

# Changing Trends in Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome in the Population Aged 50 and Older

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**OBJECTIVES:** To alert persons in the public and private healthcare professions to the increasing trends in higher proportions of persons aged 50 and older who are newly diagnosed with human immunodeficiency virus (HIV) and who are living with HIV and acquired immunodeficiency syndrome (AIDS).

**DESIGN:** Data from the period 1992 through 2004 from the HIV/AIDS Reporting System (HARS) were analyzed.

**SETTING:** New Jersey is the eleventh-most-populous state, with the highest density of persons per square mile. It also has the fifth-highest number of AIDS cases.

**PARTICIPANTS:** All persons residing in New Jersey and reported to HARS with HIV infection or who are considered to have AIDS.

**MEASUREMENTS:** Trends in persons aged 50 and older were compared with those in the population younger than 50 during 1992 through 2004 for the numbers of persons living with HIV/AIDS and the number of persons newly diagnosed with HIV infection.

**RESULTS:** The proportion of all persons aged 50 and older living with HIV/AIDS in 2004 was significantly greater than the comparable proportion of persons in 1992. Proportionally, more persons were newly diagnosed with HIV who were aged 50 and older according to sex and for each of the three major race or ethnicity groups (white non-Hispanic, black non-Hispanic, and Hispanic) than were persons younger than 50. Each of these increases was statistically significant.

**CONCLUSION:** HIV/AIDS social marketing campaigns should include images and issues related to older persons in educational and prevention efforts. New methods that reach older populations should be considered. Physicians and other healthcare providers should be made aware of their role in prevention and education about HIV. Testing of older populations with risk factors should be encouraged. *J Am Geriatr Soc* 55:1393–1397, 2007.

**Key words:** HIV/AIDS; older populations; prevention; HIV testing; HIV exposure modes

The number of patients with human immunodeficiency virus (HIV) aged 50 and older is increasing because of increased longevity in patients treated with highly active antiretroviral therapy (HAART) and because of new primary infections in older patients.<sup>1</sup> The Centers for Disease Control and Prevention (CDC) estimated that the number of adults aged 50 and older living with acquired immunodeficiency syndrome (AIDS) increased 213.7% between 1994 and 2000, accounting for 18.9% of persons living with AIDS in 2000.<sup>2</sup> Additional estimates from the CDC of the burden of AIDS cases among the population aged 50 and older indicate that this group accounted for 18.6% of newly diagnosed AIDS cases in the nation (according to age at the time of AIDS diagnosis) in 2004.<sup>3</sup>

Older age is an important consideration in HIV/AIDS for two main reasons. First, the body has less ability to resist infection as age increases and the immune system weakens. Second, older people tend to have more chronic conditions than younger people and to be taking medications for these conditions. These medications may interfere with HIV therapy.

The numbers of persons with HIV/AIDS are expected to increase even further in the future because of advances in treatment, which will enable many currently infected people to survive for a sufficient number of years to become part of the group aged 50 and older. The number of persons becoming infected after the age of 50 is also increasing. HIV/AIDS educational and prevention programs are not aimed at the elderly population. The aging of the AIDS epidemic leads to questioning of the reliance of HIV/AIDS prevention and treatment on age-generic paradigms, which results in ignoring the specific needs of persons aged 50 and older.<sup>4</sup>

The current healthcare system does not adequately explore risk behaviors among the older population in general. Most physicians rarely or never discuss HIV or AIDS or risk factor reduction with their older patients. Although this is a vulnerable population, healthcare providers may

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DOI: 10.1111/j.1532-5415.2007.01295.x

not even consider a diagnosis of HIV/AIDS in an older patient, on the assumption that older patients are not sexually active and do not inject drugs. Many of the symptoms of HIV/AIDS may be viewed as a normal part of the aging process. The presence of these symptoms in older patients may lead to misdiagnosis or, at the least, to delay in diagnosis of HIV/AIDS in this group.<sup>5</sup>

For the most part, people in the older age groups are less knowledgeable about HIV/AIDS and sexually transmitted diseases (STDs) than younger people. There is lack of information about how these diseases are spread and how to avoid transmission of viruses.<sup>6</sup> Actual rates of infection in the population aged 50 and older may be even more understated than those in the general population, because older people are less likely to be tested for HIV infection. Data from the National AIDS Behavioral Surveys showed that persons aged 50 and older who were at risk for HIV were only one-fifth as likely to have been tested for HIV as a comparison group of people in their 20s with similar risk status.<sup>7</sup> Delay in testing results in infected individuals starting treatment at later stages or not at all.

