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### Overdose Deaths Involving Prescription Opioids Among Medicaid Enrollees – Washington, 2004–2007

During 1999–2006, the number of poisoning deaths in the United States nearly doubled, from approximately 20,000 to 37,000, largely because of overdose deaths involving prescription opioid painkillers (1). This increase coincided with a nearly fourfold increase in the use of prescription opioids nationally (2). In Washington, in 2006, the rate of poisoning involving opioid painkillers was significantly higher than the national rate (1). To better characterize the prescription opioids associated with these deaths and to reexamine previously published results indicating higher drug overdose rates in lower-income populations (3), health and human services agencies in Washington analyzed overdose deaths involving prescription opioids during 2004–2007. This report describes the results of that analysis, which found that 1,668 persons died from prescription opioid-related overdoses during the period (6.4 deaths per 100,000 per year); 58.9% of decedents were male, the highest percentage of deaths (34.4%) was among persons aged 45–54 years, and 45.4% of deaths were among persons enrolled in Medicaid. The age-adjusted rate of death was 30.8 per 100,000 in the Medicaid-enrolled population, compared with 4.0 per 100,000 in the non-Medicaid population, an age-adjusted relative risk of 5.7. Methadone, oxycodone, and hydrocodone were involved in 64.0%, 22.9%, and 13.9% of deaths, respectively. These findings highlight the prominence of methadone in prescription opioid-related overdose deaths and indicate that the Medicaid population is at high risk. Efforts to minimize this risk should focus on assessing the patterns of opioid prescribing to Medicaid enrollees and intervening with Medicaid enrollees who appear to be misusing these drugs.

For this analysis, the Washington State Department of Health defined an overdose death involving prescription opioids as a death in Washington during 2004–2007 of a state resident whose death certificate had 1) a manner of death of

“accidental” or “natural”; 2) one or more contributing causes coded to “poisoning by narcotics” or a “mental and behavioral disorder due to use of opioids” (based on *International Classification of Diseases, 10th Revision* codes T40.0–T40.6 and F11\*); 3) specific words compatible with an acute drug intoxication recorded in any of the cause of death fields (e.g., “overdose”); and 4) a prescription opioid term in any of the cause of death fields. Examples of prescription opioid terms sought on manual review of the certificates were “oxycodone,” “methadone,” and “hydrocodone.” Although morphine is a prescription opioid painkiller, it is also a metabolite of heroin. Therefore, mention of morphine on a death certificate was only accepted as evidence that a death was prescription opioid-related when the certificate specified that the morphine was a prescription drug. As a result, 82 deaths involving morphine and no other opioids (36.6% of all deaths in which morphine was mentioned) were excluded from this analysis.

The Washington State Health and Recovery Services Administration (WSHRSA), which operates Medicaid and several associated medical-assistance programs, determined which deaths occurred among persons who were enrolled in

\* Available at <http://apps.who.int/classifications/apps/icd/icd10online>.

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Medicaid at some time during the year of their death. During 2004–2007, the Medicaid-enrolled population (5,109,363 person-years) represented 20.2% of the Washington population (25,287,800 person-years). WSHRSA also linked the deaths from prescription opioids to records of clients in the Medicaid Patient Review and Coordination (PRC) program, a special state program for clients who overuse or inappropriately use medical services.<sup>†</sup> PRC program members (5,858 person-years) represented 0.1% of the Medicaid population during 2004–2007. Rates were age adjusted because the Medicaid population was younger than the non-Medicaid population.

During 2004–2007, a total of 2,282 deaths in Washington met the manner and cause of death case definition criteria. Of these, 2,194 (96.1%) had a death certificate that included a term indicating acute drug intoxication. Of these 2,194, a total of 1,668 (76.0%) had a death certificate that included a prescription opioid term and were included in this analysis. The age-adjusted prescription opioid overdose rate was 6.4 per 100,000 per year (Table 1). The male mortality rate was 1.4 times the female rate. Rates increased with age to a peak of 15.0 per 100,000 in the 45–54 years age group and then declined.

Among all decedents, 758 (45.4%) were enrolled in Medicaid at some point during the year of their death. Medicaid-enrolled decedents had an age distribution comparable with that of decedents statewide. However, the percentage of females was greater among Medicaid-enrolled decedents (52.2%) than among decedents statewide (41.1%). A total of 34 Medicaid-enrolled decedents were in the PRC program, representing 4.5% of all Medicaid-enrolled decedents.

