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### THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE, AND AFRICA

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Panelists: ANDRÉ P. CHUFFART\*  
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Recorder: ELIZABETH H. MERDIAN

- o Status of the epidemic, affected groups and trends
- o Impact on general population mortality
- o Impact on insured mortality experience
- o Impact on underwriting practices
- o Actions taken by actuaries in affected countries to provide for an expected increase in claims experience
- o Pricing considerations
- o Reserving

MR. DAVID M. HOLLAND: I am with Munich American Reassurance and will serve as Moderator. Our panelists are: André P. Chuffart, Vice President of Swiss Reinsurance Company, and a member of the Swiss Society of Actuaries and the International Actuarial Association. André's expertise on HIV and AIDS is known worldwide; he previously spoke to us at the Society of Actuaries 1988 Symposium on Insurance and the AIDS Epidemic, and at a Society Meeting in Nashville in April 1987 on "Organ Transplantation and Mechanical Implants." Thomas W. Reese is with Tillinghast/Towers Perrin. Tom is Chairperson of the SOA Committee on HIV Research and a member of the SOA Task Force on the Financial Implications of AIDS.

These groups produced the SOA AIDS Committee Reports published July 1989 and December 1989. Harry H. Panjer is a Professor, Department of Statistics, University of Waterloo. Harry is a recently elected Vice President of the Society, chairs the Subcommittee on Modeling of the Canadian Institute of Actuaries Task Force on AIDS and is a noted author on this subject including papers in the *Transactions*.

The June 1990 *Actuarial Update* published by the AAA announced "AIDS Risk Exaggerated"; on the other hand, consider the following:

1. The number of reported cases of AIDS have been rising year by year. There have been 150,000 AIDS cases and 90,000 AIDS-related deaths reported in the U.S. alone.
  2. In the U.S., AIDS is the third ranking cause of death for people 25-34 (the number one medical cause), and the fourth ranking cause of death for people 35-44.
- \* Mr. Chuffart, not a member of the Society, is Vice President of Swiss Reinsurance Company in Zurich, Switzerland.

## PANEL DISCUSSION

3. By the end of 1990, the number of U.S. AIDS deaths is expected to be more than double the number of U.S. battle deaths in Vietnam.
4. Over the 1980s there has been a steady improvement in U.S. population mortality for ages 45-74 (see Chart 1), whereas for ages 15-44, the improvement plateaued in the early 1980s and subsequently worsened (see Chart 2).

The impact of AIDS varies considerably by country. The number of AIDS cases reported was approximately 560 per million of population for the U.S. (as of midyear 1990) versus 150 per million for Canada. On a global basis, the U.S. accounts for approximately half of the reported AIDS cases (see Chart 3); however, concern about underreporting for U.S. data is magnified for certain less developed countries.

For the insurance industry, billions of dollars have already been paid out in AIDS-related claims. For a more detailed profile, the panel presentation will commence with André Chuffart discussing AIDS outside North America, followed by Tom Reese who will cover developments in the United States. Harry Panjer will conclude the panel with comments on Canada and a contrast of the Canadian and U.S. environment.

MR. ANDRÉ P. CHUFFART: The title of my presentation is "Some Characteristics of the HIV Infection Outside North America."

### REPORTED AIDS CASES, EXTENT OF HIV INFECTION AND FORECASTS

#### Introduction

Since the initial description of patients with AIDS in 1981, HIV infection has spread to virtually every corner of the globe. As of October 1, 1990, 288,337 cases of AIDS had been reported by 157 countries to the World Health Organization (WHO) in Geneva. To give you, however, a more elaborate picture of the extent of the HIV infection, I have to go back a few months, when WHO released a very comprehensive set of data. (See Tables 1, 2, and 3.)

TABLE 1

Global Distribution of HIV Infections  
Reported AIDS and Estimated/Projected AIDS Cases as of June 1, 1990

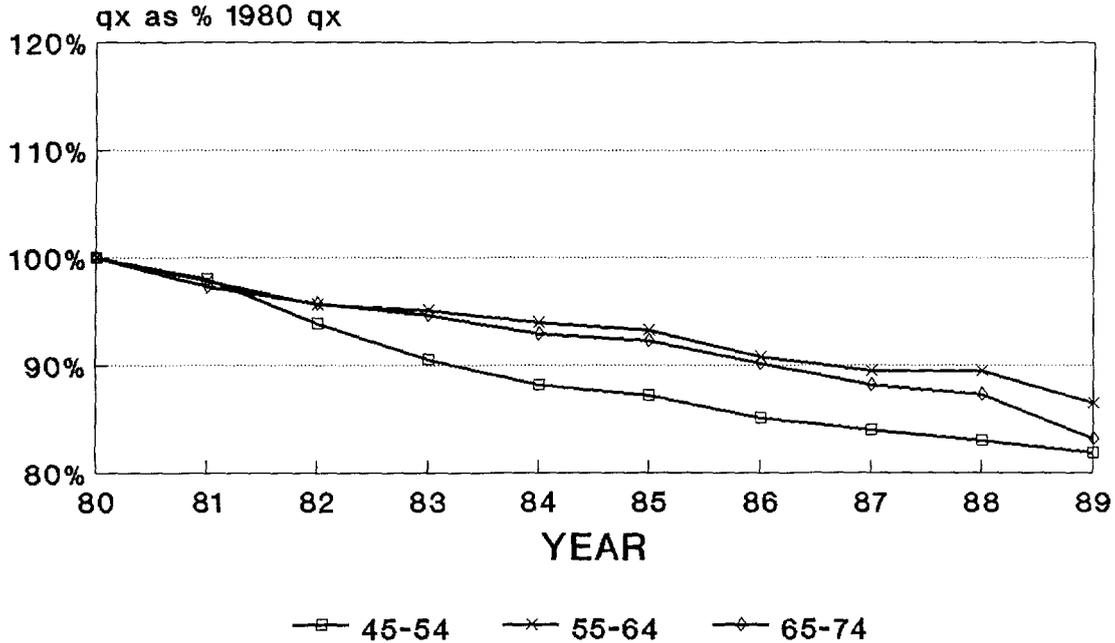
Area	HIV	AIDS (Rep)	AIDS (Est.)	AIDS/1991
Africa	3,500,000	64,745	375,000	650,000
Americas	2,500,000	160,619	250,000	450,000
Asia	150,000	647	1,200	5,000
Europe	550,000	35,021	45,000	100,000
Oceania	30,000	2,019	2,500	6,000
Total	> 6,700,000	263,051	> 670,000	> 1,200,000

Source: Reprinted with permission of WHO Global Programme on AIDS, Geneva, Switzerland.

# Population Death Rates by Year U.S. Males

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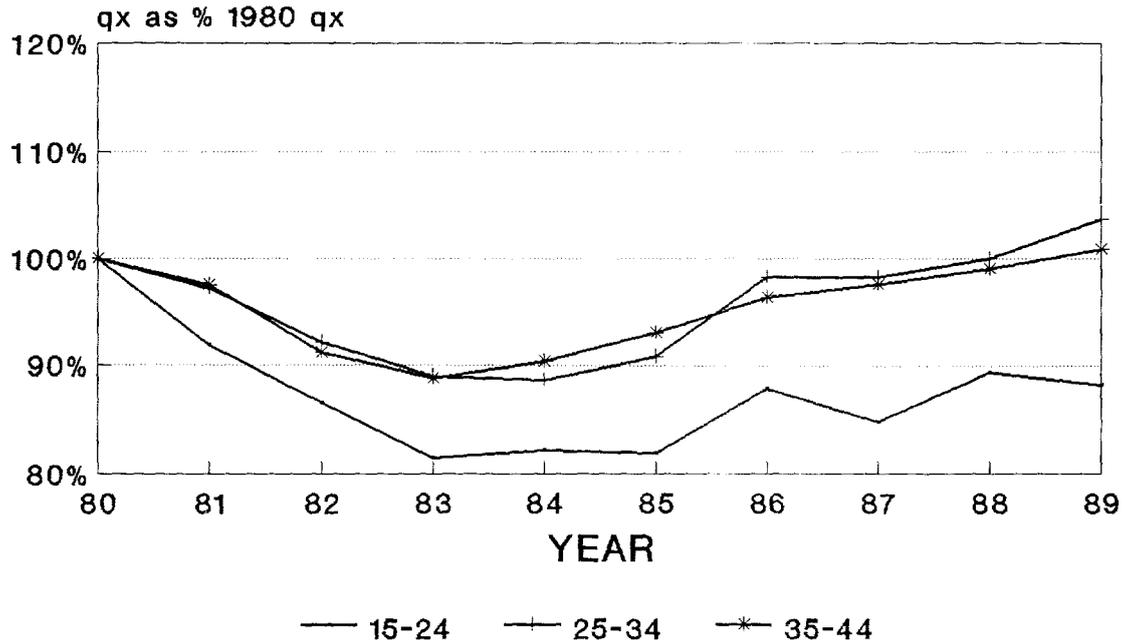
CHART 1



1987

# Population Death Rates by Year

## U.S. Males

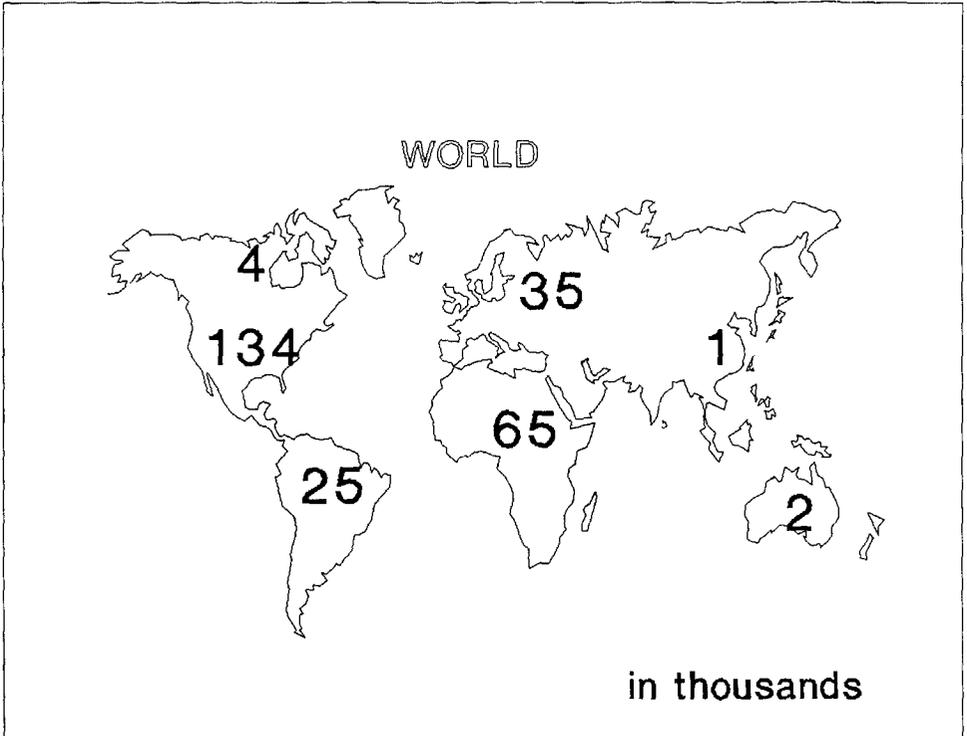


1988

PANEL DISCUSSION  
CHART 2

CHART 3

# Reported AIDS Cases



Source: Reprinted by permission from WHO Global Programme on AIDS, Geneva, Switzerland.

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In Table 1, the expected number of people infected worldwide: 6-8 million. Reported AIDS cases only represent a fraction of the actual fatal HIV-related illnesses, as not all fatal HIV-related illnesses qualify as AIDS, not all AIDS cases are diagnosed, and not all diagnosed AIDS cases are reported.

TABLE 2

Global Distribution by Sex of HIV-Infected Adults as of June 1990

	Female/2 Million	Male 4/Million
Africa	79%	39%
Western Europe	3	11
North America	5	24
South America	10	21
Other	3	5

Source: Reprinted with permission of WHO Global Programme on AIDS, Geneva, Switzerland.

TABLE 3

Global Distribution by Continents  
Reported and Estimated AIDS Cases as of June 1990

	Reported	Estimated
Africa	25%	55%
Europe	13	7
USA	50	22
Americas	11	15
Other	1	1

Source: Reprinted with permission of WHO Global Programme on AIDS, Geneva, Switzerland.

### Projections

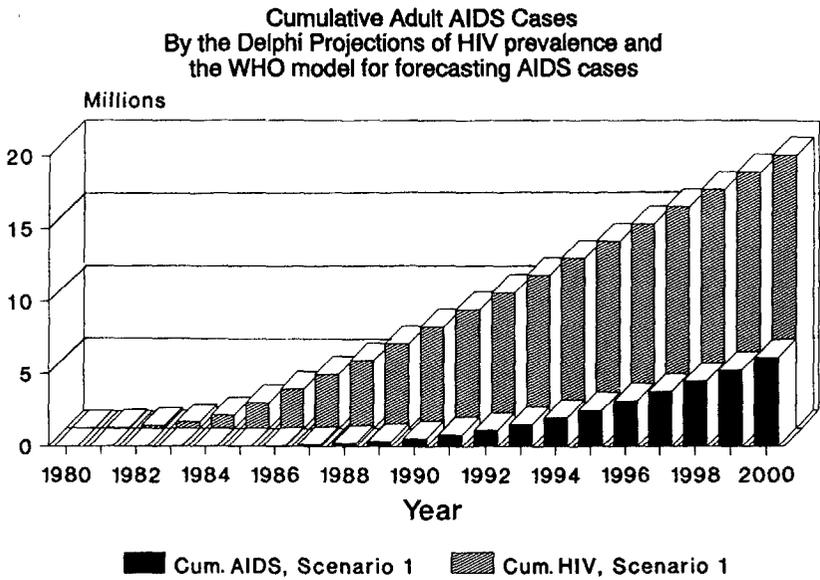
WHO's last published projections date back to 1989:

Short-term projections: the number of AIDS cases should at least double, possibly triple in most areas of the world within the next five years. Long-term projections (the so-called Delphi projections; see Appendix 1 as well as Chart 4 and Table 4): there should be by the year 2000 a cumulative total of 15 to 20 million HIV-infected persons and 5-6 million AIDS cases.

The second decade of HIV-AIDS pandemic, i.e., the 1990s, will be much worse than the first decade -- the 1980s. Fewer than 1 million cumulative adult AIDS cases are expected by the end of 1990; in contrast, during the 1990s, over 5 million adult AIDS cases are projected. The ratio of cumulative HIV infection to AIDS cases during the

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CHART 4



Source: Adapted by permission from: Chin, J. et al. Projections of HIV infections and AIDS cases to the year 2000. *Bulletin of the World Health Organization*, 69(1): 1-11 (1990).

## PANEL DISCUSSION

early 1980s was very high whereas by the mid to late 1990s, this ratio is expected to fall substantially to less than 10:1.

TABLE 4

Delphi Projections of HIV Prevalence in Adults

	Estimated Mid-1988 (mil)	Projected Mid-2000	
		Scenario 1 (mil)	Scenario 2 (mil)
Global	5.1	18.3	12.2
Patterns I and I/II	2.5	6.5	3.9
Pattern II	2.5	10.5	7.6
Pattern III	.1	1.3	.7

Source: Adapted by permission from: Chin, J. et al. Projections of HIV infections and AIDS cases to the year 2000. *Bulletin of the World Health Organization*, 68(1): 1-11 (1990).

Scenario 1 of Table 4: There is no coordinated effort at all whether globally or at a regional level. Scenario 2 of Table 4: A coordinated effort to prevent and control sexually transmitted HIV infections is implemented and will reduce transmission by more than 50% in Pattern I areas but only by about 30% in Pattern II areas. Prevention of HIV infection transmitted by IV-drug use is also implemented but only a 20% reduction is projected to be potentially possible.

Global patterns of Table 4: See Appendix 2.

From the estimated mid-1988 global HIV prevalence of about 5.1 million, Delphi participants (see Appendix 1) projected that there would be a three- to four-fold increase to a projected prevalence of 18.3 million by mid-2000 (scenario 1). Comparison of the projected HIV prevalence in mid-2000 to the estimated mid-1988 prevalence indicates that those areas currently classified as epidemiological Pattern II can anticipate the largest absolute increase of HIV infection (8 million). The largest relative increase in HIV prevalence (13-fold) is expected in areas currently classified as Pattern III.

