

## Estimating HIV Incidence in Connecticut

The Connecticut Department of Public Health (DPH) has conducted surveillance for acquired immunodeficiency syndrome (AIDS) since 1982. Human immunodeficiency virus (HIV) reporting for physicians was implemented in 2002. In 2006, Connecticut ranked fifth among states in the rate of people living with HIV/AIDS (PLWHA) (1). From 1982-2007, 18,950 HIV/AIDS cases were reported to the DPH (2). Currently, there are 10,899 PLWHA in Connecticut (252 cases per 100,000 population).

Historically, HIV/AIDS surveillance activities have consisted of laboratory reporting of HIV-positive findings and physician reporting of HIV and AIDS cases. Until recently, no testing options existed for identifying persons who were recently infected. However, a new testing technology that distinguishes recent from long-standing HIV infections at the population level was developed by the Centers for Disease Control and Prevention (CDC) and is available for use by public health surveillance programs. The new laboratory method is the Serologic Testing Algorithm for Recent HIV Seroconversion (STARHS) (3).

STARHS involves testing remnant diagnostic HIV positive specimens using the BED HIV-1 capture enzyme immunoassay. The infection is defined as having occurred in the previous 5 months, if an HIV-positive person has a BED result of "recent". The test result is used in conjunction with HIV surveillance data and testing and treatment history (TTH) information to estimate HIV incidence using statistical methods described elsewhere (4). Cases involving persons aged less than 13 years were excluded from the analysis.

In August 2008, the CDC published national HIV incidence estimates for 2006 based on data from 22 funded sites, including Connecticut (5). The estimate indicated that in 2006, 56,300 new HIV infections occurred in the United States (US) (22.8 cases per 100,000 population [CI:19.5-26.1]). As a participating site, Connecticut estimates were also calculated and indicated that 585 new infections

### *In this issue...*

<b>Estimating HIV Incidence in CT</b>	<b>9</b>
<b>HIV Viral Load Reporting Update</b>	<b>11</b>

occurred in 2006 with a rate of 19.9 cases per 100,000 population [CI:11.2-28.7] (Table 1). Of these, 65.6% were male. When stratified by race and ethnicity, 40.6% were white, 27.8% black, and 31.6% were Hispanic. The cases were broken down by the following risk classifications: 31.5% were men who had sex with men (MSM), 21.1% were injection drug user (IDU), and 16.4% were high-risk heterosexuals.

The confidence intervals around the Connecticut estimates were wide due to small numbers of reported cases and small numbers of cases that tested as BED recent. However, the estimates were similar to the US estimates in most strata and were consistent with routine surveillance data collected in recent years (Figure 1).

As with the US estimate, there were specific groups at higher risk for HIV infection in Connecticut including men compared with women (2.1 fold higher). Although whites had a higher proportion of cases, blacks had a higher incidence of disease (59.0 vs. 9.6 cases per 100,000 population). A notable difference from the US estimate was the higher rate seen in Hispanics. In Connecticut, Hispanics had an incidence of 64.8 cases per 100,000 population compared with 29.3 cases per 100,000 population nationally, though the difference was not statistically significant. A second important difference was that IDU constituted a higher percentage of cases in Connecticut, 21% compared with 12% for the US.

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### **Editorial:**

HIV incidence estimation represents an important advance in monitoring trends in the HIV epidemic in Connecticut and nationally. The advantage these

**Table 1: HIV incidence estimates, Connecticut, 2006.**

	Number	Percentage	Rate <sup>1</sup>	95% CI
<b>Total</b>	585	100%	19.9	(11.2-28.7)
<b>Sex</b>				
Male	384	65.6%	27.1	(11.2-42.4)
Female	201	34.4%	13.2	(5.1-20.9)
<b>Race/Ethnicity</b>				
White	237	40.6%	9.6	(4.1-14.6)
Black	163	27.8%	59.0	(22.8-92.8)
Hispanic	185	31.6%	64.8	(15.8-111.0)
<b>Age group</b>				
13-29	162	27.7%	23.9	(10.9-35.3)
30-39	176	30.1%	40.1	(13.9-63.3)
40-49	174	29.8%	31.0	(7.8-51.9)
50+	73	12.4%	6.6	(0.0-13.5)
<b>Risk<sup>2</sup></b>				
MSM	184	31.5%	--	--
IDU	123	21.1%	--	--
Hetero	96	16.4%	--	--

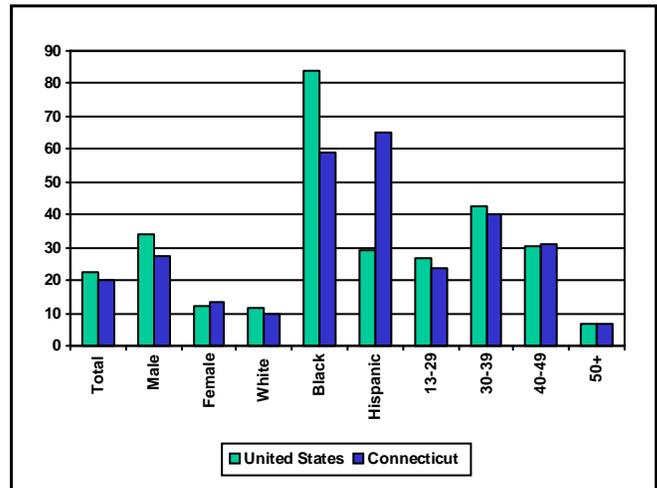
1 Per 100,000.

