

Deciphering Suicide and Other Manners of Death Associated with Drug Intoxication: A Centers for Disease Control and Prevention Consultation Meeting Summary

Manner of death (MOD) classification (i.e., natural, accident, suicide, homicide, or undetermined cause) affects mortality surveillance and public health research, policy, and practice. Determination of MOD in deaths caused by drug intoxication is challenging, with marked variability across states.

The Centers for Disease Control and Prevention hosted a multidisciplinary meeting to discuss drug intoxication deaths as they relate to suicide and other MOD. The meeting objectives were to identify individual-level, system-level, and place-based factors affecting MOD classification and identify potential solutions to classification barriers.

Suggested strategies included improved standardization in death scene investigation, toxicology, and autopsy practice; greater accountability; and creation of job aids for investigators. Continued collaboration and coordination of activities are needed among stakeholders to affect prevention efforts. (*Am J Public Health*. 2017;107:1233–1239. doi:10.2105/AJPH.2017.303863)

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Accurately classifying how someone died (by natural causes, accident, suicide, homicide, or an undetermined cause), called manner of death (MOD), is critical to public health. This information feeds directly into mortality surveillance systems that, in turn, drive prevention, research, policy, monitoring and evaluation, and allocation of resources.¹ Since 1790, suicide rates have been considered to be substantially underestimated, both internationally and domestically, with variations across countries.^{2–6} In modern times, underestimation is thought to range from 10% to 30%.^{2–4,7,8}

Undercounting may result from stigma avoidance; legal, religious, and political pressure; and underresourcing of medicolegal death investigation systems, among other reasons.^{4,6,8,9} In an effort to standardize MOD ascertainment, the National Association of Medical Examiners (NAME) developed *A Guide for Manner of Death Classification* in 2002.¹⁰ Although this document was considered a milestone in the field, death investigation systems and the authority to require guidance compliance are highly decentralized in the United States,¹¹ and thus undercounting likely persists.

Research suggests that many suicides, defined typically as

self-inflicted acts with the intent to die, may be hidden among accidental deaths^{12,13} (the term “accident” vs “unintentional death,” which is preferred in the field of injury prevention, is the official label used in ascribing MOD and thus is used here out) and undetermined deaths (the manner ascribed when no single MOD is more compelling than another given the information available).^{3,14} Undetermined deaths are made up largely of drug intoxication deaths, also called “drug overdose” and “drug poisoning” deaths. (The term “drug intoxication” is used throughout to refer to both prescription and recreational drugs. The latter are used for their psychoactive effects without medical justification, and they do not have a prescribed dosage meant to be followed.¹⁵)

Drug intoxication deaths are thought to be among the most challenging for which to

determine MOD.^{1,13} This is, in part, because of potentially equivocal evidence and intent to die, the overlapping demographic groups affected (e.g., middle-aged men), and overlapping premorbid risk factors (e.g., substance abuse, mental health problems).^{6,15–18} The percentage of drug intoxication deaths classified as undetermined varies greatly across the United States. Between 2008 and 2010, percentages ranged from 1% to 85% across states, with an average of 8%.¹ From 2011 to 2014, the average dropped to 6.7%.¹⁵ Although this average is small and many undetermined deaths are correctly classified, accurate accounting of deaths that may be misclassified is critical in guiding public health research, policy, and practice; this is especially the case in the current context, wherein rates of drug intoxication deaths across all MODs increased 2.7-fold from

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1999 (6.0 per 100 000 population) to 2015 (16.3 per 100 000 population).¹⁵

In March 2015, the Centers for Disease Control and Prevention (CDC) convened a meeting to discuss barriers and potential solutions to misclassification of drug intoxication deaths. This meeting built on previous CDC-supported efforts, including a 1988 panel that developed operational criteria for determining whether a person died by suicide¹⁹ and a 2012 panel that resulted in NAME's recommendations regarding investigation, diagnosis, and certification (i.e., attesting to the fact that a death took place as a result of the causes stated on the death certificate) of deaths related to opioid analgesics.²⁰

The 2015 meeting was also meant to complement CDC's current strategies to prevent opioid overdose deaths, specifically improving data quality and safe prescribing practices and strengthening state prevention efforts.²¹ The 3 core objectives of the meeting were to (1) identify individual- and systems-level factors affecting MOD classifications, (2) identify place-based factors (e.g., geographical, political, and cultural) affecting classifications, and (3) obtain input from individual meeting participants on potential solutions to reduce inconsistencies in classifications of drug intoxication deaths across states and jurisdictions.

