



RECOMMENDATIONS AND LESSONS LEARNED FOR IMPROVED REPORTING OF DRUG OVERDOSE DEATHS ON DEATH CERTIFICATES



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Introduction

In 2008, poisoning became the leading cause of injury death in the United States (Warner et al., 2011). Nearly all poisoning deaths (90%) are caused by drugs. Since 2000, the age-adjusted rate of drug overdose deaths has more than doubled from 6.2 per 100,000 population in 2000 to 14.7 per 100,000 population in 2014 (Rudd et al., 2015). This striking increase has resulted in heightened interest in identifying the specific drugs and drug classes that singly or in combination cause drug overdose deaths.

Death certificates, which have long been used to identify major health problems, set priorities, and monitor progress (Rosenburg, 1989), are a critical source of information on drug overdose deaths ([U.S. Standard Certificate of Death](#)). However, death certificates sometimes lack the detailed information needed to identify the specific drugs that contributed to the death. Rather than listing the specific drugs involved, general terms such as “multiple drug toxicity” or “polypharmacy” are sometimes used (Davis et al., 2013). Thus, while it’s possible to identify that the death was due to a drug overdose, the specific drug(s) that contributed to the death are not specified on the death certificate. Nationally in 2014, about 20% of drug overdose death certificates did not include information on the specific drug(s) involved. State variability in the percent missing specific drugs ranged from 1-52% of drug overdose deaths (NCHS, 2015).

State and local epidemiologists can play an important role in improving the quality of drug overdose mortality data in their jurisdiction and consequently improve the quality of drug overdose mortality surveillance at the national level. This document, prepared by the CSTE Overdose Subcommittee (<http://www.cste.org/group/OverdoseWorkgroup>), outlines various strategies that epidemiologists and staff at state and local health departments can use to evaluate the quality of their drug mortality data and to collaborate with vital registrars and medical examiners and coroners to improve the drug specific information reported on death certificates (for background, see Hanzlick, 2006). Recommendations and lessons learned provide concrete examples that may be applicable in other jurisdictions.

Data from Death Certificates

Epidemiologists generally rely on analysis of death certificate data to monitor the leading causes of death in their jurisdictions. Death certificate data are generated through a multi-step process between the certifier, which for drug overdoses is most often a medical examiner or a coroner, state vital registrar’s offices and the National Center for Health Statistics (NCHS). The process begins with the completion of the death certificate by the certifier. The medical portion of the death certificate includes a description of the immediate, an underlying, and contributing causes of death as captured in the certifier’s own words. The certifier makes the final determination about the cause and manner of death. The completed death certificate is submitted to the state vital registrar’s office, which then transfers some of the information from the death certificate to NCHS. The information from the death certificate includes such variables as demographic characteristics, the manner of death, and the literal text from the certifier (often a coroner or medical examiner) on the causes of death and how the injury occurred.

NCHS then uses a software program known as SuperMICAR to code the medical information and literal text from the death certificate according to the rules of the [International Classification of Diseases, Tenth Revision \(ICD-10\)](#). The use of a standard process to assign the ICD-10 codes minimizes subjectivity and limits state-to-state variation in assigning the ICD-10 Codes. From this coding process, one underlying and up to 20 “multiple” causes of death are identified by the software or a trained nosologist. Figure 1 shows an example of the ICD-10 codes applied to the literal text from a death certificate.

