MMWR™
Morbidity and Mortality Weekly Report
Weekly July 11, 2003 / Vol. 52 / No. 27

# Surveillance for Acute Insecticide-Related Illness Associated with Mosquito-Control Efforts — Nine States, 1999–2002

Ground and aerial applications of insecticides are used to control populations of adult mosquitoes, which spread such diseases as West Nile virus–related illness, eastern equine encephalitis, and dengue fever (*1*). This report summarizes investigations of illnesses associated with exposures to insecticides used during 1999–2002 to control mosquito populations in nine states (Arizona, California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington) (estimated 2000 population: 118 million). The findings indicate that application of certain insecticides posed a low risk for acute, temporary health effects among persons in areas that were sprayed and among workers handling and applying insecticides. To reduce the risk for negative health effects, public health authorities should 1) provide public notice of application times and locations and appropriate advice about preventing exposures, 2) ensure that insecticide handlers and applicators meet state-mandated training and experience requirements to prevent insecticide exposure to themselves and the public, and 3) implement integrated pest management control strategies that emphasize mosquito larval control, reduction of mosquito breeding sites, and judicious use of insecticides to control adult mosquito populations.

Staff in state-based pesticide poisoning surveillance programs identified patients who had been exposed to insecticides used in mosquito-control efforts in nine states during April 1999–September 2002. Information was gathered on persons who had illnesses consistent with the national case definition for pesticide poisoning, which requires the collection of data on pesticide exposure, health effects, and toxicologic evidence supporting an association between exposure and effect (*2,3*). Cases of insecticide-related illness or injury were classified as either definite, probable, or possible, depending on the certainty of exposure and whether health effects were signs observed by a health-care provider or symptoms reported by a patient (*2,3*).

Of the 133 cases of acute insecticide-related illness associated with mosquito control that were identified, two (1.5%) were classified as definite, 25 (18.8%) as probable, and 106 (79.7%) as possible. Of the 132 cases for which work-relatedness could be assessed, 36 (27.3%) were work-related and 96 (72.7%) were not work-related; 31 (86.1%) of the 36 work-related cases occurred among males, and 66 (68.8%) of the 96 cases that were not work-related occurred among females.

Of the 49 cases identified in 2001, a total of 29 (59.2%) were related to a single event at a softball game in which workers operating a mosquito-control truck inadvertently sprayed 29 persons (16 spectators, 12 players, and one coach) with Fyfanon ULV®, which contains malathion. All 29 persons were treated in emergency departments (EDs).

Of the 133 persons with acute insecticide-related illness associated with mosquito control, 35 (26.3%) were identified from monitoring media reports (including 34 reported subsequently by health-care providers), 32 (24.1%) were reported by poison-control centers, 27 (20.3%) were self-reported, and seven (5.3%) were reported by state health departments.

INSIDE



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

The *MMWR* series of publications is published by the Epidemiology Program Office, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

**SUGGESTED CITATION**
Centers for Disease Control and Prevention. [Article Title]. MMWR 2003;52:[inclusive page numbers].



Physicians and EDs were responsible for initial reporting of five and three cases, respectively. The remaining cases were reported initially by friends or relatives (n = seven), government agencies (n = five), employers (n = four), laboratories (n = two), and other sources (n = six).

Of the 85 persons with reported illness who were known to have sought medical care, 45 (52.9%) were treated in EDs, 35 (41.2%) were treated in physicians' offices, four (4.7%) were treated in employee health centers, and one (1.2%) was hospitalized. An additional 16 persons received advice from a poison-control center, and 15 did not seek medical care; information about medical treatment was not available for 17 persons.

Of the 133 reported cases of pesticide-related illness, 95 (71.4%) cases were associated with organophosphates, primarily malathion. Malathion alone was associated with 64 (67.4%) of the 95 cases; 37 (27.8%) cases were associated with pyrethoids, primarily sumithrin (24 cases) and resmethrin (10 cases) (Table 1).

