, and Gagnon 1994). A later study based on samples from San Francisco and Los Angeles found that less than 10 percent of caregivers were the mothers of the persons with AIDS (Turner, Pearlin, and Mullan 1998).

Many older Thais live with or near their adult children and are supported

by them. Analysis of the same 1995 survey as used for this study indicates that 90 per cent of Thais over age 60 lived with an adult child or had daily contact with one (Knodel and Chayovan 1997). Over two thirds report receiving significant amounts of money from their non-coresident adult children. Thus the illness and death of an adult child typically entail current and future losses of income and assistance.

Caregiving itself may involve burdensome monetary costs, which in turn may necessitate additional income-producing activities on the part of parents. Alternatively, time spent in caregiving may impose significant opportunity costs, when parents have to forego income-producing activities. Funerals in Thailand are typically elaborate events incurring formidable costs. After loss, parents may foster orphaned grandchildren. The whole process of caregiving may put an older person's health at risk through exposure to illnesses or heavy lifting. Many persons with AIDS become incapacitated and unable to move by their own efforts before dying. The emotional strain may be enormous, as parents see their adult child suffer, knowing that death is all but certain. Older poeople may also face some degree of estrangement from the local community from stigma attached to having a child sick and dying from AIDS (Brown and Sankar, 1998; De Vries, Lana, and Falck 1994; Mullan 1998; Sanders 1989). Thus, at the family level, parents whose children succumb to AIDS confront a whole range of costs, burdens, and sorrows. How common is this plight for the current generation of older persons in Thailand? For answers, we turn to our family-centered projections.

# 4 Data

The principal data which permit us to carry out our projections are two national surveys focused on the older population of Thailand, the 1995 Survey of the Welfare of the Elderly in Thailand (SWET) and the household sample of the 1994 National Statistical Organization Survey of Elderly in Thailand (NSOSET). SWET is based on a national probability sample of 7,708 respondents over age 50 living in private households (Knodel and Chayovan 1997). The NSOSET household sample is a national probability sample of 21,219 households. We also rely on two projections of the AIDS epidemic and the Thai population at the national level, one conducted by the United Nations (1999a) and the other by the National Economic and Social Development Board of Thailand (NESDB 1994).

The SWET data set includes one respondent over age 50 from each household and supplies the age of each of the respondent's living sons and daughters as of May 1995. The starting population for the micro-simulations consists of the respondents and their living children. Thus each child is included with a father or a mother but not both. Sample weights reflect the probability of selecting the respondent from all persons over 50 in the household, so that fathers and mothers and childless persons are all accounted for in proportion to their numbers. The weights are designed to make the sample representative of the Thai population over 50 region by region. The base population is not representative across the whole range of ages, because young people without living parents or with parents under 50 are omitted. Besides ages and sexes of the respondents and their children, the variables in use include respondent's province of residence, counts of children deceased before 1995, and an index of the proximity of a child's residence to his or her parents' home.

SWET provides parent-centered information, whereas NSOSET provides the equivalent of child-centered information. For every member of the household, NSOSET records the age and survival status of the member's mother and father. We thus obtain an age distribution of parents for each age of offspring, the essential data for our aggregate demographic measures in Section 6.

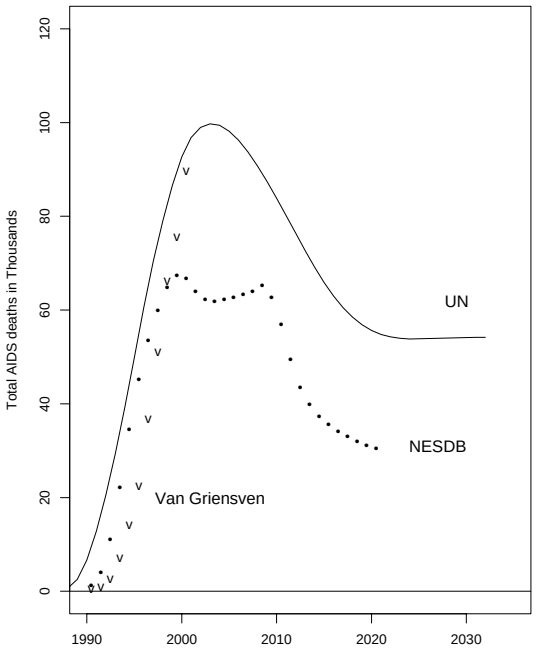
The U.N. and NESDB projections supply numerators and denominators from which we construct future age and sex-specific rates of death from AIDS and from other causes for use in our calculations. The U.N. forecasts derive from the Epimodel routines which fit a gamma distribution for dates of infection to estimates of national prevalence for 1994 and 1997. Progression from infection to AIDS and from AIDS to death follow fixed distributions, and deaths are allocated to age groups of men and women in fixed fractions at the final stage. The data available to us consist only of population counts, AIDS deaths, and other deaths by age and sex, complete down to 2030, from which, as described below, we recover a time series for total infections.