This article examines the trends in relative proportions and rates of newly diagnosed cases of HIV/AIDS in the population aged 50 and older in New Jersey. It also examines changes over a 12-year period in the numbers and characteristics of persons in this age group living with HIV/AIDS. Trends in newly diagnosed cases have important implications for prevention activities, and trends in those living with HIV/AIDS have important clinical implications.

## METHODS

AIDS has been a reportable disease in New Jersey since 1985, and HIV has been reportable since late 1991. The data used to estimate the incidence and prevalence of HIV/AIDS in New Jersey for this report were obtained from the HARS. The HARS was created in 1993 and incorporated data from the previously existing AIDS reporting system and from an interim HIV reporting system. The AIDS reporting system included cases reported from 1981 to 1993; the interim HIV system included cases reported from 1991 to 1993.

An HIV case is defined as a person diagnosed and reported to HARS with HIV infection. An AIDS case is defined as a person with HIV infection who has been diagnosed with an AIDS-defining opportunistic infection or who has a CD4 (+) count of less than 200 mm<sup>3</sup> or whose proportion of CD4 (+) T-lymphocytes is less than 14% of his or her total lymphocytes. An HIV/AIDS case is a person diagnosed and reported with HIV or AIDS. Persons living with HIV/AIDS at the end of the reporting year are considered prevalent cases; those diagnosed during the reporting year are considered incident cases. An individual previously diagnosed with HIV infection (but not AIDS) in HARS whose disease progresses to AIDS status is considered an incident AIDS case for the year in which the AIDS diagnosis was made.

Although efforts are made to match death records with cases in HARS, through use of the New Jersey death files and hospital records, deaths of persons included in HARS who have moved out of the state or country may be missed. Some deaths of persons included in HARS may never be

known to the registry. Any analysis of survival of HARS cases can only distinguish between persons “known to be deceased” and “not known to be deceased.” The latter group is assumed to be the currently living cases.

An unknown number of HIV/AIDS cases may not be reported to the system. These may be due to lack of diagnosis before death, failure of the reporting system to obtain all relevant reports from healthcare provider sources, or other reasons. Any data from HARS are only as complete as the reports to the various data sources from which cases are identified.

Data collected in HARS for each case include sex, birth date, race or ethnicity, vital status, modes of exposure, year of diagnosis, date of report, and residence. Census data for each age, race or ethnicity, and sex group for New Jersey for 1990 and 2000 were used for the denominators in computing rates for the decennial years, whereas the intercensal population estimates for the state formed the denominators for the computation of rates for noncensus years.

HIV and AIDS cases are counted only once in a hierarchy of exposure categories. Persons with more than one reported mode of exposure to HIV are classified as the exposure category listed first in the hierarchy. The only exception is that men with a history of sexual contact with other men and injecting drug use comprise a separate, combined category.<sup>8</sup> CDC designed these mutually exclusive risk hierarchy categories to “take into account the efficiency of HIV transmission associated with each behavior as well as the probability of exposure to an infected person within the population to produce a single category to describe the most probable way through which a person became infected with HIV.”<sup>9</sup> The hierarchical categories are men who have sex with men (MSMs), injecting drug users (IDUs), men who have sex with men and inject drugs (MSMs/IDUs), persons with hemophilia or a coagulation disorder, heterosexual persons, persons who received HIV-infected blood or blood components or tissue, and persons with no risk reported (NRR).

Data analyses were done using SAS software, version 8E (SAS Institute, Inc., Cary, NC), to calculate frequencies, differences in proportions with the chi-square test ( $\chi^2$ ), and the Cochran-Armitage test for trends in proportions.

