

Cumulative number of people with HIV estimated from surveillance data

Table 1 shows the estimated cumulative numbers of Japanese with HIV and/or AIDS at the end of 2002. The mean of years after the report of HIV infection among reported HIV cases at the end of 2002 was 4.6 years. Under the assumptions that unreported HIV cases received no active antiretroviral treatments, and that the distribution of years after HIV infection among such cases was equal to that among reported HIV cases, the mean expected cumulative probability of AIDS progression among unreported HIV cases was calculated as 0.163. The number of unreported HIV cases was estimated as 11,000 (=the number of initially reported AIDS cases / the mean expected cumulative probability of AIDS progression among unreported HIV cases = $1,771/0.163$). The cumulative number of people with HIV was estimated as 14,000 (=the number of reported HIV cases plus the estimated number of unreported HIV cases = $3,436 + 11,000$), which was 4.2 times higher than the number of reported HIV cases.

The cumulative number of HIV cases reported up to 1996 was 1,033, which was nearly equal to the 1,090 estimated by the above-mentioned method.

DISCUSSION

The increase in the number of reported HIV cases indicated that the number of people diagnosed with HIV was increasing. The rise in the number of initially reported AIDS cases indicated that people with undiagnosed HIV were increasing. Thus HIV infection would appear to be spreading widely among the Japanese population. However, the increase up to 1996 together with the decrease in 1997-2002 in the number of secondarily reported AIDS cases suggested that progression to AIDS among many people diagnosed with HIV has been prevented or delayed due to the wide use of highly active antiretroviral treatments since 1997 in Japan.⁹ The number of persons with AIDS progression prevented in 1997-2002 might be evaluated by the number of secondarily reported AIDS cases in 1997-2002 compared with its number

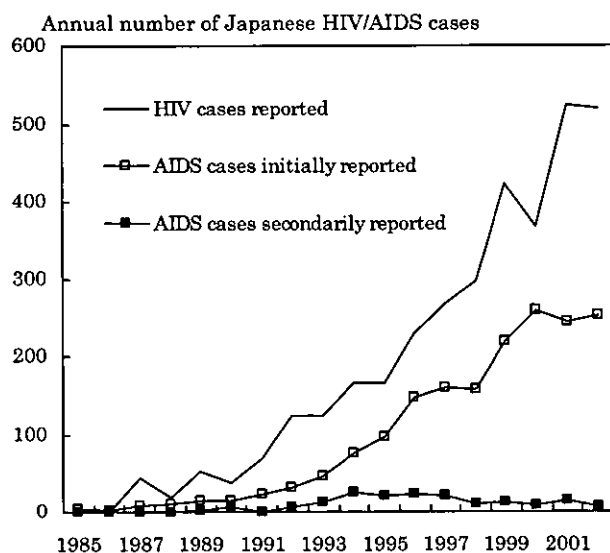


Figure 1. Annual trends in the numbers of Japanese HIV and AIDS cases reported to surveillance.

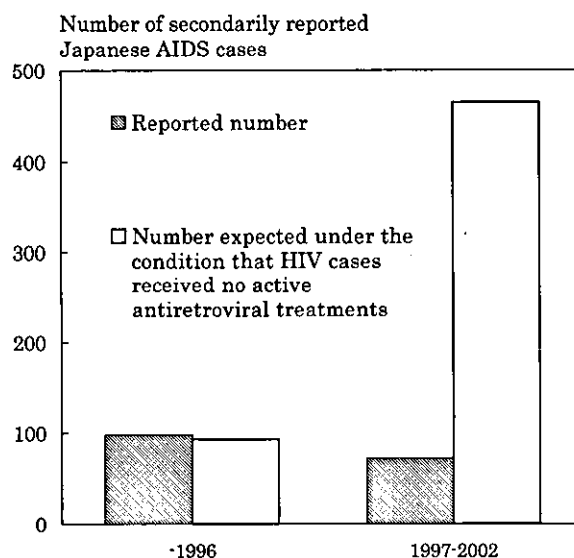


Figure 2. The number of Japanese AIDS cases secondarily reported to surveillance and its expected number.

Table 1. The estimated cumulative number of Japanese with HIV at the end of 2002.

| | Progression to AIDS | Without progression to AIDS | Total |
|----------------------------|------------------------|-----------------------------------|---------|
| Reported as HIV- infected | 171* | 3,265* | 3,436* |
| Unreported as HIV-infected | 1,771* | 9,000† | 11,000† |
| Total | 1,942* | 12,000† | 14,000† |

* : the reported number

† : the estimated number

expected under the condition that reported HIV cases received no active antiretroviral treatments (the reported number of 72 vs. the expected number of 465). Further research is required.

The cumulative number of people with HIV was estimated as 14,000, which was 4.2 times higher than the number of reported HIV cases. These findings suggested that many people had HIV in Japan, that a large proportion of those not diagnosed had no opportunity to prevent or delay their progression to AIDS by undergoing highly active antiretroviral treatments, and that aggressive countermeasures must be taken to prevent HIV infection and provide opportunities to detect such potential HIV infection in Japan.

This study has several problems and limitations. The most critical problem involves the accuracy of the data from the HIV/AIDS surveillance system in Japan. Our results were affected by the breadth of the coverage and the possible duplication in reporting diagnosed HIV and AIDS cases.^{3,14} However, the proportion of people diagnosed with HIV and AIDS who reported to surveillance was seen to be sufficiently high.⁸ Although the secondarily reporting of AIDS cases was put on a voluntary basis after the Infectious Disease Control Law was enacted in April 1999 in Japan, no great decline in its coverage was suggested.¹⁵

In estimating the number of unreported HIV cases, we used the back-calculation method which has been widely employed for predicting the number of HIV and AIDS cases.¹³ In this method, the data on reported HIV cases and initially reported AIDS cases was used, whereas the data of secondarily reported AIDS cases was not. For applying other methods such as a system analysis, further data would be necessary.^{10,16}

The essential assumptions were that unreported HIV cases received no active antiretroviral treatments, and that the distribution of years after HIV infection for unreported HIV cases was equal to that for reported HIV cases. Using these assumptions, the mean expected cumulative probability of AIDS progression for unreported HIV cases was calculated. The former assumption would be reasonable because the proportion of people diagnosed with HIV reported to surveillance was found to be sufficiently high. Had the coverage of undiagnosed HIV cases reported to HIV/AIDS surveillance in Japan risen rapidly in recent years, the latter assumption would not be valid. There were no reports enabling us to reliably determine whether this assumption was valid or not in Japan.

Another assumption was that data on the expected cumulative probability of AIDS progression in the absence of active antiretroviral treatments previously reported were available.¹² It would be safe to assume that HIV cases reported up to 1996 (before highly active antiretroviral treatments were widely available in Japan) would not have received active antiretroviral treatments, as was also true of unreported cases. The cumulative number of HIV cases reported up to 1996 was nearly equal to the number estimated by the same method under this assumption, suggesting that this assumption would be equally valid for HIV cases reported up to 1996 as well as for unreported cases.

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