Some remarks on the Delphi projections: the global prevalence of HIV in mid-1988 was about 5.1 million whereas at that time WHO had already estimated that from 5-10 million persons worldwide were infected. Thus, projections based on the Delphi responses were already conservative when released in 1989.

The Delphi projections of HIV infection by mid-2000 should also be considered speculative, since major uncertainties and incomplete information about variables remain.

The Delphi projections were never considered as being final. As with any other projections they need to be reviewed and revised periodically as additional data suggest that changes are warranted.

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### **WHO's Last Estimates on HIV Seroprevalence**

At the end of July 1990, WHO, as a result of a detailed review and analysis of HIV serologic data for 1988 and 1989, released the following data: the incidence of HIV infection is accelerating dramatically in developing countries, especially in sub-Saharan Africa and Asia. At the same time, the rate of the new HIV infections is slowing down in the developed world although there continued to be groups subject to increased HIV infection (e.g., IV drug users).

As a result of these observations, WHO's previous estimate of 6-8 million people infected with HIV around the world was adjusted to 8-10 million (see Chart 5), without excluding a further revision upwards, if HIV prevalence over the next couple of years were continuing to increase in Asia, Latin American and in sub-Saharan Africa.

More specifically, WHO's last estimates show the following:

**Sub-Saharan Africa:** The number of persons infected with HIV has increased from 2.5 million in 1987 to about 5 million at mid-1990. In 1987, most infected people were found in large urban populations; now, extensive spread is being documented in rural areas in most sub-Saharan African countries which contain the majority of the population of the continent (see Chart 6).

**Asia:** Up until the end of the 1980s, the number of both HIV infections and AIDS cases was low in Asia. However, recent data indicate that the total number of HIV-infected persons in this region has risen from virtually nil two years ago to an estimated current total of at least 500,000, a much more rapid increase than projected even a year ago. More precisely, serological data for 1988 and 1989 indicates marked increases of HIV infection in Thailand (HIV prevalence among the estimated 60,000-80,000 IV-drug users in Bangkok rose from about 1% in late 1987 to over 40% in early 1989) and in India (several serosurveys on prostitutes found high HIV prevalence rates, up to 30% in Bombay's red light district; as a consequence, WHO estimated that there may be 250,000 HIV-infected people in the large cities of India).

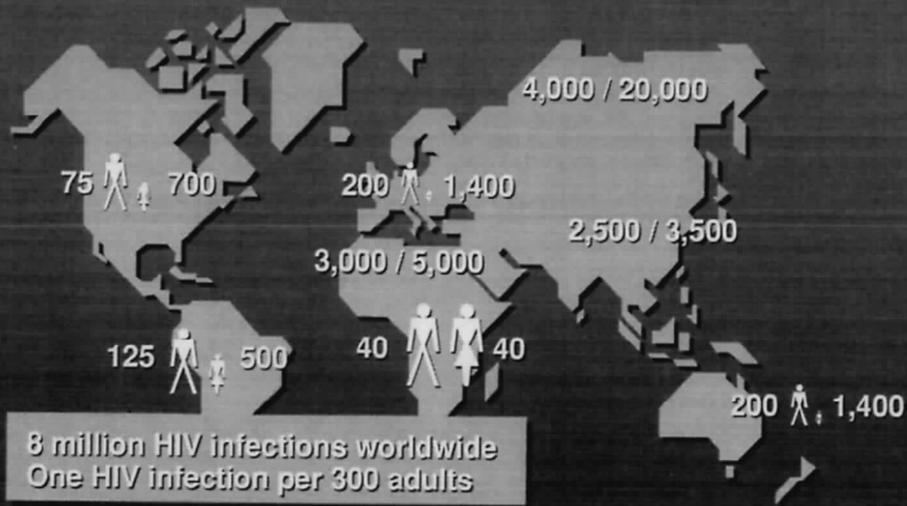
**Women and children:** The increases in HIV seroprevalence reflect the growing incidence of heterosexual transmission around the world. As a result, there will be an increasing rate of HIV infections, AIDS cases and deaths among women and children in the 1990s (see Chart 7). During this first decade, the HIV pandemic had caused an estimated 500,000 cases of AIDS in women and children, most of which were unrecognized. During the 1990s, WHO estimates that the pandemic will kill an additional 3 million or more women and children throughout the world. In addition, more than 10 million uninfected children will be orphaned, because their HIV-infected mothers and fathers will have died from AIDS.

### **Final Remarks**

In 1989, WHO, on the basis of a mid-1988 estimated HIV prevalence of 5.1 million, had projected by the year 2000, a worldwide cumulative HIV prevalence between 15-20 million. With the current updated global estimate of 8-10 million HIV infections, there is no doubt that a dramatic upward revision of the projections by the year 2000 must be envisaged. This is especially the case in Asia where WHO had projected there would be

## Estimated HIV infection rate (early 1990)

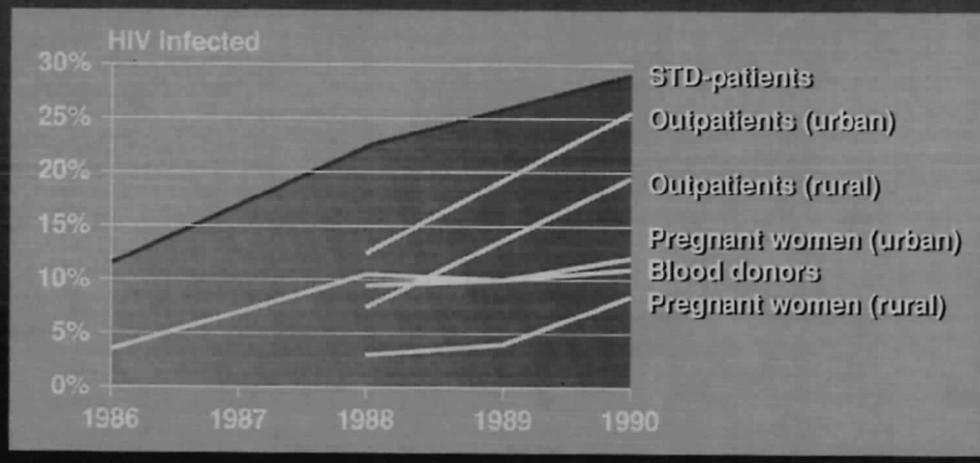
Number of adults per infection



Source: Reprinted by permission from: Chin, J. Global estimates of HIV infection and AIDS. *AIDS 1990*.

## HIV prevalence in one region of an East African country

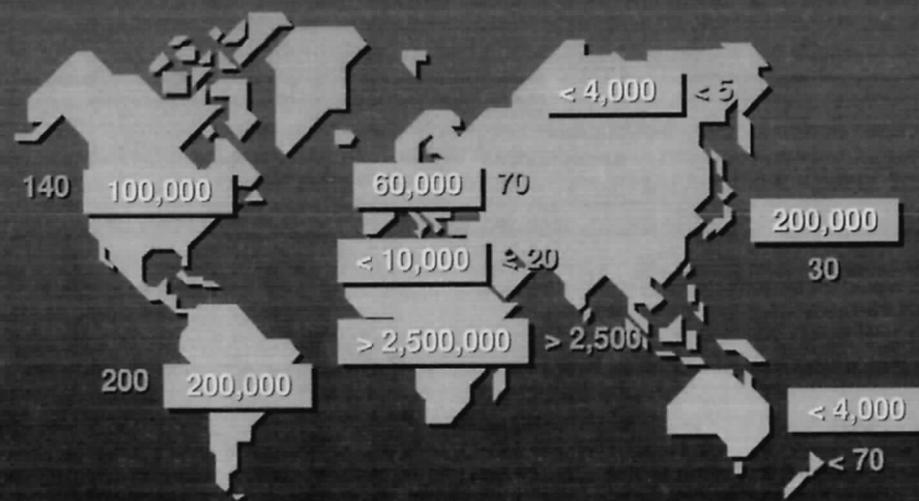
Sentinel surveys 1986-1990 (N=4368)



Source: Reprinted by permission from WHO Global Programme on AIDS, Geneva, Switzerland.

## Estimated number of HIV+ females aged 15-49

Prevalence per 100,000



PANEL DISCUSSION  
CHART 7

Source: Reprinted by permission from WHO Global Programme on AIDS, Geneva, Switzerland.

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1.0-1.5 million HIV infections by the year 2000, yet half a million have probably already occurred.

### AFRICA

#### Introduction

As of October 1, 1990, 71,572 AIDS cases had been reported by 52 countries to WHO in Geneva. This number is, however, greatly underreported and a reasonable estimate of the "real" number of AIDS cases should be about 400,000.

Mass media usually refers to Africa as if it were a single country, disregarding the great heterogeneity of culture and environment that make up this continent. Practically, three global patterns of HIV infection can be found in Africa: Pattern III in North Africa; Patterns I and I/II in South Africa (SA), and Pattern II in the other sub-Saharan countries. (For a description of these patterns, see e.g., the article written by J. Chin, P. A. Sato and J. M. Mann mentioned in Appendix 1.)

The two points I would highlight are the following: developing experience in a few of SA's neighboring countries and the situation in the South African life insurance market.

Background note: The South African life insurance market is extremely sophisticated. In terms of the ratio of life insurance premium income to natural gross domestic product, South Africa headed the world in 1989 with 7.93%; as a comparison: U.S.A., 3.65%; Canada, 2.54%; U.K., 4.89%; Switzerland, 4.85% (Source: Sigma, Swiss Re).

#### South Africa's Neighboring Countries

Extent of HIV infection: The extent of the HIV infection is not known; however, a few serosurveys are available, which clearly underscore the severity of the problems; for example:

In Malawi, 29% of first-time blood donors and up to 52% of prospective employees were found to be infected. Since 1990, the local government has prohibited HIV testing for insurance purposes.

In Zambia, 19% of blood donors, 27% of hospital staff, and 23% of individual life applicants were found to be infected.

Impact on general population mortality: No significant information on the impact on general population mortality is available except that staff attendance at colleagues'/relatives' funerals is now having a noticeable effect on work force output!

Impact on insured mortality experience: Here, also, no mortality data on the impact on insured mortality experience are available, but the experience in group business seems to be different from that in individual business. Group claim life payments due to AIDS are increasing at an alarming rate (see Table 5).

There is a possibility that group life mortality could be adversely affected by a deliberate policy to retain sick staff on the payroll until death, particularly if there is some disability income benefit provided.

PANEL DISCUSSION

TABLE 5

Group Life Claims in Three Southern African Countries (Excluding S.A.)

Year	AIDS Claims as a % of Total Claims		
	Country 1	Country 2	Country 3
1987	4.8	1.2	N/A
1988	10.7	3.0	N/A
1989	20.0	3.4	28.0
1990 (June)	N/A	7.7	N/A

Interestingly individual business experience shows very few claims, which can be explained by a combination of: underwriting measures, policy termination prior to death (often due to inability to pay premium), and loss/unawareness of policy by dependents.

Impact on underwriting practices and actions taken by actuaries: The general approach, not only in SA's neighbors, but in many sub-Saharan countries, is as follows: introduction of HIV blood testing, when not prohibited by law (testing limits, however, vary a great deal from country to country), and introduction of specific questions in the application form or in the medical examiner's report, or in both. However, not all carriers have adopted this approach and not all carriers which have adopted it, have implemented it!

In Malawi, following the prohibition by local government on HIV antibody testing for insurance purposes, one of the largest companies has withdrawn its previous product range and now only sells, unless a negative HIV test is provided by the applicant, either 10-year with profit endowment assurances (with a 20 per thousand per annum loading; maximum sum assured: Kwacha 20,000, i.e., approximately US \$7,800) or pure endowments. There is no information available on disability products, but the presumption is that they have been withdrawn. Malawi National Insurance, however, is currently not testing and has not changed its product range!

In Zimbabwe, a debate between the Life Offices' Association (LOA) and the Minister of Health regarding the right to test for HIV antibodies on larger sums assured is still ongoing. It would seem that it is likely to be accepted at Zimbabwe \$100,000 (approximately US \$40,000). Some companies have withdrawn pure term assurance products from the market.

**South Africa (SA)**

Population (1990 estimate): Whites, 5.0 mil; Blacks, 22.0 mil; Coloreds, 3.2 mil; Indians, 1.0 mil; Total: 31.3 mil.

Extent of HIV infection: Up to August 8, 1990, 455 AIDS cases had been reported; 173 were among blacks and 263 were among whites.

At present the prevalence of HIV infection increases exponentially, with a doubling time in April 1990 of about 8.5 months. Of great concern is the extensive and continuing silent spread of HIV in the urban black population. For the time being, however,

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seroprevalence figures in municipal employees of mainly rural origin are considerably lower, but regular movements between urban and rural areas could well introduce and amplify infection in rural areas.

By the end of 1989, the number of HIV-infected black South Africans aged 15-49 years was estimated to be between 45,000 and 63,000 (G.N. Padayachee, SAMJ; vol. 77; p 329), and it is predicted that these numbers will rise to between 119,000 and 168,000 by the end of 1990 and to between 317,000 and 446,000 by the end of 1991. Because of the lack of basic data, these forecasts are obviously tentative, but they nevertheless underscore the great seriousness of the HIV epidemic in South Africa.

Impact on general population mortality: it has been negligible. Up to August 8, 1990, 215 deaths were reported.

Impact on insured mortality experience: it has also been negligible. As of May 26, 1990, 110 claims were reported (source: Mercantile & General Re).

Impact on underwriting practices: The individual life insurance market has for some years now been trying to avoid any racially discriminatory underwriting/pricing practices. By amounts of cover, the market is still predominantly composed of white lives, although, if counted by number of policies, the proportion of white business would be considerably reduced. Insurers in South Africa are relatively free to introduce whatever underwriting measures/policy wording they think fit.

In November 1988, members of the LOA introduced an entrenched agreement, i.e., a business approach which all member offices were obliged to follow, demanding a permanent AIDS exclusion or a negative HIV antibody test on all individual proposals for life cover with a death benefit greater than or equal to Rand 200,000, (Rand 1 = U.S. \$0.39), inclusive of simultaneous proposals and any other covers taken out during the last 12 months. Most offices responded by offering the alternative to applicants although a minority did not offer the exclusion; at least one office insisted on both an exclusion and a negative test. Some offices introduced lower testing limits (Rand 100,000 or 150,000) for term assurances. Shortly thereafter, most offices introduced compulsory testing at about Rand 600,000 for prospects of large sums assured being effected with an AIDS exclusion. During 1989 and 1990, there has been a general downward drift in the testing limits being applied, although not uniformly across the market.

The exclusions being applied in practice are generally of the type that avoid claims payment in the event that the cause of death is directly or indirectly associated with AIDS/HIV infection. It is rare for the exclusion to apply merely because the life assured is infected at the time of death, without regard to cause.

The debate about the effectiveness of an exclusion as an underwriting measure will only be resolved in time as differential mortality experience statistics become available and as companies have experience of actually admitting claims. It has yet also to be discovered how the medical fraternity would respond to requests made by insurers on whether AIDS/HIV infection were contributory causes of death. Furthermore, the pricing of

## PANEL DISCUSSION

policies with an exclusion is not as easy as it might appear at first sight, as seropositives, aware of their infection and in need of an insurance coverage in excess of Rand 200,000, have then the possibility to apply for such a policy, in the hope that the carrier will not detect HIV infection should a claim occur. Possibly, policies with an AIDS exclusion might therefore be more expensive than policies with full coverage! This is why an overall compulsory testing limit at about Rand 600,000 has been introduced. Finally, the exclusion route suffers from the two following defects: (1) It is difficult to be sure that life insurance purchasers appreciate the implications of buying a policy with an exclusion, especially given the very long-term nature of the policy; and (2) the credibility of the life insurance industry will be severely tested if, in the future, the exclusion leads to many claims not being paid, especially in a society where multiple sexual partnerships are fairly common and not necessarily frowned upon socially.

For individual disability policies providing lump sum acceleration benefits, the practices applicable to death benefit were introduced, although in some cases companies offered only the exclusion route.

For individual disability income benefits, the entrenched agreement introduced in November 1988 provided for a sum assured limit of Rand 2,000 per month, above which either a negative test or an exclusion had to be applied. Some companies insisted on the exclusion route.

All group business is annually renewable. The British 'free cover limit' system of underwriting applies (i.e., no medical evidence is requested for sums assured below the group free cover limit -- individual underwriting criteria apply for covers in excess).

