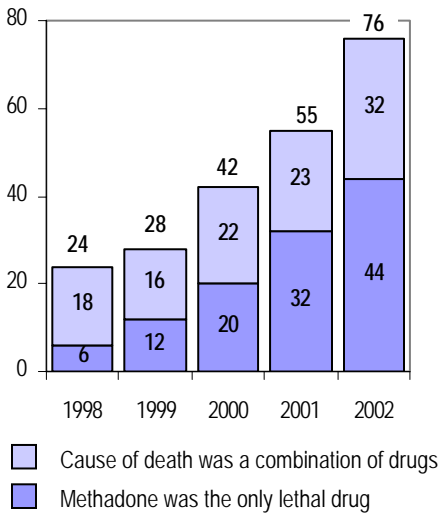


DEWS INVESTIGATES

What is Behind the Rise in Methadone Deaths in Maryland?

May 2004

Fig.1. Maryland deaths caused by methadone intoxication tripled between 1998 and 2002.



Source: Adapted by CESAR from data supplied by the Maryland State Office of the Chief Medical Examiner on March 30, 2004.

Maryland Indicators

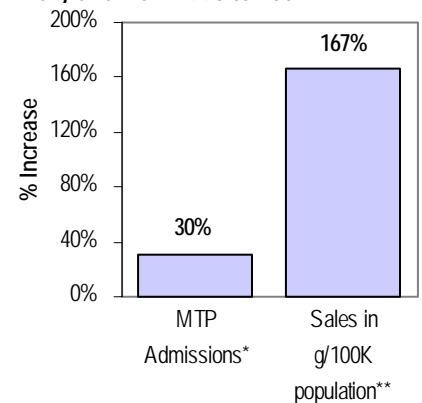
Data from the Maryland State Office of the Chief Medical Examiner (OCME) indicate that the number of deaths caused by methadone has more than tripled (from 24 to 76) between 1998 and 2002, for a total of 225 deaths during five years (Figure 1). In some of these deaths, methadone was the only lethal drug detected, while others were caused by a lethal combination of drugs that included methadone. Although deaths in both of these groups have increased, the faster increase has occurred among deaths caused by methadone only (633% increase, from 6 to 44). Figure 2 shows that during the same time period, commercial distribution of methadone increased 167% in Maryland (from 326 to 870 grams per 100,000 population), while admissions to Methadone Treatment Programs (MTPs) increased only 30% (from 5,398 to 7,025 in 2002). The small increase in MTP ad-

missions suggests that methadone from MTPs may not be a primary factor in the increase in deaths, and that decedents may have obtained the drug through other means. For example, methadone can be obtained legally as a prescribed treatment for chronic pain, or illegally through diversion and street sales.

National Indicators

Increases similar to Maryland's have been observed in Maine, Florida, North Carolina, and Oregon.¹ Nationally, methadone-associated deaths increased rapidly in 2001 and 2002, according to the FDA's MedWatch reporting system.² Methadone-related emergency department visits increased 230% between 1994 and 2001, according to The Drug Abuse Warning Network (DAWN),³ and the Baltimore metropolitan region ranks fifth with a rate of 8.2 emergency department methadone mentions per 100,000 population.⁴ The

Fig. 2. Sales of methadone to retail outlets climbed five times faster than admissions to methadone treatment programs (MTPs) in Maryland from 1998 to 2002.



* Source: Adapted from data provided by the Maryland Alcohol and Drug Abuse Administration.

** Source: Adapted from data provided by the Automation of Reports and Consolidated Orders System of the U.S. Drug Enforcement Agency.

HIGHLIGHTS

Since 1998, the number of people dying from methadone intoxication in Maryland has tripled. We obtained demographic information for all 225 people who died of methadone intoxication between 1998 and 2002, as reported by the Maryland State Office of the Chief Medical Examiner (OCME). In addition, we reviewed OCME medical records on a subset of 64 decedents.

Key Issues: Did the people who died prior to 2000 differ from those who died during the rapid increase in 2000 to 2002? Were decedents likely to obtain methadone legally or illegally, and has this changed throughout time? Do the OCME records contain sufficient details to answer our research questions?

Key Findings:

- More information than is contained in OCME records is needed to fully answer the research questions we raised.
- Most decedents were using more than one drug.
- Since 2000, more decedents have come from Maryland's suburban and rural counties and had medical or psychological problems.
- Few decedents were known to be enrolled in Methadone Treatment Programs when they died.

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DEWS Investigates provides a succinct report of the findings and implications of studies on important substance abuse-related issues in Maryland. Online copies are available at <http://www.dewsonline.org>. For more information, please contact Eric Wish at ewish@cesar.umd.edu or 301-405-9774.