METHODS

With input from partner organizations, CDC developed a list of 16 expert consultants, including law enforcement personnel, medical examiners and coroners (ME/Cs), suicidologists, substance abuse researchers, toxicologists, epidemiologists,

and state and federal collaborators. The consultants provided individual input in a 1.5-day meeting with CDC staff. A third-party facilitator guided the discussion, and selected panelists were invited to give presentations introducing and informing each section of the meeting, which corresponded to a particular objective. The results described here reflect the opinions of the panelists and are accompanied by supporting citations when appropriate.

RESULTS

Consultants identified 3 basic conditions from which variability in MOD classification of drug intoxication deaths was thought to stem: (1) ambiguous evidence at the death scene or the circumstances leading to the death, (2) missing or incomplete information because either no death scene investigation (DSI) took place or information was not obtained or was only partially obtained during the DSI, and (3) heterogeneous DSI practices (Table 1). We describe specific issues contributing to this variability. It should be noted that in some instances, as specified, discussions by the panelists extended beyond classification of deaths caused by drug intoxication to include other causes of death (e.g., suffocation, drowning).

Individual-Level Factors Affecting Classification

Observer bias. Underreporting of official suicide rates (as a result of underclassification) may affect certain demographic subgroups more than others^{8,12,22–24} and may be a result of observer (e.g., death scene investigator, ME/C) bias. Such bias may

result, for example, from one's perception or interpretation of social norms as they relate to manners and causes of death among subgroups. It was noted that suicide decedents, overall, are likely to be White, middle aged, and male,^{22,23} whereas decedents with an undetermined MOD (according to all mechanisms, drugs or otherwise) are more than twice as likely to be Black/African American as White.²³

Moreover, in nearly half of the states implementing the National Violent Death Reporting System (NVDRS), more than 50% of undetermined deaths among African Americans involved unknown circumstances of death (at the time of reporting to the surveillance system).²³ Conversely, only 2 states had unknown circumstance rates exceeding 50% among White decedents with undetermined deaths.²³ A noted limitation, that the NVDRS may not contain the complete information available to the certifier when determining MOD, was mentioned. Other evidence of bias included the fact that undetermined MOD (from all causes) has been associated with Hispanic ethnicity, less educated decedents, non-comorbid psychiatric disorders, drug intoxication, and female gender.^{22–24}

Medical examiner training and philosophy differences. Chief medical examiners differ in their expressed philosophies or guiding principles regarding MOD according to where they completed their graduate training and where they practice.²⁵ These principles, typically unwritten rules or standards, often dictate office operating procedures. As such, they potentially contribute substantial levels of unobserved variation in evidence and scene interpretation and, thus, MOD

classification. Moreover, the philosophy of the chief medical examiner may take precedence over issued consensus statements or guidelines put forth by professional organizations or agencies addressing the importance of scene evidence, autopsy findings, and toxicology results.

Lack of appreciation of the implications of death scene investigations. The consultants indicated that death scene investigators, depending on their training and experience, may not fully appreciate the far-reaching implications of their work. Specifically, they may not be aware that the outcomes of their investigations ultimately feed back into prevention efforts in public health vis-à-vis MOD determination, death certificate completion, and mortality surveillance systems.

Concern for, or by, next of kin. The consultants also indicated that if ME/Cs do not have clear and convincing evidence to rule a suicide, they will typically default to an accident as the MOD. Even amid evidence supporting suicide, ME/Cs may still hesitate to rule a death as such to avoid inflicting stigma or pain on the family. This may be especially true in instances in which the family argues strongly against suicide. Similarly, if the family opposes a suicide determination and the ME/C finds the evidence supporting suicide lacking in any way, the ME/C may declare the death undetermined to avoid a potential legal dispute.

