

The Course of the HIV Epidemic among Intravenous Drug Users in Amsterdam, The Netherlands

ABSTRACT

To determine if behavioral changes in intravenous drug users in Amsterdam have retarded the HIV (human immunodeficiency virus) epidemic in this group in recent years, we report that: HIV-antibody seroprevalence in annual samples of injectors has been constant over the years 1986–89; HIV-antibody incidence in a cohort of injectors appears to have decreased from 1986 to 1987 and stabilized after that until 1989; acute hepatitis B incidence in all drug users in Amsterdam declined rapidly between 1985–89. It is concluded that changes in drug use behavior so far appear to have resulted in a stabilization of the epidemic among injectors, at a level with a still disturbingly high incidence rate of 5–6 per 100 person-years. (*Am J Public Health* 1991; 81:59–62)

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Introduction

Intravenous drug use was the only risk factor in 75 (7 percent) of the 1,074 AIDS (acquired immunodeficiency syndrome) cases diagnosed and reported in The Netherlands by December 31, 1989. Forty-five of these cases were residents of Amsterdam (P. Bindels, personal communication). Although the absolute number of AIDS cases among intravenous drug users in this city of approximately 700,000 inhabitants is still relatively small, the rate of the recent increase is high: from one new case in 1985, three in 1986, eight in 1987, and 15 in 1988 to 18 new cases in 1989. In an effort to stop or slow down the spread of HIV among drug users, a number of national and local policies have been developed and applied. The informational programs directed to drug users, on the dangers of AIDS and on ways of preventing infection (since 1986), were supplemented by supplying condoms to addicted prostitutes. In 1984, a needle and syringe exchange program was implemented,^{1,2} the original purpose of which was to prevent the spread of hepatitis B. All of these policies aim at voluntary behavioral change, by reducing risk behavior and thereby limiting the occurrence of new HIV infections. Evidence based on self-reporting suggests that behavioral change toward safer drug using practices did indeed occur in Amsterdam in recent years. A study previously published in this Journal,³ showed that in a cohort of intravenous drug users a marked increase in making exclusive use of the Amsterdam needle and syringe exchange program occurred during the period December 1985 through July 1988 with a concurrent marked reduction in sharing used needles

and syringes. Self-reported changes in behavior have their limitations and more objective measures of risk reduction are needed to corroborate these findings. The aim of this study therefore is to describe several of these more objective indicators for the development of the HIV epidemic among drug users in Amsterdam during the past few years.

Three indicators will be dealt with: 1) HIV seroprevalence among intravenous drug users at intake into a study from 1986 through 1989; 2) incidence of HIV infections in a cohort of intravenous drug users from 1986 through 1989; and 3) incidence of acute hepatitis B infection among drug users in the city of Amsterdam from 1983 through 1989. In drug users, hepatitis B virus (HBV), like HIV, is transmitted mainly through the sharing of needles and syringes. Acute hepatitis B infection was therefore chosen as a surrogate marker for HIV infection. In homosexual men, where both HBV and HIV also share the same main transmission mode (anogenital intercourse), a close correspondence between hepatitis and HIV incidence was shown.⁴

Methods

Study Participants

Participants were recruited at six methadone maintenance outposts and at a weekly sexually transmitted diseases

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TABLE 1—HIV-antibody Prevalence and Presence of Independent Risk Factors in Annual Samples of IVDU in Amsterdam

Independent Risk Factors*	1986 (N = 220)	1987 (N = 178)	1988 (N = 133)	1989 (N = 91)
% first injection > 5 years ago	75.0	73.4	66.2	71.4
% last injection in past week	61.2	57.6	58.6	57.1
% German nationality	20.0	18.5	16.5	17.6
% residing in Amsterdam > 2 years	72.3	75.8	72.2	78.0
% smoking of heroin not daily	84.5	78.0	83.5	76.9
% HIV-ab positive†	33.2	30.3	27.8	31.9
% adjusted **HIV-ab positive	33.2	31.0	31.2	34.1

*Presented categories are associated with a positive HIV-ab test.

