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## APPENDIX A

### DAWN MORTALITY DATA COLLECTION

#### DAWN data collection

DAWN mortality data are collected in participating medical examiner and coroner (ME/C) offices through a retrospective review of case records for every death investigated by the ME/C. Families are never interviewed. The review of source records is performed by a trained DAWN reporter in each participating facility. Depending on the needs of the facility, the DAWN reporter may be an employee of the death investigation jurisdiction or an employee of the DAWN operations contractor.

Within each facility that participates in DAWN, the designated DAWN reporter reviews all death records to identify deaths related to drug use. The DAWN reporter submits an electronic case report to the DAWN system for each death that meets the specific case selection criteria.

#### Deaths eligible for DAWN

A DAWN case is any death related to recent drug use. DAWN includes deaths associated with substance abuse and misuse, both intentional and accidental. This also includes the use of drugs for legitimate therapeutic purposes. To be a DAWN case, the relation between the death and the drug need not be causal; the drug needs only to be implicated in the death. Only recent drug use is included, and the reason that a patient used a drug is irrelevant.

The case criteria are intended to be broad and inclusive and to have few exceptions. Broad criteria take into account the fact that documentation in death records varies in clarity and comprehensiveness across ME/Cs. Broad criteria minimize the potential for judgments that could cause data to vary systematically and unexpectedly across reporters and jurisdictions. In addition, broad criteria are designed to capture a very diverse set of drug-related deaths, which can be aggregated and disaggregated to serve a variety of analytical purposes and the interests of multiple audiences.

There are some clearly delineated exceptions to the DAWN case criteria. A death is *not* a DAWN case if:

- There was no evidence of recent drug use.
- The death was not processed by an ME/C.
- The decedent was a drug user but died of natural causes unrelated to the drug use.
- The decedent was a homicide victim, but the method of homicide was not poisoning by drugs.
- The decedent consumed a nonpharmaceutical substance but did not inhale it.
- The death involved inhalation of carbon monoxide and no other reportable substance.
- The decedent had a history of drug use but no recent use.
- Alcohol was the only substance involved, and the decedent was an adult (age 21 or over).
- The only documentation of drug involvement was in toxicology test results.

- The only drugs listed (e.g., current medications) were not related to the death.
- The death was a consequence of undermedication (taking too little of a drug).

## Data items collected by DAWN

The information collected on DAWN deaths and suicide deaths falls into four general categories:

- **Operations data.** These data items, used in processing and tracking DAWN cases, include *Facility ID* and *Date of Death*.
- **Demographic data.** These data items, used to investigate difference in drug use patterns across decedent demographic groups, include basic information such as *Sex*, *Age*, *Decedent's Last Residence ZIP Code*, and *Race/Ethnicity*.
- **Characteristics of the case.** These data items, used to understand the circumstances of the death, include *ZIP Code for Place of Death*, *Cause of Death*, and *Manner of Death*. The Manner of Death information collected reflects the manner of death assigned by the ME/C using the categories appearing on the U.S. Standard Certificate of Death.
- **Substances data.** These data items constitute the core of the data reported to DAWN. They include information about the specific drug(s) or substance(s) used, whether the substance was confirmed by toxicology report, the route of administration of each reported substance, and whether alcohol was involved and confirmed by toxicology test.

Depending on the data item, the DAWN data collection system, eMERS, allows for entering categorical responses (including "Not documented" or "Could not be determined") and open-ended responses. Additional information on the data items collected by DAWN, particularly as may be pertinent to analysis, appears in the Glossary of Terms (Appendix B to this publication). Further details on the data items and how they are collected can be found in the *DAWN Medical Examiner Reference Guide*.<sup>1</sup>

## Drugs included in DAWN

DAWN covers a wide range of drugs and substances, including the following:<sup>2</sup>

- Illegal drugs, such as heroin, cocaine, marijuana, and Ecstasy;
- Prescription drugs, such as Prozac<sup>®</sup>, Vicodin<sup>®</sup>, OxyContin<sup>®</sup>, alprazolam, and methylphenidate;
- Over-the-counter medications, including aspirin, acetaminophen, ibuprofen, and multi-ingredient cough and cold remedies;
- Dietary supplements, including vitamins, herbal remedies, and nutritional products;
- Psychoactive, nonpharmaceutical inhalants;
- Alcohol in combination with other drugs; and
- Alcohol alone, in patients aged less than 21 years.