No industry agreement has been introduced and little action has been taken so far, except to generally reduce the period of premium guarantees from 3, and occasionally 5, years to 1 year.

For covers above the group free cover limits, companies are generally not requesting HIV tests, although some are applying the individual business underwriting rules.

In general, conversion options on withdrawal (i.e., the right to convert group cover into an individual contract on withdrawal from the group scheme) have been continued, mainly because the individual standard contracts now incorporate an AIDS exclusion, which is waived on production of a negative HIV test.

Group disability covers have also seen little change. The introduction of exclusions on group disability cover has been rare.

Action taken by actuaries: Prior to the HIV/AIDS epidemic, South African life assurance products were primarily of the savings types. The traditional with profits whole life and endowment assurances are now gradually being replaced by universal life type products containing very few guarantees. For example, the mortality charge itself is not guaranteed and, in addition, the company reserves the right to adjust the unit values, at the actuary's discretion, by mortality and/or expense surpluses/deficits.

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Given the above types of products, little has been changed with the advent of HIV infection/AIDS other than the underwriting considerations mentioned previously. As far as is known, no companies have yet increased their premium on either universal life type contracts or the traditional with profit products.

Actuaries are required to set up "proper" reserves to cover future liabilities, subject to the proper reserve not being less than a certain minimum laid down by law. There are no specific requirements for setting up additional AIDS reserves. However, the Registrar of Insurance now requires the actuaries to supply him with information on the amount of any additional AIDS reserves, the basis of calculation, or, if none are held, in what way they (= the actuaries) are satisfied with overall adequacy.

At present, most actuaries are of the opinion that the current minimum valuation basis provides more than adequate margin and, to date, have not set up additional reserves, although most reassurers and building societies' insurers have done so, generally using the U.K. Institute model as a guide for white lives.

Mass marketed term assurance products have quietly disappeared.

### **AUSTRALIA**

Population: about 16 million

Extent of HIV infection: As of August 10, 1990, 2,040 AIDS cases had been reported to the National Centre in HIV Epidemiology and Clinical Research. Over 88% of cumulative AIDS cases have occurred among homosexual/bisexual men whereas IV-drug users (male and female) have accounted for slightly more than 4% of all cases. The number of heterosexual cases has remained under 1%.

The AIDS Subcommittee of the Institute of Actuaries has reassessed its AIDS death projections for mid-1995. The original estimation predicted 13,000-26,000 AIDS deaths whereas the new projections estimate some 6,000-12,000 will have died from AIDS.

As of August 10, 1990, the cumulative number of new diagnoses of HIV infection (excluding, however, since June 30, 1989 New South Wales, which shows the highest cumulative incidence of AIDS per million total population, i.e., almost twice the national average) was over 12,000. The proportion of new cases recently diagnosed as HIV positive is now less than 80% in the homosexual/bisexual male category but has increased to 7.3% among IV-drug users. In contrast, the proportion of heterosexual cases has remained unchanged.

The AIDS Subcommittee of the Institute of Actuaries has also revised downwards their estimate of HIV-infected persons by mid-1989. The earlier projections estimated the number would be between 34,000 and 54,000 whereas new figures show that "only" between 18,000 and 31,000 persons were infected by mid-1989.

Impact on general population mortality: The annual number of deaths in Australia is around 60,000 males and 50,000 females; hence, the additional number of AIDS deaths

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of 330 males and 7 females has little impact on the total population mortality. However, when the ages are considered, the additional 60 male AIDS deaths at age 20-29 represent an additional 3% and the 168 male AIDS deaths at age 30-39 represent an additional 10%, and are significant at these age groups.

**Impact on insured mortality experience:** While many estimates or projections of the impact of AIDS on insured mortality have been prepared, no insured mortality experience studies on the impact of AIDS have been published.

The number of AIDS claims and the amount paid have shown the following trend:

Year	1985	1986	1987	1988	1989
Number of claims	23	66	73	123	125
Amount (A\$ mil)	1.0	2.1	2.4	5.4	6.7

Source: The Life Insurance Federation of Australia (LIFA)  
A\$1 = U.S. \$0.82

These claims include life, group life and disability income claims. Interestingly, among the 23 claims rejected as of March 31, 1990, 3 had medical examinations and 20 were accepted without medical examination.

**Impact on underwriting practices:** In September 1987, the only routine AIDS testing was being done at A\$2 million, the level at which routine blood tests were required; the market was waiting for a lead on an AIDS questionnaire and automatic testing. By the end of 1987, most companies had adopted an AIDS questionnaire (Appendix 3) and had reduced the testing level to A\$500,000, inclusive of the new business and all existing proposals. (Some offices, however, still referred to business with themselves and not total cover, whereas a few referred only to new business.) A standard AIDS questionnaire and code of conduct had been agreed on between the health authorities and LIFA. Testing levels were gradually reduced over the following year until by the end of 1989 testing was routinely required for proposals which took the total sum assured on the life to A\$250,000 or more.

As of September 30, 1990, two-thirds of 66 companies surveyed were defining their testing limit by reference to all cover on the life whereas one-third were referring to cover only with their company, which obviously leaves the market open to antiselection!

The testing level for disability income has been reduced in line with the life limit and is currently about A\$2,500 per month. Some companies offer disability income with an AIDS exclusion for a cheaper premium or grant AIDS cover subject to an AIDS test and a higher premium.

Most companies exclude AIDS as a cause of claim under group life policies if the life has been accepted under the free cover limit of the scheme. This exclusion covers death within the first two, sometimes three, years of membership or of employment. At present, the government and the industry are working on a code of practice. The testing

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levels for group life benefits in excess of the free cover limit are similar to the individual level quoted above.

Actions taken by actuaries: No exclusion clauses are used in individual life. Exclusion clauses are the norm in disability income. A few companies grant AIDS cover for a high premium and subject to an AIDS test. Exclusion clauses are the norm for the first two, sometimes three, years for lives accepted under the free cover limit in group life.

Companies have either withdrawn guaranteed insurability or have made the exercise of the option subject to a clear AIDS test and declaration. No change in practice has been noticed in the duration of term insurance.

AIDS questions have been added to direct mail proposals during the past two years.

In general, premium rates have not been increased and appear to have been held at their "pre-AIDS" level. However, most companies have moved to YRT tables for risk business and have the facility to alter the premium rates for the class of business.

The market is divided between those who have made specific reserves for the impact of AIDS and those who are confident that the margins in their mortality assumptions will provide an adequate safeguard against future claims. To a large extent, the decision is heavily influenced by the type of business being written, with profits, whole life or endowment, or term assurance, and whether the impact of AIDS can be offset against bonus rates or against a revision of premiums.

### EUROPE

Outside the U.K., the reaction of the insurers has been quasi-limited to the introduction of blood tests and of a few additional questions either in the application form (In France, however, HIV-related questions have been prohibited by the Control Authority) or in the medical examiner's report, or in both. In the U.K., however, the response of the insurance industry has been different. That is why I have chosen to restrict my presentation on Europe to the U.K. market.

Extent of HIV infection: As of the end of June 1990, a cumulative total of 3,433 cases of AIDS had been reported in the U.K., of which 1,869 (54%) were known to have died. Among these 3,433, about 80% were homosexuals/bisexuals and 3% were IV-drug users. People infected through heterosexual intercourse accounted for about 6% (Source: Department of Health, July 10, 1990).

The future outlook of the HIV infection/AIDS epidemics remains extremely uncertain and any projections should be used with caution, bearing in mind that a projection is only as good as the model and underlying assumptions. The model developed by the Institute of Actuaries' AIDS Working Party has been based and continues to be based on a relatively simple model of homosexual spread. The resulting projections and the revised projections in terms of the number of HIV infected, the number of people with AIDS, and the number of AIDS deaths can be found in the AIDS Bulletins of the AIDS Working Party.

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The cumulative total for HIV antibody positive reports for the U.K. is now slightly above 14,000. Needless to say, this figure is far less than the true number of infected people. Among the cases reported to the Department of Health with known transmission, about 62% are homosexual/bisexuals, 16% are IV-drug users and 8% have been infected through heterosexual contacts.

Impact on general population mortality: Population mortality and AIDS population mortality have recently become available for 1989. The number of reported male AIDS deaths expressed as a percentage of all male deaths is as follows:

Age	1989	1988	1987	1986
- 24	0.4	0.3	0.8	0.4
25 - 29	2.9	2.0	1.7	1.3
30 - 34	4.2	2.5	3.0	2.3
35 - 39	4.1	2.2	2.6	1.9
40 - 49	0.9	0.9	0.9	0.8

Based on this information, the Munich Re has recently published an interesting paper on which I would like to comment briefly hereunder.

Considering the male U.K. population mortality within 10-year age patterns from 1972 to 1989, it appears from Chart 8 that mortality within the 40-49 age band is still continuing to fall, whereas mortality within the 20-29 and 30-39 age bands is slightly down in 1988, but nevertheless remains higher than that experienced in each of the years from 1982-87.

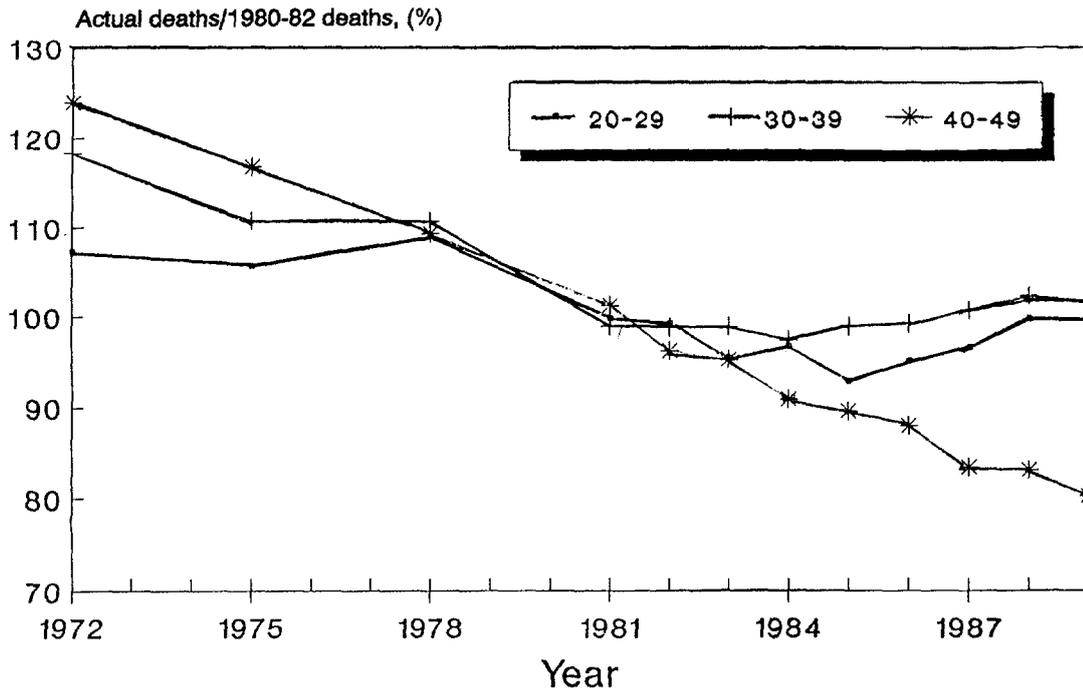
More precisely, one can see from Charts 9 and 10 that the overall mortality of the U.K. male population between the ages of 20 and 39, even after exclusion of the reported AIDS deaths, shows a tendency towards higher rates since the year 1984, this despite the fact that the pre-1984 mortality experience within the same age bands has shown steadily reducing rates, and the mortality of the male population between the ages of 40 and 49 is continuing to move along its pre-1984 trendline (see Chart 11).

If part of the increasing mortality among the males aged 20-39 has been identified (increasing mortality due to accidents and other violent causes, including suicide as well as reported AIDS deaths; see Charts 12 and 13), a substantial proportion, i.e., about 20%, of the excess deaths (actual minus expected deaths from a projection of 1970 and 1984 trendline) remains unexplained (see Chart 14).

According to the Government's Chief Medical Officer, "Something is happening [in these age groups] that more than compensates for the overall decline in mortality during this time. We cannot be certain of the reasons and I am asking the Office of Population, Censuses and Surveys to look into it as a matter of priority."

Although it may be questionable to expect that the mortality (net of that due to accidents and other violent causes) within the male age bands 20-29 and 30-39 would have improved during the years 1984-89 at the same rate as had occurred during the years 1970-84 -- this improvement, however, did broadly take place for the male age band

# Population mortality from the UK All male deaths



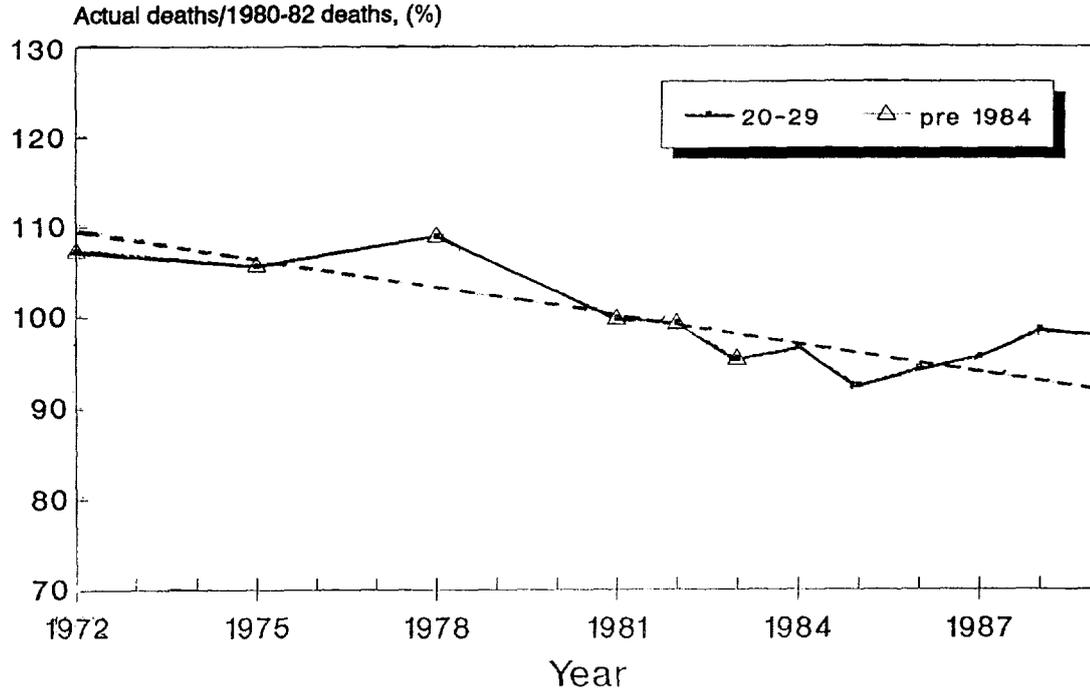
Reproduced with the kind permission of Munich Re, U.K. Life Branch

2005

CHART 8

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

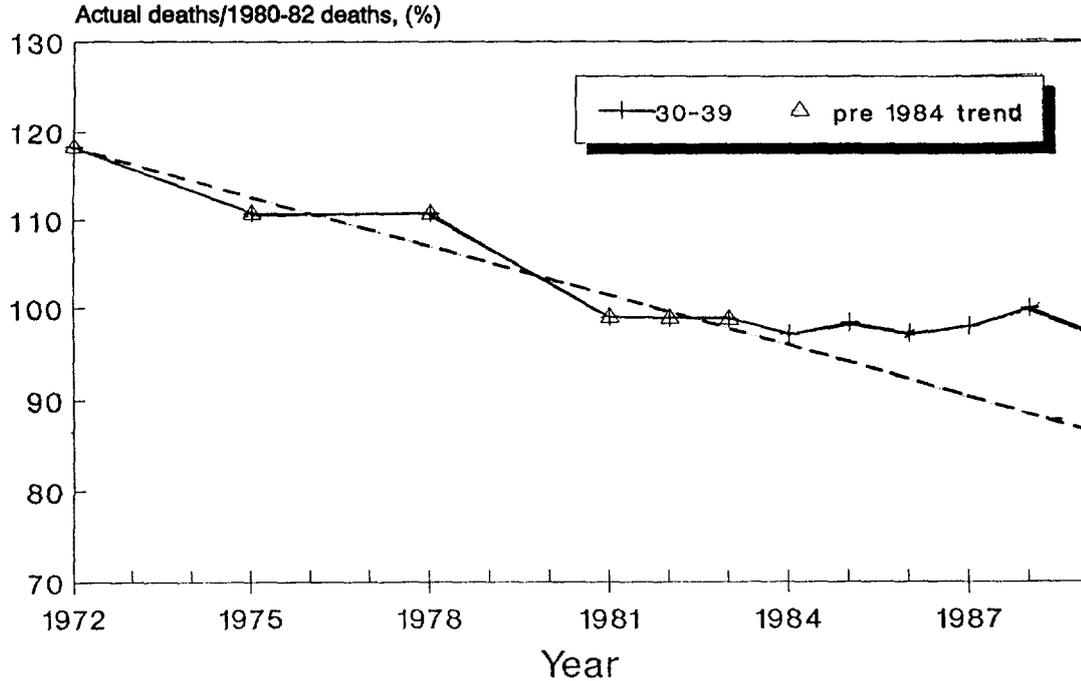
# Population mortality from the UK All male deaths excluding AIDS deaths