Ambiguous intent. An important contributor to undercounting of suicides is ambiguous intent. In a study of people who had recently experienced a non-fatal overdose, Bohnert (unpublished data) asked participants to rate their intent, as follows: totally an accident, totally

TABLE 1—Summary of Barriers and Potential Solutions to Inconsistent Manner of Death Classifications Involving Drug Intoxication Deaths

Barriers to Consistent Classification	Potential Solutions
Individual-level factors	
Observer bias	Continuing education, training, and certification
ME training/philosophy differences	MEs
Implications of DSI for prevention efforts not fully appreciated	Coroners
Concern by or for next of kin	Law enforcement personnel
Ambiguous intent	Improved communication between and within disciplines:
Overlapping decedent risk factors	Reinstitution of the MECISP
	Attendance of death scene investigators at suicide prevention coalition meetings
Certifier fear of litigation	Immunity from litigation and talks with the industry
System-level factors	
Varying definitions and burden of proof standards	Standardization of definitions and establishment of new DDSI definition
Multidisciplinary differences in DSI training and practice	Standardization of practices
	Standard protocol for DSI of potential suicides
	Improved implementation of existing guidelines
	Use of SUID case example as a model
	Creation of job aids
	Accountability and accreditation
	Enhanced use of death certificate
Variations in toxicology and autopsy training and practice	Creation and adoption of best practices for toxicological testing and autopsies
Variability in resources and infrastructure	Documentation of issues via research and surveillance and examination of their impact on classification and prevention
Place-based factors	
Differences in social, political, economic, and cultural contexts	Research on the impact of place-based differences

Note. DDSI = death from drug self-intoxication; DSI = death scene investigation; ME = medical examiner; MECISP = Medical Examiner and Coroner Information Sharing Program; SUID = sudden unexpected infant death.

a suicide attempt, a passive wish to die, or I knew there were risks and I just didn't care at the time. Many respondents chose the latter 2 options indicating ambiguous intent. This suggests that intent can be unclear, even to the person initiating the action; in such cases, had a death resulted, it would have been correctly classified as undetermined. However, this situation also underscores the need for a thorough investigation to ascertain intent that is discoverable from intent that is truly ambiguous.

Overlapping decedent risk factors. Overlapping decedent risk factors in drug intoxication deaths include mental health problems, prior suicide attempts, and pain conditions.^{16,17,26} Similarly, substance use disorders, long associated with suicide,²⁷ have also been found to be associated with homicide, undetermined MOD, and accidental MOD.^{28–30} As a result of this overlap, one cannot simply assess the presence or absence of these factors in assigning MOD.

Certifier's fear of litigation. A higher burden of proof is often ascribed to suicide, meaning that certifying a death as a suicide requires a greater level of evidence than that required for other MOD classifications. A history of legal challenges associated with suicide determinations, for example suits brought by next of kin over nondisbursement of life insurance payments, may be to blame and may deter some ME/Cs from classifying true suicides as such.

System-Level Factors Affecting Classification

Varying definitions and burden of proof standards. Myriad system-level factors likely contribute to inconsistencies in MOD classification. Most notably, MOD classification is often dependent on the burden of proof stipulated in state codes or as dictated by office operating procedures (see the earlier discussion of training and philosophy). For instance, the same drug intoxication death with the same circumstances may be classified one way in one jurisdiction and another way in another jurisdiction. This inconsistency, even if the classification according to the burden of proof is correct, has the potential to affect large numbers of deaths and skew mortality estimates across MOD classifications.