<sup>1</sup> Substance Abuse and Mental Health Services Administration, Office of Applied Studies. (2006). *DAWN Medical Examiner Reference Guide*. (Available at [http://dawninfo.samhsa.gov/files/collect\\_2006-2008/me\\_reference\\_guide\\_2006-2008.pdf](http://dawninfo.samhsa.gov/files/collect_2006-2008/me_reference_guide_2006-2008.pdf))

<sup>2</sup> The classification of drugs used by DAWN is derived from the Multum *Lexicon*, © 2008, Multum Information Services, Inc. The classification has been modified to meet DAWN's unique requirements. The Multum Licensing Agreement governing use of the *Lexicon* is provided in Appendix C. (Also available at <http://www.multum.com/>.)

In general, DAWN includes nonpharmaceutical substances that are consumed by inhalation, sniffing, or snorting and have a psychoactive effect when inhaled. There are two noteworthy exceptions: (1) deaths involving inhalation of carbon monoxide, and (2) deaths involving accidental inhalation of nonpharmaceuticals (e.g., exposure to paint fumes while painting a closet).

## DAWN features that enhance data quality and reliability

Several methods are used to improve the quality and reliability of DAWN data. These include:

- Case finding by a retrospective review of death records for every death investigated by a participating ME/C;
- Electronic reporting with automated prompts and data validation;
- Accurate, specific, and nonredundant drug reporting;
- Screening data to reduce incidental drug reporting;
- Inclusion of information on laboratory testing performed by the ME/C to identify drugs;
- Rigorous training and certification of DAWN reporters; and
- In-house review and cleaning of DAWN case reports.

## Participation of medical examiners and coroners

ME/Cs participate in DAWN on a voluntary basis and constitute neither a sample nor a census of ME/Cs in the United States. ME/Cs are invited to join DAWN based on their location in selected metropolitan areas. Recruitment efforts focus primarily on areas where DAWN data are also collected from hospital emergency departments. In addition to recruitment targeted at metropolitan areas, DAWN has added States with centralized ME/C systems to gain a better understanding of drug-related mortality outside of the targeted metropolitan areas.

In this publication, the terms “death investigation jurisdiction” (or, simply, “jurisdiction”) and “county” are used interchangeably because ME/Cs’ offices are typically organized by county. One exception occurs in Niagara County, NY, which is divided into four districts. For reporting purposes, the four districts that make up Niagara County, NY, are treated collectively as a single jurisdiction. For participating states, every county or jurisdiction within each state is included in DAWN.

## Metropolitan area definitions

The metropolitan area definitions used in this publication are those established by the Office of Management and Budget (OMB) based on the 2000 U.S. Census, as updated in 2003.<sup>3</sup> OMB issues annual updates to the boundaries and names of metropolitan areas. DAWN Area Mortality reports use the name that was current during the data collection year. While there have been several name changes, changes in metropolitan statistical area boundaries since 2003 have not altered the metropolitan areas reported on in this publication.

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<sup>3</sup> Office of Management and Budget, Revised Definitions of Metropolitan Statistical Areas, New Definitions of Micropolitan Statistical Areas and Combined Statistical Areas, and Guidance on Uses of the Statistical Definitions of These Areas, Bulletin No. 03-04, June 6, 2003. (Available at <http://www.whitehouse.gov/omb/bulletins/b03-04.html>.)



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## APPENDIX B

### GLOSSARY OF TERMS

This glossary defines terms used in data collection activities, analyses, and publications associated with the mortality component of DAWN.

**Accident (Manner of death):** “Accident” is a manner of death assigned by the medical examiner or coroner (ME/C) to deaths where there is little or no evidence that the injury or poisoning occurred with intent to harm or cause death and the fatal outcome was unintentional. To be considered a DAWN case, the ME/C must have determined that the death was related to recent drug use. (See **Manner of death** and **Drug-related death**.)