The risk for prescription opioid overdose death varied substantially by Medicaid status (Table 2). The crude annual risk for prescription opioid overdose death was approximately one in 6,757 in the Medicaid-enrolled population and one in 172 in the Medicaid-enrolled PRC program population.

Medical examiners and coroners recorded methadone on death certificates nearly three times more often than the next most common opioid, oxycodone (Table 3). At least one nonopioid prescription drug was reported in 54.6% of the deaths. A benzodiazepine was listed on the death certificate in 20.9% of the deaths, and an antidepressant in 31.7%. An illegal drug was reported in 21.8% of the deaths. Cocaine was involved in 15.7%, methamphetamine in 5.5%, heroin

<sup>†</sup> During 2004–2007, approximately 90% of clients in the Washington PRC program misused prescription opioids by doctor shopping, frequent cycling through emergency departments, and prescription forgery. WSHRSA attempted to limit such misuse by restricting PRC clients to one primary-care provider, one narcotics prescriber, one pharmacy, and one hospital for nonemergency care. In addition, WSHRSA could require prior authorization for all opioid prescriptions.

**TABLE 1. Number, percentage, and rate of deaths attributed to overdoses of prescription opioid drugs among the total and Medicaid-enrolled populations, by selected characteristics — Washington, 2004–2007**

| Characteristic         | Total population |                |            | Medicaid-enrolled population |                |             |
|------------------------|------------------|----------------|------------|------------------------------|----------------|-------------|
|                        | No.              | (%)            | Rate*      | No.                          | (%)            | Rate        |
| <b>Sex</b>             |                  |                |            |                              |                |             |
| Male                   | 977              | (58.9)         | 7.4        | 362                          | (47.8)         | 41.2        |
| Female                 | 691              | (41.1)         | 5.3        | 396                          | (52.2)         | 24.8        |
| <b>Age group (yrs)</b> |                  |                |            |                              |                |             |
| <18                    | 16               | (1.0)          | 0.3        | 10                           | (1.3)          | 0.4         |
| 18–24                  | 117              | (7.0)          | 4.6        | 32                           | (4.2)          | 4.4         |
| 25–34                  | 285              | (17.1)         | 8.4        | 133                          | (17.5)         | 22.6        |
| 35–44                  | 425              | (25.5)         | 11.3       | 200                          | (26.4)         | 53.2        |
| 45–54                  | 573              | (34.4)         | 15.0       | 284                          | (37.5)         | 101.9       |
| 55–64                  | 211              | (12.6)         | 7.7        | 89                           | (11.7)         | 50.4        |
| ≥65                    | 41               | (2.5)          | 1.4        | 10                           | (1.3)          | 2.9         |
| <b>Year</b>            |                  |                |            |                              |                |             |
| 2004                   | 351              | (21.0)         | 5.5        | 114                          | (15.0)         | 19.9        |
| 2005                   | 399              | (23.9)         | 6.1        | 190                          | (25.1)         | 32.2        |
| 2006                   | 464              | (27.8)         | 7.0        | 213                          | (28.1)         | 33.4        |
| 2007                   | 454              | (27.2)         | 6.7        | 241                          | (31.8)         | 37.2        |
| <b>Total</b>           | <b>1,668</b>     | <b>(100.0)</b> | <b>6.4</b> | <b>758</b>                   | <b>(100.0)</b> | <b>30.8</b> |

\* Per 100,000, age-adjusted to the 2000 U.S. standard population for all but the age-specific rates. Total rates are based on 25,287,800 person-years for the total population and 5,109,363 person-years for the Medicaid-enrolled population.

**TABLE 2. Number and rate of deaths attributed to overdoses of prescription opioid drugs, by Medicaid status — Washington, 2004–2007**

| Status                 | No. | Crude rate* | Age-adjusted rate† | Age-adjusted RR§ (95% CI¶) |
|------------------------|-----|-------------|--------------------|----------------------------|
| Medicaid               | 758 | 14.8        | 30.8               | 5.7 (5.3–6.1)              |
| Medicaid PRC** program | 34  | 580.4       | 381.4              | 92.6 (64.1–129.5)          |
| Non-Medicaid           | 910 | 4.5         | 4.0                | Referent                   |

\* Per 100,000. Rates are based on 5,109,363 person-years for the Medicaid population, 5,858 person-years for the Medicaid PRC program, and 20,178,437 person-years for the non-Medicaid population.