Figure 1. Example drug overdose death certificate with ICD-10 codes

CAUSE OF DEATH (See instructions and examples)				Approximate interval: Onset to death
32. PART I. Enter the <u>chain of events</u> -- diseases, injuries, or complications -- that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation. Do not use the word "DUE TO" or "AS A RESULT OF". ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.				
IMMEDIATE CAUSE (Final disease or condition resulting in death)		a. ANOXIA BRAIN INJURY Due to (or as a consequence of):		G93.1 Anoxic brain damage, NEC
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST		b. SECONDARY TO INGESTION OF METHADONE Due to (or as a consequence of):		T40.3 Methadone
		c.		
		d.		
PART II. Enter other <u>significant conditions contributing to death</u> but not resulting in the underlying cause given in Part I.				33. WAS AN AUTOPSY PERFORMED? <input type="checkbox"/> Yes <input type="checkbox"/> No
X42 Accidental poisoning and exposure to narcotics and psychodysleptics, NEC				34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> No
35. DID TOBACCO USE CONTRIBUTE TO DEATH? <input type="checkbox"/> Yes <input type="checkbox"/> Probably <input type="checkbox"/> No <input type="checkbox"/> Unknown	36. IF FEMALE: <input type="checkbox"/> Not pregnant within past year <input type="checkbox"/> Pregnant at time of death <input type="checkbox"/> Not pregnant but pregnant within 42 days of death <input type="checkbox"/> Not pregnant but pregnant 43 days to 1 year before death <input type="checkbox"/> Unknown if pregnant within the past year	29. MANNER OF DEATH <input type="checkbox"/> Natural <input type="checkbox"/> Pending Investigation <input checked="" type="checkbox"/> Accident <input type="checkbox"/> Could not be Determined <input type="checkbox"/> Suicide <input type="checkbox"/> Homicide		
38. DATE OF INJURY (Mo/Day/yr)(Spell Month)	39. TIME OF INJURY	40. PLACE OF INJURY (e.g., Decedent's home, construction site, restaurant, wooded area) HOME	41. INJURY AT WORK? <input type="checkbox"/> Yes <input type="checkbox"/> No	
42. LOCATION OF INJURY: State:		City or Town:	Zip Code:	
43. DESCRIBE HOW INJURY OCCURRED DRUG INGESTION		TRANSPORTATION INJURY, SPECIFY <input type="checkbox"/> Unintended Operator <input type="checkbox"/> Passenger <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other (Specify)		
		T50.9 Other and unspecified drug		

Deaths with an underlying cause-of-death code indicating poisoning by drugs, medicaments, and biological substances are considered drug poisoning (or overdose) deaths. The ICD-10 underlying cause codes for drug overdose deaths by various intents include X40–X44 (unintentional), X60–X64 (suicide), X85 (assault), and Y10–Y14 (undetermined intent). The specific drugs involved in the death are identified using the ICD-10 multiple cause-of-death codes T36–T50, poisoning by drugs, medicaments, and

biological substances. ICD-10 uses the language ‘drug poisoning,’ however these are commonly called drug overdose deaths; this is the terminology used in this document.

Various factors can impact the completeness and accuracy of the cause of death information from death certificates. For drug overdose deaths:

- The words and terms used on the death certificate can influence the underlying cause assigned to the death. For example, the words “intoxication” or “toxicity” will result in the assignment of drug overdose as the underlying cause, while the words “abuse” or “use” will result in the assignment of an underlying cause related to mental health or behavior (i.e., an ICD-10 “F” code rather than an “X” or “Y” code).
- The location on the death certificate where information is recorded also influences the determination of the underlying cause. Information recorded in Part I or Part II of the death certificate is more influential in determining the underlying cause than information recorded in the “how the injury occurred” box.
- As mentioned above, terms such as “multiple drug toxicity” or “polypharmacy” identify the death as involving drug overdose, but do not provide the detail needed to classify the specific drugs that were involved in the death.

A complete and accurate death certificate for a drug overdose death should list the names of the drugs that contributed to the overdose, if known. The medical certifier uses multiple sources (e.g., toxicology reports, coroner investigation, medical examiner report, medical records) to make an informed decision about the specific drugs that contributed to the death. As described above, in processing the death certificate data, ICD-10 codes in the range of T36-T50.9 are assigned to the specific drugs or drug classes contributing to the death that are named in the literal text. If no specific drug names or drug classes are listed on the death certificate, the ICD-10 coding rules require that a single ICD-10 code, T50.9 for “other and unspecified drugs,” be assigned. The occurrence of T50.9 alone, with no other multiple cause-of-death ICD-10 code in the range of T36-T50.8, indicates that most likely no specific information on the contributing drugs was available on the death certificate.

By understanding the importance of the literal text and how the information from the death certificate is ultimately converted to ICD-10 coded data for analysis, state and local epidemiologists can begin to examine their own data, identify issues or problems that need to be addressed, and consider strategies to improve the quality and completeness of information on death certificates for drug overdose deaths.