**Calculated, using regression coefficients for the different years from a logistic model where all listed risk factors were included, with 1986 as arbitrary year of reference.

† χ^2 test for trend $p = 0.54$

clinic for drug-using prostitutes. Both intravenous and non-intravenous drug users were invited to participate. After informed consent was obtained, a blood sample for HIV serology was taken and participants were interviewed using a standard questionnaire. Participants were asked to return for follow-up examinations every four months for repeat interviews and blood samples. There was no payment for their first visit; those who continued participation in the study were offered 25 Dutch guilders as an incentive for each follow-up visit. HIV antibody tests were performed using standard procedures described elsewhere.⁵ The intake of participants started December 1985 and continues to the present.

Results reported here pertain to the period January 1986 to the end of 1989. Participants who reported at intake ever having used drugs intravenously were considered intravenous drug users (IVDUs) and were all included in the HIV-seroprevalence analysis. The HIV-incidence analysis was limited to those follow-up participants who had used drugs intravenously within the five years preceding intake or who (re-)started intravenous drug use in the course of follow-up. IVDUs with a positive HIV-antibody test result at entry were more inclined to take part in the follow-up than those who tested negative; 69 percent versus 57 percent, respectively, returned for at least one follow-up visit by March 1990. Risk factors for the presence of HIV-antibody that were more often present in those in follow-up than in others were: recently injecting, residing in Amsterdam for more than two years, and German nationality.

HIV-Seroprevalence and -Incidence

The development of the HIV-seroprevalence rate over time was examined

by separating the intakes according to year of intake (1986–89). Since participants were self-selected, it is conceivable that IVDUs with different probabilities of being seropositive entered the study at different times. To control for such a selection bias, predetermined risk factors⁵ that predict the probability of being seropositive and that were presumed not to reflect policy-induced behavior changes were multivariately controlled by logistic regression, using standard statistical software.⁶ These risk factors were: date of first and date of last injection, nationality, length of stay in Amsterdam, and frequency of smoking of heroin in past six months. Annual incidence rates were calculated by determining the number of seroconversions per 100 person-years for those at risk. At risk were considered IVDUs who were HIV-antibody negative at entry, from their first visit until their last one or until seroconversion. Date of seroconversion was estimated as the midpoint of date of last seronegative visit and date of first seropositive visit.

Incidence of Acute Hepatitis B

All cases of acute hepatitis B in Amsterdam must be reported to the Municipal Health Service. On a routine basis, background data including drug use are collected in a personal interview by a public health nurse. This procedure remained unchanged throughout the study period. All records of acute hepatitis B cases from 1983 through 1989 were carefully screened by one of us (CB) for cases with a history of illicit drug use. Incidence was calculated by using estimates of the total number of hard drug users present per year as denominator; these estimates were calculated by the Municipal Health Service's drug department, based on a capture/recapture method quarterly⁷ and have

wide margins of uncertainty. We assumed there was a constant proportion of injectors among these drug users during the study period.

Results

HIV-Seroprevalence

A total of 622 subjects who had ever used drugs intravenously participated in the study between January 1986 and December 1989 (Table 1). In four consecutive years (1986–89), both the crude HIV seroprevalence rates and the adjusted rates (taking 1986 as year of reference) remained between 27.8 percent and 34.1 percent with no trend effect (Table 1).

HIV-Incidence

A total of 236 subjects who were seronegative at entry into the study and who reported intravenous drug use either within the five years preceding entry or in the course of follow-up, were analyzed to determine incidence. Twenty-seven seroconversions were recorded: five in 1986, six in 1987, eight in 1988, and eight in 1989.