The NESDB projection method begins with forecasts of total incidence for adult men, adult women, and infants over time based on a set of behavioral assumptions. It distributes incidence by age rather than deaths by age, and then employs Epimodel to calculate onsets of symptoms and of death. We focus on the NESDB medium intervention scenario. The data available to us are five-year population counts by age and sex, yearly time series of total AIDS deaths, incidence, and prevalence, and yearly age distributions of AIDS

deaths but not of other deaths down to 2020.

We apply a variety of standard demographic techniques – census survival calculations, cubic spline interpolation, and mortality extrapolation using Lee and Carter (1992) models – to obtain complete tables of mortality rates for AIDS and other causes down to 2050 from these sets of partial information. The U.N. assumes constant adult AIDS deaths beyond 2025, and we follow their practice when using their forecasts. All these forecasts are confined to the national level. We disaggregate them to regions by techniques described in Section 5.

Figure 1: Projected Total AIDS Deaths in Thailand 1990-2030.




There is substantial uncertainty about present and future levels of AIDS in Thailand. The contrasting forecasts of total AIDS deaths for Thailand are shown in Figure 1. The solid line for U.N. projections shows much higher total deaths than the dotted line for NESDB projections. The U.N. series peaks in 2003 at 100,000 AIDS deaths per year, cumulating to 2.15 million by 2020. The NESDB series peaks twice, at 2000 and 2010 at around 60,000

AIDS deaths per year. The NESDB series, which ends in 2020, gives 1.42 million total deaths. The most detailed empirical estimates so far, those of van Griensven et al. (1998:Table 43), are shown with "v" on the graph. Estimates up to 1996 derive from studying excess mortality by age. Projections for 1996 to 2000 derive from back-calculated levels of infection. Starting lower and later than both series, the van Griensven estimates are close to the U.N. series by 2000. On the basis of this comparison, we choose the U.N. series for the detailed graphs that we report from our microsimulations.

# 5 Simulations

The demographic computer microsimulation routines used for the forecasts are the SOCSIM programs, developed from 1970 onwards by E.A. Hammel and K. W. Wachter (see, e.g., Hammel et al. 1991; Wachter, Blackwell, and Hammel 1997; Wachter 1997). SOCSIM assigns demographic events month by month to members of the population list in the computer by comparing random numbers to user-specified tables of demographic rates. The program keeps track of life histories and kinship relationships among the members. For this project, features implementing marriage, childbirth, and migration are not in use. The simulated population is not replenished over time by births or by new cohorts of older persons aging into the over-50 range. The focus is on the future experience of the sharply defined sub-population of Thais over 50 in May 1995 as they live out their lives over the next five decades. Given that HIV incidence probably peaked during the first half of the 1990s, this is a particularly relevant group to follow as their children succumb to AIDS.

The function of the simulation routines in this project is to assign dates of onset of symptomatic AIDS and dates of death from AIDS and from other causes. The advantage of simulation over a lifetable approach is the ability to track multiple deaths within families and the ease with which rates can be made region-specific and heterogeneous, reflecting concentrations of infection in certain communities or families. Heterogeneity interacts with family size to determine the number of parents who lose two, three, or more children to AIDS.

The published forecasts are all at the national level. In the early 1990s, HIV infections varied substantially by region. We introduce region-specific multipliers on rates of infection from AIDS. The multipliers are chosen on the

basis of information on HIV seroprevalence by region among male recruits to the Royal Thai Army from 1990 to 1997 (see, e.g., van Griensven et al. 1998: Table 23). The data reflect prevalence rather than incidence, but for such a young group of men they may serve as a proxy for differentials in incidence. We assume that regional differentials stabilize after 2000 close to 1998 levels. Based as they are on data for males, our multipliers may not capture the details of emerging regional differentials among women, but the broad patterns are likely to agree.

The implementation of the multipliers is technically challenging. The available U.N. time series provide deaths from AIDS, not infections from HIV. Documentation in the United Nations report (1999a:30) also quotes distributions for incubation times and for times of progression from illness to death. These distributions allow us to reconstruct the time series of adult infections implied by the U.N. time series of adult deaths using a special form of evolutionary algorithm. This algorithm starts with an arbitrary time series for infections and subjects it to small random changes (like mutations), only keeping the changes that improve the fit of the implied death series to the series given in the data, until the process converges to a curve which gives a near-perfect match.

Given our reconstructed series, we apportion infections to regions based on the army recruit data, and project forward to recover regional rates of illness and death for the simulations, imposing the age distribution assumed by the United Nations at the end of this process. Onset of symptomatic AIDS and death from other causes are treated as competing risks in a multiple decrement framework, and members of the population who have made the transition to symptomatic AIDS have probabilities of 50 percent of dying in the year of transition or in the following year.

