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Unintentional Poisoning Deaths --- United States, 1999--2004

In 2004, poisoning was second only to motor-vehicle crashes as a cause of death from unintentional injury in the United States (1). Nearly all poisoning deaths in the United States are attributed to drugs, and most drug poisonings result from the abuse of prescription and illegal drugs (2). Previous reports have indicated a substantial increase in unintentional poisoning mortality during the 1980s and 1990s (2,3). To further examine this trend, CDC analyzed the most current data from the National Vital Statistics System. This report summarizes the results of that analysis, which determined that poisoning mortality rates in the United States increased each year from 1999 to 2004, rising 62.5% during the 5-year period. The largest increases were among females (103.0%), whites (75.8%), persons living in the southern United States (113.6%), and persons aged 15--24 years (113.3%). Larger rate increases occurred in states with mostly rural populations. Rates for drug poisoning deaths increased 68.3%, and mortality rates for poisonings by other substances increased 1.3%. The largest increases were in the "other and unspecified," psychotherapeutic, and narcotic drug categories. The results suggest that more aggressive regulatory, educational, and treatment measures are necessary to address the increase in fatal drug overdoses.

Mortality data for 2004 were collected from the National Vital Statistics System (1). Unintentional poisoning deaths that occurred during 1999--2004 were defined as those with underlying cause-of-death codes X40--X49 from the *International Classification of Diseases, Tenth Revision* (ICD-10). This category included overdoses of illegal drugs and legal drugs taken for nonmedical reasons, poisoning from legal drugs taken in error or at the wrong dose, and poisoning from other substances (e.g., alcohol, pesticides, or carbon monoxide). Adverse effects of legal drugs taken in the proper doses and as directed are coded elsewhere in ICD-10 and were not included in this analysis. Rates were age adjusted to the 2000 U.S. Census population using bridged-race* population figures. Information on the percentage of the population that was rural, defined as the percentage living in census blocks below a certain population density, was derived from U.S. Census data for 2000 (4).

The number of unintentional poisoning deaths increased from 12,186 in 1999 to 20,950 in 2004. The annual age-adjusted rate increased 62.5%, from 4.4 per 100,000 population in 1999 to 7.1 in 2004. The increase among females, from 2.3 to 4.7 per 100,000 population (103.0%), was twice the increase among males, from 6.5 to 9.5 per 100,000 population (47.1%) ([Table 1](#)). Among males, rates among whites, American Indians/Alaska Natives, and Asians/Pacific Islanders all increased approximately 50%. Rates among black males were highest in 1999 but did not increase. Among females, rates among whites more than doubled, whereas nonwhites had smaller increases or decreased. Overall, rates increased 75.8% among whites, 55.8% among American Indians/Alaska Natives, 27.4% among Asians/Pacific Islanders, and 11.2% among blacks. Rates among non-Hispanics increased more than rates among Hispanics for both sexes. Among all sex and racial/ethnic

groups, the largest increase (136.5%) was among non-Hispanic white females. Among all age groups, the largest increase occurred among persons aged 15--24 years (113.3%). In 2004, the highest rates were among persons aged 35--54 years, who accounted for 59.6% of all poisoning deaths that year.

From 1999 to 2004, rates increased by less than one third in the Northeast and West but more than doubled in the South and nearly doubled in the Midwest.[†] Delaware, Maryland, New York, and Rhode Island had decreases in rates, and California had the smallest increase (4.0%) ([Figure](#)). States with the largest relative increases were West Virginia (550%), Oklahoma (226%), Maine (210%), Montana (195%), and Arkansas (195%). Increases of 100% or more occurred in 23 states: 11.8% (two of 17) of states[§] in the most urban tertile, 41.2% (seven of 17) of those in the middle tertile, and 82.4% (14 of 17) of those in the most rural tertile (extended Mantel-Haenszel chi-square for linear trend across the tertiles = 15.4, $p < 0.001$).

The increase in poisoning mortality occurred almost exclusively among persons whose deaths were coded as unintentional drug poisoning (X40--X44), for which the rate increased 68.3% ([Table 2](#)). The rate for poisoning deaths attributed to other substances (X45--X49) increased 1.3%. By 2004, drug poisoning accounted for 19,838 deaths, 94.7% of all unintentional poisoning deaths. Among types of drug poisoning, the greatest increases were in the "other and unspecified" drug, psychotherapeutic drug, and "narcotic and hallucinogen" drug categories.