Strategies and Recommendations: What epidemiologists can do to improve the quality of information on drug overdose deaths

1. Learn more about existing studies, methods and tools

- A recent study by Warner, et al. (2013) provides a baseline state-to-state comparison of drug overdose deaths by manner of death and by percentage of drug overdose deaths lacking information on the specific drugs involved. This baseline comparison can be very informative for states as they review the quality of their drug overdose mortality data. Updated results from 2013 and 2014 are also available on the NCHS website (NCHS, 2016).
- Epidemiologists from 11 jurisdictions, who are also members of the CSTE Overdose Subcommittee, evaluated the completeness and accuracy of the multiple cause-of-death fields for drug overdose deaths in their jurisdictions (Slavova et al., 2015). The methodological approach outlined in the study uses publicly available data from the Centers for Disease Control and Prevention (CDC) WONDER (Wide-Ranging Online Data for Epidemiologic Research, <http://wonder.cdc.gov/>) and can be easily replicated in other states.
- A major enhancement in identifying the drugs that contribute to drug overdose deaths can be achieved by analyzing the literal text from the death certificate. The CSTE Overdose Subcommittee developed an Epi tool that searches the electronic version of the literal text for references to specific drugs and other words of interest from the cause of death statement and the “how the injury occurred” text box. A new set of variables is created that includes the specific drug names identified (e.g., hydrocodone, oxycodone) (<http://www.cste.org/blogpost/1084057/211072/Epi-Tool-to-Analyze-Overdose-Death-Data>). Analyses using this derived variable can help determine the burden attributable to specific drugs.

2. Review your drug overdose data.

The Centers for Disease Control and Prevention, National Center for Injury Prevention and Control’s State Special Emphasis Report (SER) Instructions for Drug Overdose Death Data provides guidance on evaluating the completeness of state drug overdose data. These guidelines are available on the CSTE Injury subcommittee website (<http://cste.site-ym.com/page/InjuryResources>).

We recommend that epidemiologists consider several measures of data quality:

- The percent of drug overdose deaths that only have a drug multiple cause code of T50.9, other and unspecified drugs.
 - a. This measure reflects the percent of drug overdose deaths for which specific information about the drugs involved is not recorded on the death certificate.
 - b. To calculate this measure:

- Determine the total number of drug overdose deaths (i.e., deaths with an underlying cause of death of X40–X44, X60–X64, X85, or Y10–Y14). This value is the denominator in the percent calculation.
 - Determine the number of drug overdose deaths (from the denominator calculation above) that have only T50.9 as a drug multiple cause code (i.e., the death has T50.9 as a multiple cause and no other multiple cause code in the T36–T50.8 range). This value is the numerator in the percent calculation.
 - c. In 2014, 19% of drug overdose deaths in the US had T50.9 as the only drug multiple cause code (CDC WONDER, 2016). This value varied by state ranging from 0.4% to 52.3% of drug overdose deaths.
 - d. If a large percent of drug overdose deaths are coded solely with T50.9, the number/rates of deaths involving specific drugs would be an underestimate, and therefore misleading.
 - The percent of narcotic drug overdose deaths that only have a narcotic multiple cause code of T40.6, other and unspecified narcotics.
 - a. This measure reflects the percent of narcotic drug overdose deaths for which specific information about the narcotic involved is not recorded on the death certificate.
 - b. To calculate this measure:
 - Determine the total number of narcotic drug overdose deaths (i.e., deaths with an underlying cause of death of X40-44, X60-64, X85, or Y10-14 and a multiple cause code of T40.0-T40.6). This value is the denominator in the percent calculation.
 - Determine the number of narcotic drug overdose deaths (from the denominator calculation above) that have only T40.6 as a narcotic drug multiple cause code (i.e., the death has T40.6 as a multiple cause and no other multiple cause code in the T40.0-T40.5 range). This value is the numerator in the percent calculation.
 - c. In 2014, 4.3% of narcotic drug overdose deaths in the US had T40.6 as the only narcotic drug multiple cause code (CDC WONDER, 2016). This value varied by state ranging from 0.4% to 18.5%.
 - d. If a large percent of narcotic drug overdose deaths are coded with T40.6 only, there is likely an underestimation of the contribution of a particular type of narcotic (e.g., opium, heroin, methadone, other pharmaceutical opioids, cocaine) in drug overdose deaths.
 - The percent of all deaths (not just drug overdose deaths) with an underlying cause of R99, Other ill-defined and unspecified causes of mortality.