The SWET survey does not give the province or region of residence directly for children, only for respondents. It does tell whether each child resided in the same house or compound as the parent or next door, in the same province, or outside the province. Only 30 percent resided outside the province of their parent. We assume that half of these children resided in another province of the same region, and we assign the rest to the regions at random in proportion to those children whose province is known.

HIV infection may run in families or cluster in certain areas. Even if levels of risk did not differ among families or areas, so that infections of siblings were independent chance events, there would still be some cases of multiple child loss. In modeling heterogeneity, we are interested in estimating the

increase in cases of multiple loss which result from non-independence, that is, from concentration of risk. In the simulations, we give all members in each family a family-specific risk multiplier which enhances or depresses the chance of infection for all of them. We could do the same for local areas identifiable in our sample, but for a first effort such additional complexity seems unwarranted. Following the usual practice in studies of correlated risk and frailty like Yashin, Vaupel, and Iachine (1995), we assume a Gamma distribution for our risk multiplier. The simulations reported here implement multipliers with a mean of 1.0 and a shape parameter of 5, implying a standard deviation of 0.447, which represents mild to moderate heterogeneity. Future research would do well to explore the consequences of alternative assumptions.

Table 1: Lifetime Single and Multiple Child Loss. Simulation estimates of number and percentage of people over 50 in 1995 who lose specified numbers of children to AIDS during their lifetimes under U.N. Assumptions.

| Sample | | 0 | 1 | 2 | 3 | 4+ |
|---|---|---|---|---|---|---|
| Thais over 50 | Number | 8,397,848 | 990,208 | 123,458 | 14,642 | 4844 |
| | Percent | 88.1 | 10.4 | 1.3 | 0.2 | 0.05 |
| Thais 50 to 60 | Number | 3,494,314 | 384,193 | 44,183 | 3,445 | 0 |
| | Percent | 89.0 | 9.8 | 1.1 | 0.1 | 0 |
| Thais over 50 | Numbers | 885,631 | 163,612 | 31,441 | 6,851 | 468 |
| in Upper North | Percent | 81.4 | 15.0 | 2.9 | 0.6 | 0.04 |

Selected summary measures from the simulations based on United Nations assumptions are shown in Table 1. From the group of 9.53 million Thais over age 50 in 1995, 1.13 million or 11.9 percent are projected to lose one or more children to AIDS before their own deaths. Estimates for cohorts aged 50 to 60 in 1995 are very similar. For the Upper North, where the epidemic has been most severe, nearly 19 percent of the group over 50 in 1995 can expect to lose a child to AIDS before death. Data underlying the table show that across all of Thailand, about 57 percent of those adult children who die of AIDS die before a parent's death.

Losing two or more children before one's own death is rare overall, but among the group of Thais over 50 in 1995, under our assumptions about heterogeneity, 13 percent of those who lose at least one child lose two or more. Taking the child's point of view, 25 percent of those dying of AIDS before their parent's death have a sibling who does also. However, few of these multiple cases are seen in the simulations during the first few years. Only about 1 percent of those over 50 in 1995 who lose at least one child to AIDS before 1999 lose two or more before 1999. It is interesting to compare these estimates with data from the key informant study. For about half of the 66 sites visited, key informants reported at least one case of multiple sibs being infected. Overall, multiple sibs accounted for 7 or 8 percent of the total cumulative number of AIDS cases estimated by the key informants (unpublished results). The key informants are likely to overstate the extent of siblings dying, since such cases are probably especially prominent in their memory. Nevertheless, this comparison suggests that the concentration of infection in families may be even more substantial than assumed in these simulations.

The simulations predict that the experience of losing a child to AIDS before one's own death will be widespread for the present generation of older Thais, but far from universal. One way to put the numbers in perspective is to consider the chance of losing one or more children to any cause of death before one's own death. About 3.01 million of the Thais over 50 in 1995 are expected to experience such loss. Thus, the AIDS epidemic increases the chances of such loss by 76 percent. These losses are distributed across a variety of ages. Detailed results from the simulations with respect to the timing of child loss over the life course and the components that contribute to it are presented in Section 7.

# 6 Aggregate Analytic Measures

The simulations are designed to reveal lifetime impacts of AIDS on those cohorts of Thai men and women born before 1945 who were age 50 and over in 1995 and whose children's ages are found in the SWET. Results for these specific cohorts are not readily translatable into period time series. Fortunately, the general household questionaire of the 1994 NSOSET provides the survival status and age of the mother and father of each household member of any age, regardless of whether there was an older person residing in

the household. When combined with the series of numbers of AIDS deaths by age from the UN and NESDB projections, these data permit aggregate demographic measures of period and cohort trends.