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Drug Enforcement Administration reported that between 2001 and 2002, law enforcement seizures of methadone increased 133% nationwide for the tablet form of methadone (usual form administered for pain), and 11% for liquid methadone (usual form administered by MTPs).⁵

Some Possible Reasons for the Increase in Methadone Deaths

Some authorities in Maine and elsewhere have speculated that take-home doses from MTPs may be a major source of diverted methadone.⁶ However, the Center for Substance Abuse Treatment (CSAT), in its national assessment of methadone deaths, concluded that MTPs were not a major source of diverted methadone.⁷ Instead, CSAT suggested that the increased distribution of methadone pills (the form used mainly for pain) through pharmacies has been responsible for most of the increase in the drug's availability and the resulting increases in deaths.

In addition to its well-known use in treating heroin addiction, methadone is also a powerful pain reliever that has been prescribed more frequently in recent years to treat pain.⁸ At the same time, addiction and abuse of many prescription pain relievers (including methadone, oxycodone products, and others) are on the rise nationally⁹ and in Maryland,¹⁰ raising the possibility that inappropriate prescribing practices by physicians (i.e., "script clinics") and "doctor-shopping" by users are contributing to the availability of these drugs for illicit distribution and abuse.¹¹ Many of these pain relievers (especially oxycodone, fentanyl, and morphine products) are more expensive than methadone¹² and have received increasing law enforcement and media attention, making them more difficult to obtain. In effect, methadone may have become a more affordable and more available alternative for addicts seeking relief from withdrawal symptoms from heroin, oxycodone, and other popular drugs.¹³

The Current Study

To understand what factors are contributing to Maryland's increase in methadone-caused deaths, DEWS staff designed a study to review OCME records on all

methadone-caused deaths from 1998 to 2002. The study aimed to answer the following questions:

1. Could we find sufficient information in the OCME records to address our research questions about decedents' demographics, substance abuse, treatment, and health problems?
2. Since the rapid increase in deaths began in 2000, have there been changes in:
 - The proportion of decedents receiving methadone to treat heroin addiction vs. chronic pain?
 - The proportion of decedents who have had other substance abuse problems?
 - The ways decedents have obtained their methadone?

Initially, this study was based on an OCME data query run in 2003, which identified 66 cases in which methadone intoxication was the cause of death. (Data from that query were also presented in a previous DEWS report on overdose deaths in Maryland.¹⁴) For the current study, we excluded two cases (one was a homicide, the second was determined to be a disease-caused death) for a revised total of 64 cases. However, after reviewing the preliminary results of this study,

OCME staff suspected that additional cases of methadone-caused deaths existed. Further review of their records led OCME to increase their estimate from 66 to 226 deaths caused by methadone intoxication during the 1998 to 2002 interval. However, time constraints prevented us from reviewing the additional records for this study, so we are presenting the record information on the original 64 cases only. Demographic information obtained from the OCME database is presented for 225 decedents (one death was omitted from our study because it was a homicide). Refer to page 4 for a detailed description of the study methods.

Findings

Research information in the records. The OCME collects data relevant to its task of rendering an opinion as to the cause and manner of death (see Study Methods on page 4). We were, therefore, not surprised to learn that we could not find all of the information we were seeking to answer our research questions. Every record contained demographic information and toxicology results and slightly more than half provided some evidence of why, how, and where the decedent had obtained methadone. Our findings, therefore, represent minimal estimates of the behaviors in which we were most interested.

What is Methadone?

Methadone is a synthetic opioid used to treat heroin addiction and chronic or terminal pain. Since the 1960s, methadone has been the predominant treatment modality for addiction to heroin and other opiates. At the correct dosage, methadone prevents the painful symptoms associated with heroin withdrawal without producing a high, but it must be taken daily on an ongoing basis to prevent withdrawal symptoms and relapse. In methadone-assisted treatment programs, including methadone maintenance clinics, methadone is normally administered in liquid form to patients once a day under direct supervision, but can also be taken home in limited quantities by patients with a long-standing, stable treatment history. Methadone's use as an analgesic (pain reliever) has gained popularity since the late 1990s due to its low cost compared to many other narcotic analgesics. For treatment of pain, patients may obtain a prescription for methadone from their physician and have the prescription filled at any licensed pharmacy. For pain, methadone is usually administered in pills and water-soluble diskettes. Methadone, like other narcotic analgesics with high abuse potential (e.g., morphine, codeine, oxycodone, and hydrocodone), is a Schedule II controlled substance subject to special federal and state requirements for how the drug is prescribed, dispensed, and administered.

Source: Layson-Wolf, C., Goode, J., & Small, R. E. (2002). Clinical use of methadone. *Journal of Pain and Palliative Care Pharmacotherapy*, 16 (1), 29-59.