In Utah, for example, the enabling legislation defines suicide as “death caused by an intentional and voluntary act of a person who understands the physical nature of the act and intends by such act to accomplish self-destruction.”³¹ This is a more stringent threshold than other states' definitions, for example those that reference common law (“suicide is the intentional, voluntary taking of one's own life”).³² Other standards include those put forth by NAME, which states that a suicide determination requires a preponderance of evidence, equated with about 70% certainty.¹⁰

Differences in training and practice among death scene investigators and medical examiners and coroners. Death scene investigators include law enforcement personnel and in some cases ME/Cs, as well as other certified and noncertified individuals acting on behalf of ME/Cs. All investigators have responsibilities

for collecting data that will inform MOD, and yet each group has unique duties and training incumbent upon it (e.g., law enforcement personnel collect evidence to rule out the commission of a crime). Similarly, training among investigators varies across disciplines. For example, MEs are highly trained medical professionals, whereas coroners are typically elected officials³³ and are not required to have an advanced professional education.

Variations in toxicology and autopsy training and practice. A lack of information, knowledge, or training can lead a certifier to make an uninformed decision about MOD, especially in the absence of toxicological testing. As an example, an ME/C could misclassify the death of an older man with known coronary problems if there was no autopsy, toxicological testing, or investigation for drug involvement. Conversely, a more detailed and complete investigation could result in the correct conclusion, that the death involved drug intoxication. The consultants noted that, even with complete toxicological testing, errors could be introduced via limited information in the toxicology report or via autopsy findings interpreted in the absence of toxicology results.

Variability in resources and infrastructure. The quality of the evidence collected in DSI and in the completion of other tasks associated with MOD certification is often resource dependent. Jurisdictions may lack sufficient funding to collect complete scene evidence and to conduct toxicological testing and autopsies. As an example, in the 1960s most of the investigations of potential suicides in Los Angeles County, California, included a full psychological autopsy, an in-depth

examination of the surrounding circumstances. Today, Los Angeles and most other jurisdictions can no longer afford such resource-intensive procedures. Resource constraints may also affect whether, and how many, specific drugs are tested for and subsequently documented on the death certificate.

Other noted infrastructure barriers include the chain of command within a medicolegal death investigation office and even the physical location of offices within a state. For example, the probability of a specific case being investigated could be influenced by whether the coroner's office is co-located alongside the attorney general's office.

Place-Based Factors Affecting Classification

Drug intoxication death rates vary markedly within and across states, as do drug intoxication suicide rates specifically. Social, political, economic, and cultural contexts may account for these variations. Politics and stigma, deemed to be particularly relevant in smaller jurisdictions, can affect MOD classification, particularly in the case of suicides. Similarly, in places where coroners are elected, they may feel pressure to rule on the side of stakeholders, typically against a suicide determination.

A study conducted by Rockett et al. addressed factors implicated in misclassifications, including economic, political, and cultural contexts.¹² Curious about interstate variations in drug intoxication deaths and suicides in particular, Rockett and his colleagues examined death certificate data and found that in instances in which one or more specific drugs were noted on the death certificate, a state had greater odds of classifying the

drug intoxication death as a suicide as opposed to an undetermined or accidental MOD. This finding was considered to reflect both the scope and the quality of toxicological testing, which are likely correlated with other factors related to the investigation such as resource availability. Ultimately, Rockett et al. concluded that interstate variation in drug intoxication deaths classified as suicides appears to be partially an artifact of geographic region and degree of toxicological assessment.¹²

Potential Solutions to Individual-Level Barriers

Continuing education, training, and certification. Although MEs are assumed to be knowledgeable about suicide risk factors and other suicide-related issues, continuing education could provide opportunities for them to stay informed on the latest developments in the field and provide needed support for early-career MEs. Similarly, standardized training and continuing education were suggested for both new and veteran law enforcement personnel and coroners given the relatively high turnover within these professions. In addition, certification of death scene investigators by the American Board of Medical Death Investigators was suggested as an important strategy to improve DSI, decrease observer bias, and ultimately improve MOD classification.

Improved communication. To aid communication and promote sharing of ideas among ME/Cs, the consultants suggested reinstatement of the CDC's ME/C Information Sharing Program.³⁴ This program could serve the functions it once did, of improving DSI quality, promoting standardized practices, facilitating

communication among investigators, improving dissemination of information regarding investigated deaths, and promoting the sharing and use of ME/C death investigation data. (Since the CDC meeting took place, this solution has in part been achieved, as the National Commission on Forensic Sciences voted unanimously in August 2015 to adopt a proposal for electronic networking of ME/C offices in the United States.)