AIDS figures as supplied by GAD

Reproduced with the kind permission of Munich Re, U.K. Life Branch

# Population mortality from the UK All male deaths excluding AIDS deaths



AIDS figures as supplied by GAD

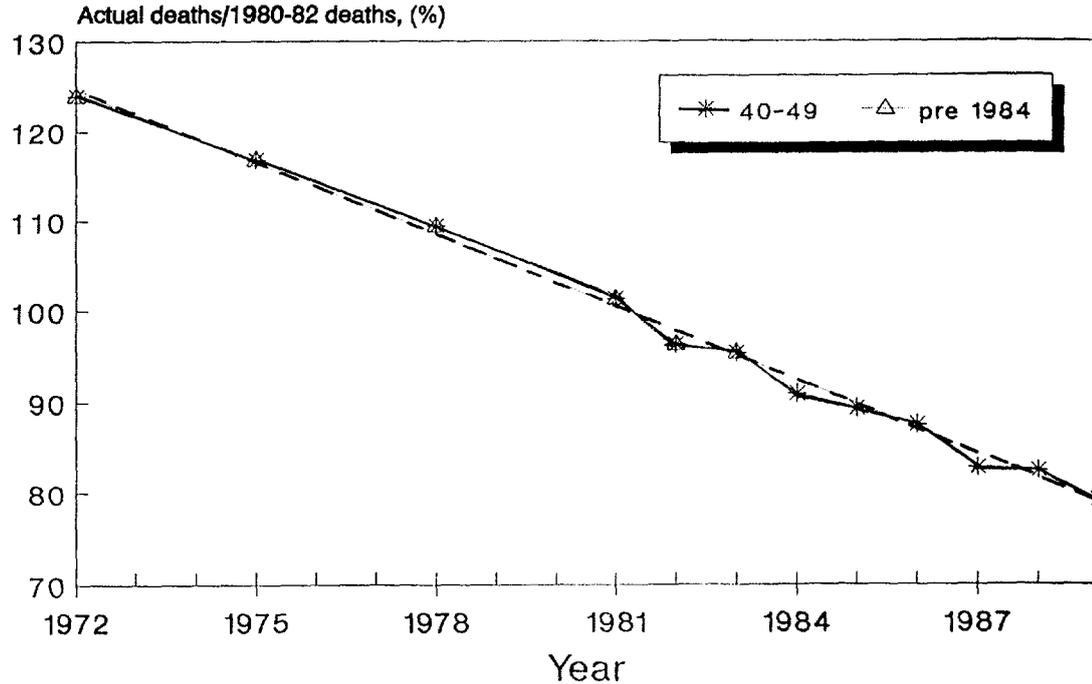
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2007

CHART 10

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

# Population mortality from the UK All male deaths excluding AIDS deaths



AIDS figures as supplied by GAD

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2008

PANEL DISCUSSION  
CHART 11

# Population mortality from the UK Male deaths from accidents & violence

Actual deaths/1981 deaths, (%)

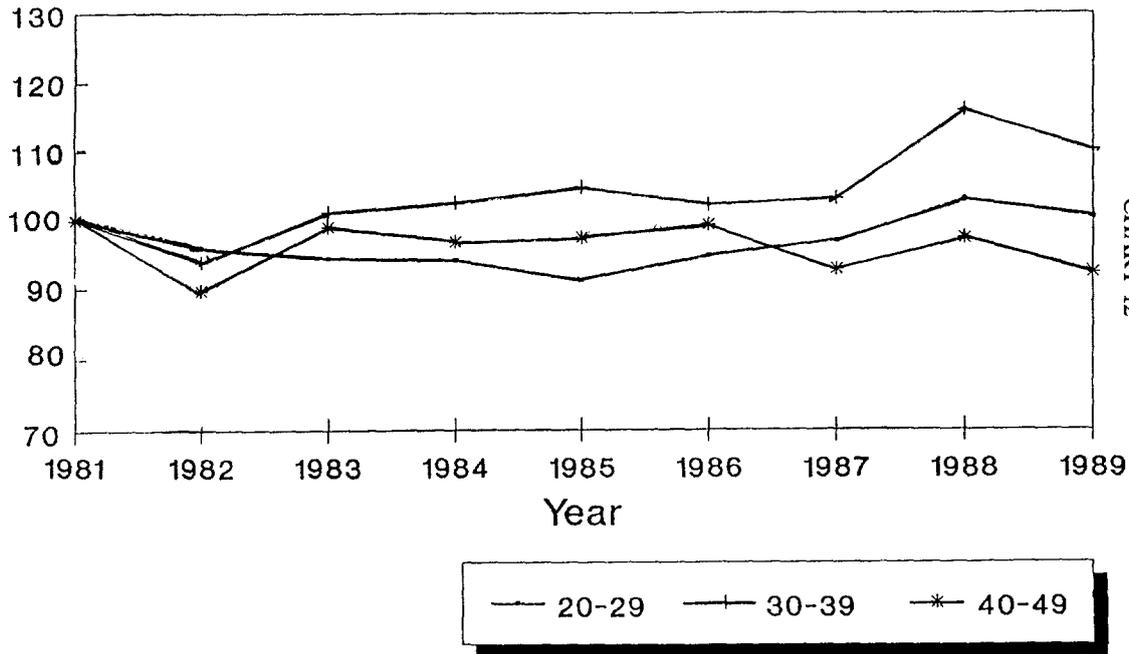


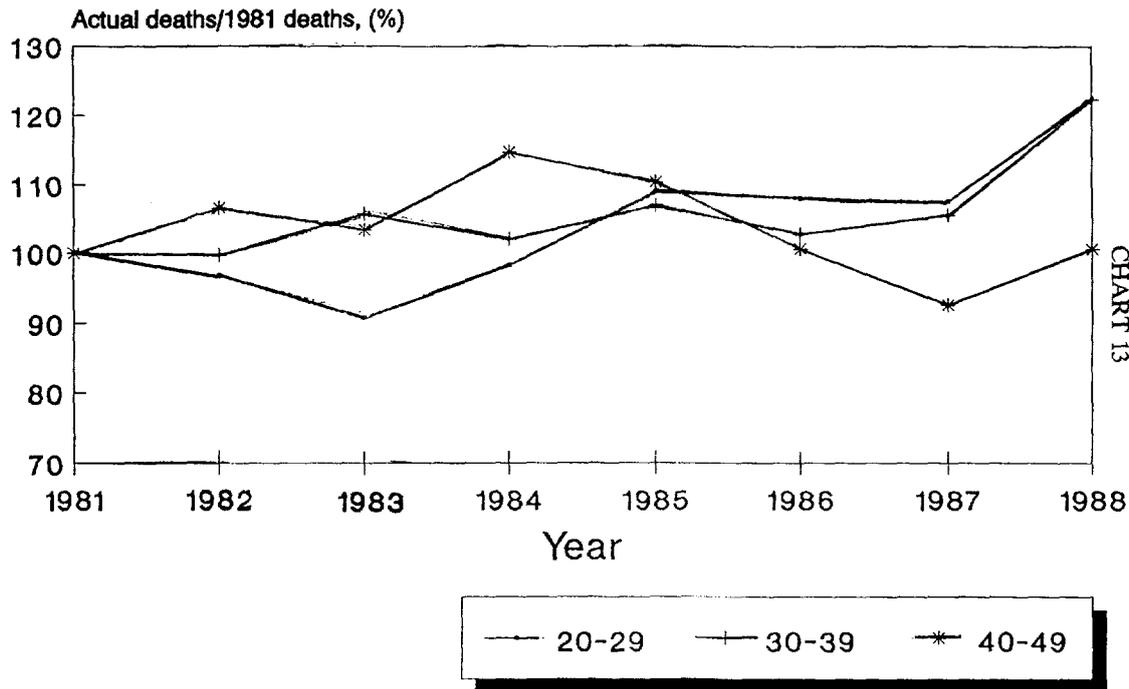
CHART 12

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

2009

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# Population mortality from the UK Male deaths -- suicides & self inflicted



2010

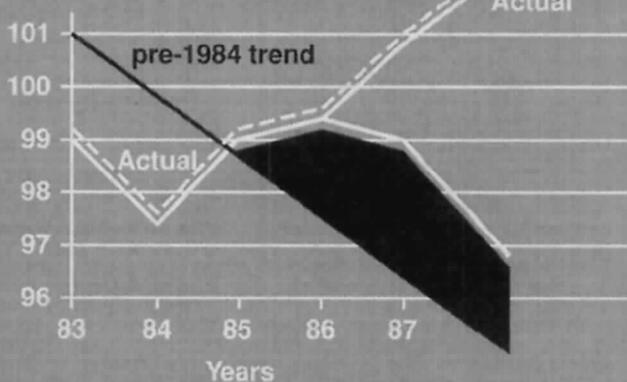
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CHART 14

## Population statistics - males 30-39



Percentage  
1980-82 Mortality



Source: LE GRYS, F.I.A.

Swiss Re

## PANEL DISCUSSION

40-49 -- it is reasonable to think that a portion of these unidentified "excess deaths" is due to unreported AIDS deaths. If these "excess deaths" were entirely due to unreported AIDS deaths -- this, however, is quite unlikely -- then it would mean that for the age bands 20-39, only one-third of the AIDS cases would have been reported, and the true percentage of AIDS deaths would be much higher, e.g., up to 12% for the male age band 30-39. The results of the analysis by the Office of Population, Censuses and Surveys are, therefore, impatiently awaited!

Some interesting statistics on the survival rates of people diagnosed with AIDS in the U.K. up to June 1990 have also recently been published (see Tables 6 and 7):

TABLE 6

AIDS Survival Rates by Age Group

Age at Diagnosis	% Surviving to the End of Month		
	12	24	36
25-29	69	42	26
30-34	67	41	28
35-39	62	36	22
40-49	54	30	20
50-	45	18	11
All Ages	61	36	23

Note that survival rates are better at the younger ages.

TABLE 7

AIDS Survival Rates by Year of Diagnosis

Year of Diagnosis	% Surviving to the End of Month		
	12	24	36
1986	44	24	15
1987	61	34	23
1988	69	46	N/A
1989	73	N/A	N/A

Note that survival rates are improving significantly each year. Average survival time from the AIDS diagnosis should now be about two years.

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

From these statistics, it is also noteworthy that except when both Kaposi's sarcoma and *Pneumocystis carinii* pneumonia are present, the survival rates do not really depend on the clinical manifestations of the disease.

Impact on insured mortality experience: 1,036 suspected AIDS claims on 676 separate lives, of which 16 were females, had been reported up to June 30, 1990, for a total sum assured of approximately £22 million.

A number of submitted claims were rejected as being outside the scope of the survey, e.g., permanent health insurance. Twenty-two policies were for sums assured in excess of £100,000, totaling almost £7 million. Of these 22 policies in excess of £100,000, 7 were for more than £200,000.

The highest individual sum assured was £2 million which in itself accounted for over 9% of the total. The second and the third largest policies were for £750,000 and £700,000, both policies issued on the same life!

These two policies, together with the £2 million sum assured accounted for 16% of the total sum assured. Interestingly, the £2 million policy had been in force for less than a year whereas the two policies with sums insured of £700,000 and £750,000 had been in force for less than 3 years.

Sixty-seven percent of the lives whose marital status is known were single and 30% were married. This latter percentage is quite surprising when one looks at the U.K. insurers' underwriting practices.

Insured mortality experience shows that there is no evidence of any large selection against offices.

Impact on underwriting practices and action taken by actuaries: Before entering into more detail, I would like to underscore the four fundamental factors which have conditioned the U.K. market response:

Insurers are free to impose terms and conditions without reference to any regulatory bodies providing that they do not offend against the Sex Discrimination Act, which requires that people (1) be given equal access to insurance benefits and (2) are not unfairly discriminated against on the basis of sex or marital status.

Insurers are free to underwrite medically, again provided such provisions do not offend against the Sex Discrimination Act.

Insurers are free to set premium rates without reference to any regulatory bodies.

The attitude of the control bodies has been to ensure that solvency will be maintained by the insurers by reserving to the appropriate level.

The distribution of the information in respect to HIV infection within the U.K. for the insurance industry has been concentrated within the Association of British Insurers (ABI)

## PANEL DISCUSSION

and the Institute of Actuaries Working Party (to date four AIDS Bulletins have been published).

The British insurance response can be summarized as follows:

- o Increased reserves
- o Increased/variable premiums
- o Removal of high-risk options
- o More stringent underwriting
  - Proposal form questions
  - Lifestyle questionnaires
  - HIV blood tests
  - Exclusion clause for permanent health insurance and certain term assurances.

The first announcement by the Government Actuary's Department (GAD) on AIDS reserving was informally given at an Institute of Actuaries' meeting in February 1988 following the publication of the AIDS Bulletin No. 2. It was suggested that offices should be reserving on Basis F while preparing a strategy for moving towards Basis BC over a number of years.

In November 1988, a formal announcement from the government actuary confirmed Basis F as the GAD's working rule for advising the Department of Trade and Industry on the adequacy of reserving. It also stated that at that stage the solvency margin could be left to cover worse contingencies.

November 1989 saw a revised announcement recommending Basis R (see AIDS Bulletin No. 4) with a crude adjustment to allow for heterosexual spread.

As of April 1988, premium levels for guaranteed term assurances increased to levels consistent with projection BC from the Institute of Actuaries' AIDS Working Party although this was as much influenced by the future expected reserving requirements as by the expected level of AIDS mortality. Since then, due to a more optimistic view of AIDS and a lower level of reserving requirements, companies have been able to incorporate increased commission levels plus several other changes into their pricing basis without changing overall premiums.

Premium rates on reviewable contracts were increased less than their guaranteed rate counterparts by taking into account the products' flexibility and lower reserving requirements. A number of offices writing unit-linked business have increased rates to incorporate an AIDS loading and virtually all have reduced the maximum sum assured.

Recently, General Accident reduced rates significantly for high sums assured where HIV testing would be carried out and Sun Life increased the maximum sums assured on flexible whole life policies for married couples in an effort to give credit to members of lower risk groups.

The guaranteed insurability option has been greatly reduced and the conversion option almost eliminated.

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

Most companies have included ABI's recommended question into the proposal form: "Have you ever been counselled or medically advised in connection with AIDS (HIV) or any sexually transmitted disease? Have you ever had an AIDS (HIV) blood test? If so, please give full details."

The AIDS question in the proposal form is a "trigger" question which can lead to the following supplementary lifestyle questionnaire in certain circumstances: "Do you belong or have you belonged to any of the following AIDS high risk groups -- homosexual, bisexual men, intravenous (IV) drug users, hemophiliacs or sexual partners of the preceding groups?"

General market limits for lifestyle questionnaires and HIV blood tests are outlined in Table 8:

TABLE 8

	Questionnaire	HIV Test
Single males (including divorced and separated)	£ 10,000	£ 150,000
Married males (including widowers)	£ 75,000	£ 250,000
All females	£ ?	£ 250,000

There is no standard practice on lifestyle questionnaires for females. Some companies use the £75,000 limit as for married males, others use the female HIV testing limit while the remainder do not bother at all. Females are still not seen as a significant risk and, therefore, companies tend to adopt a rather relaxed attitude.

For individual disability business, testing is still carried out even with the existence of an exclusion clause (I will revert to this later). HIV testing levels vary, with a few companies testing at £15,000 per annum, but more usual levels are £25,000 to £30,000 per annum. Females are not tested. Lifestyle questionnaires are also used and starting levels vary between £7,500 and £15,000 per annum.

