

Drug Intoxication Deaths Involving Methadone, 2004–2005

Wendy Verhoek-Ofstedahl, PhD, Tucker Bittel, Michael K. Kim, Edward F. Donnelly, RN, MPH, and Thomas P. Gilson, MD, FCAP

Methadone has been shown to be an effective intervention for treating heroin addiction and lowering the risk of heroin-induced overdose deaths. In recent years increases in its use for pain management and its use in combination with illicit and prescription drugs have been associated with drug intoxication deaths.^{1,2} This analysis presents recent data on methadone-related overdose deaths in **Rhode Island (RI)**.

METHODS

Data presented here were abstracted from medical examiner records at the **RI Office of State Medical Examiners (OSME)**. All drug intoxication deaths occurring in RI are confirmed by state medical examiners through autopsy and toxicology testing. A toxicology screen is performed on body fluids with subsequent more comprehensive and confirmatory testing. The screen tests for the presence of amphetamines, alcohol, antidepressants, cocaine, marijuana, opiates, and selected other substances.

Prior to May 2006 the OSME routinely classified drug intoxication deaths as being of undetermined manner unless there was definitive evidence to justify another classification. In keeping with current forensic practice in most jurisdictions, this convention was supplanted in May 2006 with a protocol to designate overdose deaths lacking evidence or suggestion of intent as accidental.

All 2004 and 2005 deaths with a manner of undetermined intent were abstracted and electronically entered into the RI component of the **National Violent Death Reporting System (NVDRS)**, a project sponsored by the **Centers for Disease Control and Prevention (CDC)** to collect standardized information on violent deaths (homicide, suicide, manner undetermined, unintentional firearm) in 17 States across the nation. Detailed information including decedent demographics, autopsy and toxicology results, and life circumstances are computerized from medical examiner and hospital records, death certificates and police reports. Cases are identified by daily review of entries in the Medical Examiner Log. Information on accidental drug intoxication cases that were not included in the NVDRS system have been abstracted from hard copy death certificates and recorded in a supplemental database.

Final toxicology is still pending on some 2006 deaths; therefore, 2004 and 2005 are the only complete years of data available. Data on drug intoxication deaths with manner of undetermined and accident were combined for this analysis. Data on the source of methadone and blood level of methadone require further refinement and, therefore, are not presented here.

RESULTS

A total of 280 drug intoxication deaths occurred in RI during the two-year period 2004-2005. Of these 44 involved methadone as a contributing cause of death. Of the 112 drug intoxication deaths that occurred in 2004, 15 (13.4%) involved methadone while 29 of the 168 drug intoxication deaths (17.3%) that occurred in 2005 involved methadone as a cause.

Over half of decedents (59.1%) with methadone as a contributing cause were male. The majority of decedents (81.8%) were white, non-Hispanic; 11.4% were Hispanic and 6.8% were non-Hispanic persons of races other than white. Almost half of decedents (47.7%) were never married (including single, not otherwise specified), 27.3% were married, 15.9% were divorced, and 6.8% were widowed. The age distribution differed somewhat for males and females. (Figure 1) While overall 52.3% of decedents were age 40-49 years, a higher proportion of males (61.5%) than females (38.9%) were in this age group.

Of the 44 methadone-related deaths, 12 (27.3%) involved methadone alone as a cause of death, 20 (45.5%) involved methadone and one other drug, and 12 (27.3%) involved methadone in combination with two or more drugs. (Figure 2)

Of the 32 deaths with methadone in combination with other drugs as the contributing cause, 19 deaths (59.4%) involved cocaine, four (12.5%) involved cocaine with other opiates, and four (12.5%) involved other opiates. The five deaths that did not involve cocaine and/or other opiates involved one or more prescription drugs.

Blood alcohol assays detected the presence of alcohol for 13 (29.5%) decedents. However, of the 12 decedents with methadone alone as the contributing cause of death, only one (8.3%) tested positively for the presence of alcohol.

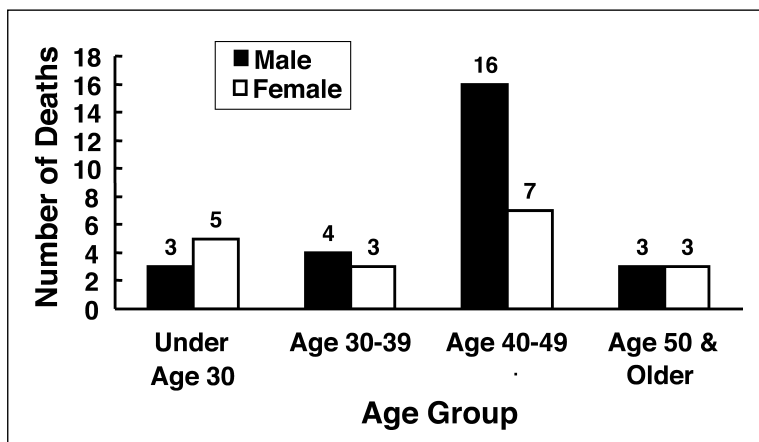


Figure 1. Methadone-Related Overdose Deaths, by Age Group and Sex, Rhode Island, 2004-2005.