Method of analysis. We separated the 225 decedents into two groups so that we could compare characteristics of deaths that occurred before and after the increase that began in 2000. Fifty-two deaths occurred between 1998 and 1999, and 173 deaths occurred between 2000 and 2002. The subset of 64 deaths was divided similarly into groups of 8 and 56. Because of the small sample size, we looked for apparent meaningful differences between the two groups and did not test for statistical significance.

Demographics. As shown in Table 1, both groups were fairly similar demographically with the majority being male and white. The mean ages were 41.6 and 39.2, respectively. Geographically, the decedents have become slightly less urban throughout time, in that residents of Baltimore city have made up a decreasing proportion of deaths (56% vs. 47%). Outside the city, 10 rural and suburban Maryland counties were represented in the 1998 to 1999 group, compared with 17 counties in 2000 to 2002.

Toxicology. Among the subset of 64 cases, toxicological reports showed that the people who died in 2000 to 2002 were more likely to have had more than one drug in their system (89%), compared with those who died in 1998 to 1999 (63%). Besides methadone, the most commonly found drugs were antidepressants, followed by antihistamines, cocaine, and antipsychotics, all of which were found more frequently in the people who died in 2000 to 2002 than in the earlier group (data not shown). These other drugs did not necessarily contribute to death. However, the presence of multiple drugs suggests that drug interactions may have contributed to at least some of the deaths, because methadone is known to interact adversely with many common substances including antidepressants, alcohol and other CNS depressants, benzodiazepines, and antibiotics.

Health factors. Another notable trend in the subset was a marked increase in medical conditions contributing to death (13% vs. 46%), with heart, respiratory, and liver problems being the most common. Psych-

ological conditions were also more prevalent among those who died in 2000 to 2002 (13% vs. 38%).

Source of methadone. The proportion of decedents in the subset who were known to be enrolled in MTPs at the time of death decreased markedly (from 50% to 16%), while the proportion known to have a legal prescription for methadone increased slightly from 0% to 5%. In both time periods, a small proportion of decedents were known to have obtained methadone through diversion or other illegal means (13% and 20%, respectively). Note that, for the majority of decedents since 2000, we could not find information in the records regarding the source of methadone.

Implications

During this study, OCME staff adopted a new procedure for sub-classifying all narcotic-caused deaths. In the past, OCME staff used the general term “narcotic intoxication” without reporting the specific type of narcotic that caused the death; they now report the specific drug on the death certificate (e.g., methadone, heroin, oxycodone). This allows for a more accurate estimate of methadone-caused deaths.

Based on our findings, we conclude that additional sources of data are still necessary to fully answer our research questions about substance abuse, treatment, and the source of methadone in this group of decedents. Additional discussions between OCME staff and DEWS staff have led to the development of a pilot study designed to collect research data on future methadone-caused deaths in Maryland, with an emphasis on how the methadone was obtained and the decedent’s substance abuse treatment history. The OCME’s investigative staff are well-positioned to collect such data if the necessary resources are provided (see Recommended Action #1).

In this study, very few decedents were known to be in MTPs and about half came from jurisdictions outside Baltimore. Although our data were not sufficient to provide conclusive evidence of how decedents obtained the lethal dose of methadone, our findings suggest that many methadone-caused deaths in Maryland have not involved addicts in treatment,

Table 1. Decedent characteristics, by year of death.

Demographics (N=225 Methadone-Caused Deaths, 1998-2002)	1998-1999 (n=52)	2000-2002 (n=173)
Mean age	41.6	39.2
Male	63%	65%
White	73%	67%
Baltimore city resident	56%	47%
Number of counties (outside of Baltimore city) in which decedents resided	10	17
Characteristics of Subset (n=64)	(n=8)	(n=56)
Toxicology positive for two or more substances	63%	89%
Medical condition contributing to death*	13%	46%
Known psychological condition	13%	38%
Source of methadone:		
Known to be enrolled in MTP at death	50%	16%
Known to have used diversion/illegal means	13%	20%
Known to have a prescription for treating pain	0%	5%
Source not found in record	38%	59%
* Includes decedents who had a medical condition documented as a “contributing factor” and/or “cause of death.”		

which agrees with the conclusions in CSAT's national report.

Study Limitations

While we were able to present demographic information for all 225 cases, we limited our review of records to the 64 original cases. It is possible that our results would have been different if we had reviewed all 225 records. Also, our conclusions were severely limited by the lack of specific information in the records regarding the source of methadone, so our estimates should be interpreted with caution. Furthermore, we did not study any decedents whose deaths were caused by something other than drug intoxication (e.g., trauma, homicide), even if they happened to have methadone in their systems when they died.