Reported by: *L Paulozzi, MD, Div of Unintentional Injury Prevention; J Annett, PhD, Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC.*

Editorial Note:

Unintentional drug poisoning mortality rates increased substantially in the United States during 1999--2004. Previous studies, using multiple cause-of-death data, have indicated that the trend described in this report can be attributed primarily to increasing numbers of deaths associated with prescription opioid analgesics (e.g., oxycodone) and secondarily to increasing numbers of overdoses of cocaine and prescription psychotherapeutic drugs (e.g., sedatives), and cannot be attributed to heroin, methamphetamines, or other illegal drugs (3,5).

The mortality increases might be the result of greater use and abuse of potentially lethal prescription drugs in recent years, behaviors that are more common among whites than nonwhites (6,7). The substantial increase in deaths among persons aged 15--24 years is consistent with substantial recent increases in recreational prescription drug and cocaine use among adolescents and young adults (8).

Studies by state health agencies have reported recent increases in prescription-drug--poisoning mortality in rural communities ([9,10](#)), despite historically higher rates in urban areas. The South and Midwest regions, which had the largest relative and absolute increases among regions in this study, are the most rural regions of the country (4). Further research is needed to determine how differences in drug use, drug-abuse--control measures, and demographic characteristics (e.g., race/ethnicity) contribute to this pattern.

The findings in this report are subject to at least three limitations. First, mortality coding assigns the underlying cause of death to broad drug categories rather than to specific drugs. Second, death certificates do not reveal the circumstances of drug use. Third, determining the intent of a person who took a drug is often difficult for a coroner or medical examiner and might result in misclassification; some of these deaths might have been suicides, although not classified as such, and some deaths categorized as suicides or of undetermined intent might have been unintentional and therefore not

analyzed in this study. The extent of this error is not known.

Effective response to increasing fatal drug overdoses requires strengthening regulatory measures to reduce unsafe use of drugs, increasing physician awareness regarding appropriate pharmacologic treatment of pain and psychiatric problems, supporting best practices for treating drug dependence, and potentially modifying prescription drugs to reduce their potential for abuse. State agencies that manage prescription-monitoring programs should use such systems to proactively identify 1) patients who abuse drugs and fill multiple prescriptions from different health-care providers and 2) providers whose prescribing practices are outside the standards of appropriate medical care. Both federal and state prevention measures should be evaluated periodically to determine their effectiveness.

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* Information about bridged-race categories is available at <http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm>.

† *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

§ Includes the District of Columbia.

Table 1

TABLE 1. Unintentional poisoning mortality rates,* by selected characteristics — United States, 1999 and 2004

Characteristic	1999	2004	Rate change (%)
Sex and race/ethnicity			
Males	6.5	9.5	47.1
White	6.3	10.0	58.6
<i>Hispanic</i>	8.5	7.1	-16.3
<i>Non-Hispanic</i>	6.0	10.7	79.0
Black	9.8	9.9	1.0
American Indian/Alaska Native	6.7	10.6	57.5
Asian/Pacific Islander	1.1	1.7	50.5
Females	2.3	4.7	103.0
White	2.3	5.0	121.8
<i>Hispanic</i>	1.7	2.4	40.8
<i>Non-Hispanic</i>	2.3	5.4	136.5
Black	3.2	4.5	40.3
American Indian/Alaska Native	4.3	6.6	54.8
Asian/Pacific Islander	0.6	0.5	-10.3
Age group (yrs)			
0–14	0.1	0.1	0.0
15–24	2.5	5.3	113.3
25–34	5.9	9.1	54.8
35–44	10.1	14.5	43.8
45–54	7.8	14.5	87.0
55–64	2.8	5.4	91.1
65–74	1.6	2.3	39.3
≥75	2.5	2.7	7.2
Region†			
Northeast	4.5	5.9	31.7
Midwest	3.3	6.1	85.5
South	3.7	7.9	113.6
West	6.4	7.9	22.7
Total	4.4	7.1	62.5

* Age-adjusted rates per 100,000 population.

† *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

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Table 2

TABLE 2. Number of deaths and mortality rates* attributed to unintentional poisoning, by type of substance — United States, 1999 and 2004