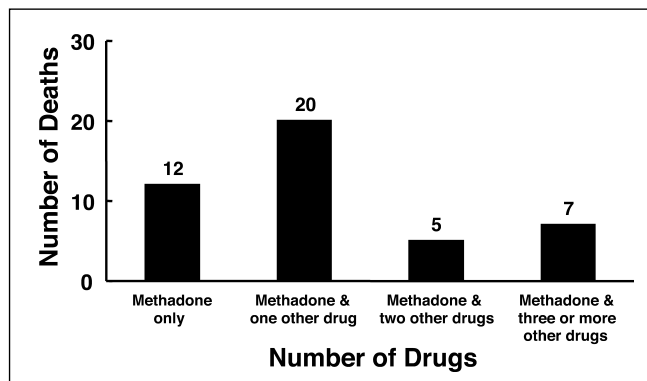


Figure 2. Methadone-Related Overdose Deaths, by Number of Contributing Drugs, Rhode Island, 2004-2005.

– Comment –

This is an alarming report. Recent changes in classification of overdose deaths, as described in the report, will enhance our understanding of this trend and efforts to prevent further deaths. It is unlikely that this recent change has led to increased reporting of overdose. We need additional details to clarify preventive interventions; e.g., were the decedents enrolled in methadone maintenance programs? Did a physician prescribe the methadone? Did the decedents obtain the drug illegally? What were the circumstances surrounding the deaths?

Opiates are often involved in overdose (see overdose article in this journal); mixing alcohol and other drugs increases the risk. Methadone is a long-acting opiate agonist. The long half life and slow onset of action can lead people to take additional or excessive doses, as well as to supplement with other drugs and alcohol.

There is an important distinction between the use of methadone prescribed by a physician for pain and methadone dispensed to treat addiction in a strict federally regulated program. The latter have consistently been shown to protect against overdose death.

Nationally, there has been a trend toward prescribing methadone for pain, and this has unfortunately been associated with increasing reports of methadone-associated deaths. The recent media publicity implicating methadone in the deaths of Anna Nicole Smith and her son have increased concern about the dangers of methadone. It is important to reduce the risks of overdose through education of both physicians and patients, and at the same time champion the life-saving benefits of methadone maintenance programs.

– Josiah D. Rich, MD, MPH, and
Michelle McKenzie, MPH

DISCUSSION

From 2004 to 2005 the number of drug intoxication deaths in RI associated with methadone nearly doubled, from 15 to 29. To date, 30 deaths in 2006 have been associated with methadone. Methadone-associated deaths are also reported to be increasing nationally.³ Research indicates that the increase may largely be due to the use of methadone for pain management.^{1,2} Methadone has a short-term analgesic effect but a long plasma half-life, which can expose patients who use frequent prescribed doses to toxic levels.²

It is possible that decedents with methadone as the only contributing cause of death also had additional drugs in their systems that were not among those for which toxicology testing was performed. Use of methadone in conjunction with such drugs may increase the risk of adverse reactions including death. There is no indication that methadone used as prescribed for substance abuse treatment increases mortality.

The marked increase in the number of methadone-associated deaths in RI from 2004 to 2005 warrants further study. Examination of the source of methadone, reason for use and level of methadone detected is needed to further characterize these deaths and to inform prevention recommendations.

Wendy Verhoek-Oftedahl, PhD, is Program Manager, Rhode Island Violent Death Reporting System, and Assistant Professor of Community Health (Research), The Warren Alpert Medical School of Brown University.

Tucker H. Bittel is Senior Data Manager, Rhode Island Violent Death Reporting System, and MPH student, Program in Public Health, Department of Community Health, The Warren Alpert Medical School of Brown University.

Michael K. Kim is Data Manager, Rhode Island Violent Death Reporting System, and MPH student, Program in Public Health, Department of Community Health, The Warren Alpert Medical School of Brown University.

Edward F. Donnelly, RN, MPH, is Senior Public Health Epidemiologist, Center for Health Data and Analysis, and Clinical Teaching Associate, Department of Community Health, The Warren Alpert Medical School of Brown University.

Thomas P. Gilson, MD, FCAP, is Chief Medical Examiner and Clinical Assistant Professor of Pathology and Laboratory Medicine, The Warren Alpert Medical School of Brown University.

REFERENCES

1. Bertschy G. Methadone maintenance treatment. *Europ Arch Psychiatry Clin Neurosci* 1995; 245: 114-24.
2. Ballesteros MF, Budnitz DS, et al. Increase in deaths due to methadone in North Carolina. *JAMA* 2003; 290: 40.
3. Fingerhut L. Increases in methadone-related deaths: 1999-2004. National Center for Health Statistics. December 2006. Available online at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/methadone1999-04/methadone1999-04.htm>.