We describe our measures for fathers; corresponding formulas hold for mothers too.

Let $p_{ax}$ be the proportion of people aged $a$ who have a living father aged $x$.

Let $D_{ta}$ be the number of AIDS deaths in time period $t$ to people age $a$.

Taking the sum over ages $a$ of those dying of AIDS, we have

$$B_{tx} = \sum_a D_{ta} p_{ax}$$

$B_{tx}$ is an estimate of bereavements, that is, of losses of children to AIDS in time period $t$ for living fathers aged $x$. (In practice, being interested in losses of adult children, we sum over ages $a$ from 15 up.) Dividing by the count $K_{tx}$ of men in period $t$ aged $x$, we have an age-specific bereavement rate $b_{tx}$.

$$b_{tx} = B_{tx}/K_{tx}$$

Summing $B_{tx}$ over ages $x$ of fathers gives a period estimate of total bereavements, $B(t)$.

This period allocation depends on the stylized assumption that the survival rates and distribution of ages of parents for children of a given age is not changing over time. Like all the forecasts, it ignores any possible correlation between parents' deaths and losses of children to AIDS. It is meant to give a general sense of the expected period trajectory of losses. Because a small proportion of AIDS deaths in a particular year occur to siblings, the same older person may be counted more than once in this tally. The series $B(t)$ should therefore be a slight overestimate of the number of distinct older people suffering loss.

The estimates of period total bereavements $B(t)$ based on NESDB and on U.N. forecasts are shown in Table 2. The series using NESDB assumptions peak earlier, due to younger estimates of ages at death from AIDS. The higher survival of women leads to higher total losses for mothers than for fathers. The key informant study shows that mothers are much more likely than fathers to be principal caregivers for afflicted adult children in Thailand (Knodel et al. 2000).

Table 2: Period Trajectory of Child Loss. Number of times that men and women age 50 and over lose an adult child to AIDS during each five-year period, estimated from parental age distributions.

| Period | U.N. 1998 Estimates | | NESDB Estimates | |
|---|---|---|---|---|
| | Fathers | Mothers | Fathers | Mothers |
| 1988-92 | 14,710 | 20,502 | 8,341 | 9,906 |
| 1993-97 | 86,384 | 120,403 | 130,405 | 158,562 |
| 1998-02 | 157,565 | 219,615 | 183,680 | 230,691 |
| 2003-07 | 168,602 | 235,000 | 159,862 | 209,391 |
| 2008-12 | 144,245 | 201,052 | 131,467 | 177,486 |
| 2013-17 | 112,881 | 157,336 | 89,259 | 117,441 |
| 2018-22 | 93,242 | 129,961 | 76,225 | 99,625 |
| 2023-27 | 88,382 | 123,187 | n.a. | n.a. |
| 2028-32 | 88,241 | 122,991 | n.a. | n.a. |

We calculate period-by-period "Net Bereavement Ratios" (NBRs) by substituting age-specific bereavement rates $b_{tx}$ for age-specific fertility rates in the familiar formula for the Net Reproduction Ratio. We draw our estimates of person-years lived from the lifetable derived from the 1995-96 Survey of Population Change conducted by the NSO (1997).[2] We start our calculation at age 50 (using survivors to age 50, $l_{50}$, as our lifetable radix) and combine men and women in proportion to the male and female $l_{50}$ values. A period's NBR measures the expected number of children a person aged 50 would lose to AIDS if the person and his or her family experienced the age-specific bereavement and mortality currently prevailing in the period over the whole remainder of their lives.

Period Net Bereavement Ratios are shown in Table 3. Under U.N. as-

[2]We keep old-age mortality rates constant at 1995 levels in calculating NBRs. Rates are already low. Male $e_{50}$ is 27.9 years and female $e_{50}$ is 31.7 years, probably reflecting some underestimation of deaths by the survey. This underestimation may be assumed to offset further declines in mortality likely over the next few decades. In comparison to the uncertainties about AIDS deaths, uncertainties about the old-age lifetable is a minor consideration.

Table 3: Period Net Bereavement Ratios per Hundred, five-year pooled data for men and women combined.

| Starting Date | 1988 | 1993 | 1998 | 2003 | 2008 | 2013 | 2018 | 2123 | 2028 |
|---|---|---|---|---|---|---|---|---|---|
| U.N. | 5 | 21 | 31 | 27 | 19 | 12 | 8 | 6 | 5 |
| NESDB | 1 | 15 | 21 | 18 | 13 | 7 | 5 | n.a | n.a |

sumptions, the NBR reaches as high as 31 percent between 1998 and 2003, only dropping below 10 percent after 2018. NESDB levels are about two-thirds of U.N. levels. As with period fertility measures, these period NBRs are inflated by tempo effects (cf. Bongaarts and Feeney, 1998). The rapid expansion and contraction of incidence rates make these ratios for synthetic cohorts rise well above the levels expected for actual cohorts.