2 Does not add to total. Cases with risk not reported were excluded.

estimates have over standard HIV/AIDS surveillance data is that they provide a more current indication of who is at highest risk. These estimates will increase in reliability and stability after several years of operation and as data becomes more complete. The HIV estimate will enable prevention providers to evaluate their methods and more accurately direct their services.

The Connecticut estimate has important limitations, and the results should be interpreted cautiously. Given the small number of cases reported and small cell sizes in the analysis strata, wide confidence intervals rendered many of the apparent differences between estimates not statistically significant. There were also specific differences in the way the US and Connecticut estimates were generated that could weaken the comparisons. Although the national data was adjusted for reporting delay and risk redistribution, Connecticut data were not. However, there is similarity between the Connecticut and US estimate in the overall rate of HIV infection and in most strata. The

**Figure 1: HIV incidence estimates (cases per 100,000 population), United States and Connecticut, 2006.**



approximately two-fold higher rate in Hispanics in Connecticut reflects the higher proportion of HIV/AIDS cases reported in Connecticut compared to the US. In 2006, 32% of prevalent HIV/AIDS cases in Connecticut were Hispanic, while in the US 17% were Hispanic.

The US release included calculations that enabled trends to be established leading up to 2006 and showed that the annual number of HIV infections in the US held steady since the early 1990s, but that the number of cases increased in MSM and decreased in IDU. Connecticut data were not sufficient to support this type of analysis. The previous CDC estimate of 40,000 HIV infections per year in the US was derived using indirect methods, and the 2006 estimate should not be interpreted as an increase in the number of cases.

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## HIV Viral Load Reporting Update

Human immunodeficiency virus (HIV) viral load (VL) test results (both detectable and undetectable) were made laboratory reportable in 2006. The reasons for making VL reportable were two-fold. First, VL would enable the surveillance system to register many of the HIV cases that had gone unreported before 2002 when HIV was made reportable. The second reason for making VL reportable was to use the information as a marker for entry into care. Persons with HIV infection should be tested routinely for VL to monitor the effectiveness of their treatment.

Due to the anticipated high volume of reports, VL was the first laboratory finding that required electronic reporting of results. In the absence of an electronic laboratory reporting system, laboratories were requested to send reports to the Connecticut Department of Public Health (DPH) via compact disk (CD). Electronic files containing VL reports were matched against the HIV/AIDS registry. Viral load reports for persons not previously reported with HIV were followed-up to confirm HIV status.

From January 2006-August 2008, 36,318 VL results were received by the DPH. Of these, 91.0% were reported using CD, but some laboratories opted to report using paper (8.8% of reports), and a small number were reported by telephone (0.2%). Thirty-five laboratories have reported VL but, as expected, the larger laboratories reported the majority of reports. Six laboratories reported 87% of VL (range 2,554 – 8,070 reports) with 17 laboratories making 10 or fewer VL reports.

Figure 1 (see page 12) shows the trend in HIV/AIDS cases and illustrates the bolus of cases being reported as a results of adding HIV and VL reporting. From 1995 through 2000, only AIDS cases were reported. During 2002-2004, HIV was reportable with code option and only newly diagnosed cases were entered into the HIV/AIDS registry. In 2005, with name-based reporting, all HIV cases were entered whether newly diagnosed or diagnosed in previous years. In 2006, VL reporting was added. The combination of VL and HIV reporting caused a significant but temporary increase in reporting of both AIDS and HIV cases. The estimated count in 2008 was based on 8 months of reporting.

In 2007, 16,035 reports were received for 6,688 individuals (average 2.4 per person) with 31.0% of persons receiving one test, 30.3% two, 19.5% three, and 19.2% had four or more. Eight persons received 10 or more tests. Of 7,574 people living with HIV/AIDS (PLWHA) at the end of 2006, 62.2% had been tested for VL during 2007 (Table 1). Demographic (sex, race, age group) or transmission category such as men who had sex with men (MSM), injection drug user (IDU), or high-risk heterosexual characteristics were not significant predictors of VL testing.