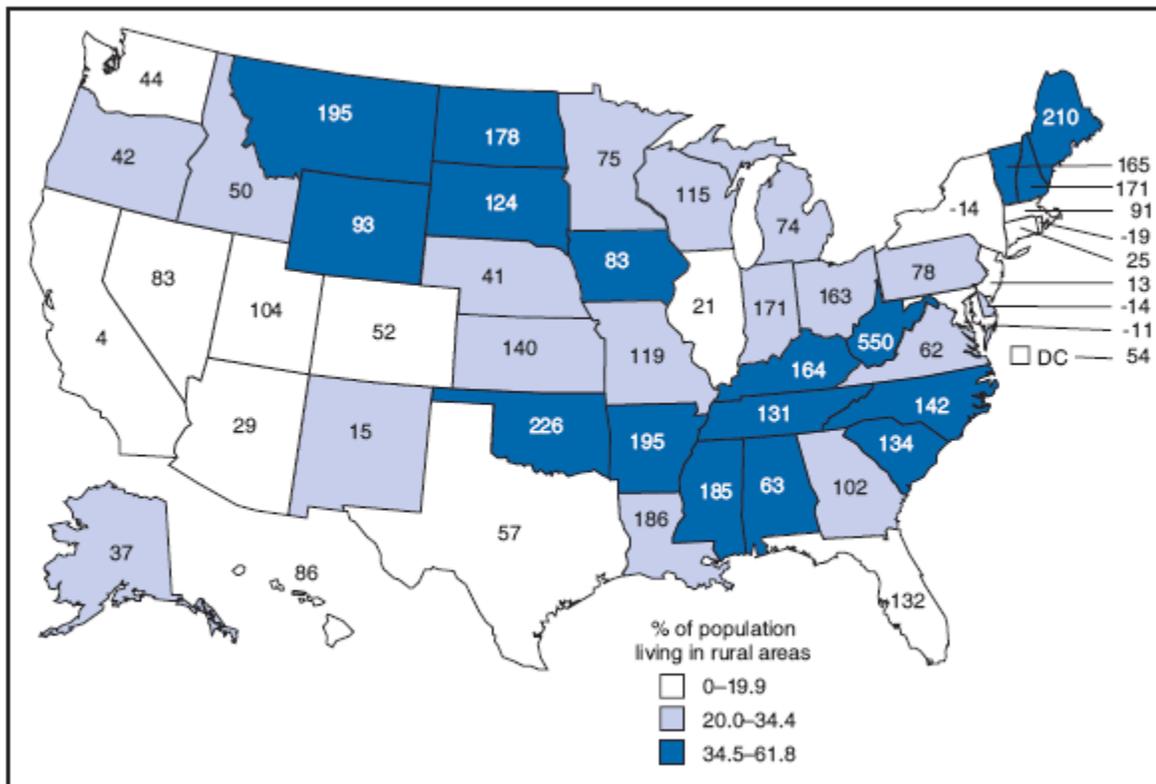
Type of substance	ICD-10 [†] code	1999		2004		Rate change (%)
		No.	Rate	No.	Rate	
Drugs	X40–X44	11,155	4.0	19,838	6.7	68.3
Nonopioid analgesics [§]	X40	168	0.1	212	0.1	18.1
Psychotherapeutic drugs [¶]	X41	671	0.2	1,300	0.4	83.5
Narcotics and hallucinogens ^{**}	X42	6,009	2.1	9,798	3.3	54.6
Other drugs acting on the central nervous system	X43	21	0.0	22	0.0	-0.5
Other and unspecified drugs ^{††}	X44	4,286	1.5	8,506	2.9	87.3
Other substances	X45–X49	1,031	0.4	1,112	0.4	1.3
Alcohol	X45	320	0.1	358	0.1	6.0
Organic solvents and halogenated hydrocarbons	X46	63	0.0	67	0.0	2.0
Carbon monoxide and other gases	X47	534	0.2	562	0.2	-1.7
Pesticides	X48	12	— ^{§§}	3	— ^{§§}	— ^{§§}
Other and unspecified chemicals ^{¶¶}	X49	102	0.0	122	0.0	10.6
Total	X40–X49	12,186	4.4	20,950	7.1	62.5

* Age-adjusted rates per 100,000 population.
[†] *International Classification of Diseases, Tenth Revision.*
[§] Includes painkillers such as aspirin and acetaminophen and other antipyretic or antirheumatic drugs, both prescription and over-the-counter drugs.
[¶] Includes antiepileptic, sedative-hypnotic, antidepressant, antipsychotic, and other psychotherapeutic drugs.
^{**} Includes heroin, opioid analgesics (e.g., oxycodone), and cocaine.
^{††} Category used to classify deaths attributed to drugs from more than one of the other categories (e.g., deaths attributed to both an opioid analgesic and a sedative) and deaths attributed simply to "drug overdose."
^{§§} Rates based on fewer than 20 deaths are not included.
^{¶¶} Includes corrosives, metals, plants, and detergents.

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Figure

FIGURE. Percentage change in unintentional poisoning mortality rates,* by rural status of state[†] — United States, 1999–2004



* Age-adjusted rates per 100,000 population.
[†] Defined as the percentage of the population living in census blocks below a certain population density, based on U.S. Census data for 2000 (4).

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