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# Editorial

## Serosurveillance of Human Immunodeficiency Virus Infection

Surveillance of HIV (human immunodeficiency virus) infection through serologic surveys and studies is an important adjunct to AIDS (acquired immunodeficiency syndrome) case surveillance for monitoring the epidemic.<sup>1</sup> Since the occurrence of new infections is largely invisible, such critical public health issues as the extent of HIV transmission among injecting drug users, the continuing rate of infection among young homosexual men, the rates and trends in heterosexuals, and perinatal transmission can best be addressed through carefully designed and conducted serologic surveys.

The Centers for Disease Control (CDC) collaborates with state and metropolitan health departments, other federal agencies, medical research institutions, and the blood banking community on a variety of HIV surveys and studies aimed both at surveillance of the epidemic and at helping target and evaluate prevention activities.<sup>2</sup> For areas outside Europe and the United States, AIDS surveillance is far less complete. The World Health Organization promotes standardized serologic surveillance of HIV as the most reliable means to assess and forecast future HIV trends in developing countries.<sup>3</sup>

New York State was one of the first areas to institute serosurveys and has one of the most extensive serosurveillance programs. The supplement to this issue of the Journal<sup>4</sup> reports a number of New York's studies and illustrates some of the breadth and applications of HIV serosurveillance.

HIV is extremely heterogeneous in extent and impact within the United States. For example, there is nearly an 80-fold difference in prevalence among sentinel hospital populations across the country, ranging from 0.1 percent to 7.8

percent in patients treated for reasons other than HIV-associated disease.<sup>5</sup> Because of this variability, HIV serosurveillance focuses on various subpopulations of public health interest rather than the population as a whole. Locally applicable data are essential for targeting and evaluating disease prevention in a particular area.

More important than the current prevalence of infection are the changes in prevalence, or actually the underlying incidence, over time. Are the different segments of the epidemic worsening, stabilizing, or slowing in response to local and national prevention efforts? Surveying the same subpopulations accurately over time is therefore critical for monitoring HIV trends.

In order to assure the necessary standardization and adequate sampling of populations of greatest theoretical risk, accessible subpopulations such as patients entering drug treatment, homeless youths, sexually transmitted disease patients, and lower risk groups, such as childbearing women, non-AIDS patients at selected hospitals, and blood donors, are selected as "sentinels" to indicate the levels and trends of infection. In New York State these sentinel surveys are termed "windows"<sup>4</sup> through which the epidemic can be observed.

Since no individual sentinel population reflects all the principal patterns of HIV spread and each has its own biases, the various serosurveys must be considered together with AIDS case reporting to understand the nature and extent of the HIV problem. Other valuable information can come from surveys of sexual risk behaviors<sup>6</sup> and from surveillance of sexually transmitted diseases, which serve as a surrogate for sexual risk behavior.

HIV reporting (conducted by name in 21 states)<sup>7</sup> primarily serves public health and prevention needs by assisting in provision of counseling, partner notification and follow-up treatment services. Reports of persons known to have HIV infection reflect testing patterns as well as the prevalence of infection and provide minimum estimates of HIV prevalence.

A pilot study for an HIV household serosurvey was completed in Dallas in 1990.<sup>8</sup> Although the study was conducted with great proficiency, the prevalence estimate appeared low as evidenced by back-calculation<sup>9,10</sup> from the numerous AIDS cases reported annually from that area. The low estimate probably resulted from the non-response of some persons at increased risk, which was documented by the pilot study.

Over the past few years, back-calculation from AIDS case incidence and natural history data has increasingly been used on a national and local level to estimate overall HIV prevalence in the United States.<sup>11</sup> The availability of this technique as well as HIV serosurveillance has lent confidence to national estimates of HIV prevalence. For these reasons, and in view of the limitations and costs of the household survey approach, a national HIV serosurvey has not been recommended by CDC.<sup>8</sup>

In many of the sentinel serosurveillance surveys, anonymous unlinked sampling of blood specimens collected for other purposes and testing those specimens in a manner which prevents linking antibody results to identifiable individuals has been a crucial although sometimes controversial element.<sup>12</sup> The reason for the unlinked approach is to avoid the participation (or "non-response") bias inherent in linked surveys, which ethically must

allow consent (and hence refusal) of those to be tested.<sup>13</sup> The unlinked surveys, however, in no way reduce the opportunity for those infected or at risk to receive counseling and testing. In fact, the documentation of HIV infection rates through unlinked surveys can lead to mobilizing the necessary resources to provide and focus the more expensive counseling, testing, and referral services. Anonymous unlinked surveys in clinical settings which also offer counseling and testing have been effectively used to measure the extent to which those services are utilized by infected patients.

Sentinel surveillance through serosurveys is a relatively new way of monitoring an epidemic. Approaches being developed for analysis of these repeated, cross-sectional surveys attempt to decipher infection patterns and trends. Estimating the HIV incidence responsible for the observed prevalence also presents a challenge. The most cost-effective survey approaches, or "windows" on the epidemic, will be determined as further experience is gained. While the epidemic remains both dynamic and clinically invisible, however, some forms of serologic surveillance will remain essential for health officials, and for society, to monitor the movements of the virus in the population. □

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