Tempo effects may be avoided by calculating NBRs on a true cohort basis, letting the age and time indices for $b_{tx}$ increase together as along the diagonal of a Lexis diagram. Data are only complete for two early cohorts. Results are shown in Table 4.

Table 4: Cohort Net Bereavement Ratios.

| | Based on U.N. Estimates | | | Based on NESDB Estimates | | |
|---|---|---|---|---|---|---|
| | Fathers | Mothers | both | Fathers | Mothers | Both |
| From age 50 | | | | | | |
| from 1988-92 | 13.67 | 16.35 | 15.04 | n.a. | n.a. | n.a. |
| from 1993-97 | 13.25 | 16.77 | 15.03 | n.a. | n.a. | n.a. |
| From age 60 | | | | | | |
| from 1988-92 | 11.94 | 14.53 | 13.28 | 9.23 | 8.26 | 8.72 |
| from 1993-97 | 13.23 | 15.54 | 14.39 | 12.95 | 11.75 | 12.32 |
| Adjusted | | | 13.15 | | | |
| Simulation | | | 11.00 | | | |

Counts of bereavements exceed counts of people experiencing loss because

some people lose two or more children. Our aggregate demographic measures, built up from the child-centered data in the NSOSET, cannot distinguish one from the other. However, we can adjust the NBRs on the basis of multiple-loss statistics from the simulations. The row labeled "Adjusted" in Table 4 averages the cohorts aged 50 with the cohorts aged 60 centered on 1995 and multiplies by the ratio of parents to bereavements estimated by the simulations. The result is close to 13 percent, which may be compared to an estimate of 11 percent from the simulations for lifetime loss for cohorts aged 50 to 60 in 1995. The agreement between the two estimates, based as they are on data from different series, is reasonably good. The difference between them, however, is enough to hint again that heterogeneity and multiple loss may be even more common than assumed for the simulations.

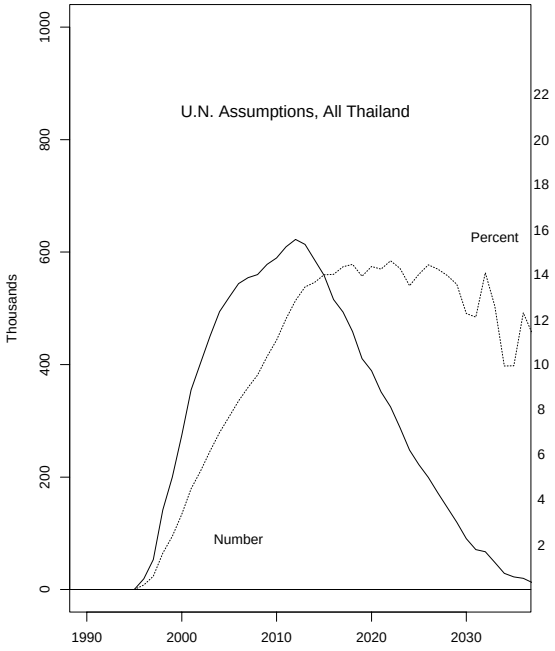
# 7 Lifecourse Bereavement

We now turn to the full projected trajectories of life course experience from the SOCSIM simulations. We restrict ourselves here to results predicated on U.N. forecasts of AIDS and non-AIDS mortality. The simulations take account of the pronounced regional differentials in HIV infection as well as allowing calculations of multiple losses within families.

Figure 2 shows the future life experience of the group of men and women who were age 50 and over at the time the SWET survey was conducted in May 1995. This collection of cohorts born before May 1945 are followed forward as a group over time as they age and gradually die. There is no replenishment of the group by people turning 50 after 1995. The survey population is weighted up to national totals for Thailand. The solid line shows the number of these persons who are still alive in the given year and have lost one or more children to AIDS. This number grows as deaths in the younger generation accumulate, and it then shrinks as the original cohort gradually dies off. The dotted line shows the percent of those surviving who have lost a child to AIDS by the given year. This continues to rise, ultimately hovering around 15 per cent for the longest-surviving members of the group. At the peak around 2010, about 622,000 of the survivors from this group of older people will have had to cope with the loss of one or more children to AIDS. Some 280,000 of them belong to the cohorts aged 50 to 60 in 1995.