† Per 100,000, adjusted to the 2000 U.S. standard population.

§ Relative risk, adjusted to the age distribution of the non-Medicaid population.

¶ Confidence interval.

\*\* Patient Review and Coordination.

in 2.4%, and alcohol in 17.1% of the deaths. More than one drug was listed for 72.3% of decedents. The mean and median numbers of drugs per death were 2.7 and 2.0, respectively.

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**Editorial Note:** The number of deaths attributed to poisoning, more than 90% of which involve drugs, has risen steadily in the United States for the past decade (1). Poisoning became second only to motor-vehicle crashes among leading causes of injury death in the United States in 2004 (4). By 2006, poisoning had become the leading cause of unintentional injury death in

**TABLE 3. Number and percentage of deaths attributed to overdoses of prescription opioid drugs, by specific drug involved — Washington, 2004–2007**

| Drug          | No.   | (%)*   |
|---------------|-------|--------|
| Methadone     | 1,068 | (64.0) |
| Oxycodone     | 382   | (22.9) |
| Hydrocodone   | 232   | (13.9) |
| Fentanyl      | 76    | (4.6)  |
| Propoxyphene  | 61    | (3.7)  |
| Hydromorphone | 60    | (3.6)  |
| Codeine       | 53    | (3.2)  |
| Morphine†     | 40    | (2.4)  |
| Meperidine    | 11    | (0.7)  |
| Sufentanil    | 1     | (0.1)  |

\* Percentages are based on 1,668 deaths. Percentages add to more than 100% because some deaths involved more than one opioid drug.

† Includes only morphine attributed to prescription drugs.

Washington, five other states,§ and the District of Columbia. Overdoses associated with prescription opioid painkillers are driving increases in poisoning death rates nationally (1), which parallel increases in opioid prescribing in the United States (2). Opioids are subject to abuse and are frequently used recreationally in combination with other drugs, including alcohol. In 2006, Washington's opioid overdose death rate was 8.2 per 100,000 population, compared with a national rate of 4.6 per 100,000 (1). Some of this might be attributable to Washington's high rate of self-reported nonmedical use of prescription opioid painkillers, which was the fourth highest in the United States during 2006–2007 (5). The findings of

§ Connecticut, Massachusetts, New Jersey, Ohio, and Rhode Island.

#### What is already known on this topic?

Since 1999, deaths from overdoses of prescription opioid painkillers have been increasing in the United States, but no study has determined whether the rate of such deaths is higher in the Medicaid population.

#### What is added by this report?

The rate of prescription opioid-related overdose death during 2004–2007 in Washington state was 30.8 in the Medicaid population and 4.0 per 100,000 in the non-Medicaid population (a relative risk of 5.7), and methadone was involved more frequently than any other prescription opioid.

#### What are the implications for public health practice?

Health authorities (e.g., state and local health departments, coroner and medical examiner offices, and substance abuse programs) in other states should examine trends in and risks for prescription opioid-related overdose death in their jurisdictions, especially among Medicaid clients.

this analysis indicate that deaths from prescription opioid drug overdose in Washington occurred disproportionately among males and persons aged 45–54 years. This analysis also is the first to show an increased risk among persons enrolled in Medicaid. The age-adjusted risk of such a death for a Medicaid enrollee was 5.7 times the risk for a person not enrolled in Medicaid. These findings are similar to previous research showing a higher risk for such deaths in lower-income populations (3) and can be used to better focus preventive interventions.

The cause of the higher death rate in Washington's Medicaid enrolled population might be related, in part, to differences in opioid prescribing in the Medicaid population. Although comparable prescribing data for Medicaid and non-Medicaid populations are not available for Washington, studies indicate that opioid prescribing rates among Medicaid enrollees are at least twofold higher than rates for persons with private insurance (6,7). In one of these studies, both the percentage of patients with pain being treated with opioids and the opioid dose per prescription were higher in Medicaid patients than in non-Medicaid patients (6). The higher death rate among Medicaid enrollees in Washington also might be related to a higher prevalence of substance abuse and other mental health problems, which has been found in other Medicaid populations (8). In this analysis, medical examiners and coroners reported the presence of an illegal drug (e.g., cocaine, methamphetamine, and heroin) in nearly a fifth of deaths, and psychotherapeutic drugs such as benzodiazepines and antidepressants were reported in a high proportion of deaths.