## RESULTS

### Persons Living with HIV/AIDS (Prevalent Cases)

In 1992, there were 1,048 residents of New Jersey aged 50 and older whose records were active in HARS and therefore were considered to be living with HIV/AIDS. This number increased to 8,630 by the end of 2004, including all cases reported to the system by June 30, 2005. Table 1 shows the number and proportions of persons living with HIV/AIDS who were aged 50 and older. The proportion of all persons living with HIV/AIDS in 2004 who were aged 50 and older (26.2%) was significantly greater than those aged 50 and older who were living with HIV/AIDS in 1992 (6.4%) ( $\chi^2 = 2,715.5$ , degrees of freedom (*df*) = 1,  $P < .001$ ). Almost 70% of the persons aged 50 and older living with HIV/AIDS as of June 30, 2005, were diagnosed before the age of 50 (69.6%); the remaining 30.4% were diagnosed after reaching their 50th birthdays.

**Table 1. Estimated New Jersey Residents 50 and Over Living with Human Immunodeficiency Virus or Acquired Immunodeficiency Syndrome (HIV/AIDS) as of June 30, 2005, HIV/AIDS Reporting System Data at End of Year, 1992-2004**

Year	Aged ≥50		Rate/100,000	Total n
	n	%		
1992	1,048	6.4	59.9	16,376
1993	1,378	7.1	63.5	19,462
1994	1,646	7.7	75.2	21,272
1995	1,895	8.5	85.9	22,297
1996	2,253	9.6	101.3	23,509
1997	2,749	11.0	120.9	25,095
1998	3,297	12.5	142.6	26,289
1999	3,909	14.3	166.4	27,379
2000	4,721	16.3	194.7	28,969
2001	5,555	18.5	225.2	30,085
2002	6,538	21.0	260.3	31,081
2003	7,474	23.4	292.6	31,896
2004	8,630	26.2	332.3	32,960

The data from the most infrequent modes in the risk hierarchy were combined with data from cases with no reported risk to form an “other/unknown” category. Included in the category were hemophilia or coagulation disorder, receipt of HIV-infected blood or blood components or tissue, and no risk reported. Most of the cases in the other/unknown category have no reported mode of exposure. Table 2 summarizes the distribution of HIV/AIDS cases aged 50 and older with leading modes of exposure in years 1992 and 2004 according to sex and percentage of total cases in the category.

Results show 2,542 men aged 50 and older, representing 39.3% of all men living with HIV/AIDS with IDU as the mode of exposure in 2004, compared with 324 cases aged 50 and older with IDU as the mode of exposure in 1992, representing 5.8% of all male HIV/AIDS cases with IDU as the exposure mode. Other/unknown was the second-most-frequent mode of exposure in men aged 50 and older in 2004, with 1,521 cases accounting for 28.6% of all men with other or unknown mode of exposure, a major increase from the 139 (11.1%) male cases in 1992 whose mode of exposure was other or unknown. There were 223 men who were aged 50 and older in 1992 who had MSM as the mode of exposure. These men were 7.7% of all MSM cases in

1992. This number had increased to 1,256 by 2004, and men aged 50 and older were 20.2% of all HIV/AIDS cases of MSM.

The number of women aged 50 and older with heterosexual contact as the leading mode of exposure increased from 97 to 876 over the period 1992 to 2004. In 1992, women aged 50 and older who had heterosexual contact as the mode of exposure were 6.1% of all the women with this exposure mode. This had increased to 19.5% by 2004. There were 70 women with an other or unknown mode of exposure in 1992 and 792 in 2004; the relative percentage of cases in the category rose from 7.6% to 21.3%. There were 69 females with a mode of exposure of IDU in 1992 and 781 in 2004. The percentage that the women aged 50 and older represented in this mode increased from 2.5% to 22.0% from 1992 to 2004.

The percentage of persons living with HIV/AIDS who were in the older portion of the age span declined slightly between 1992 and 2004. In 1992, there were 234 persons aged 60 and older of a total of 1,048 persons aged 50 and older living with HIV/AIDS (22.3%). By 2004, the number of persons aged 60 and older with HIV/AIDS was 1,741 of 8,630 persons aged 50 and older who were living with HIV/AIDS (20.2%).