Illness severity was categorized for all cases (*4*). One exposure was associated with illness of high severity (Table 2). When her neighborhood was sprayed, a woman aged 54 years was exposed to sumithrin, which passed through operating window fans and a window air conditioner. She had exacerbation of her asthma and chronic obstructive pulmonary disease. The majority of the remaining cases were of low (65.4%) or moderate (33.8%) severity.

The majority of cases were associated either with respiratory (66.2%) or neurologic (60.9%) dysfunction. Other systems affected were gastrointestinal (45.1%), ocular (36.1%), dermal (27.1%), cardiovascular (12.0%), renal-genitourinary (3.0%), and miscellaneous (28.6%).

Of 36 persons who were exposed at their workplaces (Table 1), 14 (38.9%) were insecticide applicators, and 22 (61.1%) were performing tasks that did not involve pesticide application. Seven (50.0%) of 14 applicators were exposed to sumithrin; of the other 22 workers, 11 (50%) were exposed to malathion, and five (22.7%) were exposed to resmethrin. Illness of moderate severity was more frequent among applicators (42.9%) than nonapplicators (27.3%).

**Reported by:** *MP Mauer, DO, New York State Dept of Health. R Rosales, J Sievert, M Propeck, Texas Dept of Health. A Becker, MPH, Florida Dept of Health. E Arvizu, M Hadzizanovic, MD, Arizona Dept of Health Svcs. L Mehler, MD, California Dept of Pesticide Regulation. D Profant, PhD, C Thomsen, MPH, Oregon Dept of Human Svcs. L Baum, Washington State Dept of Health. M Lackovic, MPH, Louisiana Dept of Health and Hospitals. J Granger, MPH, Michigan Dept of Community Health. GM Calvert, MD, Div of Surveillance, Hazard Evaluations and Field Studies, National Institute for Occupational Safety and Health; WA Alarcon, MD, EIS Officer, CDC.*

**TABLE 1. Number and percentage of persons with mosquito-control insecticide–related illnesses, by type of insecticide exposure, state, sex, site of exposure, severity of illness, and year — nine states*, 1999–2002**