Methadone, a drug used both for treatment of heroin addiction and as a long-acting, inexpensive painkiller, has become increasingly prominent among drugs involved in overdoses, both nationally and in state studies (1,9,10). Methadone's use

as a painkiller increased more than twelvefold in the United States and Washington during 1997–2006 (2), driven in part by its low cost. Washington ranked fourth among states in the per-capita consumption of methadone in 2005 and 2006 (2).

The findings in this report are subject to at least two limitations. First, the number of overdoses involving prescription opioids might be underestimated because 1) such drugs might not have been specified on the death certificates even though they contributed to death and 2) some deaths involving morphine and no other opioids were not included because the morphine detected might have been a metabolite of heroin. Second, some deaths labeled unintentional might have been suicides by poison or vice-versa, but the net effect of such errors likely is minimal.

Surveillance for prescription drug overdose deaths should be improved. Drugs listed on death certificates for overdoses are coded into broad categories, making identification of specific drugs difficult. Use of uncoded text in the cause-of-death fields on death certificates, as was done in this study, might be a promising strategy at the state or national level. Health authorities (e.g., state and local health departments, coroner and medical examiner offices, and substance abuse programs) in other states should examine trends in and risks for prescription opioid-related overdose death in their jurisdictions, especially among Medicaid clients.

#### References

1. Warner M, Chen LH, Makuc DM. Increase in fatal poisonings involving opioid analgesics in the United States, 1999–2006. NCHS data brief, no. 22. Hyattsville, MD: National Center for Health Statistics; 2009. Available at <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/poisoning/poisoning.htm>. Accessed October 26, 2009.
2. US Department of Justice, Drug Enforcement Administration. ARCOS: Automation of Reports and Consolidated Orders System. Available at <http://www.deadiversion.usdoj.gov/arcos/index.html>. Accessed October 22, 2009.
3. Washington State Department of Health. The health of Washington state. A statewide assessment of health status, health risks, and health care services. Poisoning and drug overdose [Chapter]. Olympia, WA: Washington State Department of Health; 2007. Available at <http://www.doh.wa.gov/hws/doc/iv/iv-poi2007.pdf>. Accessed October 22, 2009.
4. Fingerhut LA, Anderson RN. The three leading causes of injury mortality in the United States, 1999–2005. Hyattsville, MD: National Center for Health Statistics; 2008. Available at <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/injury99-05/injury99-05.pdf>. Accessed October 22, 2009.
5. Hughes A, Sathe N, Spagnola K. State estimates of substance abuse from the 2006–2007 National Surveys on Drug Use and Health. Rockville, MD: Office of Applied Studies, Substance Abuse and Mental Health Services Administration; 2009. Available at <http://www.oas.samhsa.gov/2k7/state/cover.htm>. Accessed October 22, 2009.
6. Sullivan MD, Edlund MJ, Fan M, DeVries A, Braden JB, Martin BC. Trends in use of opioids for non-cancer pain conditions 2000–2005 in commercial and Medicaid insurance plans. *Pain* 2008;138:440–9.
7. Raofi S, Schappert SM. Medication therapy in ambulatory medical care: United States, 2003–04. *Vital Health Stat* 2006;13:1–40.



8. Adelman PK. Mental and substance use disorders among Medicaid recipients: prevalence estimates from two national surveys. *Admin Policy Men Health* 2003;31:111–29.
9. Hall AJ, Logan JE, Toblin RL, et al. Patterns of abuse among unintentional pharmaceutical overdose fatalities. *JAMA* 2008;300:2613–20.
10. Oregon Department of Human Services. Methadone deaths (and distribution) on the rise. *CD Summary* 2003;52(14).