The joint processes of parental survival and cumulating AIDS deaths among their adult children which determine the curves of Figure 2 are shown

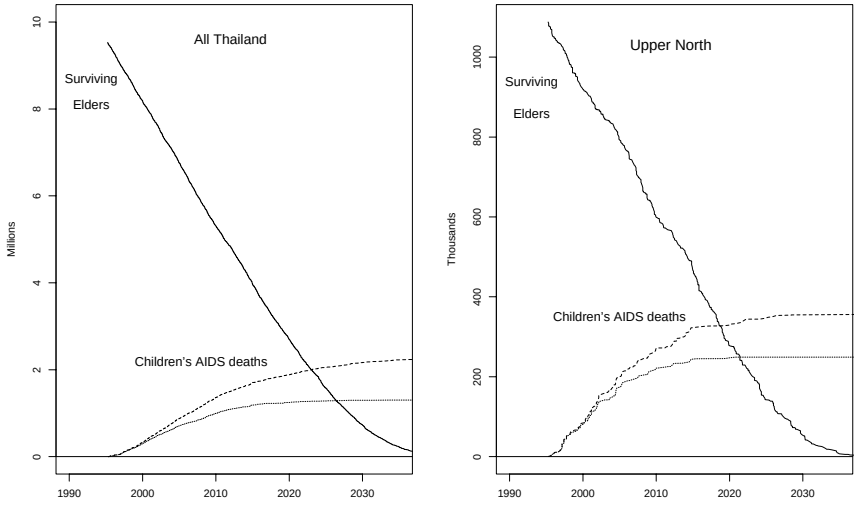
Figure 2: Living Elders with One or More Children Lost to AIDS. SOCSIM simulation projections for Thai men and women over age 50 in 1995.




in Figure 3. The left-hand panel pertains to the whole of Thailand, with counts weighted up to population totals. The right-hand panel pertains to the Upper-North region where the HIV epidemic has been most severe. In each panel, the upper solid line shows the number of survivors of the cohorts born before 1945. The dotted line shows the cumulative total of cohort members, alive or dead, one or more of whose children have died of AIDS before or after their own death. The lower solid line shows the cumulative total who have lost one or more children to AIDS before their own deaths. Less than half of all these AIDS deaths occur after the parent's own death.

In the Upper North, where the epidemic has been most severe, the curves for deaths of adult children from AIDS are higher in relation to the size of the parental cohort. About one-third of the group will lose one or more children to AIDS, and in nearly two-thirds of these cases, the loss will occur before the parent's death.

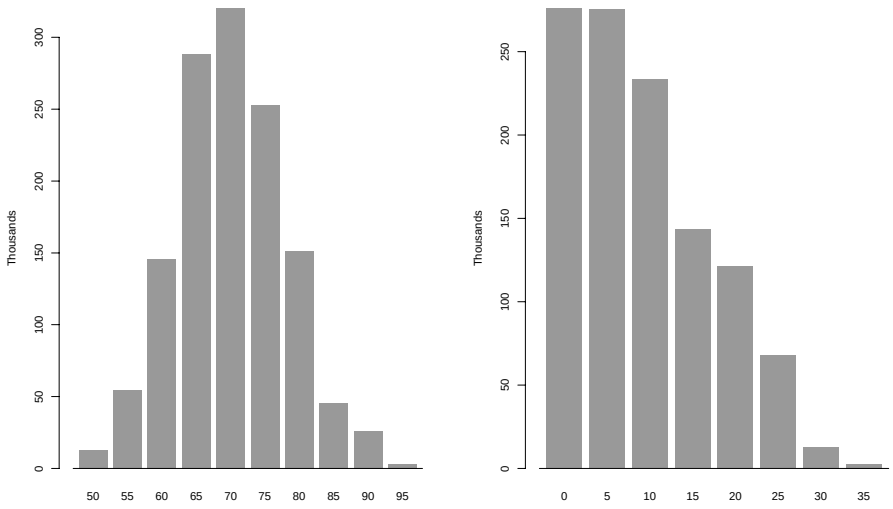
Figure 3: Surviving Elders and Cumulating AIDS Deaths. SOCSIM simulation projections for men and women age 50 and over in 1995 for all Thailand (left panel) and the Upper North (right panel). The upper solid lines show the number of survivors from the over-50 group. The dotted lines show the cumulative total from this group, alive or dead, one or more of whose children have died of AIDS by the given year. The lower solid lines show the cumulative total from the group who have lost one or more children to AIDS before their own death.




The ages of the members of the senior generation at the death of a child are shown in the left panel of Figure 4. The mean age is 73.8 years, with one-quarter of all cases occurring before age 68 and one quarter after age 77. Note that this is a very different picture than period estimates of the age distribution of parents who lose an adult child to AIDS would present. For example, based on the period estimates for 1995-1999 from the data derived from NSOSET and U.N. forecasts of AIDS deaths, only 36 percent of parents who lost a child to AIDS during 1995-1999 were aged 70 or more. If NESDB AIDS projections are used, the percentage aged 70 and over among those aged 50 and over who had a child die of AIDS is only 16 percent for the same period, an estimate that agrees well the 13 percent found by the key informant study for more or less the same period (unpublished results). The younger ages associated with period estimates reflect the cross-sectional nature of

such estimates which necessarily truncates the experience of cohorts.