For group life, the same limits as in individual life would tend to apply above the free cover limit.

In group disability, no specific underwriting for AIDS takes place when an AIDS exclusion clause is in operation.

There has been no real interest in AIDS/HIV exclusion clause in life policies and only the Commercial Union and a few other companies have introduced a product with this clause. It is thought that with the Commercial Union product, less than 20% of the policyholders opt, or at least have opted for the AIDS exclusion terms. Generally, for the few companies that have an AIDS exclusion clause, there is no difference in the underwriting of an exclusion policy and a nonexclusion policy. However, in respect to the pricing, various approaches have been used. For example, one company systematically applies an AIDS exclusion clause, but accepts to remove it subject to an annual extra premium of £7 per thousand for male and £2 per thousand for female lives. Another company offering its applicants the option between full cover and a limited

## PANEL DISCUSSION

cover with an exclusion clause has tariff differences for term assurances which can be as high as 45% (for example, at entry age 30 and duration 15).

Life companies have seen an exclusion clause as the answer to AIDS/HIV infection on disability business. All companies have adopted this approach for new business and, where possible, to existing business. This applies to both individual and group business. In contrast, for permanent and total disability insurance, the practice is mixed, some policies have exclusion while others do not.

### CONCLUSIONS

Even after almost 10 years of the HIV epidemic, one must recognize that its extent is not well known, particularly in those countries where its spread is probably the greatest. A lot of epidemiological work remains to be done! One thing is sure -- the AIDS viruses will be with us for a long time to come and even if science ultimately finds a cure and a vaccine, it will not be tomorrow! During that time, all of us must commit ourselves and accept responsibilities and not simply expect a solution from others. Our greatest immediate enemy is complacency, as the structures set up to respond to the epidemic have given a lot of people, also in the insurance industry, a false sense of security. If we want to win this battle, too, and I think we can, then we will once again have to be prudent, flexible and innovative.

I am particularly indebted to Dr. J. Chin (WHO/GPA), Douglas Keir (Swiss-South African Re), Ron Hunter (Australian Re), Mike Eves (Swiss Re, U.K.) and Rolf Brunner (Swiss Re, Zurich) for their contributions and their comments.

# THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

## Appendix 1

### The Delphi Projections (1989)

The Delphi Projections are based on a method -- the Delphi method -- used to systematically collect and analyze expert judgments when few or no epidemiological data are available.

At the end of 1988, WHO selected a group of 14 experts -- the so-called Delphi participants -- with extensive experience and knowledge of the epidemiology of HIV/AIDS and asked each of these experts to complete a detailed questionnaire. The aim of this questionnaire was to determine as of mid-1988, common baseline estimates and assumptions about the extent of the HIV infection, and the current number of AIDS cases.

After having gathered these data and analyzed them, WHO informed the Delphi participants of the result of this first survey and requested them to provide a projection up to mid-2000 of the cumulative number of HIV infections in adults for each of the 4 global patterns (for the description of these 4 patterns, see Appendix 2). Then, inputting these data into their mathematical model, WHO projected the number of adult AIDS cases through the year 2000.

For more information on the Delphi projections, interested readers are recommended to read the paper entitled "Projections of HIV Infections and AIDS Cases to the Year 2000," written by J. Chin, P. A. Sato and J. M. Mann and as published in the *Bulletin of the World Health Organization*, 68(1): 1-11 (1990).

## PANEL DISCUSSION

### Appendix 2

#### Global Patterns of HIV Infection (See Chart 15)

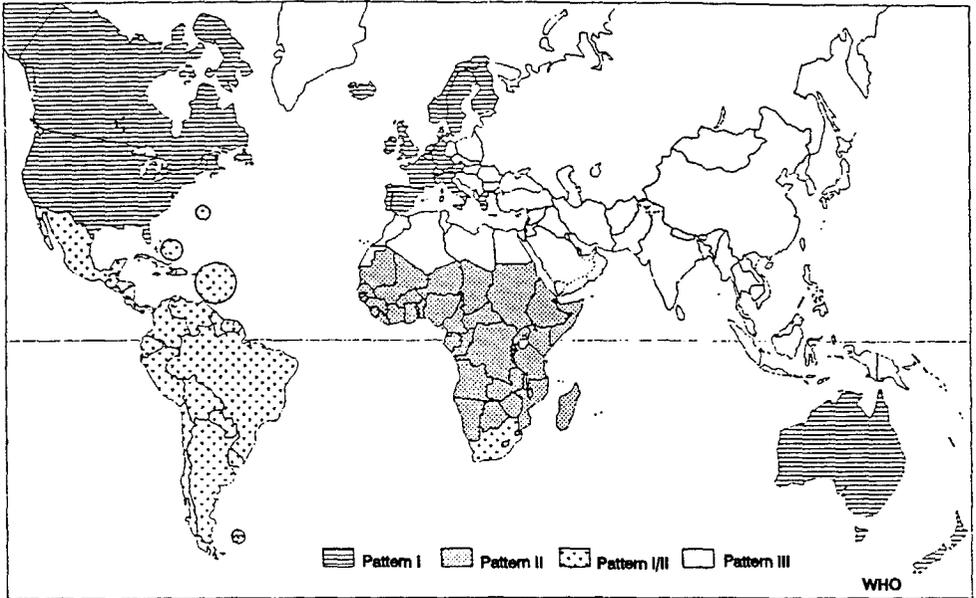
**Pattern I:** Areas designated as Pattern I originally included the industrialized countries of North America, Western Europe, Australia, New Zealand, South Africa and some countries in Latin America. Extensive spread of HIV within these areas probably began in the late 1970s or early 1980s, predominantly among homosexual men and IV-drug users. However, the epidemiological pattern in many Pattern I countries is evolving. For example, in the Caribbean and in many Latin American countries, increasing transmission among heterosexuals with multiple partners has been noted since the middle of the 1980s, to the extent that this mode of transmission has now become the predominant mode of HIV transmission. As a result of this, Latin America has been reclassified as a Pattern I/II country. So has also South Africa been reclassified as a Pattern I/II country due to the increasing evidence of HIV spread among blacks through heterosexual contacts.

**Pattern II:** Areas classified as Pattern II include sub-Saharan Africa and as already mentioned, increasingly countries in the Caribbean and Latin America. In these areas, HIV probably began to spread extensively in the late 1970s or early 1980s, and heterosexual transmission of HIV has predominated. As a result, perinatal transmission has become a serious problem. Within these areas, the pattern appears to be remaining stable. The major change is that the incidence of HIV infection continues to rise, not only in urban but also in rural parts of Pattern II countries.

**Pattern III:** Areas classified as Pattern III include Asia, most of the Pacific (excluding Australia and New Zealand), Eastern Europe, North Africa and the Middle East. HIV was not introduced until the early to mid-1980s. There is no mode of HIV transmission predominating. However, if the general prevalence of both AIDS cases and HIV infections were low at the end of the 1980s, the situation began changing rapidly in at least two countries, Thailand and India.

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CHART 15



Source: Reproduced by permission from: Chin, J. et al. Projections of HIV infections and AIDS cases to the year 2000. *Bulletin of the World Health Organizations*, 68(1): 1-11 (1990).

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### Appendix 3

#### Australia AIDS Questionnaire

The following questions are to be completed by the life to be insured.

TO THE BEST OF YOUR KNOWLEDGE,

1. Have you been infected by the virus which causes AIDS (the Human Immunodeficiency Virus, HIV) or are you carrying antibodies to that virus? Yes ... No ...
2. Have you had or are you expecting to have any medical advice, investigation or treatment for HIV, AIDS or AIDS-related conditions? Yes ... No ...
3. Have you had or have you requested a test for AIDS (HIV antibodies)?  
Yes ... No ...
4. Have you suffered or are you suffering from unintentional weight loss, persistent night sweats, persistent fever, persistent diarrhea or persistent swollen glands?  
Yes ... No ...
5. Have you engaged in male-to-male anal sexual activity on any occasion since January 1, 1980? Yes ... No ...
6. Did you receive a blood transfusion or treatment with human blood products during the period January 1, 1980-December 31, 1980? Yes ... No ...
7. Have you worked as a prostitute at any time since January 1, 1980? Yes ... No ...
8. Have you injected yourself or been injected with any drug not prescribed by a registered medical practitioner since January 1, 1980? Yes ... No ...
9. Have you been treated for any sexually transmitted disease since January 1, 1980?  
Yes ... No ...
10. If your spouse or any other sexual partner were asked to make this personal statement would they, to the best of your knowledge, answer "yes" to any of the above questions? Yes ... No ...

If you answer "yes" to any of the above questions, please give details.

**MR. THOMAS W. REESE:**

#### **AIDS -- IMPACT ON U.S. INSURANCE**

To review the current status of AIDS on the United States life and health insurance industry, I will first discuss trends in industry claims levels. Then I will discuss HIV testing practices and, finally, actuarial practices and reserve methods.

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

### Industry Claims

United States industry AIDS claims data are available from a series of surveys conducted by the ACLI and the HIAA. A survey has been conducted for each of the years 1986 through 1989. The number of companies participating in the surveys ranged from 265-301.

Table 9 shows the total U.S. industry AIDS claims estimated to be paid in these years. The total claims have increased from about \$300 million in 1986 to a little over \$1 billion in 1989. This increase represents an average annual growth rate slightly above 50%.

TABLE 9

Estimated U.S. AIDS Claims -- ACLI/HIAA Surveys  
(Millions)

	1986	1987	1988	1989
Group A&H	84.8	188.0	248.6	455.0
Individual A&H	34.7	35.9	50.3	79.4
Group Life	79.4	132.5	155.5	253.0
Ordinary Life	93.3	130.8	135.5	221.7
<b>Total</b>	<b>292.2</b>	<b>487.2</b>	<b>589.9</b>	<b>1,009.1</b>

The average annual growth rate was higher for group insurance, where HIV testing at issue is generally not practiced, than for individual insurance. The average annual growth rate was highest for group accident and health at about 75%. The average growth rate was about 47% for group life. The average growth rate was about 32% for both individual accident and health and ordinary life.

*Best's Insurance Management Reports* published a survey of AIDS-related claims in its December 4, 1989 issue. This study was based on 1987 and 1988 life and health claim information provided by 462 insurers. For 1987, the *Best's* results were comparable to the ACLI/HIAA results. The *Best's* survey reported \$513.8 million in estimated AIDS-related claims, only 5% higher than the \$487.2 million estimated by ACLI/HIAA.

In 1988, however, the *Best's* survey reported \$802.2 million in estimated AIDS-related claims, 36% higher than the \$589.9 million claims estimated in the ACLI/HIAA survey. The *Best's* survey was 47% higher for life business and 25% higher for A&H business. It is not clear why there are such large differences between the two surveys.

Table 10 shows the ratio of AIDS claims to total company claims. For both group life and ordinary life, the 1986 survey showed about .9% of total claims were AIDS-related. This percentage has grown to 2.5% of claims for group life and 1.7% of claims for ordinary life in 1989.

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TABLE 10

AIDS-Related Claims as a Percent of Total Claims -- ACLI/HIAA Surveys

	1986	1987	1988	1989
Group A&H	.3%	.6%	.8%	1.4%
Individual A&H	.7	.7	.9	1.3
Group Life	.9	1.4	1.6	2.5
Ordinary Life	.9	1.2	1.1	1.7

The proportion of claims that is AIDS-related has increased for individual accident and health from .7% in 1986 to 1.3% in 1989. The percentage has increased for group accident and health business from .3% in 1986 to 1.4% in 1989.

As with the estimated total claims amounts, there were differences between the *Best's* and ACLI/HIAA studies in the percentage of claims that are AIDS-related. The percentages were similar in 1987, but for 1988 the *Best's* survey reported 2.0% of life claims were AIDS related versus the 1.3% estimated for ACLI/HIAA. For A&H business, the *Best's* survey estimated .9% of claims were AIDS related while the ACLI/HIAA survey reported .8%.

**Laboratory Results**

Table 11 shows the number of HIV-positive test results per 10,000 tests from Home Office Reference Laboratory (HORL) from 1987 through the first 6 months of 1990. The rate of positive tests has been nearly level at about 9 positive results per 10,000 tests. Only in 1987 was it higher, at 14 positive results per 10,000 tests.

TABLE 11

HIV Positive Test Results Per 10,000 -- HORL

Calendar Year	Positive Tests
1987	14
1988	9
1989	8
1990 (through June)	9

It is hard to draw conclusions from these data about possible HIV infection trends in the insurance-buying population. There is substantial selection and antiselection in who takes these tests. The actual prevalence of HIV-infected persons in the potential insurance buying public is almost certainly higher than these results indicate.

Table 12 shows the HIV-positive results per 10,000 tests separated for different geographic regions. The highest HIV-positive rates are for the District of Columbia, with 92 HIV-positive test results per 10,000 tests, and Puerto Rico with 24. The next highest positive rate occurred in Florida/Georgia, where 1989 test results showed a rate of 18

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positive results per 10,000 tests. Other high HIV-positive areas are New York, New Jersey/Maryland/Delaware, California, and Texas. A large group of about 31 states makes up a "middle" group that experienced about 6 positive test results per 10,000. Finally, a group of 11 states makes up the "low" group that experienced only about 3 positive results per 10,000 tests.

TABLE 12

HIV-Positive Test Results Per 10,000 -- 1989 HORL

Region	Positive Results
DC	92
PR	24
FL/GA	18
NY	16
NJ/MD/DE	14
CA	12
TX	11
"Middle" States	6
"Low" States	3

Probably the most common reaction to the AIDS epidemic in the United States among life and health insurers has been to establish limits for testing new issues. In the following, I will discuss the limits used for individual life insurance. Table 13 shows the results of three surveys conducted by Tillinghast.

TABLE 13

HIV Blood Tests Limits -- Individual Life Insurance  
Issue Age 35

Test Limit	Percent of Companies		
	May 1987 20 Companies, All States	March 1988 17 Companies, All States	September 1990 17 Companies, "High Tier" States
\$ 50,000			35%
75,000			12
100,000	5%	88%	53
150,000		6	
200,000	15	6	
250,000	25		
300,000	20		
400,000	15		
500,000	20		

In May 1987 the median testing limit for 20 large insurers was about \$250,000. The HIV testing practices had shifted dramatically, however, just a year later in March 1988. By

## PANEL DISCUSSION

that time, 15 of the 17 companies included in that survey began testing either for policies issued for \$100,000 and over or for policies issued for over \$100,000.

That testing limit around \$100,000 is still the common practice today in most states. There is considerable variation, however, by state of issue. Ten of the 17 companies surveyed in September 1990 have lower testing limits in certain states and another has lower limits in the District of Columbia and Puerto Rico.

Table 13 also shows the September 1990 HIV testing limits in the "high tier" states. These states commonly include California, Florida, New York, District of Columbia, Texas, New Jersey, and Puerto Rico. A few companies use a longer list of states where their lower testing limits apply. Three companies included Illinois, and two companies included Georgia and Maryland. Eleven other states plus the Virgin Islands were included by one company each.

In these states, about a third of those 17 companies surveyed test at either \$50,000 or over \$50,000 test limits. Two of the 17 companies use a test limit around \$75,000, and just over half of the companies use the \$100,000 test limit that applies to other states.

Even the companies that test around the \$100,000 level often have a lower limit for the "high tier" states. For these states there are only four companies that have a testing limit as high as over \$100,000. In other states there are 8 companies that have a limit of over \$100,000 and one company with a limit of \$150,000.

A further point of distinction is to use lower test limits for term products. Five of the 17 companies use this differentiation. For term products issued in the "high tier" states, only one of the 17 companies surveyed still has a testing limit as high as over \$100,000. Seven of the 17 companies test at the \$50,000 or over \$50,000 level.

Probably the greatest current trend in HIV testing practices is the move to testing urine instead of blood for HIV infection. Two strong factors continue to change company HIV testing rules -- agent pressure and underwriting budgets. Agents are strongly in favor of using a urine specimen instead of having to draw blood from the prospective insured. Further, the urine test is less expensive than the blood test.

Only 4 of the 17 companies included in the survey are already using the urine test, but almost all of the others are considering it or will consider it in the future.

One insurer uses the urine test for amounts through \$150,000; one uses it through \$250,000; and one uses it through \$500,000 for ages through 40 and through \$250,000 through age 60. One company uses the test to nearly \$200,000 in most states and to a lower limit in the "high tier" AIDS states.