| Characteristic | 1999 | | 2000 | | 2001 | | 2002 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | (%) | No. | (%) | No. | (%) | No. | (%) | No. | (%) |
| **Insecticide** | | | | | | | | | | |
| Malathion | 22 | (84.6) | 1 | (3.3) | 31 | (63.3) | 10 | (35.7) | **64** | **(48.1)** |
| Malathion + pyrethrin | 0 | | 0 | | 0 | | 2 | (7.1) | **2** | **(1.5)** |
| Malathion + pyrethroid | 0 | | 0 | | 0 | | 2 | (7.1) | **2** | **(1.5)** |
| Naled | 0 | | 4 | (13.3) | 15 | (30.6) | 4 | (14.3) | **23** | **(17.3)** |
| Sumithrin | 2 | (7.7) | 21 | (70.0) | 0 | | 1 | (3.6) | **24** | **(18.1)** |
| Resmethrin | 0 | | 2 | (6.7) | 1 | (2.0) | 7 | (25.0) | **10** | **(7.5)** |
| Fenthion | 1 | (3.8) | 0 | | 0 | | 1 | (3.6) | **2** | **(1.5)** |
| Other† | 1 | (3.8) | 2 | (6.7) | 2 | (4.1) | 1 | (3.6) | **6** | **(4.5)** |
| **State** | | | | | | | | | | |
| New York | 10 | (38.5) | 22 | (73.3) | 29 | (59.2) | 1 | (3.6) | **62** | **(46.6)** |
| Texas | 9 | (34.6) | 5 | (16.7) | 2 | (4.1) | 15 | (53.6) | **31** | **(23.3)** |
| Florida | 7 | (26.9) | 1 | (3.3) | 15 | (30.6) | 5 | (17.9) | **28** | **(21.1)** |
| Arizona | 0 | | 0 | | 1 | (2.0) | 2 | (7.1) | **3** | **(2.3)** |
| California | 0 | | 2 | (6.7) | 0 | | 0 | | **2** | **(1.5)** |
| Oregon | 0 | | 0 | | 0 | | 2 | (7.1) | **2** | **(1.5)** |
| Washington | 0 | | 0 | | 0 | | 2 | (7.1) | **2** | **(1.5)** |
| Michigan | 0 | | 0 | | 1 | (2.0) | 1 | (3.6) | **2** | **(1.5)** |
| Louisiana | 0 | | 0 | | 1 | (2.0) | 0 | | **1** | **(0.8)** |
| **Sex** | | | | | | | | | | |
| Male | 15 | (57.7) | 18 | (60.0) | 15 | (30.6) | 13 | (46.4) | **61** | **(45.9)** |
| Female | 11 | (42.3) | 12 | (40.0) | 34 | (69.4) | 15 | (53.6) | **72** | **(54.1)** |
| **Site of exposure** | | | | | | | | | | |
| Public area | 8 | (30.7) | 6 | (20.0) | 35 | (71.4) | 11 | (39.3) | **60** | **(45.1)** |
| Home | 6 | (23.1) | 11 | (36.7) | 9 | (18.4) | 8 | (28.6) | **34** | **(25.6)** |
| Workplace | 12 | (46.2) | 12 | (40.0) | 3 | (6.1) | 9 | (32.1) | **36** | **(27.1)** |
| Other | 0 | | 1 | (3.3) | 2 | (4.1) | 0 | | **3** | **(2.2)** |
| **Severity§** | | | | | | | | | | |
| High | 0 | | 1 | (3.3) | 0 | | 0 | | **1** | **(0.8)** |
| Moderate | 11 | (42.3) | 18 | (60.0) | 11 | (22.4) | 5 | (17.9) | **45** | **(33.8)** |
| Low | 15 | (57.7) | 11 | (36.7) | 38 | (77.6) | 23 | (82.1) | **87** | **(65.4)** |
| **Total** | **26** | **(19.6)** | **30** | **(22.6)** | **49** | **(36.8)** | **28** | **(21.0)** | **133** | **(100.0)** |

* Arizona, California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington.
† Chlorpyrifos (n = one), permethrin (n = one), petroleum hydrocarbons (n = two), pyrethrins (n = one), and temephos (n = one).
§ Defined by using the Severity Index for Use in State-Based Surveillance of Acute Pesticide-Related Illness and Injury (*4*).

**Editorial Note:** The findings in this report indicate that serious adverse outcomes potentially related to public health insecticide application were uncommon. When administered properly in a mosquito-control program, insecticides pose a low risk for acute, temporary health effects among persons in areas that are being sprayed and among workers handling and applying insecticides. In this analysis, adverse health effects were identified in a small percentage of the population in the nine states. Data about the actual number of persons potentially or actually exposed were not available because insecticide applications were conducted only in certain areas of participating states, and the boundaries of these areas were not available.

Malathion, naled, sumithrin, and resmethrin were associated with the majority of reported cases of acute insecticide-related illness. Malathion is an organophosphate insecticide that is classified as an acute toxicity category III compound*. Although it is less acutely toxic than many other organophosphates, adverse health effects have been reported by exposed persons (*5*). Naled is an acute toxicity level I organophosphate. When combined with piperonyl butoxide, resmethrin and sumithrin are highly effective insecticides that are of low-order toxicity to mammals, including humans; these pyrethroid products are classified as acute toxicity category III compounds and have been associated with adverse health effects in humans (*6,7*).

These insecticide formulations are registered by the U.S. Environmental Protection Agency for use in urban areas for

* The U.S. Environmental Protection Agency classifies pesticide products into one of four acute toxicity categories on the basis of certain criteria, with category I comprising pesticides with the greatest toxicity and category IV those with the least toxicity.