**Persons Newly Diagnosed with HIV Infection (Incident Cases)**

The numbers of persons first diagnosed with HIV/AIDS declined in those younger than 50 and those aged 50 and older during 1992 through 2003 (Table 3). During this period, the relative proportion of new diagnoses in the older group increased steadily, from 6.4% of the total in 1992 to 17.9% in 2003. The rate of HIV/AIDS cases first diagnosed per 100,000 population declined dramatically in those younger than 50, from 101.8 to 25.1, a decrease of 70.3%, whereas the rate in those aged 50 and older declined 45.6%, from 24.1 to 13.1. The proportions of newly diagnosed cases in those aged 50 and older increased significantly from 1992 through 2003 (|Z| = 21.47, P < .001).

In the time period directly before the availability of HAART in 1992 through 1995, 58.8% of the persons aged 50 and older who were first diagnosed with HIV infection were presumed to be alive at the end of the 4-year period in 1995, and 41.2% were known to have died. More-recent data for 1998 through 2001, after the introduction of HAART, show that 74.5% of the population aged 50 and older that was infected was presumed to be alive at the end of the 4-year period in 2001, and 25.5% was known to have

**Table 2. Distribution of Prevalent Human Immunodeficiency Virus or Acquired Immunodeficiency Syndrome Cases Aged 50 and Older with Leading Modes of Exposure in Years 1992 and 2004, According to Sex and Percentage of Total Cases in Category**

Year	Male IDU	Male Other/Unknown	Men Who Have Sex with Men	Heterosexual*	Female Other/Unknown	Female IDU
	n (%)					
1992	324 (5.8)	139 (11.1)	223 (7.7)	97 (6.1)	70 (7.6)	69 (2.5)
2004	2,542 (39.3)	1,521 (28.6)	1,256 (20.2)	876 (19.5)	792 (21.3)	781 (22.0)

\* Includes only female prevalent cases who report sex with men as the mode of transmission. IDU = injecting drug users.

**Table 3. Human Immunodeficiency Virus (HIV) or Acquired Immunodeficiency Syndrome Cases First Diagnosed with HIV Infection According to Age Group and Year of Diagnosis, New Jersey, 1992–2003**

Year	<50			≥50			Total n
	n	%	Rate/100,000	n	%	Rate/100,000	
1992	6,186	93.6	101.8	421	6.4	24.1	6,607
1993	5,327	91.9	93.3	470	8.1	21.6	5,797
1994	4,475	90.5	78.1	468	9.5	21.4	4,943
1995	3,875	90.4	67.3	412	9.6	18.7	4,287
1996	3,258	89.0	56.3	402	11.0	18.1	3,660
1997	2,800	88.0	48.4	382	12.0	16.8	3,182
1998	2,216	87.4	38.3	320	12.6	13.8	2,536
1999	2,162	87.7	37.3	302	12.3	12.9	2,464
2000	2,444	85.5	40.7	415	14.5	17.1	2,859
2001	1,969	84.5	32.6	361	15.5	14.6	2,330
2002	1,811	83.7	29.9	354	16.4	14.1	2,165
2003	1,531	82.1	25.1	334	17.9	13.1	1,865

died. The proportions of the population aged 50 and older who are presumed to have survived to the end of the period were significantly different in the two time periods ( $\chi^2 = 205.7$ ,  $df = 1$ ,  $P < .001$ ).

The demographics of the various segments of the population first diagnosed with HIV/AIDS changed during the 1992 through 2003 period. The proportion of men aged 50 and older in 1992 was 7.3% of all men first diagnosed in 1992; this proportion had increased to 19.2% in 2003. The trend in the proportions was significant ( $|Z| = 17$ ,  $P < .001$ ). The percentage of all women diagnosed in 1992 who were aged 50 and older was 4.4%. By 2003, this had increased to 15.4%. This trend in proportion was also significant ( $|Z| = 13.6$ ,  $P < .001$ ).

During the 1992 to 2003 period, the proportions of all cases first diagnosed with HIV infection who were aged 50 and older also changed dramatically according to race and ethnicity; white non-Hispanics increased from 7.4% to 18.7% of all newly diagnosed white non-Hispanics and the trend in proportion was significant ( $|Z| = 11.2$ ,  $P < .001$ ); the relative proportion of black non-Hispanics increased from 6.6% to 18.3%, in a trend that was also significant ( $|Z| = 15.9$ ,  $P < .001$ ). The trend in percentage of Hispanics aged 50 and older was significant, increasing from 4.3% to 16.6% ( $|Z| = 9.7$ ,  $P < .001$ ).