Improved communication between ME/Cs and law enforcement personnel was also suggested, as the latter conduct most of the DSIs in the United States, with ME/Cs determining MOD. Other suggestions included inviting ME/Cs and law enforcement personnel to attend suicide prevention coalition meetings where members of the community share information and investigators can gain a greater appreciation and understanding of how their work affects suicide prevention and public health more broadly.

Protection from litigation. To support the best work of ME/Cs and investigators, consultants suggested that they be protected from litigation. In addition, conversations with the life insurance industry were suggested to discuss the impact of rules and regulations regarding life insurance payments on surviving family members, ME/Cs, and the industry itself and to devise potential improvements to identified issues, including MOD classification.

Potential Solutions to System-Level Barriers

Standardization of definitions. The consultants suggested examining the multiple definitions of suicide and burden of proof

across jurisdictions and evaluating how these variations affect MOD classification. Rockett and Caine suggested that there is a need for an additional descriptive term—death from drug self-intoxication (DDSI)—for use in the NVDRS and epidemiological studies. It was noted that public health is challenged to find approaches recognizing the contributions of premorbid self-injurious behaviors (e.g., drug intoxication) that change the probability of premature death. In a similar manner, Haddon reframed traffic deaths not as “accidents” or random phenomena but as statistically predictable fatal injuries at the population level that can be examined scientifically.³⁵ DDSI would encompass all drug intoxication suicides and most accidental and undetermined drug intoxication deaths resulting from an individual’s own harmful behavior, regardless of intent.³⁶

According to Rockett et al, operationalization of DDSI as a working category based on the death certificate and multiple sources of data would enable researchers studying suicide, substance abuse, and prevention science to end their dependence on medicolegal determinations of MOD that force choices of “accidental” and “undetermined” when there are insufficient data of proximal suicidal intent.³⁶ DDSI, it was noted, would not require modification of extant MOD categories or *International Classification of Diseases* coding practices, but its operationalization would be greatly enhanced if drug types and doses were more consistently recorded on death certificates.

Standardization of practices. A standard protocol for DSI is in need of development, specifically for suspected suicides. A review of the National Institute of

Justice’s *Death Investigation: A Guide for the Scene Investigator*,³⁷ which includes recommendations focused on operational criteria for determining suicide¹⁹ and certification of deaths related to opioid drugs,²⁰ could provide initial guidance.

Other means to support standard practices include studying the model set by CDC’s Sudden Unexpected Infant Death Expert Panel,³⁸ which developed a system for better surveillance of sudden unexpected infant deaths, improved related practices, and created job aids. In the case of job aids, the creation of a DSI checklist or mobile application (i.e., app) was suggested. Such a tool could walk investigators through standard DSI steps in instances in which drugs (or other causes of death) may be involved, including documenting prescription dates, actual versus expected pill counts, veteran status and marital status, known life stressors (e.g., unemployment, substance abuse history), and suicide warning signs (e.g., social withdrawal). Such tools could also serve quality assurance and professional development functions.

Encouragement of accountability and accreditation. As discussed by the consultants, most professional fields include metrics such as core and quality measures and acceptable practice parameters. DSI systems would also benefit from quality assurance oversight, including a set of agreed-upon practice parameters and core metrics to which ME/Cs are required to adhere.

In addition, recognizing that guidelines are created without enforcement and that state medical boards do not directly govern medicolegal death investigation systems, the consultants suggested that an oversight body be established. Involving

stakeholders and various professional organizations such as NAME, the American Academy of Forensic Sciences, the American Board of Medical Death Investigators, the International Association of Coroners & Medical Examiners, the National Association of Public Health Statistics and Information Systems, and the International Homicide Investigators Association would be important. Finally, accreditation, such as that offered by NAME, the International Association of Coroners & Medical Examiners, and the National Commission on Forensic Sciences (which recently issued draft recommendations on accreditation and certification), was discussed as a means of ensuring greater accountability.