**TABLE 2. Number and percentage of persons with mosquito-control insecticide–related illnesses, by type of insecticide exposure, age group, and severity* of illness — nine states†, 1999–2002**

| Characteristic | High | | Moderate | | Low | | Total | |
|---|---|---|---|---|---|---|---|---|
| | No. | (%) | No. | (%) | No. | (%) | No. | (%) |
| **Insecticide** | | | | | | | | |
| Malathion | 0 | | 18 | (40.0) | 46 | (52.9) | **64** | **(48.1)** |
| Malathion + pyrethrin | 0 | | 0 | | 2 | (2.3) | **2** | **(1.5)** |
| Malathion + pyrethroid | 0 | | 1 | (2.2) | 1 | (1.2) | **2** | **(1.5)** |
| Naled | 0 | | 4 | (8.9) | 19 | (21.8) | **23** | **(17.3)** |
| Sumithrin | 1 | (100.0) | 18 | (40.0) | 5 | (5.8) | **24** | **(18.1)** |
| Resmethrin | 0 | | 4 | (8.9) | 6 | (6.9) | **10** | **(7.5)** |
| Fenthion | 0 | | 0 | | 2 | (2.3) | **2** | **(1.5)** |
| Other§ | 0 | | 0 | | 6 | (6.9) | **6** | **(4.5)** |
| **Age group (yrs)** | | | | | | | | |
| 0–5 | 0 | | 1 | (2.2) | 0 | | **1** | **(0.8)** |
| 6–19 | 0 | | 7 | (15.6) | 22 | (25.3) | **29** | **(21.8)** |
| 20–39 | 0 | | 13 | (28.9) | 21 | (24.1) | **34** | **(25.6)** |
| 40–59 | 1 | (100.0) | 22 | (48.9) | 33 | (37.9) | **56** | **(42.1)** |
| ≥60 | 0 | | 2 | (4.4) | 6 | (6.9) | **8** | **(6.0)** |
| Unknown | 0 | | 0 | | 5 | (5.8) | **5** | **(3.8)** |
| **Total** | **1** | **(0.8)** | **45** | **(33.8)** | **87** | **(65.4)** | **133** | **(100.0)** |

* Defined by using the Severity Index for Use in State-Based Surveillance of Acute Pesticide-Related Illness and Injury (*4*).
† Arizona, California, Florida, Louisiana, Michigan, New York, Oregon, Texas, and Washington.
§ Chlorpyrifos (n = one), permethrin (n = one), petroleum hydrocarbons (n = two), pyrethrins (n = one), and temephos (n = one).

mosquito control and benefit the public by controlling populations of mosquitoes that transmit diseases that affect humans. Reported symptoms associated with these insecticides were temporary and included dermal, ocular, and upper and lower respiratory tract irritation and exacerbation of conditions such as asthma. These health effects might represent irritant or allergic responses, to either the insecticide or its carrier (*5,7,8*). Anxiety about insecticide use for mosquito control also might have been responsible for symptoms in some persons.

The findings in this report are subject to at least three limitations. First, the number of reported cases is probably an underestimate of the true magnitude of illnesses associated with mosquito-control efforts. Affected persons who did not seek medical care or whose symptoms were not reported to a surveillance system could not be identified; even if these persons had sought medical care, their illness might not have been recognized as insecticide-related, and even if they had received a proper diagnosis, their cases might not have been reported. Second, only nine states have pesticide poisoning surveillance systems, and the data in this report might not be representative of the 41 states without such surveillance systems. Finally, although all cases were consistent with case definition criteria, the possibility of false positives cannot be excluded. Because clinical findings of pesticide poisoning are nonspecific, especially when of mild severity, and no standard diagnostic test exists, some illnesses related temporally to insecticide exposures might be coincidental and not caused by the exposures.

To reduce potential risks from insecticide exposure, CDC recommends the use of integrated pest management strategies for mosquito-control programs that emphasize mosquito larval control, reduction of breeding sites (e.g., human-made collections of stagnant water such as unchlorinated swimming pools, discarded tires or other containers, and bird baths), and judicious use of insecticides to control adult mosquito populations when quantitative measures suggest an elevated risk for human infection or in community settings when extensive immature mosquito larval habitats cannot be controlled (*9,10*). When insecticides are used, public health agencies should inform the public when and where spraying will occur and communicate how to reduce the likelihood of exposure. To avoid direct exposure from passing spray trucks, public health agencies should ensure that visible and audible warnings are made before spraying. Persons with exposure-related health concerns should consult their health-care providers. To prevent exposures from improper application methods, insecticide handlers and applicators should be trained in proper insecticide handling and application methods and in the use of appropriate personal protective equipment.