If paramedics continue to be used to collect the specimen, the cost savings is about \$5 per urine test. However, one company has the agent collect the specimen, reducing the total testing cost to only \$17, which includes tests for HIV, drugs, and nicotine. This company first experimented with agent-collected specimens, and switched after they

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

determined that positive test rates were about the same for agent-collected and paramedic-collected specimens.

Some companies anticipate that urine testing will allow them to change to lower HIV test limits in a way that would be acceptable to their agents. Others would simply replace part of their *current testing structure* with a urine test, reducing their costs.

The companies not yet using urine testing cite several concerns about it. Among the concerns mentioned were: questions about the accuracy of the test, fears of switched specimens, and confidentiality problems. Confidentiality is an issue since the urine test is only a screening test and is not adequate to confirm HIV infection. When the insurer goes back to the insured to collect a blood specimen for the confirmation test, the special request seems obviously to reveal a finding of HIV infection.

Another problem with using urine specimens to test for HIV is that some states do not allow this test to be used even as a screening test. Eleven states were cited as problem states in this regard.

Four of the 17 companies use the dried blood spot (DBS), or finger-stick testing for some tests. One uses it through \$500,000 amounts; one uses it through \$600,000; and one uses it through \$999,999. Another uses DBS in about one fifth of its geographic regions. These companies report favorable experience with DBS -- the results of the HIV test are still reliable and agents like it better. A paramedic must still be involved to make the finger stick, so the cost savings are not large compared to venipuncture tests.

Two other companies experimented with DBS but dropped it. The primary problem cited was sometimes not getting enough blood to make a good test. None of the 13 companies not using the DBS test is considering changing to it.

### Actuarial Practices

Table 14 gives summary information from a survey conducted by Tim Harris of Milliman and Robertson's St. Louis office. This survey was conducted and presented at Tim's panel discussion at the Hartford Society of Actuaries meeting in April 1990. 146 companies responded to this survey -- 51 mutuals and 95 stocks.

TABLE 14

U.S. Company AIDS Survey Results -- Percentage of Companies

	51 Mutuals	95 Stocks
Have projected the impact of AIDS on new business	51%	37%
Have incorporated AIDS in pricing	41	37
Have projected the impact of AIDS on existing business	59	47
Have established reserves or surplus for AIDS	10	8

Two important ways that actuaries must look at the AIDS problem are first as a pricing issue and then as a reserving or a surplus issue. The first 2 questions in Table 14

## PANEL DISCUSSION

summarize how companies are addressing the pricing issue. About half the mutual companies and a little more than one-third of the stock companies have made projections of the impact of AIDS on new business pricing. About 92% of the companies that have projected that impact have incorporated AIDS assumptions in their pricing.

The survey does not tell what has been done to incorporate AIDS in pricing. Some companies have undoubtedly made projections of excess AIDS mortality to incorporate in pricing. Many others have simply reduced or eliminated future mortality improvement assumptions as an implicit offset to future increased AIDS claims.

The last two questions in Table 14 show that about half of the companies surveyed have projected the impact of AIDS on existing business. The percentage is slightly higher for mutuals than for stocks.

Only about 9% of the companies surveyed reported that they have established AIDS reserves or surplus allocated for individual life insurance AIDS claims. Eight out of the 146 companies established reserves and 5 out of the 146 companies established an allocated surplus amount.

There were 133 companies that have not set up reserves or allocated surplus for individual life insurance AIDS claims. Of these 133:

- o 63 companies stated that they believed that future AIDS claims would be covered by margins in the tables used for calculating reserves;
- o 24 companies felt AIDS to be an insignificant risk not requiring special attention;
- o 13 companies stated that management made a decision to delay recognition of the AIDS liability;
- o 8 companies stated that future AIDS claims will be covered by a strategy of changes to nonguaranteed elements, such as a reduction in policyholder dividend schedules;
- o 6 companies listed miscellaneous reasons; and
- o 19 companies were not involved in the individual life insurance business.

### **Reserve Methods**

One method of setting up reserves for unfunded AIDS claims costs would be to set up the projected present value of AIDS claims, net of recoveries through change in nonguaranteed elements, as an immediate reserve.

The July 1989 report of the SOA Task Force on the Financial Implications of AIDS described two alternative AIDS reserve methods. These are the fund accumulation method and the augmented mortality method.

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

The fund accumulation AIDS reserve method was described by Dave Holland in the 1988 report of the SOA AIDS Task Force. It operates similarly to the funding of a pension plan. The AIDS reserve fund value at the beginning of the period is increased by interest and by a periodic AIDS claims funding contribution. It is decreased by AIDS claims paid during the period.

The periodic contribution amounts can be thought of as a type of "normal cost" of AIDS claims. These contribution amounts would be calculated by dividing the present value of projected AIDS claims, net of the fund already held, by an annuity factor that reflects the period over which the AIDS costs are to be funded.

An advantage of this method is that it is self-correcting for changes in the estimated amount of AIDS claims. When the AIDS claim estimate is revised -- as it is expected to be quite often, given the uncertain nature of these projections -- the periodic contribution amounts will change to fund to this new level over the remaining planned funding period.

Another advantage of the fund accumulation method is that individual company experience will be directly reflected by deducting actual AIDS claims in the recursive development of the AIDS mortality reserve.

The time period over which contributions should be calculated should be set according to the expected period of time to the end of the highest AIDS claims. The period should certainly be short enough so that the fund values are always positive. It is doubtful whether a company would be able to realize planned AIDS claims funding contributions in years after the time that the peak of the epidemic has receded.

The augmented mortality AIDS reserve method uses more traditional reserve calculation formulas. For this method the normal reserve is subtracted from a special reserve calculated with AIDS claims. The reserve calculated with AIDS claims is based on the valuation table increased by AIDS claim rates based on the year of issue.

Special consideration must be given to the AIDS reserve net premium for the calculation of augmented mortality AIDS reserves. It would not be appropriate to assume that AIDS claims can be funded over the entire duration of a whole life policy, given the likely much shorter duration of the period of highest AIDS claims. Thus the premium payment period should be shortened for this calculation, in order to build up a reserve that is appropriately matched to the expected extra mortality cost.

There are two ways to deal with this need for a shorter premium period for the augmented mortality AIDS reserve. The simpler way is to treat the policy, for this calculation, as if it were, say, a 15-year pay life policy.

A more precise method would use a two-step net premium approach. For policy years after the period of highest AIDS claims, the valuation net premium is equal to the whole life valuation net premium on the same policy using the normal valuation mortality table.

## PANEL DISCUSSION

For policy years before that time, the valuation net premium is the amount needed, together with the whole life premiums after the high AIDS claims period, to mature the policy using the valuation mortality table increased for AIDS.

### **ASB Standard**

The Actuarial Standards Board (ASB) decided at their meeting just last Wednesday, October 10, 1990, that there will be no special actuarial standard of practice for the HIV epidemic. I believe this is the first case where no standard has resulted from such a proposal -- this one even went through two exposure drafts.

The first exposure draft was released in October 1989. After receiving comments, a second exposure draft was released in April 1990. This was to be an actuarial standard of practice giving guidance on estimating and providing for the costs of HIV-related claims covered under life and accident and health insurance policies.

The comments received for the second exposure draft were overwhelmingly negative. The majority interpretation of the wording of the exposure draft was that special reserves were required for AIDS. This interpretation was strongly opposed, with the argument being that AIDS is just one of a number of factors that can increase claims, and should not be singled out for special reserves. Instead, reserves should be tested in the aggregate, with reserves being strengthened if needed to meet cash flow demands.

Instead of issuing a special standard of practice for HIV, the Actuarial Standards Board will distribute a memorandum explaining that HIV claims increases are covered by American Academy of Actuaries Actuarial Standard of Practice Recommendation 7: Statement of Actuarial Opinion For Life Insurance Company Statutory Annual Statements. This standard of practice prescribes how actuaries are to test the adequacy of aggregate reserves.

This interpretation has the effect of implementing the main intent of the proposed HIV standard while making it clear that AIDS is to be included in the aggregate testing of reserves. A special reserve for AIDS is not required.

### **AIDS Mortality Rates**

The July 1989 reports of the Society of Actuaries Committee on HIV Research and the Society of Actuaries Task Force on the Financial Implications of AIDS give example AIDS mortality rates for use in projecting future AIDS claims for life insurance coverages. I will not repeat any of this information here.

However, I believe it would be instructive to compare the committee's middle scenario for United States general population AIDS mortality rates to the projections published by the Canadian Institute of Actuaries (CIA) and the Institute of Actuaries (IOA) in the U.K.

To put those different AIDS mortality projections in perspective, I calculated the relative rates of AIDS cases reported through May 1990 per million population in 1989. The U.S. has the highest prevalence of AIDS cases, with 534 AIDS cases reported for each million of population. This prevalence rate is nearly 4 times higher than the 142 cases

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

per million rate in Canada. The U.S. prevalence rate is nearly 5 times higher than the 111 cases per million rate for Australia and nearly 10 times higher than the 55 cases per million rate in the U.K.

Chart 16 compares the SOA committee's 1989 middle projection with rates published by the CIA and the IOA.

The CIA rates are the intermediate set of projections meant to apply to Canadian business. For males attained age 35 in 1989, these Canadian rates are about 40% of the SOA middle scenario rates for the next 15 years or so. This would appear to be somewhat more conservative than the SOA middle scenario, given that the prevalence rate of AIDS in Canada per million population is only about 27% of that in the United States as of May 1990.

The Institute of Actuaries published several sets of projected AIDS mortality rates in March 1989. The rates shown in Chart 16 are Projection R, a revision of the former Projection F, which was referred to as a "low" projection. The Working Party recommended in 1987 that: ". . . the assumptions underlying Projection F are sufficiently moderate for it to be essential for insurance companies to have regard to the possibility of an incidence of HIV infection of at least this level . . . there is no reason to delay making changes to reserves and to pricing structures to take this into account." The working party stated in 1989 that: "We believe that there are still grounds for using Projection R . . . for insurance applications . . . ."

Chart 16 shows that Projection R initially starts lower than the SOA committee's middle projection, but exceeds it by 1995 and is over 50% higher by the year 2000. It is especially remarkable that the IOA low projection rates are this high compared to the U.S. scenario rates when it is taken into account that the prevalence of AIDS cases in the U.K. through May 1990 is only about 10% of the United States prevalence rate.

Further, the SOA middle scenario projection rates are meant to apply to the U.S. general population, not to the insured population. The report of the SOA Task Force on the Financial Implications of AIDS gives guidelines for multiplying these general population rates by factors to relate them to the insured population. It is generally felt that in most cases the factors will be less than one, and examples were given in the range of 40-80%. Thus the U.S. SOA committee's middle scenario AIDS Mortality Rates are even substantially lower than those general population rates shown on Chart 16.

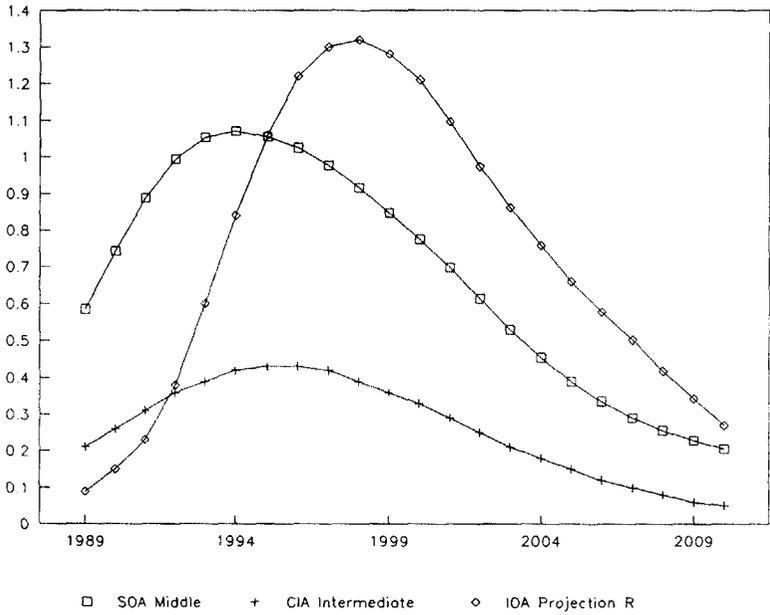
At the San Francisco Society of Actuaries meeting held in June 1990, I presented some data comparing the SOA Committee on HIV Research AIDS mortality scenario rates to recent projections released by the CDC. I will not repeat any of that analysis here, other than to say that the SOA Committee's scenarios still appear to be well within the range of CDC projections. The SOA Committee on HIV Research is studying trends in the AIDS epidemic to determine when new scenarios of AIDS mortality rates should be prepared. For testing reserves in 1990, however, the research published in 1989 appears to be a reasonable basis for actuaries to use in their cash flow testing involving increased claims due to the AIDS epidemic.

PANEL DISCUSSION

CHART 16

AIDS MORTALITY RATES PER THOUSAND

MALES AGE 35 IN 1989



## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

MR. HARRY H. PANJER: Tom Reese and André Chuffart have given you detailed information on the AIDS epidemic worldwide and in the U.S. and the response of actuaries. I'm going to discuss the AIDS situation in Canada and the reserving considerations there over the past couple of years.

Before I get into any detail, I would like to discuss the epidemic in Canada and compare it to that in the U.S. Table 15 gives the number of cases reported to August 1990 by year of diagnosis. The final column in Table 15 gives the ratio of the number in the U.S. to the number in Canada. As you can see from Table 15, the ratio is relatively constant for recent years. It should be noted that the drop in cases in 1990 reflects not a drop in the number of AIDS cases but the fact that only those cases that have been reported to date are included. Naturally, the ultimate numbers for 1990 will be significantly larger. We'll come to the ultimate expected numbers soon.

TABLE 15

Cases Reported to August 1990 By Year of Diagnosis

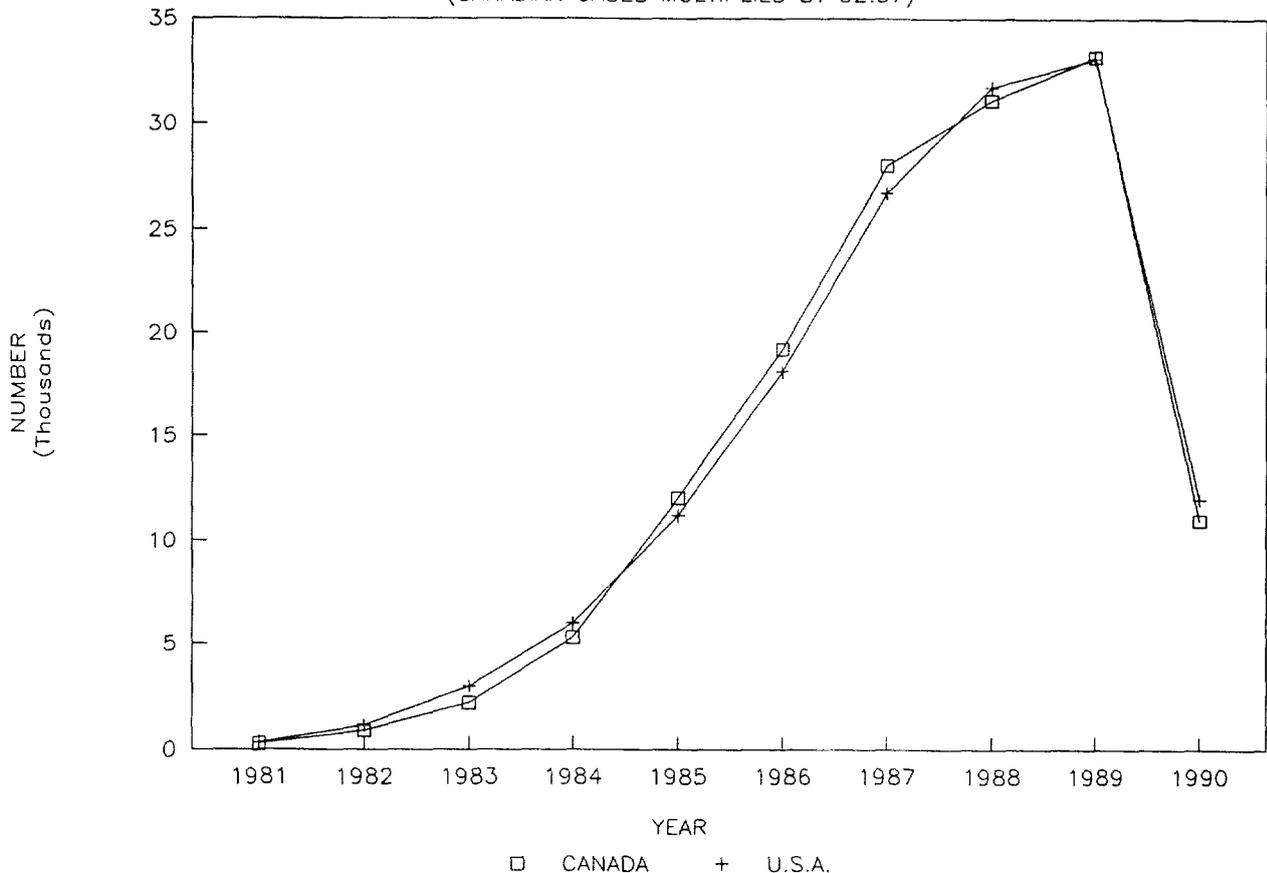
	Canada	U.S.	Ratio U.S./Canada
Before 1981	7	83	11.86
1981	8	306	38.25
1982	27	1,101	40.78
1983	67	2,956	44.12
1984	163	5,970	36.63
1985	371	11,182	30.14
1986	593	18,112	30.54
1987	865	26,740	30.91
1988	961	31,747	33.04
1989	1,026	33,121	32.28
1990	339	11,968	35.30
Total	4,427	143,286	32.37

Chart 17 shows the numbers in Table 15. In this case the number of Canadian cases is multiplied by the overall ratio of the numbers of cases in the U.S. to the number of cases in Canada. Chart 17 illustrates how consistent the shape of the Canadian epidemic is relative to the U.S. epidemic. This is remarkable considering that people have frequently been describing the Canadian epidemic as similar to the U.S. epidemic but delayed by two years. As you can see from Chart 17 the horizontal deviation is very small and it appears that the epidemics are running in parallel.