- a. Unpublished reviews of national data suggest that some of the deaths assigned an underlying cause code of R99 might actually have resulted from drug overdose. Analyses have shown an inverse relationship between the percent of R99 deaths and the rate of drug overdose deaths in individual states. For example, in some states in some years, when the percent of R99 deaths was higher than average, drug overdose death rates were low.
- b. To calculate this measure:
 - Determine the total number of deaths from all causes. This is the denominator in the percent calculation.
 - Determine the number of deaths with an underlying cause of R99. This is the numerator in the percent calculation.
- c. In 2014, the percent of deaths in the US with R99 as the underlying cause was 0.4% and varied by state, ranging from 0.07% to 2.0% (CDC WONDER, 2016).
- d. A high percent of deaths coded to R99 might complicate efforts to understand the magnitude and trends in drug overdose deaths. If the jurisdiction of interest has significant variability in the R99 deaths that corresponds to variability in drug overdose mortality during the same time period, consider noting this finding when presenting the results of a trend analysis.

More detailed analyses could include:

- Use the Epi tool mentioned in Section 1 to identify the number of drug overdose deaths with morphine listed in the literal text with no indication of whether the morphine was from heroin or pharmaceutical morphine. This is important because heroin is metabolized into morphine in the body, and in many cases toxicology testing cannot distinguish between heroin and pharmaceutical morphine. Heroin has been found to be underrepresented on death certificates, and instead listed as morphine (Mertz, 2014 & Davis, 2013).
- Check the sensitivity of specific drugs involved in drug overdoses on the death certificate by comparing them to toxicology reports, if available. It is also important to understand the limitations of this comparison. The medical examiner or coroner may not have listed all of the drugs involved in the overdose if they believed one or more of the drugs did not play a role in the death (Goldberger, 2013).

3. Collaborate with the state's vital statistics registrar

We recommend that epidemiologists consider sharing their observations about the quality of the data from death certificates on drug overdose deaths with their state vital statistics registrar.

The state vital statistics registrar's office collects death certificates from local registrars and is generally the primary entity at the state health department to review the literal text for cause of

death. The state registrar can query the coroners and medical examiners if the information they provide is not clear or complete.

Cause of death querying is performed to obtain more complete and accurate mortality statistics. A secondary function is to educate the medical certifier on the proper method of completing the cause of death. NCHS has developed the cause of death querying manual, which is available at http://www.cdc.gov/nchs/data/dvs/Instruction_Manual_revise20_2013.pdf.

Washington State has used the query process to improve drug reporting for drug overdose deaths (see WA lessons learned). Washington State uses a SAS program to identify candidate death certificates for querying based on rare, questionable, or non-specific underlying cause-of-death codes. From the list of candidate death certificates, the literal causes of death are manually reviewed to determine if the certificate should be queried. This manual review is necessary because sometimes the certifier has already indicated that no additional information is available. The SAS program is dynamic and can be revised if there is an emerging public health question or concern. If it is determined that a certificate should be queried, a letter is created and sent to the medical certifier. The letter contains contact information in case the certifier has questions. A return envelope for the response is also included. Many medical certifiers have received little or no training on how to complete a death certificate, and the query letter provides an opportunity for input on common errors and omissions. Washington State does not require that the medical certifier fill out an affidavit of correction, which would change the description of the death on the official death certificate. Instead, only the literal text sent to NCHS for recoding of the cause of death is changed.

State examples of lessons learned

Kansas

The state vital statistics registrar helped us to understand and communicate with staff members who work directly with coroners. Having a good relationship with the vital statistics registrar clarified the relationship between coroners and medical examiners and the state health department. We needed to understand coroners and medical examiners constraints, which are mainly time, cost of toxicology testing, and legal ramifications. Our vital statistics registrar collaborated with us to develop the optimum methods to obtain buy-in and to communicate with coroners and medical examiners. We also learned that coroners and medical examiners have their own mission and purpose. We needed to understand exactly what changes we wanted from the coroners and medical examiners. Building a mutually beneficial working relationship will take time and patience.

Kentucky

Kentucky drug overdose statistics and epidemiological studies are a primary responsibility of the Kentucky Injury Prevention and Research Center (KIPRC), the bona fide agent for the Kentucky Department for Public Health (KDPH) in injury surveillance and prevention. KIPRC and the

Kentucky Office of Vital Statistics (KOVs) have a memorandum of understanding that provides KIPRC with timely access to KOVS death certificate (DC) electronic data record extracts for injury surveillance, including drug overdose surveillance. The KOVS collaborates with other state partners and agencies, including KIPRC, to identify and address DC data limitations and data quality issues. In July 2010 the state upgraded the KOVS data system for electronic reporting and expanded available electronic data fields, including text narrative on the causes of death and a text description of how the injury occurred.