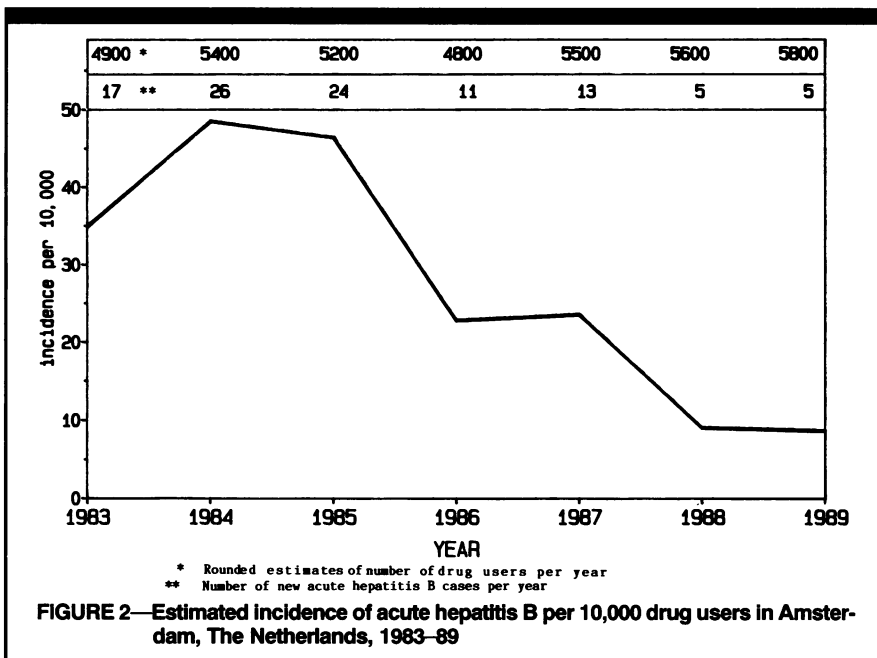
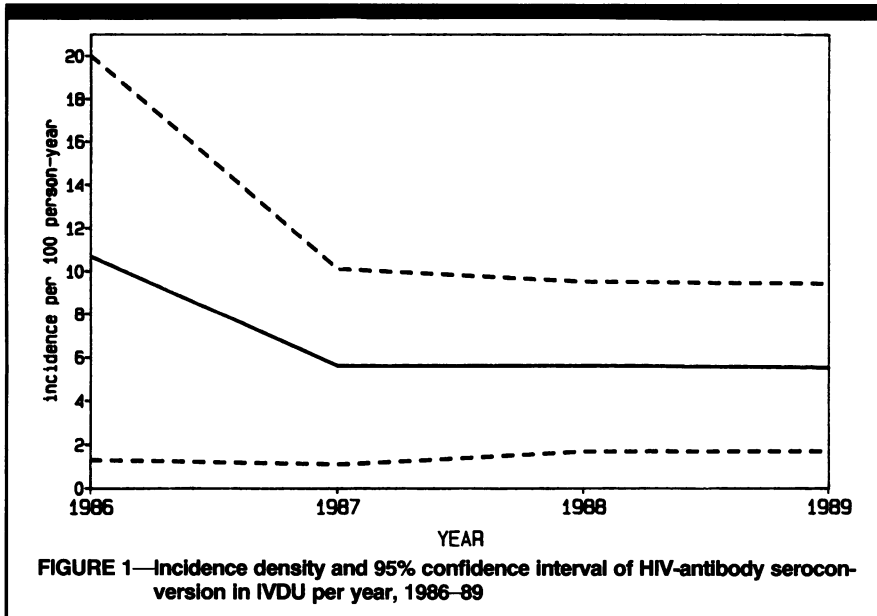
The incidence rates per 100 person-years (95% confidence interval) were: 10.7 (1.3, 20.0) in 1986, 5.6 (1.1, 10.1) in 1987, 5.6 (1.7, 9.5) in 1988, and 5.5 (1.7, 9.4) in 1989 (Figure 1). The incidence rate difference between 1986 and 1987 was 5.0 (–5.3, 15.4).

Acute Hepatitis B Incidence

The incidence of acute hepatitis B (AHB) per 10,000 varied from a high of 48 in 1984, to a low of 8.6 in 1989 (Figure 2). Over the seven-year time span under study, there was a significant decline in AHB incidence (χ^2 for trend = 23.5, $df = 1$, $p = 10^{-6}$).