**Table 1. The number of persons living with HIV/AIDS diagnosed in 1995-2006 who had viral load testing done in 2007, Connecticut.**

	Had VL test in 2007				Total	
	Yes		No		#	% of total
	#	% of row total	#	% of row total		
<b>Total</b>	4,709	62.2	2,865	37.8	7,574	100.0
<b>Sex</b>						
Male	2,957	60.8	1,905	39.2	4,862	64.2
Female	1,752	64.6	960	35.4	2,712	35.8
<b>Race</b>						
White	1,636	61.9	1,007	38.1	2,643	34.9
Black	1,499	62.7	890	37.3	2,389	31.5
Hispanic	1,544	62.0	948	38.0	2,492	32.9
Other	30	60.0	20	40.0	50	0.7
<b>Risk</b>						
IDU	1,910	63.5	1,099	36.5	3,009	39.7
MSM	904	61.9	556	38.1	1,460	19.3
MSM/IDU	82	64.1	46	35.9	128	1.7
Heterosexual	1,171	62.5	703	37.5	1,874	24.7
Pediatric	59	65.6	31	34.4	90	1.2
Other/ Unk.	583	57.6	430	42.4	1,013	13.4
<b>Age group</b>						
0-12	13	68.4	6	31.6	19	0.3
13-19	34	70.8	14	29.2	48	0.6
20-29	171	54.6	142	45.4	313	4.1
30-39	786	60.5	513	39.5	1,299	17.2
40-49	1,933	62.7	1,152	37.3	3,085	40.7
50+	1,772	63.1	1,038	36.9	2,810	37.1

To examine VL testing patterns in more recently diagnosed persons, cases were selected that were diagnosed in 2006. Of the 668 cases meeting this criterion, 468 (70.1%) received a VL test in 2007. Further, 62.0% of 2006 cases were diagnosed based on a Western blot confirmation test; among these, 84.2% received a VL test within 12 months of diagnosis, and 92.3% had been VL tested by 24 months after diagnosis (Figure 2). Distributions by sex, race, age group, and transmission category were not significantly different. The median interval between the diagnosing confirmation test for HIV and the first viral load was one month and ranged from 0-22 months.

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**Editorial:**

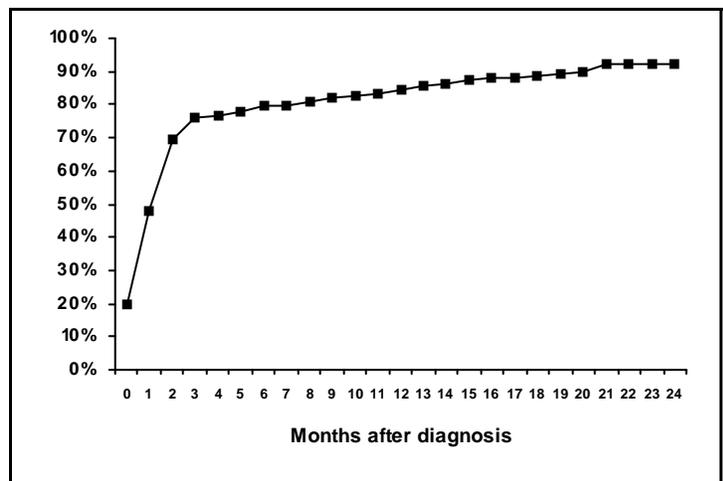
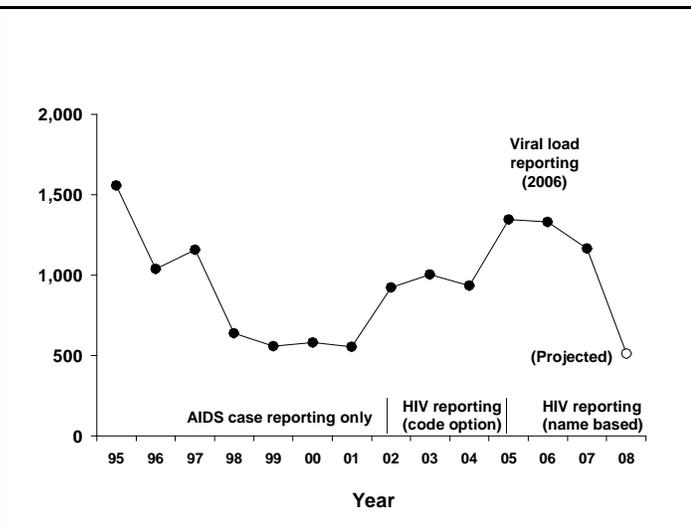
Federal funding for the medical care of persons with HIV infection has come primarily from the Health Resources and Services Administration (HRSA). As a condition of receiving these funds, states are requested to provide estimates of the

proportion of infected persons who are in care. HRSA has defined “in-care” as having received a VL or CD4 test, or medication for treatment for HIV at least once during the previous 12 months. Obtaining this data has historically been very difficult, but with the requirement for VL reporting this information is now available.

The results shown here suggest that approximately 62% of HIV infected persons met this definition during 2007. This may be a minimum number given that additional cases may have received CD4 tests or medication in the absence of VL testing, or there may have been underreporting of VL by laboratories, or the number of PLWHA may have included people who moved out of state (the DPH communicates with other states to minimize this limitation), or deaths that were not registered (the DPH routinely matches the HIV/AIDS registry with the DPH Vital Records death registry to update vital status). Encouragingly, when newly diagnosed cases in 2006 were selected, the percentage that received VL testing by 12 months after diagnosis was 84%.

**Figure 1. The number of reported cases of HIV/AIDS, Connecticut, 1995-2008.**

**Figure 2. Percentage of newly diagnosed HIV cases in 2006 with a VL test reported by the end of 2007, Connecticut.**



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