With understanding about the importance of having complete and accurate information about the specific drugs involved in the overdose deaths, KIPRC's epidemiologists began systematic analysis of the Kentucky drug overdose death certificates, using the electronic death certificate database and utilizing the ICD-10 codes according to the Injury Surveillance Workgroup on Poisoning's Consensus Recommendations for National and State Poisoning Surveillance (ISW7, 2012). In 2013, KIPRC's statisticians produced a graph on Kentucky resident drug overdose deaths that reported 1) total number of drug overdose deaths, 2) numbers of deaths involving specific drug categories (e.g., prescription opioids, benzodiazepines, and heroin), and 3) overdose deaths that had an ICD-10 code T50.9 and no other ICD-10 code in the range T36-T50.8 was assigned to the death record. The graph showed that for approximately one-third of all drug overdose deaths, no specific drug(s) was mentioned on the death certificate. The graph was widely disseminated to stakeholders (e.g., Kentucky Office of Drug Control Policy and State Medical Examiner), organizations, and researchers, and included in KIPRC's annual state drug overdose report to raise awareness on the importance of complete and accurate death certificate data to assess the magnitude of specific drugs involved in the drug overdose epidemic (pg. 5, [Drug Overdose Deaths in Kentucky, 2000 - 2013](#)). This analysis became even more important when the state enacted seminal prescription drug overdose prevention laws requiring accurate data to evaluate effectiveness of the laws (KRS §218A.172; KRS §218A.175; KRS §72.026; 201 KAR §8-540, §9-260, §20-057). KIPRC, KOVS and KDPH collaborated on a drug overdose fatality reporting framework including 1) standardized case definitions; 2) data limitations, disclaimers, extraction date(s), and suppression rules; 3) reporting of data quality issues (e.g., duplicated records, delayed upload of out-of-state deaths, truncation of text fields); and 4) ad hoc request completion guidelines. This KIPRC and KOVS partnership lead to better drug overdose fatality surveillance and data quality, and informed stakeholders on emerging trends in Kentucky with support from CDC's National Center for Injury Prevention and Control and the Bureau of Justice Assistance.

Washington

The mortality epidemiologist in our vital statistics office has historically been interested in drug overdose deaths. The idea for starting a query process for unspecific drug overdose death certificates came from the mortality epidemiologist who was troubled by the lack of drug specificity. She collaborated with her colleagues in the vital statistics registrar's office to set this up. There were three different types of deaths that were queried: 1) no drug was present, 2) 'opiate' was listed, but not a specific 'opiate,' and 3) morphine was listed, but the source was

unclear (heroin or pharmaceutical morphine). The query process started in 2010, and 67 queries were sent to medical examiners and coroners. Since that time, the number of deaths with unspecific terms such as 'opiate' and 'morphine' has declined. In 2007-2009, an average of 11% of all opioid-involved overdose deaths used the unspecific term 'opiate' instead of listing a specific opioid. In 2013, this had declined to 5%, which is likely due to the implementation of query process.

4. Collaborate with coroners and medical examiners

Several resources provide useful background information to better understand the responsibilities of coroners and medical examiners and how they approach the investigation of a drug overdose death.

The CDC's Public Health Law Program (PHLP) in conjunction with the National Center for Health Statistics assessed the state laws for coroners and medical examiners and developed an online tool that summarizes each state's death investigation structure and processes. The tool is available at: <http://www.cdc.gov/phlp/publications/topic/coroner.html>.

Two recent reports provide recommendations to coroners and medical examiners for the investigation, diagnosis and certification of deaths related to opioid drugs (Davis, 2013; Goldberger, 2013). Among the topics mentioned are: resource constraints common in forensic practice that influence decisions on when and how to perform toxicology testing; the challenge of interpreting postmortem drug concentrations when determining the causes of death; the difficulty in distinguishing between pharmaceutical morphine and heroin; the synthesis of data from multiple sources to accurately determine and document causality; and the need to assign each manner of death as unintentional, intentional, or of undetermined intent.