Discussion

These data suggest a decline in HIV-seroconversion from 1986 to 1987, followed by stabilization up to 1989. The confidence intervals, however, are broad, indicating that the early decline is not conclusive. In San Francisco, a similar decline was noticed in HIV seroconversion rate per 100 person-years in IVDUs: from seven in 1985 to 2.4 in 1987.⁸ It is very difficult to evaluate properly the impact of behavioral change among IVDUs in Amsterdam, by comparing it with studies being done in other countries. Generally, because large segments of the total population of IVDUs are hard to reach, very little is known about the representative-



ness of IVDU study samples; ours is no exception. Participants were self-selected and follow-up was poor; only 57 percent of HIV-antibody negative IVDU at entry returned for at least one follow-up visit. Continued participation in the study may be of more interest to those IVDUs who have not modified their risk behavior and therefore may suspect a change in their serostatus since their last test. For this reason we may be overestimating HIV incidence in IVDUs in Amsterdam when generalizing from this group. On the other hand, we have evidence that behavioral change did occur especially in those drug users who took part in the follow-up study.³

We found rather stable HIV seroprevalences over the years, both for the crude prevalences and after attempting to correct for the influence of selection biases following from our sampling procedures. Stable HIV seroprevalences among IVDUs in recent years have been reported from many cities in North America and Western Europe.^{8–16} The interpretation of this phenomenon, however, and especially measuring the impact of behavior change by monitoring seroprevalence, is very difficult since many factors that affect the general IVDU population and that are generally not well recorded—for example loss of seropositives for various

reasons (mortality, hospitalization, moving, cessation of drug use, etc.) and entrance of new seronegative injectors—have to be taken into account. As appears from our data and as was reported before from Manhattan, New York City,⁹ a stable seroprevalence is still compatible with a rather high incidence.

Throughout the study period the same technique was applied to estimate the number of drug users in the city and reporting requirements for acute hepatitis B remained the same. We therefore consider it unlikely that the marked decrease in acute hepatitis B observed in drug users is an artefact, i.e. the result of a change in these procedures. From the United Kingdom a similar decrease in acute hepatitis B incidence in drug users since 1985 has been reported.¹⁷

In conclusion, we found a modest decrease in HIV incidence among IVDUs participating in our follow-up study which correlates with the earlier reported behavioral change in this group.³ The decline in acute hepatitis B incidence is a convincing indicator of effective behavior change. The largest drop in hepatitis incidence appeared before 1987, a period about which we have very limited data on HIV prevalence and incidence. Possibly a parallel reduction occurred in HIV incidence in that period that we were not able to measure. Nevertheless, recent HIV incidence rates still appear to be disturbingly high, indicating that transmission among this group is continuing. □

Acknowledgments

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References

1. Buning EC, Coutinho RA, van Brussel GHA, van Santen GW, van Zadelhoff AW: Preventing AIDS in drug addicts in Amsterdam (letter to the editor). *Lancet* 1986; 1:1435.
2. Hartgers C, Buning EC, van Santen GW, Verster AD, Coutinho RA: The impact of the needle and syringe-exchange programme in Amsterdam on injecting risk behavior. *AIDS* 1989; 3:571–576.
3. van den Hoek JAR, van Haastrecht HJA,