**Body systems:** Refers to neurological, cardiovascular, gastrointestinal, genitourinary, respiratory, musculoskeletal, skin and soft tissue, lymphatic, endocrine, head and neck, abdominal, or multisystem conditions identified in the chain of events that led to the drug-related death. (See also **Cause of death**.)

**Cause of death:** The chain of events (diseases, injuries, or complications) that caused the death, as recorded on the death certificate or in other ME/C records. A death can have multiple causes. The immediate cause is listed first and is followed by contributing causes listed sequentially, ending with the underlying cause. Other significant conditions that contributed to the death are listed separately.

**Coroner (C):** Death investigation jurisdictions typically use either a medical examiner (ME) system or a coroner (C) system. Unlike MEs, coroners need not be physicians; usually, the only prerequisite for serving as a coroner is that the individual be more than 18 years of age and a resident of the county or district to be served. Coroners are typically elected rather than appointed. They may have jurisdiction over counties or districts within States. (See also **Jurisdiction** and **Medical examiner**.)

**Could not be determined (Manner of death):** “Could not be determined” is a manner of death assigned by the ME/C when the information pointing to one manner of death is no more compelling than one or more other competing manners of death when all available information is considered. For the death to be considered a DAWN case, the ME/C must have determined that the death was related to recent drug use. (See **Manner of death** and **Drug-related death**.)

**Drug:** Refers to a substance that was recorded in a DAWN case report. Substances accepted by DAWN include alcohol, illicit drugs, prescription and over-the-counter pharmaceuticals, dietary supplements, and nonpharmaceutical inhalants. DAWN publications use the term “drug” to refer to any of these substances. Multiple substances (“drugs”) can be reported for each DAWN case. Therefore, the total number of drugs reported exceeds the total number of DAWN deaths reported.

**Drug category:** A generic grouping of related pharmaceuticals or other substances reported to DAWN, based on the drug classification system developed by Multum Information Services, a subsidiary of the Cerner Corporation, and modified for use with DAWN. (More information on the Multum system is available at

<http://www.multum.com/>.) In general, the drug categories reflect the therapeutic uses for prescription and over-the-counter pharmaceuticals.

Additional clarification is provided for the following drug categories, as these are unique to DAWN:

- *Alcohol alone*—DAWN collects data on alcohol when used alone only if the decedent is under age 21.
- *Alcohol-in-combination*—“Alcohol-in-combination” is the category for alcohol present in combination with another reportable substance (or substances). DAWN does not gather data on alcohol used alone if the decedent is over age 21. For decedents 21 or older, alcohol must be used with another substance to be reported. “Alcohol-in-combination” is reportable for all ages.
- *Stimulants*—This category includes amphetamines and methamphetamine. Since some drug screens test for amphetamines only as a class, an amphetamine-positive result could indicate amphetamine or methamphetamine. For this reason, amphetamines and methamphetamine are combined for analysis into the category “stimulants.” This category does not include other central nervous system stimulants, such as caffeine or methylphenidate.
- *Inhalants*—This category includes (1) anesthetic gases, and (2) psychoactive nonpharmaceutical substances for which the documented route of administration was inhalation, sniffing, or snorting.

Anesthetic gases are presumed to have been inhaled. Included in this category are, for example, nitrous oxide, ether, and chloroform. The route of administration for nonpharmaceuticals is not assumed and must be documented in ME/C records specifically as inhalation. Psychoactive nonpharmaceuticals that, when inhaled, are included in this category fall into three main categories: volatile solvents, nitrites, and chlorofluorohydrocarbons. Examples of substances in each of these three categories include the following:

**Volatile solvents**, e.g., adhesives (model airplane glue, rubber cement, household glue), aerosols (spray paint, hairspray, air freshener, deodorant, fabric protector), solvents and gases (nail polish remover, paint thinner, correction fluid and thinner, toxic markers, pure toluene, lighter fluid, gasoline, carburetor cleaner, octane booster), cleaning agents (dry cleaning fluid, spot remover, degreaser), food products (vegetable cooking spray; dessert topping spray, such as whipped cream or “whippets”), and gases (butane, propane, helium);

**Nitrites**, e.g., amyl nitrites (“poppers,” “snappers”) and butyl nitrites (“rush,” “locker room,” “bolt,” “climax,” video head cleaner); and

**Chlorofluorohydrocarbons**, e.g., freons.

Excluded from the inhalant category are carbon monoxide and nonpharmaceutical inhalants if the exposure was accidental (e.g., inhaling paint fumes while painting a closet).