## References

1. U.S. Environmental Protection Agency and CDC. Joint statement on mosquito control in the United States from the U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control and Prevention (CDC). Available at http://www.epa.gov/pesticides/factsheets/mosquitojoint.htm.
2. CDC. Case definition for acute pesticide-related illness and injury cases reportable to the National Public Health Surveillance System. Available at http://www.cdc.gov/niosh/pestsurv/pdfs/pest-casdef2000.pdf.

3. Calvert GM, Sanderson WT, Barnett M, Blondell JM, Mehler LN. Surveillance of pesticide-related illnesses and injury in humans. In: Krieger R, ed. Handbook of Pesticide Toxicology, 2nd ed. San Diego, California: Academic Press, 2001.
4. CDC. Severity index for use in state-based surveillance of acute pesticide-related illness and injury. Available at http://www.cdc.gov/niosh/pestsurv/pdfs/pest-sevindexv6.pdf.
5. CDC. Surveillance for acute pesticide-related illness during the medfly eradication program—Florida, 1998. MMWR 1999;48:1015–8.
6. Gibly RL, Sullivan JB. Pyrethrins. In: Sullivan JB, Krieger GR, eds. Clinical Environmental Health and Toxic Exposures, 2nd ed. Philadelphia, Pennsylvania: Lippincott Williams & Wilkins, 2001.
7. Reigart JR, Roberts JR, eds. Pyrethroids. In: Recognition and Management of Pesticide Poisonings, 5th ed. Washington, DC: U.S. Environmental Protection Agency, 1999. Available at http://www.epa.gov/pesticides/safety/healthcare/handbook/handbook.htm.
8. Wagner SL. Allergy from pyrethrin or pyrethroid insecticides. J Agromed 1994;1:39–45.
9. Nasci RS, Newton NH, Terrillion GF, et al. Interventions: vector control and public education: panel discussion. Ann N Y Acad Sci 2001;951:235–54.
10. Thier A. Balancing the risks: vector control and pesticide use in response to emerging illness. J Urban Health 2001;78:372–81.

## HIV Diagnoses Among Injection-Drug Users in States with HIV Surveillance — 25 States, 1994–2000

Injection-drug use is a risk factor for acquired immunodeficiency syndrome (AIDS) (*1*). Of the 765,559 cumulative AIDS cases diagnosed as of December 2000, a total of 193,527 (25%) occurred among injection-drug users (IDUs) (*2*). IDUs become infected with human immunodeficiency virus (HIV) through sharing injection-drug equipment with HIV-infected persons or by engaging in other risk behaviors such as having unprotected sex (*3*). Since 1995, AIDS incidence among IDUs has declined (*2,4*). This report presents data on initial HIV diagnoses among IDUs aged ≥13 years, with and without AIDS at the time of HIV diagnosis, by year, during 1994–2000. The findings indicate that HIV diagnoses among IDUs have leveled in the majority of demographic groups during this period in the 25 states for which HIV surveillance data are available*. Because IDUs and their sex partners represent approximately one third of persons infected in the HIV epidemic and continue to be at risk for transmitting HIV, prevention efforts targeting IDUs and their sex partners should be enhanced.

Data were available from health departments in 25 states that have had HIV-infection case reporting since 1993, the first year for which HIV surveillance data were available. During 1993–2000, these states accounted for 516,939 (24%) AIDS case reports and 35,548 (7%) cases reported among IDUs. Data were adjusted for reporting delays. Cases reported without risk information were reclassified based on a probability formula (*5*). Annual proportions of HIV diagnoses among IDUs during 1994–2000 were compared by age, sex, and race/ethnicity, and 95% confidence intervals were computed for percentage differences.