Table 16 gives the numbers of deaths reported through August 1990 by year of diagnosis. The percentages given are the percentages of the cases reported to date that have already resulted in death. The final column gives a ratio of the numbers of U.S. AIDS deaths to Canadian deaths. The overall ratio of 34.81 is very similar to the rate in Table 15.

# AIDS CASES REPORTED TO AUGUST, 1990

(CANADIAN CASES MULTIPLIED BY 32.37)



2032

PANEL DISCUSSION  
CHART 17

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

TABLE 16

Deaths Reported to August 1990 by Year of Diagnosis

	Canada		U.S.A.		
	Number	Case Fatality Rate	Number	Case Fatality Rate	Ratio U.S./Can
Before 1981	6	85.7%	68	81.9%	11.33
1981	8	100.0	277	90.5	34.63
1982	26	96.3	980	89.0	37.69
1983	61	91.0	2,697	91.2	44.21
1984	150	92.0	5,298	88.7	35.32
1985	329	88.7	9,708	86.8	29.51
1986	495	83.5	14,932	82.4	30.17
1987	612	70.8	20,099	75.2	32.84
1988	498	51.8	18,704	58.9	37.56
1989	292	28.5	12,631	38.1	43.26
1990	41	12.1	2,255	18.8	55.00
Total	2,518	56.9%	87,649	61.2%	34.81

Table 17 gives the distribution by age of the AIDS cases reported to date for all years of diagnosis combined. As you can see the percentages are very similar; however there is a slight variation in the U.S. It appears that the proportion of persons in their 30s is larger and offset by the difference in the proportion of persons in their 40s.

TABLE 17

Age Distribution of Cases Reported to August 1990

	Canada	U.S.A.
< 19	1.56%	2.11%
20 - 29	20.14	20.20
30 - 39	43.84	46.07
40 - 49	24.09	21.43
> 50	10.27	10.19
Unknown	0.10	0.00

The difference in ages in Table 17 may be partly due to the difference in risk factors for adult cases. As you can see from Table 18 there is a dramatic difference in the proportion of cases relating to IV drug use. In Canada for only 1% of AIDS cases, IV drug use is the only reported risk factor. In the U.S.A., 21% of all cases report IV drug use as a basic risk factor. If IV drug use results in AIDS cases at an earlier age, then the age difference reported in Table 17 could be explained by the difference in risk factors. This is only a conjecture on my part. I have no hard information on this difference.

PANEL DISCUSSION

TABLE 18

Risk Factors for Adult Cases Reported to August 1990

	Canada	U.S.A.
Male homosexual/bisexual	73.2%	60.0%
IV drug use only	1.0	21.0
Both of the above	3.0	7.0
Blood product/hemophilia	4.7	3.0
Heterosexual	6.6	5.0
Other/undetermined	11.5	4.0

In 1988 the Canadian Institute of Actuaries prepared recommendations for additional reserving for AIDS. The recommendations were sent to all valuation actuaries and were the basis of additional reserves established for the 1988 year end. The recommendations were based on a model developed by a technical subcommittee which I chaired.

Chart 18 shows both the projected ultimate AIDS cases by the year of diagnosis that were developed in the model used by the Canadian Institute of Actuaries for Canada as well as corresponding projections prepared this month. The current projections reflect the actual reporting delays since the last projection and include some cases diagnosed before 1990 that may still be reported in 1990 or later years. As you can see from Chart 18 our projections tracked the actual cases reasonably well although there is a significant difference in later years. Up through 1988 our projections underestimated the number of AIDS cases; whereas in the most recent year 1989, our original projection is somewhat higher than our latest projection.

This is due to an apparent leveling out of the rate of increase of the number of new AIDS cases since the 1987 year of diagnosis. A similar observation can be made about the United States data.

Chart 19 is taken from the 1989 year-end edition of the HIV/AIDS Surveillance Report of the U.S. Department of Health and Human Services. The asterisks in Chart 19 show the projected ultimate cases; that is the number of reported cases to date adjusted by reporting delays for each month of report through September 1989. There is an apparent levelling out of the rate of increase; that is a linearization of the number of AIDS cases per month starting in 1987. This is exactly consistent with the Canadian observation.

This apparent decrease in the rate of increase of the number of new cases per month is difficult to explain theoretically. With an incubation period with a mean of about 10 years, this levelling out would suggest that there was a corresponding levelling out eight to ten years ago in the rate of increase of HIV infection which is hypothetically unlikely.

This levelling out effect has been referred to as "The AIDS deficiency" problem and has been hotly debated in the AIDS literature, some of which you may have read about in the press. In this debate, several explanations were offered for this levelling. They are:

# PROJECTED AIDS CASES

(NOV. 88 \* 1.2 FOR NEW DEFINITION)

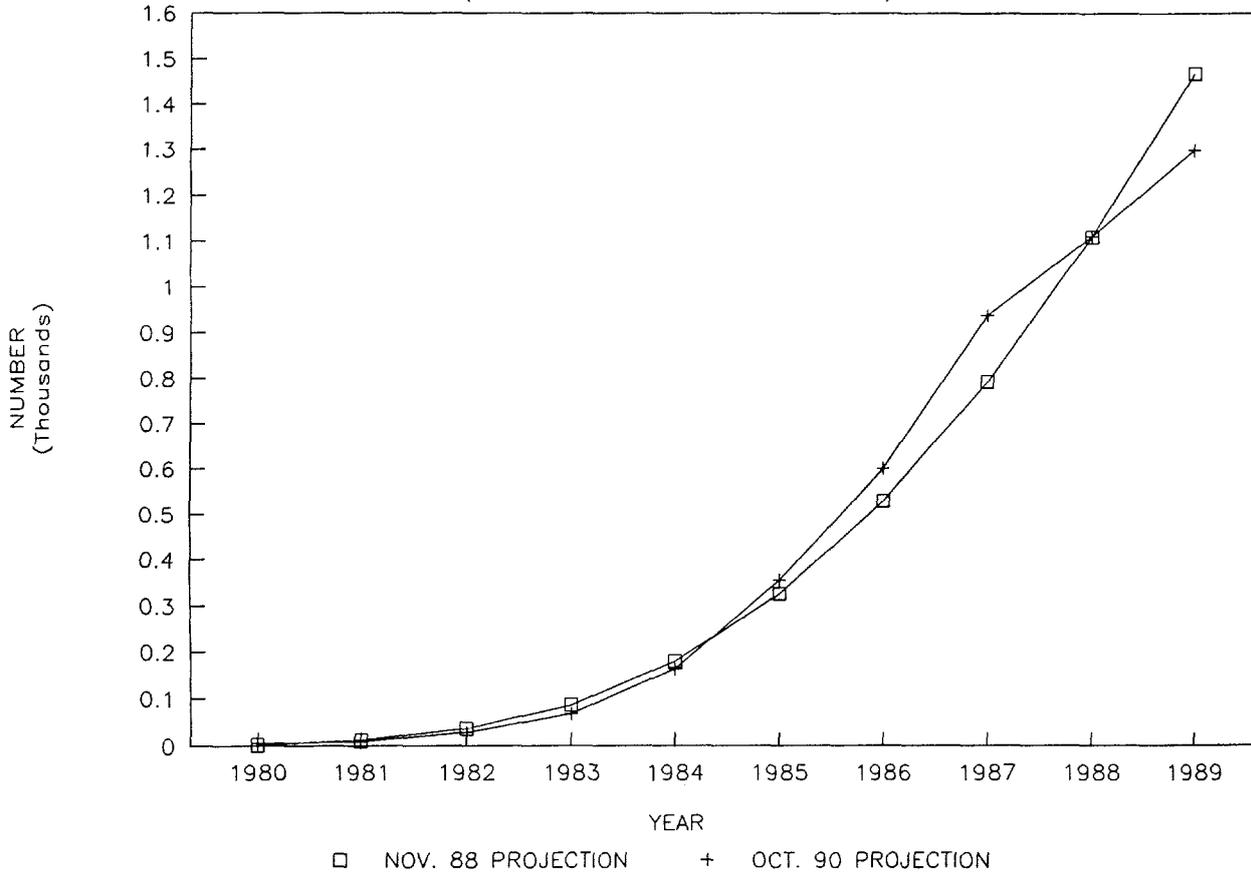
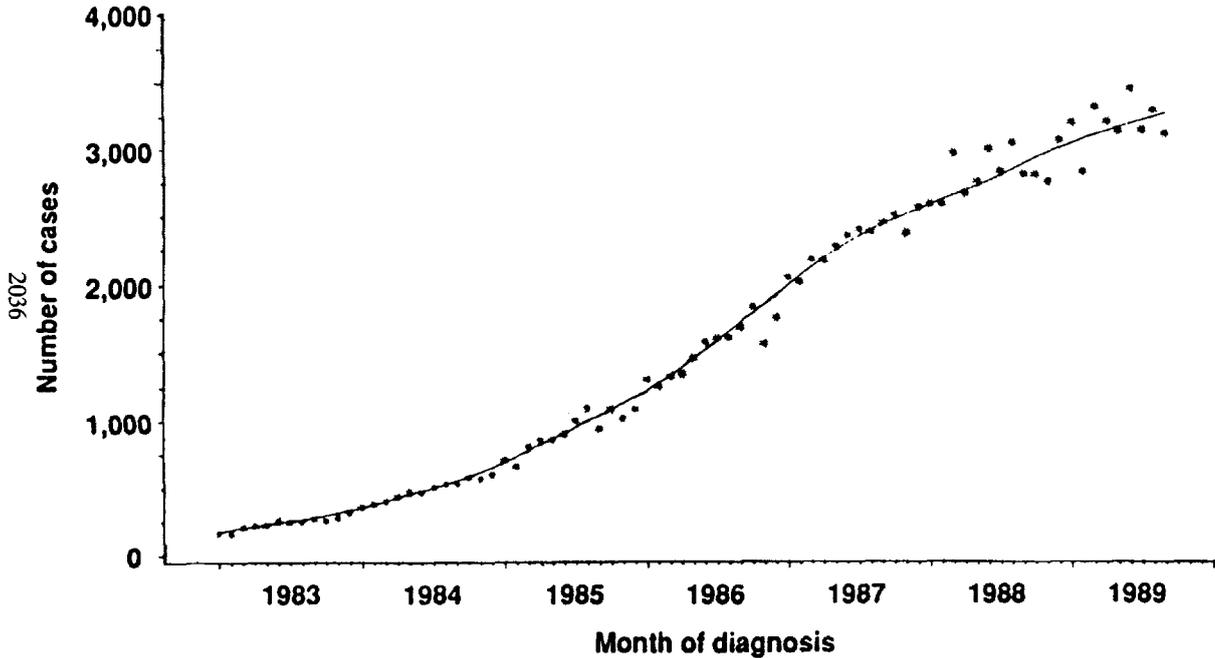


CHART 18

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

# AIDS cases by month of diagnosis, adjusted for reporting delays,<sup>1</sup> January 1983 through September 1989, United States



<sup>1</sup> See technical notes for explanation of adjusting and smoothing of data. Adjusted numbers of diagnosed cases for the most recent 3 months are not shown because of the imprecision of these estimates.

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

1. Increase in the length of the incubation period due to better treatment of persons with HIV infection prior to diagnosis of AIDS.
2. Behavioral changes due to education programs reducing the level of risk exposure.
3. Saturation effect of high risk groups resulting in a lower overall rate of infection following the saturation.

The actuarial implications of the three explanations are quite profound. First a lengthening of the incubation period does not affect the estimate of the number of people who are HIV infected. It only delays the time at which they will emerge as AIDS cases and ultimately deaths and insurance claims. This levelling effect should not make an insurer less uncomfortable about the AIDS risk. In my view, lengthening of the incubation period is quite a plausible explanation. If treatment of pre-AIDS patients with AZT and DDI lengthens their incubation period by even a fraction of a year, there can be a dramatic change in the number of diagnosed cases over the period of time in which the drug is introduced.

In contrast to the first explanation, behavioral changes due to education effects would have a profound influence on estimates of the number of persons who are currently HIV infected. Such education effects would probably have started around 1984. If in fact, the number of infections has decreased dramatically since 1984, the estimates for the number of HIV infections would be dramatically lower than under the first explanation. However, if education resulted in significant behavioral changes in 1984 or 1985, there would be no apparent change in the number of AIDS cases emerging for some significant time perhaps not before 1991, 1992 or 1993, because of the long incubation period. I personally do not believe that the behavioral change theory provides a satisfactory explanation for the linearization in the annual number of cases.

The third explanation relates to saturation of high-risk groups in which it is believed that persons exhibiting very high risk-taking behavior will become infected rapidly over a short period of time and that portion of the population with lower risk-taking behavior will be infected at a much lower rate. One would expect then a behavior much more like a rapidly spreading epidemic such as German measles in which very rapidly the entire at-risk population becomes infected and the epidemic disappears. I and many others believe that this is a very plausible explanation if, indeed, high risk-taking behavior in highly concentrated male homosexual groups in the late 1970s resulted in large numbers of AIDS cases emerging through the 1980s. In terms of the actuarial estimates of the number of HIV infections, the saturation effect would be analogous to the behavioral change explanation in the sense that the average level of infectivity over the population would decrease over time.

At this point, we do not have conclusive evidence that any of these three effects explains the linearization of the number of cases. I personally think that all of the explanations are partly correct and in combination will effect the levelling.

In order to study what the emerging cases tell us about the past epidemic I have examined several possible forms of the HIV infection epidemic and estimated the

## PANEL DISCUSSION

parameters of those infections by fitting the resulting number of AIDS cases to the observed number of projected AIDS cases for years of diagnosis through 1989.

Chart 20 shows four different epidemics with four dramatically different shapes. One increases at a decreasing rate. The second increases and levels out. A third increases and falls slowly and a fourth increases and falls dramatically. As you can see the number of infections since 1985 is dramatically different for these four epidemics.

Chart 21 shows the projected number of AIDS cases for the four epidemics and compares them with the projected actual number of cases through 1989. As you can see at the right-hand end, for 1989 the projected number of cases falls below that projected by all four of the epidemics. This suggests that probably there has been a lengthening of the incubation period. Behavioral changes reflected in the different epidemics is inadequate to explain the linearization of the number of AIDS cases.

Chart 22 shows the estimated cumulative number of AIDS cases and shows that the epidemics in cumulative terms are absolutely indistinguishable.