- *Opiates/opioids*—This category includes opiates (narcotic substances derived from opium) and opioids (semisynthetic and synthetic substances with similar narcotic properties). The category is subdivided into (1) **heroin (specified)**—includes only specific reports of heroin; (2) **methadone**—whether used in the treatment of opiate addiction or pain; and (3) **all other opiates/opioids**—includes nonspecific reports of

“opiates” and specific named substances, such as codeine, morphine, fentanyl, hydrocodone, oxycodone, and others.

**Drug-related death:** This category includes any death related to recent drug use and is the basis for the deaths reported in the annual DAWN mortality publications after 2005. To be a DAWN case, a drug needs only to be implicated in the death; the drug does not need to have caused the death. Even if only one drug is reported, it should not be assumed that the substance was the sole and direct cause of the death. (See also **Single-drug death**.)

Additional clarification is provided in regard to classifying “Homicides” and “Suicides” as being drug-related:

- *Homicide*—This category, defined as the taking of another individual’s life using drug(s), is used only when the drug was a direct cause of death. Homicides by drugs include deaths for which the decedent was given a drug or other substance to hasten his or her death. Homicides by means other than drugs are not reportable to DAWN. For example, a homicide by shooting or stabbing is not a DAWN case, even if the victim was using drugs that contributed to violent behavior. To be considered a DAWN homicide, the ME/C must have made the initial determination that the death was a homicide, and the means of death must be a drug(s).
- *Suicide*—This category includes cases for which the death was initially determined by the ME/C as a suicide death. A suicide death that involves hanging, wrist slashing, shooting, jumping, and so forth is considered to be a DAWN case only if drugs were involved and documented as a contributing factor.

**Homicide (Manner of death):** “Homicide” is a manner of death assigned by the ME/C to deaths that result from an injury or poisoning committed by another person with the intent to cause fear, harm, or death. (While quite common, intent to cause death is not required for classification as homicide.) To be considered a DAWN case, the ME/C must have made the initial determination that the death was a homicide, and the means of death must be a drug(s). The drug(s) must be the direct cause of death or have hastened the death. This condition is an exception to the general DAWN rule that a drug need only have been related to the death. (See **Manner of death** and **Drug-related death**.)

**Jurisdiction:** DAWN uses the term “jurisdiction” to mean the geographic area for which an ME/C’s office is responsible. The terms “death investigation jurisdiction” (or, simply, “jurisdiction”) and “county” are used interchangeably because ME/Cs’ offices are typically organized by county. The one exception occurs in Niagara County, NY, which is divided into four districts. For reporting purposes, the four districts that make up Niagara County, NY, are treated collectively as a single jurisdiction. Some States are organized in single statewide jurisdictions. DAWN disaggregates state-level returns by county for the purpose of reporting data at the county and metropolitan levels.

Differences in death investigation procedures are often associated with whether the jurisdiction has a medical examiner system or a coroner system. In addition, there are nearly always some differences in death investigation procedures across States. Differences in death investigation procedures limit the comparability of DAWN ME/C findings.

**Manner of death:** This classification is determined by the ME/C using the categories provided on the U.S. Standard Certificate of Death. “Manner of death” classifications reflect the presence or absence of intent to harm and the presence or absence of violence. Deaths are assigned to one of five categories by the ME/C based on the following criteria:<sup>1</sup>

- **Natural**—Deaths that are due solely or nearly totally to disease and/or the aging process.
- **Accident**—Deaths where there is little or no evidence that the injury or poisoning occurred with intent to harm or cause death and the fatal outcome was unintentional.
- **Suicide**—Deaths that result from an injury or poisoning as a result of an intentional, self-inflicted act committed to do self-harm or cause the death of oneself.
- **Homicide**—Deaths that occur as a result of injury or poisoning committed by another person with the intent to cause fear, harm, or death.
- **Could not be determined**—Deaths where the information pointing to one manner of death is no more compelling than one or more other competing manners of death when all available information is considered.