During 1994–2000, a total of 21,687 HIV diagnoses reported in the 25 states were among IDUs; males accounted for 14,252 (66%) cases. HIV diagnoses reported among IDUs declined 42% overall, compared with a 15% decrease among men who have sex with men (MSM) and a 9% increase among persons with heterosexual transmission during the same period. IDU-related HIV diagnoses declined from 4,226 cases in 1994 to 2,403 cases in 1999, and leveled to 2,514 from 1999 to 2000. Blacks continue to be represented disproportionately (65%) among IDU-related HIV cases diagnosed (Table 1).

During 1994–2000, IDU-related HIV diagnoses declined among persons aged 13–19 years and 30–39 years by 17% and 68%, respectively. Among persons aged 20–29 years and 40–49 years, diagnoses decreased 53% and 26%, respectively,

**TABLE 1. Number of HIV cases among injection-drug users, by selected characteristics — 25 states*, 1994–2000**

| Characteristic | No. | (%) |
|---|---|---|
| **Age group (yrs)** | | |
| 13–19 | 422 | (2) |
| 20–29 | 3,994 | (18) |
| 30–39 | 9,061 | (42) |
| 40–49 | 6,478 | (30) |
| ≥50 | 1,730 | (8) |
| **Sex** | | |
| Male | 14,252 | (66) |
| Female | 7,433 | (34) |
| **Race/Ethnicity** | | |
| White, non-Hispanic | 5,050 | (23) |
| Black, non-Hispanic | 14,132 | (65) |
| Hispanic | 2,077 | (10) |
| Other† | 426 | (2) |
| **Race/Ethnicity (by sex)** | | |
| Male | | |
| White, non-Hispanic | 3,186 | (22) |
| Black, non-Hispanic | 9,191 | (64) |
| Hispanic | 1,587 | (11) |
| Female | | |
| White, non-Hispanic | 1,863 | (25) |
| Black, non-Hispanic | 4,941 | (66) |
| Hispanic | 490 | (7) |

* Alabama, Arizona, Arkansas, Colorado, Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nevada, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.
† Numbers for racial/ethnic groups other than white, black, and Hispanic were combined because, when analyzed separately, data were too small for meaningful analysis.

* Alabama, Arizona, Arkansas, Colorado, Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nevada, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.

during 1994–1999, and leveled off during 1999–2000. IDU-related HIV diagnoses among persons aged ≥50 years were level during 1994–1999 and increased slightly during 1999–2000 (Table 2).

Among men, HIV diagnoses reported among IDUs declined 44%, from 2,819 in 1994 to 1,568 in 1999, and leveled to 1,628 in 2000. Among women, diagnoses declined 41%, from 1,407 in 1994 to 835 in 1999, and leveled to 886 in 2000 (Figure).

Trends were similar in all racial/ethnic groups. Among whites, IDU-related HIV diagnoses decreased 40%, from 941 in 1994 to 563 in 1999, and leveled to 590 in 2000. Among blacks, HIV diagnoses among IDUs decreased 46%, from 2,825 in 1994 to 1,535 in 1999, and leveled to 1,584 in 2000. Among Hispanics, IDU-related HIV diagnoses decreased 43%, from 409 in 1994 to 238 in 1999, and leveled to 243 in 2000 (Table 2). Asians/Pacific Islanders and American Indians/Alaska Natives accounted for 205 (1%) cases diagnosed during 1994–2000.

Sex partners of IDUs accounted for 5,117 (4%) HIV infections diagnosed in these 25 states during 1994–2000 (Figure). Heterosexual men and women who reported having sex with IDUs accounted for 1,849 (1%) and 3,268 (3%) cases, respectively. MSM/IDUs accounted for 4,626 (5%) HIV diagnoses. All IDU-related HIV diagnoses, including those among IDUs, sex partners of IDUs, and MSM/IDUs, accounted for 31,428 (32%) diagnoses, compared with MSM (not IDUs) (39,184 [42%]) and those reporting having heterosexual sex (not with an IDU) (23,674 [25%]) (Figure).