Enhanced use of death certificates. Several suggestions related to the death certificate were put forth, such as including space to indicate deaths associated with clinically significant premorbid substance abuse, including check boxes to indicate the reason a death was classified as undetermined, and developing investigator training guidelines to support better specification on the certificate of drugs involved in intoxication deaths. Currently, it is not uncommon to find notations such as “multidrug intoxication” and “polypharmacy.”

Creation and adoption of best practices for toxicological testing and autopsy. Although toxicological testing is conducted more commonly for drug intoxication deaths than for other deaths, such testing is neither guaranteed nor universal. Several suggestions for best practices were put forth, including toxicological testing for all likely drug intoxication deaths, interpretation of toxicology results only in conjunction with autopsy findings, and development of toxicology

panels tailored to specific causes of death, such as those in which drugs may be implicated. Ideally, in addition to toxicology reports, the ME/C should consider which substances were involved, postmortem redistribution of drugs, how long the decedent had been using a particular substance (i.e., tolerance), drug interactions, and the presence of coexisting disease or injury.

Similarly, consultants noted the need for best practices in conducting autopsies. NAME provides recommended performance standards, including an inspection checklist required for accredited offices; however, fewer than 100 of 2479 offices in the United States were accredited as of January 2015.³⁹ As with other standardization recommendations, the group noted that incentives and enhanced accountability can increase adoption of policies and practices.

Research on and documentation of resource constraints. To begin to address resource challenges associated with the conduct of toxicology testing, autopsies, and thorough DSIs, the consultants suggested the need for detailed documentation of problems via surveillance and research. Similarly, documentation of infrastructure challenges is needed, along with an analysis of how resource and infrastructure constraints affect classification.

Potential Solutions to Place-Based Barriers

To address place-based barriers to MOD classification, the consultants made several suggestions comprising both research and practice and training strategies. The first suggestion was to conduct research at the county level to examine in-state variation in DSI, toxicology, and autopsy practices; such studies

could shed light on interstate or intrastate variations and inform DSI practices more broadly. The second suggestion was to collect qualitative data related to DSI and MOD (through focus groups and interviews) in states at the extreme ranges of percentages of undetermined deaths to further examine the causes of variations. The third suggestion was to compare DSI procedures and MOD classifications both nationally and internationally to discover promising practices. Fourth, the consultants suggested assessing differences between suspected causes of death and MOD classifications at the death scene and actual causes and classifications after a complete evaluation. Their fifth suggestion was to conduct analyses of undetermined drug intoxication deaths and use statistical techniques such as imputation to estimate the proportion of undetermined deaths that are potential suicides. Finally, they suggested investigating sources of error in death certificate completion, reporting delays, and degree of data loss (i.e., undercounting) in the case of drug intoxication suicides and other MOD classifications.

DISCUSSION

The CDC meeting described here identified challenges and potential solutions related to variability in MOD classification of drug intoxication deaths across jurisdictions. In summary, the challenges identified included a lack of consistency in definitions, practices, and training across jurisdictions and disciplines; barriers due to politics, stigma, and personal and professional beliefs (i.e., observer bias); and lack of implementation of existing guidelines and

suggested best practices. Potential solutions include standardization of terminology and definitions, DSI procedures, and death certificate completion practices; improved and expanded training; better communication across jurisdictions and disciplines; development of job aids to enhance DSI consistency; and more research to better understand variations in practices across states.

Although the importance of MOD classification has been an ongoing topic of discussion⁴⁰ with relevance to undercounting of suicides,⁸ the issue demanded revisiting, especially in light of the current opioid overdose epidemic.²¹ Next steps include collaborative and coordinated implementation of potential solutions with active participation by all stakeholders. The challenges facing the death investigation system in this country are formidable; however, they are also prominently on the minds of top scientists and practitioners in the field, and they are not insurmountable. Maintaining the status quo will continue to have a negative impact on public health surveillance and prevention efforts. In an era in which death rates due to suicide and drug intoxication are on the rise, the time to make changes is now. **AJPH**

CONTRIBUTORS

D. M. Stone led the planning of the consultant meeting and drafted the article. All of the authors contributed to the conceptualization and writing of the article and provided feedback during article preparation.

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