(For additional detail on the criteria for determining if a death is a DAWN case, see **Drug-related death** and the individual **Manner of death** classifications.)

**Medical examiner (ME):** Death investigation jurisdictions typically use either a medical examiner (ME) system or a coroner (C) system. Most MEs are licensed physicians or forensic pathologists and are generally appointed (rather than elected). They may have jurisdiction over a county, district, or an entire State. (See also **Coroner** and **Jurisdiction**.)

**Metropolitan area:** An area comprising a relatively large core city or cities and the adjacent geographic areas. Conceptually, these areas are integrated economic and social units with a large population center. Unless otherwise noted, metropolitan area analyses prepared by DAWN utilize the boundaries established by the Office of Management and Budget (OMB), as updated in 2003.

**Natural (Manner of death):** “Natural” is a manner of death assigned by the ME/C to deaths that are due solely or nearly totally to disease and/or the aging process. To be considered a DAWN case, there must be a drug(s) related to the death. (See **Manner of death** and **Drug-related death**.)

**Place of death:** The location that best describes where the death occurred. The place of death response categories are:

- *Emergency department* (i.e., hospital emergency department),
- *Other health care facility* (i.e., hospital unit other than an emergency department, including nursing home, hospice, or any other health care institution in which the decedent was receiving care),
- *Decedent’s home* (i.e., decedent’s home, apartment, or other dwelling),
- *Public place* (i.e., in a store, on the street, in a park),
- *Other* (i.e., neighbor’s house, in a car), and
- *Not documented*.

<sup>1</sup> National Association of Medical Examiners. (2006). *Forensic Autopsy Performance Standards*. (Available at <http://thename.org/>.)

**Race/ethnicity:** OMB is responsible for standard protocols for the collection of data on race and ethnicity by federal systems. For data collections such as DAWN, where self-identification of the individual is not feasible, OMB protocol permits a combined format, whereby race and Hispanic ethnicity are recorded in a single data item that could still record multiple entries for race, Hispanic ethnicity, or both.

Since January 2003, DAWN has collected data on race/ethnicity using the combined format. The race/ethnicity categories on the DAWN data collection forms are as follows:

- *White*—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- *Black or African American*—A person having origins in any of the black racial groups of Africa.
- *Hispanic or Latino*—A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
- *Asian*—A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- *American Indian or Alaska Native*—A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
- *Native Hawaiian or Other Pacific Islander*—A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- *Not documented*—Used when documentation of race is not available from source records.

Despite the increased detail allowed by these categories and by the provision for multiple entries, the actual race/ethnicity data reported to DAWN are quite limited because race and ethnicity are often not documented with this level of specificity in patient or decedent records. As a result, the classification used to tabulate DAWN data has a more limited set of categories, as follows:

- *White*—Anyone meeting the definition of white (above). Those who are identified as white and Hispanic are classified as Hispanic.
- *Black*—Anyone meeting the definition of black or African American (above). Those who are identified as black or African American and Hispanic are classified as Hispanic.
- *Hispanic*—Anyone whose ethnicity is Hispanic or Latino (above) is placed in the category “Hispanic,” regardless of race.
- *Race/ethnicity NTA*—This includes those categories that are too small to report independently, including two or more races; American Indian or Alaska Native; Asian; and Native Hawaiian or Other Pacific Islander.
- *Unknown*—Race/ethnicity is unknown. Those who are identified only as Hispanic are classified as Hispanic.

**Single-drug death:** A single-drug death is one in which only one drug was involved. DAWN captures single-drug deaths involving alcohol only if the decedent was younger than age 21.

**Suicide (Manner of death):** “Suicide” is a manner of death assigned by the ME/C to deaths that result from an injury or poisoning as a result of an intentional, self-inflicted act committed to do self-harm or cause the death of oneself. A suicide death that involves hanging, wrist slashing, shooting, jumping, and the like is considered to be a DAWN case if drugs were involved and documented as a contributing factor. Drug(s) do not need to be the immediate cause of death. (See **Manner of death** and **Drug-related death**.)

**Toxic effects:** Injury, illness, or damage that can be attributed to the ingestion of a drug. (See also **Cause of death**.)

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## APPENDIX C

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