**Reported by:** *LM Lee, PhD, M McKenna, MD, Div of HIV/AIDS Prevention, National Center for HIV, STD, and TB Prevention; TT Sharpe, PhD, EIS Officer, CDC.*

**Editorial Note:** The finding of overall declines in new HIV diagnoses among IDUs in the 25 states with HIV infection reporting is consistent with studies that suggest a decline in new HIV infections among IDUs in other areas of the United States (*6*). Several factors probably account for the decline. Because the peak of infections occurred in the early 1990s (*2*), the decline during the late 1990s might reflect the natural decline in the epidemiologic curve following the peak in the epidemic, which often is observed after the onset of a disease in a population. The decline also might be attributable in part to advances in antiretroviral therapy since 1995. In addition, the HIV epidemic among IDUs is closely related to other risk behaviors such as having unprotected sex, which

**TABLE 2. Number of HIV cases among injection-drug users and percentage change, by selected characteristics — 25 states*, 1994–2000**

| Characteristic | 1994–1999 No. 1994 | 1994–1999 No. 1999 | 1994–1999 % change 1994–1999 | 1994–1999 (95% CI†) | 1999–2000 No. 2000 | 1999–2000 % change 1999–2000 | 1999–2000 (95% CI) |
|---|---|---|---|---|---|---|---|
| **Age group (yrs)** | | | | | | | |
| 13–19 | 65 | 63 | (-3) | (-31–37) | 54 | (-14) | (-40–23) |
| 20–29 | 840 | 391 | (-53) | (-59– -48) | 417 | (7) | (-7–22) |
| 30–39 | 1,973 | 899 | (-54) | (-58– -51) | 636 | (-29) | (-36– -22) |
| 40–49 | 1,097 | 807 | (-26) | (-33– -19) | 831 | (3) | (-7–13) |
| ≥50 | 251 | 244 | (-3) | (-18–16) | 295 | (21) | (2–43) |
| **Sex** | | | | | | | |
| Male | 2,819 | 1,568 | (-44) | (-48– -41) | 1,628 | (4) | (-3–11) |
| Female | 1,407 | 835 | (-41) | (-46– -35) | 886 | (6) | (-3–17) |
| **Race/Ethnicity** | | | | | | | |
| White, non-Hispanic | 941 | 563 | (-40) | (-46– -34) | 590 | (5) | (-7–18) |
| Black, non-Hispanic | 2,825 | 1,535 | (-46) | (-49– -42) | 1,584 | (3) | (-4–11) |
| Hispanic | 409 | 238 | (-42) | (-50– -32) | 243 | (2) | (-15–22) |
| Other§ | 51 | 67 | (31) | (-9–90) | 96 | (43) | (5–96) |
| **Race/Ethnicity (by sex)** | | | | | | | |
| Male | | | | | | | |
| White, non-Hispanic | 613 | 362 | (-41) | (-48– -33) | 368 | (2) | (-12–18) |
| Black, non-Hispanic | 1,856 | 982 | (-47) | (-51– -43) | 1,007 | (3) | (-6–12) |
| Hispanic | 313 | 179 | (-43) | (-52– -31) | 186 | (4) | (-15–28) |
| Female | | | | | | | |
| White, non-Hispanic | 328 | 201 | (-39) | (-49– -27) | 223 | (1) | (-8–34) |
| Black, non-Hispanic | 969 | 553 | (-43) | (-49– -37) | 577 | (4) | (-7–17) |
| Hispanic | 96 | 59 | (-39) | (-56– -15) | 57 | (3) | (-33–39) |
| **Total** | **4,226** | **2,403** | **(-43)** | **(-46–22)** | **2,514** | **(5)** | **(-1–11)** |

* Alabama, Arizona, Arkansas, Colorado, Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nevada, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.
† Confidence interval.
§ Numbers for racial/ethnic groups other than white, black, and Hispanic were combined because, when analyzed separately, data were too small for meaningful analysis.