However, when we examined the estimated cumulative number of HIV infecteds in Chart 23, we see that the four epidemics produce quite different estimates of the number of infecteds to date from a low of about 22,000 to a high of about 45,000 in Canada. The differences are due almost entirely to the different levels of infections since 1984.

I think it is important to recognize that the information that we have to date on the AIDS epidemic is not adequate to give very detailed, very precise estimates of the HIV infections and consequently the number of AIDS cases emerging in the future. A factor of two seems large to most actuaries but for estimating the AIDS epidemic being out by a factor of two is probably not unreasonable, given the nature of the epidemic and the long incubation period.

This provides little consolation for the actuary who has to price life insurance policies on the basis of estimates of future infections. However, the valuation actuary may find more comfort. The actuary may allocate some of the increase in reserves to the reserve portion of the annual statement and a portion to allocated surplus. Canadian actuaries have been doing this for the past two years although there is great disagreement about the level of the epidemic and the level of AIDS cases that will emerge. The Canadian Institute of Actuaries is preparing guidelines for the 1990 year-end. I suspect the inherent projections in those recommendations will not be much different from those made two years ago.

**MR. GENE ECKSTUT:** The Centers for Disease Control reported the number of new cases in the four months from May through August 1990 to be lower than the number of new cases reported from January through April 1990. Is this significant and if so, is this also being noted for Canadian statistics?

**MR. HOLLAND:** Data for 1990 is quite unusual. There was apparently a significant lag in reporting in late 1989 and a number of cases, particularly from the northeast, were reported the first quarter of 1990.

# ESTIMATED NUMBER OF HIV INFECTED PER TIME INTERVAL

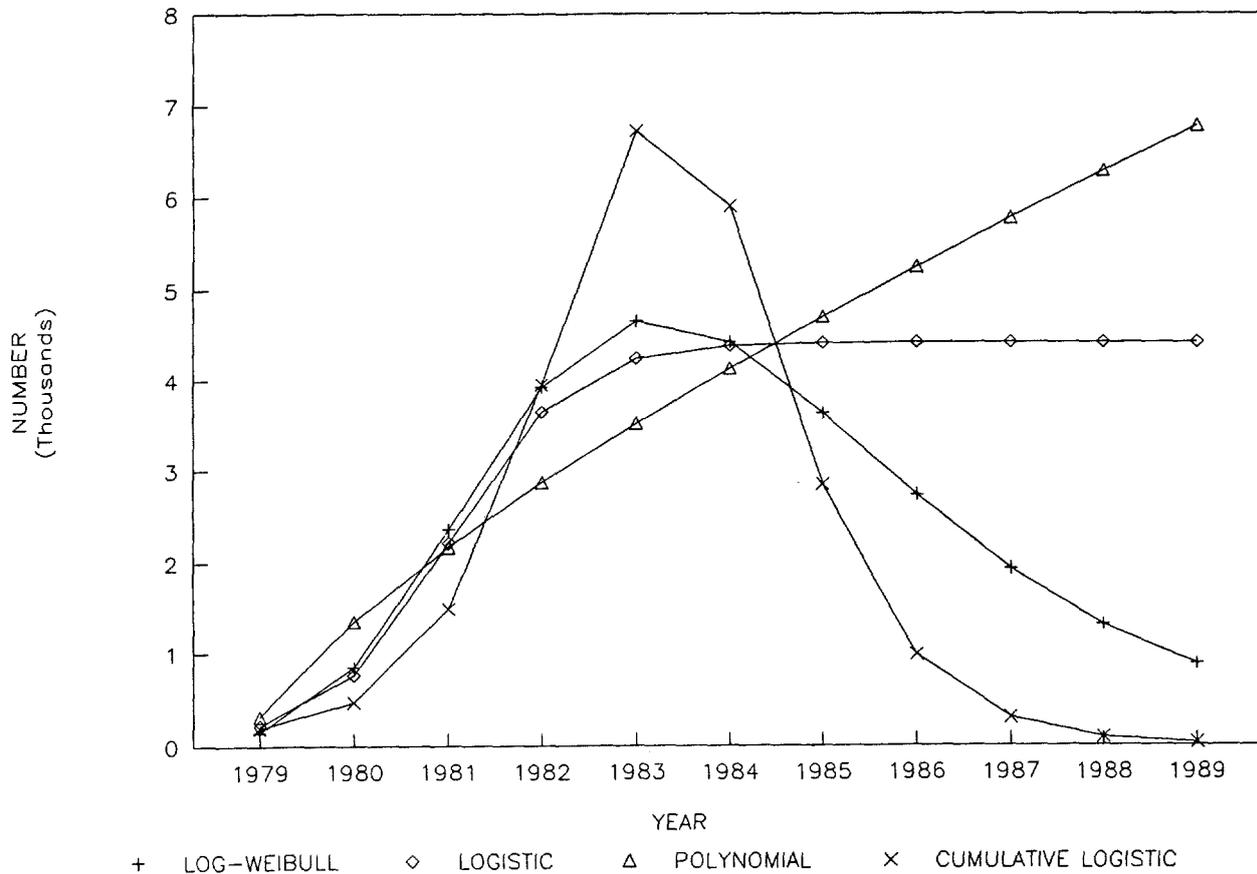
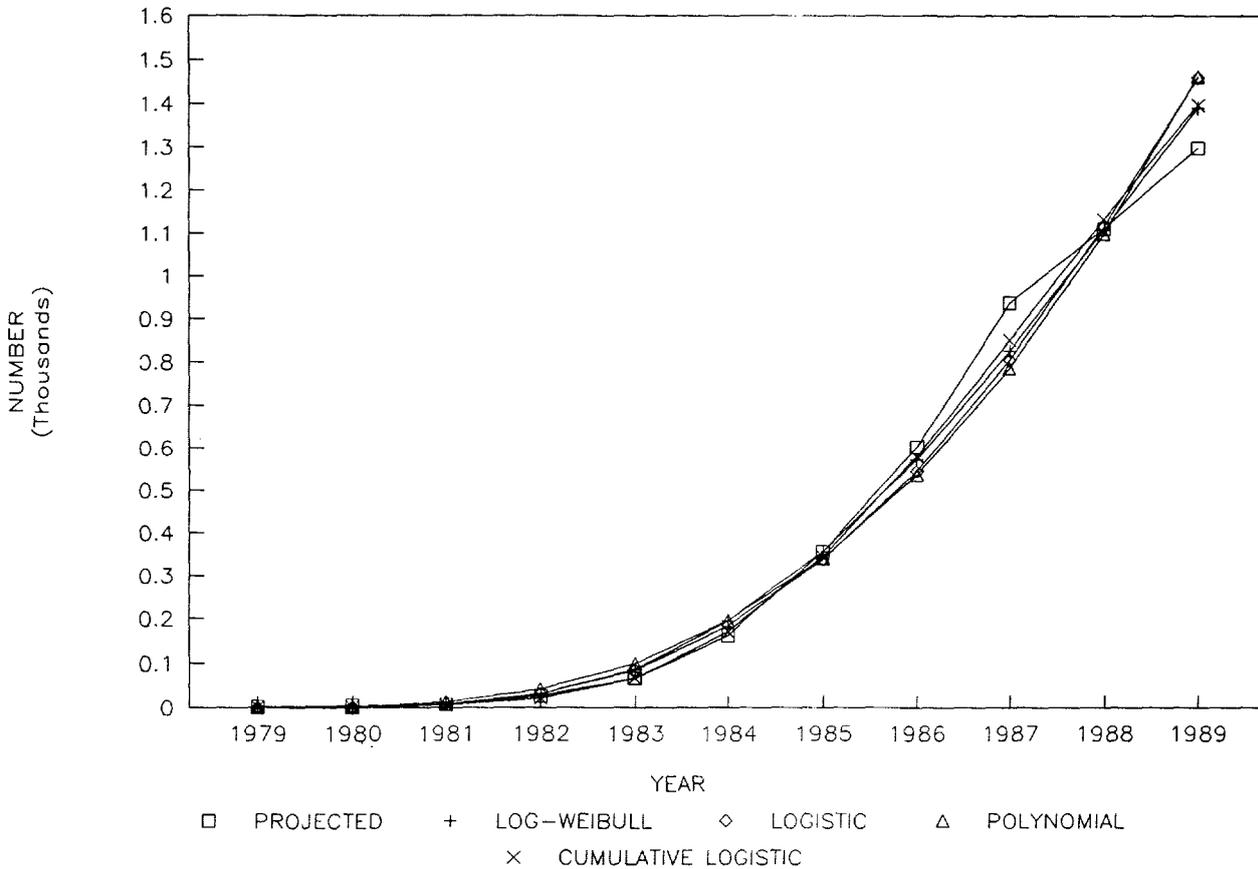


CHART 20

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

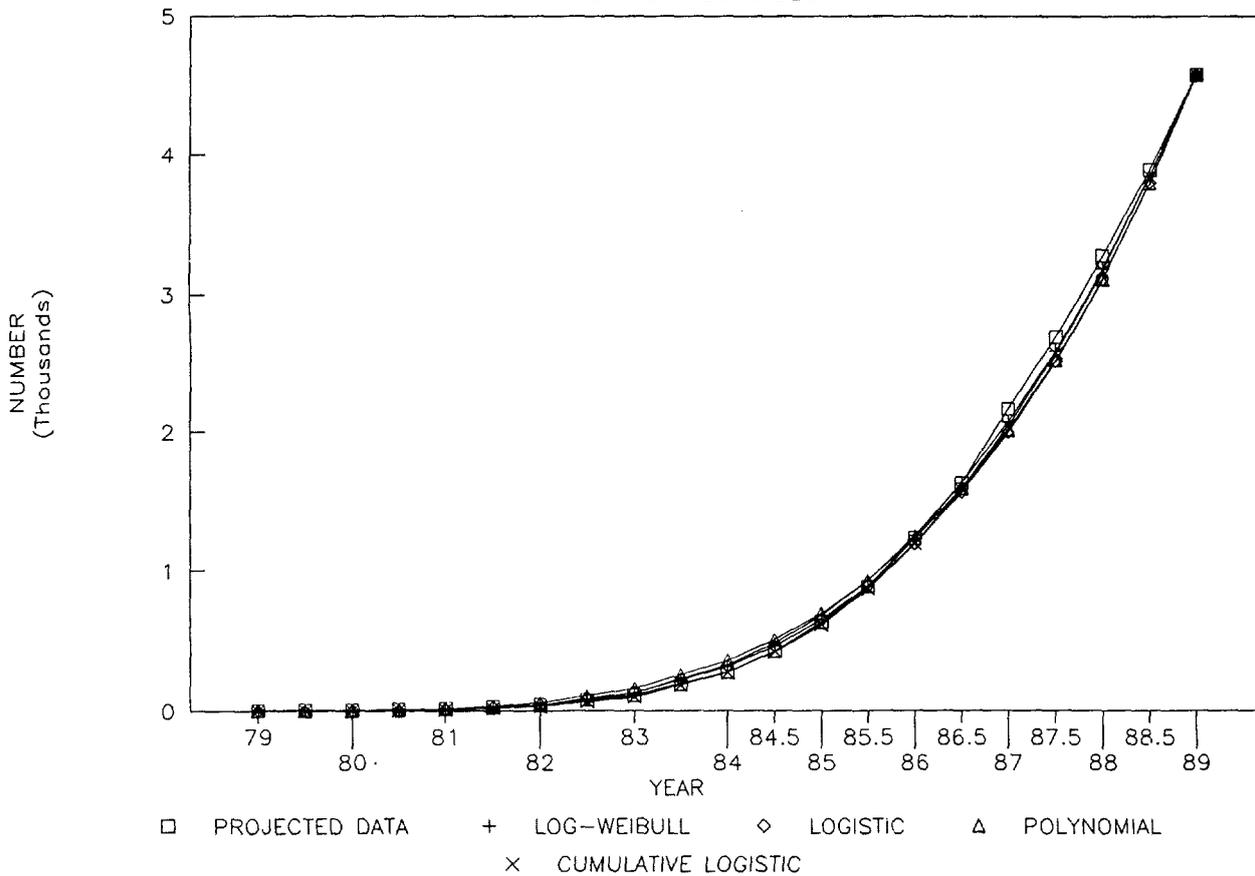
# PROJECTED NUMBER OF AIDS CASES



2040

PANEL DISCUSSION  
CHART 21

# ESTIMATED CUMULATIVE NUMBER OF AIDS CASES

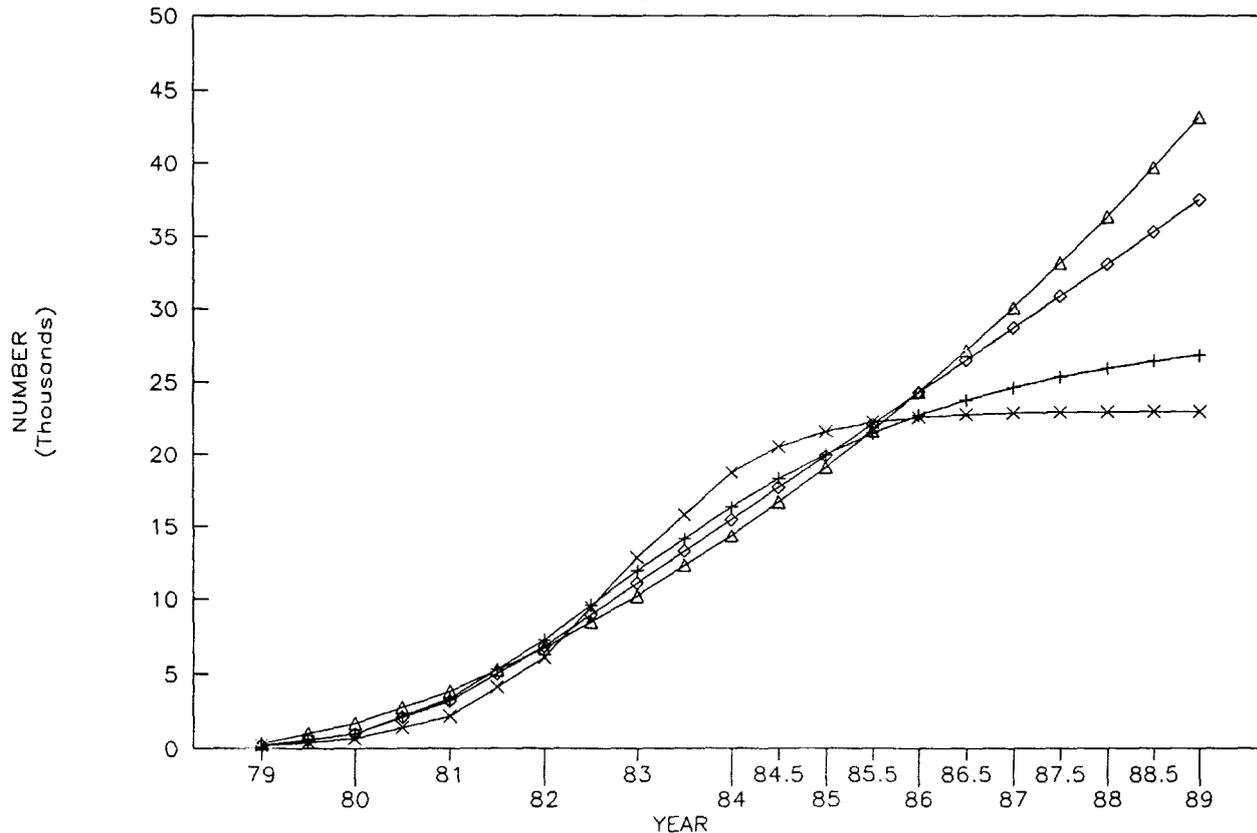


2041

THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA  
CHART 22

# ESTIMATED CUMULATIVE

NUMBER OF HIV INFECTED



+ LOG-WEIBULL    ◇ LOGISTIC    △ POLYNOMIAL    x CUMULATIVE LOGISTIC

2042

PANEL DISCUSSION  
CHART 23

## THE IMPACT OF AIDS IN NORTH AMERICA, EUROPE AND AFRICA

That caused a big increase in the number of cases reported which has subsequently fallen off in the last couple of months. Does anyone have a different reaction or opinion on that?

MR. REESE: Dave Holland and I have spoken a couple of times with John Karon, the head of the modeling area at the CDC, and we've talked about these kinds of things. There are tremendous inconsistencies in reporting by states and, like Dave mentioned, a big surge of reporting can come in. So you cannot draw conclusions from a short trend like that.