## DISCUSSION

Over the past 13 years, there has been a statistically significant increase in the percentage of persons living with HIV disease in New Jersey who are aged 50 and older. Of persons aged 50 and older currently living with HIV/AIDS, almost one third were aged 50 and older at the time of diagnosis. The remaining 70% were diagnosed at a younger age and lived to be at least 50. In the most recent year, IDU was the major mode of exposure for older men living with HIV/AIDS in New Jersey, and heterosexual contact was the leading mode in older women, followed closely by IDU.

Although the rate of new HIV/AIDS diagnoses declined in those younger than 50 and those aged 50 and older, the

percentage decrease over the study period was substantially greater in the younger group than in those aged 50 and older. There were statistically significant trends in the percentages of persons who were newly diagnosed and in those aged 50 and older according to sex and for the each of the three major race or ethnicity groups: white non-Hispanic, black non-Hispanic, and Hispanic.

Since 1992, the proportion of persons aged 50 and older living with HIV/AIDS in New Jersey has mirrored the national trend, quadrupling from 6.4% to 26.2%. Three possible explanations of this age group's trend include decreased disease mortality, refined disease surveillance, and increased disease incidence. All three of these factors appear to have played a role in the increase in persons aged 50 and older living with HIV/AIDS in the state. There has also been a substantial increase in the relative effect of the older population in the various modes of exposure categories in New Jersey since 1992. IDU was the leading transmission mode for men aged 50 and older living with HIV/AIDS in 1992 and remains the leading mode in 2004, but the relative percentage of IDU cases who are aged 50 and older has increased dramatically. This shift could reflect the effectiveness of prevention programs that target high-risk sexual behavior, thereby causing a relative proportional increase in the IDU transmission data. The number of men aged 50 and older with IDU as the mode of exposure increased from 1992 to 2004. During the same time period, men with MSM as the mode of exposure also increased, but at a lower rate. However, the data likely demonstrate an actual rise in IDU for older individuals with consequential viral infection.

The ability of an epidemic to change with time underscores the necessity of continued surveillance with ongoing strategic interventional adjustments. The emerging trend of an increase in HIV/AIDS in older persons with its concomitant shift in risk stratification demonstrates the need to develop new educational and intervention strategies targeted to this age group.<sup>10</sup> This is especially true because behavioral surveys of older Americans with known risk factors have indicated their relative lack of use of HIV precautions or participation in HIV testing.<sup>11</sup> Moreover, older

individuals tend to have less-than-adequate knowledge about HIV infection, thereby impeding their ability to use preventative measures.<sup>6</sup>

Social marketing campaigns should include images and issues related to persons aged 50 and older in their educational and prevention efforts. The older age group needs targeted HIV prevention education to heighten their awareness of HIV/AIDS.<sup>12</sup> New venues for prevention programs, such as churches, healthcare agencies, senior centers, and retirement communities, should be considered.<sup>13</sup>

Physicians and other healthcare providers play an important role in prevention. Thorough sex and drug risk assessments should be part of routine care for these patients. Those at risk should be offered HIV counseling and testing. Communicating prevention messages, positively reinforcing changes to safer behavior, referring patients for services such as substance abuse treatment, facilitating partner notification, and identifying and treating other STDs are all important in preventing HIV transmission in all age groups.<sup>13–16</sup>

#### ACKNOWLEDGMENTS

The authors wish to acknowledge the valuable contributions of John Ryan, MS, who provided information for this paper regarding the history and evolution of the AIDS Reporting System as it became the HIV/AIDS Reporting System. We also thank him for providing the trend data from the reporting system on newly diagnosed cases of AIDS and HIV infection and surviving cases of HIV/AIDS for this study.

**Financial Disclosure:** None.

**Author Contributions:** Sindy M. Paul: concept, design, interpretation of data, and manuscript preparation. Rose Marie Martin: concept, design, data analysis, interpretation of data, and manuscript preparation. Shou-En Lu and Yong Lin: design, data analysis, interpretation of data, and manuscript preparation.

**Sponsor's Role:** The sponsor was the New Jersey Department of Health and Senior Services (NJDHSS). This is a State Health Department. No funding was obtained or used. Employees of NJDHSS were involved in design, methods, data collection, analysis, and preparation of the paper.

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