One of the challenges in better reporting of drug overdose deaths may relate to the fact that fewer than 10% of the counties in the U.S. have a board certified forensic pathologist (Hanzlick, 2014). Although empirical evidence from published evaluations or research is very limited, anecdotal information suggests that possible reasons that the specific drugs involved are not always reported on the death certificate include:

- A toxicology test was not performed. For some jurisdictions, the cost of toxicology testing may be prohibitive.
- In a death involving multiple drugs, it may be difficult to determine which drugs were causally related to the death. Rather than name a specific drug or drugs, descriptions such as "polypharmacy" or "multi-drug" are used.
- There can be a delay in receiving the results from toxicology testing. Often, to meet the requirements for reporting a death within a specific time frame from the time of death, a death certificate is submitted to the state vital statistics registrar before all the details

are known. The death certificate might not be updated when new information from the toxicology testing becomes available.

- The coroner/medical examiner may have an established practice about how manner and cause of death are reported on the death certificate.
- The coroner/medical examiner might not recognize how public health officials use the data on drug overdose deaths to identify possible prevention strategies or why the information on the specific drugs involved is important to include on the death certificate. Coroners and medical examiners often report to law enforcement officials, but might not provide be aware that the same information is useful to the state health department, and that the death certificate is the current mechanism to convey this information.
- There might be limitations resulting from the structure/layout of reporting forms, such as limited space on the death certificate paper form or in software (e.g., a limited number of characters allowed, prohibited use of special characters).

To best understand the factors that are relevant in your state, talk to your state medical examiner or coroners. This could be a one-on-one conversation, a focus group with several coroners/medical examiners, or a presentation at the state coroner/medical examiner association meeting. If your state has funding to participate in the National Violent Death Reporting System, include this topic in discussions with the coroners and medical examiners. Here is a list of topics that could be considered for the conversation.

- Share data with them (e.g., results from data analysis as well as the data quality measures mentioned in Section 2).
- Explain why public health is interested, why the information on the specific drugs involved is needed and how the information is used in your state.
- Discuss possible reasons for underreporting of specific drugs, and potential solutions.
- Identify the barriers and possible solutions.
- Share successes from other states and what exactly the state would like to see from coroners and medical examiners.
- Provide background on the flow of information between coroners, vital registrar, epidemiologists, and law enforcement.

Once the barriers are identified and understood, consider possible solutions. Some states have found that funding and legislative changes can be helpful.

Increased funding sources to pay for toxicology testing

In Kansas, since 1993, statute [KSA 22a-245](#) has enabled funding to be provided to the coroners from the sale of each death certificate. This funding is dispersed annually based on the number of recorded deaths in each county for the prior calendar year. These funds are primarily used to pay for autopsies, but could be used to pay for toxicology testing.

State legislation requiring toxicology testing

To improve the completeness of drug overdose fatality death certificate data, Kentucky enacted KRS 72.026 in 2013, and amended it in 2015, that requires postmortem controlled substance testing by coroners and medical examiners in cases described by KRS 72.025. Postmortem toxicology testing is performed by an accredited national laboratory, and paid by the Kentucky Medical Examiner's Office (MEO). If the cause of death is determined to be a drug overdose, the law requires the coroner/medical examiner to provide notice of the death to 1) the state vital statistics registrar and Kentucky State Police, including drug-related information on the overdose; 2) licensing board of prescriber or dispenser of the medication, if known; and 3) the Commonwealth's attorney and local law enforcement agency for coroner cases if a schedule I controlled substance was involved. The state vital statistics registrar has five business days to report new, and amended, drug-related deaths to the Kentucky MEO. With funding from CDC's Prescription Drug Overdose Prevention program, the Kentucky Injury Prevention and Research Center is currently evaluating the effectiveness, and performing a cost-benefit analysis of the law.

State examples of lessons learned

Kansas

In 2014, Kansas initiated drug overdose fatality surveillance improvement after taking part in a national study on drug specificity (Slavova, 2015). The most important lesson we learned was identification of state health department and coroners' needs based on a better understanding of death certificate attributes, potential strategies to improve drug specificity, and communication of findings. For example, we analyzed the literal text to better understand why many records were unspecific and identify areas of improvement. We recommended being prepared before beginning the conversation with coroners and medical examiners.