- Coutinho RA: Risk reduction among intravenous drug users in Amsterdam under the influence of AIDS. *Am J Public Health* 1989; 79:1355-1357.
4. van Griensven GJP, van den Hoek JAR, Leentvaar A, Coutinho RA: Surrogate markers for HIV incidence among homosexual men. *J Infect Dis* 1989; 159:1157-1158.
 5. van den Hoek JAR, Coutinho RA, van Haastrecht HJA, van Zadelhoff AW, Goudsmit J: Prevalence and risk factors of HIV infections among drug users and drug-using prostitutes in Amsterdam. *AIDS* 1988; 2:55-60.
 6. Dixon WJ (ed): *BMDP statistical software manual*. Berkeley: University of California Press, 1988.
 7. Buning EC: *De GG&GD en het drugprobleem in cijfers deel IV*. Amsterdam: GG&GD, 1990.
 8. Moss AR, Bachetti P, Osmond D, Meakin R, Keffelew A, Gorter R: Seroconversion for HIV in intravenous drug users in San Francisco. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.O.11.
 9. Des Jarlais DC, Friedman SR, Novick DM, Sotheran JL, Thomas P, Yancovitz SR, et al: HIV-1 infection among intravenous drug users in Manhattan, New York City, from 1977 through 1987. *JAMA* 1989; 261:1008-1012.
 10. Hadler JL, Farley T, Peterson L, Carter M: Trends in HIV seroprevalence and risk behavior among drug treatment program entrants. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.O.8.
 11. MacDonald KL, Thomas J, Danila R, Osterholm M, Shultz J, Falkowski C, et al: A comparison of HIV-1 infection rates in Minnesota (MN) IV drug users between 1987 and 1988. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.P.43.
 12. Lewis BF, Sullivan J, Birch F, McCusker J, Koblin B, Noone S, et al: Coordinated community program for HIV surveillance among IVUDU. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.P.35.
 13. Brown LS, Phillips R, Ajuluchukwu D, Battjes R, Primm BJ, Nemoto T: Demographic and behavioral features of HIV infection in intravenous drug users (IVDUs) in New York City Drug Treatment Programs: 1985-1988. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.P.49.
 14. Saravolatz LD, Ognjan A, Markowitz N, Pohlod D, Lee H, Belian B, et al: HIV-1 and HTLV-I infections in intravenous drug users (IVDU) in Detroit 1985-1989. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; Th.A.P.6.
 15. Sutherland S, McMamus TJ: HIV seroprevalence in injecting drug users in South London, 1985-88. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; T.A.P.55.
 16. Aguilera JT, Soriano V, Muga R, Ribera A, Clotet B, Foz M: HTLV-I and HIV-1 infection in intravenous drug abusers of Barcelona. Presented at the V International Conference on AIDS, Montreal, Canada, 1989; Th.A.P.19.
 17. Polakoff S: Acute viral hepatitis B: Laboratory reports 1985-8. *CDR* 1989; 29:3-6.

ANA Releases Draft Report for Health Care Reform

After nearly two years of effort devoted to the development of a reform plan for health care delivery in the nation, the American Nurses' Association (ANA) has released a working draft of the report "Health Care Reform: An Agenda for Action" for review and comment. ANA President Lucille Joel describes the plan as achievable, realistic and cost-effective.

ANA expects to release the report to the public early in 1991, after study by the association's 53 constituents, elected and appointed officials, participants in the ANA Nursing Organization Liaison Forum, and the Tri-Council for Nursing. In this way, ANA expects that the report will reflect an agenda on behalf of the entire nursing profession.

Joel says, "Nursing's plan for health care reform represents a massive effort on behalf of the entire profession to clearly lay out what the nation's nurses believe to be a plan for the delivery of health care services that best meets the needs of the public." The plan offers solutions to many problems affecting the US health care system, including access to care; the lack of or misuse of appropriate providers, settings and delivery arrangements; equitable and affordable financing; and stronger cost controls.

Recognizing that cost and revenue estimates are critical components of health care reform and that adequate funding sources must be available, the ANA plan provides an example for financing. Unique characteristics proposed in the working draft include:

- federal standards to assure access by all to basic levels of health services through public and private health service plans;
- implementation of the plan through incremental steps to be completed by the year 2000 with an initial focus on pregnant women as well as infants and children;
- renewed emphasis on schools, places of work, the home, and other community settings for the delivery of care; and
- reliance on multiple payors—individuals, employers and government—to finance the reformed system.

ANA's Board of Directors planned to review comments received from the nursing community at its December meeting. After approval by the board the plan will be prepared for wide dissemination. For further information, contact ANA, 2420 Pershing Road, Kansas City, MO 64108.