Recommended Actions

1. Additional information should be collected to better characterize how decedents obtained methadone, what form of methadone they used, and whether they were in treatment at the time of death. The most feasible solution may be for OCME investigators to collect such data on future deaths as they occur. DEWS staff are working with OCME staff to design a pilot study to accomplish this task.
2. More education about the proper use of methadone should be made available to physicians, patients, and the general public. While our study could not determine

Study Methods

The Office of the Chief Medical Examiner (OCME) investigates human deaths caused by violence, suicide, or casualty; sudden death in an apparently healthy individual; and deaths that involve any suspicious or unusual manner. Maryland statute charges OCME to investigate these deaths and perform an autopsy, if necessary, to render an opinion as to the cause of death. The OCME's case record contains investigators' case notes, results of toxicological analyses on the decedent's body fluids, an autopsy report (if done), and, depending on the circumstances surrounding the death, copies of police and hospital reports. On average, the OCME conducts an investigation in less than 20% of the 40,000 deaths that occur each year in Maryland.

For this study, data on demographics were analyzed for all 225 methadone-caused deaths between 1998 and 2002 (excluding one homicide). Chart reviews were conducted for a subset of 64 decedents, focusing on toxicology, substance abuse history and treatment, and comorbid conditions. According to OCME staff, this subset of cases represented a fairly random sample of methadone-caused deaths, and we found no significant demographic differences between the reviewed (n=64) and non-reviewed (n=161) cases. Therefore, we believe that the reviewed cases were likely to be representative of all 225 methadone-caused deaths.

DEWS staff abstracted data from the OCME records during October and November of 2003 and analyzed electronic data on demographics in March 2004. This study was approved by the University of Maryland Institutional Review Board.

how many people were taking methadone under a physician's supervision (i.e., for pain or heroin addiction), the potential for drug interactions appears to have been a factor for many deaths. Educational messages targeted to physicians, patients, and the general public should stress the importance of taking methadone correctly and avoiding the many substances (including both prescription and recreational substances) that could contribute to an adverse reaction. Physicians who prescribe methadone and other narcotic analgesics should be encouraged and supported in

their efforts to prevent diversion of methadone without denying access to treatment for patients with legitimate needs. Readers are encouraged to consult the resources available through CSAT's Division of Pharmacologic Therapies (<http://dpt.samhsa.gov/>) to learn more about how to use and prescribe methadone safely.

Other DEWS Investigates:

What is Behind the Increase in PCP Use in Prince George's County?
Available online at www.dewsonline.org.

¹ Center for Substance Abuse Treatment (CSAT). (2004). *Methadone-Associated Mortality: Report of a National Assessment, May 8-9, 2003*. CSAT Pub. No. 28-03. Rockville, MD: CSAT, Substance Abuse and Mental Health Services Administration (SAMHSA).

² CSAT. (2004).

³ SAMHSA. (January 2003). The DAWN Report. Narcotic Analgesics. Office of Applied Studies, SAMHSA. Accessed February 26, 2004, online at <http://www.samhsa.gov/oas/2k3/pain/DAWNpain.pdf>.

⁴ Adapted from DAWN ED Trends data, 2002. SAMHSA. Accessed February 26, 2004, at http://dawninfo.samhsa.gov/pubs_94_02/pickatable/drugtable1.asp.

⁵ CSAT. (2004).

⁶ Chitwood, Michael J. Chief of Police, Portland, Maine. (2003, August 6). Testimony before the Committee on Senate Governmental Affairs. Federal Document Clearing House Congressional Testimony.

⁷ CSAT. (2004).

⁸ Bruera, E., & Sweeney, C. (2002). Methadone use in cancer patients with pain: a review. *Journal of Palliative Medicine*: 5 (1), 127-38.

⁹ SAMHSA. (2003). *Results from the 2002 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies, NHSDA Series H-22, DHHS Publication No. SMA 03-3836). Rockville, MD. Accessed January 27, 2004, online at <http://samhsa.gov/oas/nhsda/2k2nsduh/2k2SoFW.pdf>.

¹⁰ Drug Early Warning System (DEWS). (In press). *DEWS Investigates: Profiles of Five Oxycontin Abusers in Treatment*. College Park, MD: Center for Substance Abuse Research.

¹¹ National Drug Intelligence Center (NDIC). (September 2003). *Information Bulletin: Methadone Abuse Increasing*. NDIC Document ID 2003-L0424-004. Johnstown, PA: NDIC, U.S. Department of Justice. Accessed January 27, 2004, online at <http://www.usdoj.gov/ndic/pubs6/6292/6292p.pdf>.

¹² Fishman, S.M., Wilsey, B., Mahajan, G., & Molina, P. (2002). Methadone reincarnated: novel clinical applications and related concerns. *Pain Medicine*, 3 (4), 339-348.

¹³ NDIC. (2003).

¹⁴ DEWS. (2002). *Alcohol and Drug-Related Overdose Deaths in Maryland: 1997-2001. An Examination of Data from the Office of the Chief Medical Examiner*. College Park, MD: Center for Substance Abuse Research.