Kentucky

In Kentucky, drug overdose death certificates are completed by elected county coroners. In 2010, almost one third of Kentucky drug overdose death certificates did not list any drugs contributing to the overdose death, leading to undercounting of the contribution of prescription opioids in drug overdose deaths. To improve drug overdose death surveillance quality, the Kentucky MEO provided drug overdose death certificate completion training and drug overdose death completion suggestions based on toxicology results to coroners. With support from CDC's Drug Overdose Prevention program, the Kentucky MEO and the KIPRC established a multi-source Kentucky drug overdose fatality surveillance system based on death certificate, coroner investigation, autopsy, toxicology, and prescription drug monitoring program data. Also, KIPRC hired a data analyst who is physically located in the MEO and maintains the integrated drug overdose fatality surveillance system, communicates with coroners on drug overdose fatality findings, and tracks drug overdose death certificate completion. Initial results indicate that the

percentage of drug overdose death certificates listing specific drugs contributing to the death increased by 10% over the last 4 years.

Washington

In 2015, the Washington State Department of Health (DOH) injury epidemiologist and mortality epidemiologist requested to speak to members of the Washington Association of Coroners and Medical Examiners. DOH staff gave a presentation to their board members first, and then at their annual meeting. The presentations were essentially the same for both groups, and focused on improving understanding of why it is important to public health that they capture all drugs involved in an overdose death, ICD coding for drug related deaths, that literal text on the death certificate determines how the death gets coded, specific examples of ICD coding when the words “morphine” or “opiate” are used, a summary of the query process used by our vital statistics office and why we need their help, a graph showing a decline in the use of the words “morphine” and “opiate” since the query process began, and a list of three recommendations. Copies of the presentation are available on the CSTE Overdose webpage (<http://www.cste.org/members/group.aspx?id=87615>).

New York City

Since 2008, the New York City Department of Health and Mental Hygiene (NYC DOHMH), Bureau of Alcohol and Drug Use Prevention, Care, and Treatment has worked with the Bureau of Vital Statistics and the Office of the Chief Medical Examiner (OCME) to improve drug specificity in the reporting of unintentional drug overdose deaths in New York City. NYC DOHMH staff first identified many drug deaths where the underlying cause of death was listed as “acute and chronic substance use,” which resulted in these deaths being assigned an underlying cause of death as ‘related to mental health or behavior’, and coded with an F-code. After discussing this with the OCME, these deaths were actually ‘acute intoxications.’ Based on these conversations, the OCME switched their terminology to accurately reflect the underlying cause of death. We saw a significant decline in the use of ‘acute and chronic substance use’ and fewer F-codes, and increase in drug overdose deaths. As a result, we were also able to improve the reporting of specific drugs involved in drug overdoses through T-codes. We also met with OCME to discuss the reporting of heroin deaths, specifically deaths which listed “morphine” on the death certificate. We asked medical examiners to consistently include 6-monoacetylmorphine on the death certificate as positive toxicology for heroin. OCME started testing for 6-monoacetylmorphine in urine and vitreous samples to their standard protocols. This resulted in improved specificity of heroin-involved overdose deaths.

In 2014, OCME requested that we present data in a grand rounds meeting. We provided information on the bureau and gave a data presentation on the public health surveillance of drug overdose fatalities in New York City. We also presented data on the comparison of toxicology findings, ICD-10 coding, and literal text on death certificates. We discussed reasons

for discordance in heroin-involved, cocaine-involved, and benzodiazepine-involved overdose deaths. We highlighted the need for improvement when reporting heroin-involved overdose deaths, specifically to avoid using the terms “opiate” or “opioid” if heroin could be distinguished in toxicology results. We also asked to avoid terms such as “multiple drug toxicity” or “multiple drug involvement”, and instead requested specification of the drugs in the literal text field. Medical examiners acknowledged this issue, and many were committed to improving this in their work. Medical examiners highlighted the need to also include the parent cocaine compound in our surveillance definitions. Medical examiners expressed concern about benzodiazepine toxicology involvement, which conferred additional discussion. Since the meeting, the New York City Office of Chief Medical Examiners joined RxStat, the public health and public safety collaboration in New York City, whose primary goal is to reduce overdose deaths. OCME continues to be an active partner in assisting public health surveillance of drug overdose deaths. Follow-up meetings are planned to review current sensitivity findings using more recent data, and to discuss other data collection questions.

Conclusion

Specific drug reporting on death certificates has improved in several jurisdictions, and state and local epidemiologists played a role in this process. These recommendations can be used by other epidemiologists and public health partners to improve specific drug reporting on death certificates in other jurisdictions.

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