Figure 4: Parents' Ages at an Adult Child's Death from AIDS (left panel) and Parents' Years of Further Life after an Adult's Child's Death from AIDS (right panel). SOCSIM simulation projections for Thai men and women age 50 and over in 1995.




The right panel of Figure 4 is a histogram showing the years of life remaining to a parent after first losing a child to AIDS. The median is 12.5 years. These are calculated under the assumption of no correlation between the adult child's death and the parent's death. In fact, it is possible that the strains of caregiving and grief could impair the parents' chances of survival. This histogram therefore can be read as an indication of how many person years of life are at risk of premature loss from such an impact.

The experience of parents is bound to differ greatly from case to case, and many factors must bear on whether an ill child returns home to live with his or her parents and whether parents become major caregivers. The data from the key informant study yield age-specific rates of coresidence and caregiving for mothers and for fathers who have a child sick with AIDS (Knodel et al. 2000). These data are retrospective, gathered for children who had already died of AIDS at the time of the survey. We measure the consequences for the

cohort of parents born between 1935 and 1945 under the stylized assumption that these age-specific rates continue into the future.

Figure 5: Parents' Coresidence and Caregiving for their Adult Children with AIDS. SOCSIM simulation projections for Thai men and women born between 1935 and 1945 for all Thailand (left panel) and for the Upper North (right panel).

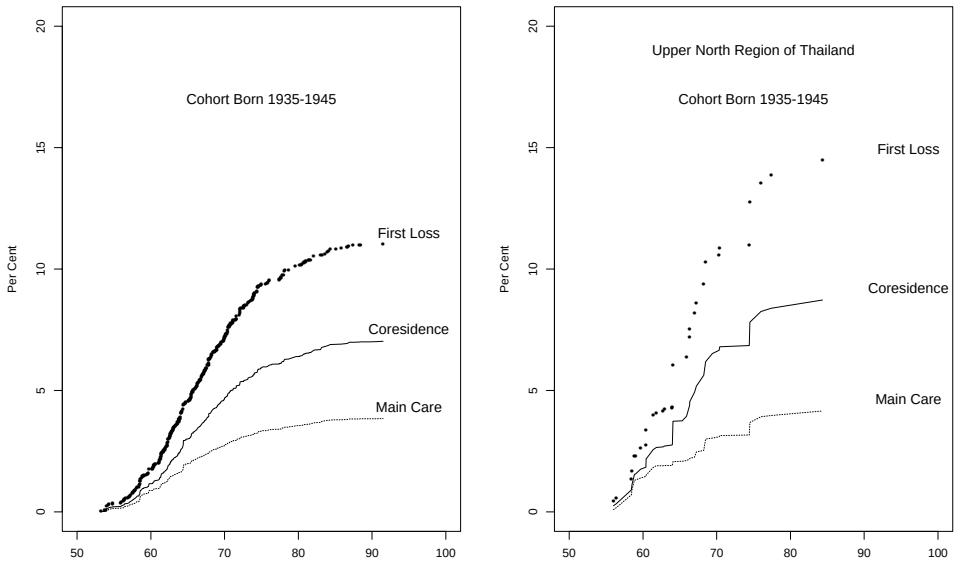



Figure 5 shows this cohort experience, on the left for Thailand as a whole and on the right for the Upper North. In each panel, the heavy band of points show the percentage of all original members of the cohort who have experienced before their own deaths the loss of at least one child to AIDS by each age. The thin solid line shows the percentage who have coresided with a child sick with AIDS, and the dotted line shows the percentage who have been the main caregiver for such a child. For the thin solid and dotted lines, multiple instances are counted multiply. Figures for parents offering any care are not shown, but they are very close to the figures for coresidence.

On the basis of the projections, among the cohort of Thai men and women turning 55 around 1995, one in 9 could expect to experience the loss of at least one child to AIDS. One in 14 could expect to have lived with that child

during the illness and to have provided care. In Thailand, death follows rapidly on the presentation of symptoms of AIDS. The U.N. assumes half of all new AIDS cases die in the first year and half in the second year. Although periods of caregiving may not be extended, they are undoubtedly often intense. One in every 26 members of this cohort could expect to be a principal caregiver of an adult child ill with AIDS. These experiences occur most frequently in the later 60s and early 70s, but a significant part of the responsibility occurs after age 75. In the Upper North, as many as one in 7 members of this cohort could expect to experience the loss of a child to AIDS, and one in 11 could expect to have coresided during illness or provided some care.