## Perceived Insufficient Rest or Sleep Among Adults – United States, 2008

The importance of chronic sleep insufficiency is under-recognized as a public health problem, despite being associated with numerous physical and mental health problems, injury, loss of productivity, and mortality (1,2). Approximately 29% of U.S. adults report sleeping <7 hours per night (3) and 50–70 million have chronic sleep and wakefulness disorders (1). A CDC analysis of 2006 data from the Behavioral Risk Factor Surveillance System (BRFSS) in four states showed that an estimated 10.1% of adults reported receiving insufficient rest or sleep on all days during the preceding 30 days (4). To examine the prevalence of insufficient rest or sleep in all states, CDC analyzed BRFSS data for all 50 states, the District of Columbia (DC), and three U.S. territories (Guam, Puerto Rico, and U.S. Virgin Islands) in 2008. This report summarizes the results, which showed that among 403,981 respondents, 30.7% reported no days of insufficient rest or sleep and 11.1% reported insufficient rest or sleep every day during the preceding 30 days. Females (12.4%) were more likely than males (9.9%) and non-Hispanic blacks (13.3%) were more likely than other racial/ethnic groups to report insufficient rest or sleep. State estimates of 30 days of insufficient rest or sleep ranged from 7.4% in North Dakota to 19.3% in West Virginia. Health-care providers should consider adding an assessment of chronic rest or sleep insufficiency to routine office visits so they can make needed interventions or referrals to sleep specialists.

BRFSS\* is a state-based, random-digit-dialed telephone survey of the noninstitutionalized U.S. civilian population aged ≥18 years, which is conducted by state health departments in collaboration with CDC (5). In 2008, response rates† among all 50 states, DC, and territories ranged from 35.8% to 65.9% (median: 53.3%), based on Council of American Survey and

Research Organizations (CASRO) guidelines. Cooperation rates§ ranged from 59.3% to 87.8% (median: 75.0%).

The 2008 survey included the question, “During the past 30 days, for about how many days have you felt you did not get enough rest or sleep?” Data from all sites were aggregated, and the numbers of days of perceived insufficient rest or sleep were categorized as zero days, 1–13 days, 14–29 days, and 30 days. Analyses were stratified by age group, race/ethnicity, sex, employment status, education level, marital status, and geographic area. Age-adjusted prevalence estimates were obtained and standardized to the projected U.S. 2000 population and 95% confidence intervals were calculated using statistical software to account for the complex sampling design. Age-adjusted estimates account for variations within state populations and permit comparisons between states and the 2006 report (4) examining data from four states. Statistical significance was determined by using t-tests. Unless otherwise indicated, all comparisons mentioned in this report were significant at the  $p < 0.001$  level.

Among the 403,981 adult respondents, an estimated 30.7% reported no days of insufficient rest or sleep in the preceding 30 days, 41.3% reported 1–13 days, 16.8% reported 14–29 days, and 11.1% reported 30 days (Table 1). The prevalence of adults reporting no days of insufficient rest or sleep in the preceding 30 days increased with age; persons aged ≥45 years were more likely to report no days than adults aged <45 years. Hispanic (38.8%) and other non-Hispanic racial/ethnic groups (35.4%) were more likely to report no days in comparison with non-Hispanic whites (27.9%) and non-Hispanic blacks (30.4%). Men (33.6%) were more likely to report no days than women (28.1%). Retired persons (43.8%) were most likely to report no days of insufficient rest or sleep in comparison with adults reporting other types of employment status ( $p = 0.003$ ). Those with less than a high school diploma or general education development certificate (GED) (37.9%) also were more likely to report no days of insufficient rest or sleep in comparison with those with a high school diploma or GED (33.8%) or with some college or college degree (28.0%). Finally, reports of no days of insufficient rest or sleep were similar among adults of varying marital status, although never married adults (31.6%) were more likely to report no days than members of an unmarried couple (28.4%;  $p = 0.005$ ).

The percentage of adults reporting insufficient rest or sleep every day during the preceding 30 days generally declined with age (Table 1). The percentage was highest among persons aged 25–34 years (13.8%) and lowest among persons aged ≥65 years (7.4%). Non-Hispanic blacks (13.3%) were significantly

\* Information regarding BRFSS data and methods is available at [http://www.cdc.gov/brfss/technical\\_infodata/surveydata/2005.htm](http://www.cdc.gov/brfss/technical_infodata/surveydata/2005.htm).

† The percentage of persons who completed interviews among all eligible persons, including those who were not successfully contacted.

§ The percentage of persons who completed interviews among all eligible persons who were contacted.