The cohort turning 55 around 1995 is still experiencing the early effects of the AIDS epidemic among their adult children. Their own childbearing preceded Thailand's dramatic decreases in fertility, so their families are larger than the families of those who will encounter later stages of the epidemic. For this cohort, virtually no one should expect to lose all their children to AIDS without the operation of some particular set of risks concentrated on the family itself. Families from this cohort will occasionally lose all their daughters or all their sons to AIDS. We estimate that 3000 parents might find themselves in Mr. Choroen's condition, with three sons all dying from AIDS. Thus such vivid tragedies are relatively rare. But losing one child from AIDS is not rare. As later cohorts of Thai men and women with much smaller families arrive at older ages later in the epidemic, the impact of losing a child will likely be greater for them and the possibility of being left childless in old age from AIDS is likely to increase.

# 8 Conclusion

The impacts of AIDS upon non-infected family members is an area requiring more extensive and careful attention. In societies lacking public resources to provide for the far-reaching medical and caretaking needs of the infected population, much of the financial and caretaking burden will likely fall upon the older parents of persons with AIDS. In this paper we have applied aggregate demographic analysis and computer microsimulation to project the experiences of the present generation of older Thais with regard to their likely loss of children to AIDS before their own deaths. Where results from the two approaches can be compared, as in Table 4, they agree reasonably well.

In other respects they complement each other. Our estimates are very much dependent on the accuracy of the forecasts of the AIDS epidemic available to us. For the simulations we have used the U.N. forecasts whose overall levels of AIDS deaths are close to the detailed recent estimates of van Griensven (1998). The lower NESDB forecasts, however, are more sophisticated in their treatment of differentials by age and sex, and parallel simulations with NESDB trajectories or some combination of NESDB and U.N. trajectories might be worthwhile. Neither of these forecasts probably does justice to the emerging dynamics of spousal transmission. As better data on spousal transmission surface, losses of daughters-in-law and sons-in-law might be measured in new simulations, although reliance on parents rather than parents-in-law would be normal in Thailand. Among other topics for future research, heterogeneity looms large. Our initial comparisons with reports from key informants suggest a need to experiment with stronger levels of family-to-family and area-to-area heterogeneity.

Much remains to be learned about the extent of impacts in settings other than Thailand, and with respect to measuring the types and degrees of impact suffered by those older persons who do experience the death of an adult child. How many, like Mr. Choroen, will face losses so severe that they will be forced to truncate retirement and seek paid employment? How many will face social ostracism in their communities, or devastating emotional stress? Which characteristics of the setting, the older person, and the infected adult child will covary with these outcomes? Current work in progress is exploring these issues in Thailand. Comparative results for a range of other nations would be welcome.

For the current generation of older Thais, impacts like the loss of old-age support from children will be moderated by the fact that the majority have had large families. More than half of all Thais aged 50 and over in the 1995 SWET have at least 5 living children. However, the cohorts who will enter older age groups in the future will have had progressively smaller families, reflecting the rapid pronounced decline in fertility dating from the late 1960s (Knodel, Chamratrithirong, and Debavalya 1987). New survey data or statistical matching techniques are needed to allow the tracking of these cohorts of future elderly with aggregate measures and with microsimulation.

The 2 percent prevalence of HIV in Thailand is hardly high by world standards. But our projections show that this 2 percent prevalence is likely to implicate as many as 12 percent of older Thais in the loss of adult children to AIDS before their own deaths. For the vulnerable Upper North, the

figure is nearly 20 percent. These higher percentage figures for loss occur because many of the present generation of older persons in Thailand have large numbers of adult children and because many adults who die of AIDS have two living parents, both of whom experience the loss. The chance of losing one or more adult children during one's lifetime will be 75 percent higher than it would have been without AIDS. Substantial proportions of older Thais will be the principal caregivers of children dying of AIDS and will coreside with them.

These are striking results. On the other hand, alarmist views are sometimes expressed in the Thai media and by Non-Governmental Organizations that assist persons with AIDS and their families, views that give the impression that most Thai families, at least in the north, are bound to suffer an AIDS death. The systematic data from key informants and our calculations in this paper contradict that dismal view. Doubtless no one's life will be wholly untouched by AIDS, but even in the Upper North four out of five people now over 50 can expect to live out their lives seeing their children spared.

On a global scale, the picture is bleaker. In many countries HIV prevalence already reaches levels far above that in Thailand, and impacts on older people will be far more extensive. The combination of surveys, AIDS forecasts, and key informant data which underlie this study of Thailand are not readily available for the harder-hit countries of Africa or the Caribbean. However, with caution, exploiting those data that are available, it may be possible to adapt the approaches developed here to other countries, and so arrive at useful assessments of the likely lifetime impact of AIDS on older people elsewhere around the world.

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