

Using International Classification of Diseases (ICD) Codes to Assess Opioid-Related Overdose Deaths

Since 1999, there has been a four-fold increase in opioid-related overdose death rates.¹ To prevent these deaths, public health professionals, including practitioners who are committed to preventing opioid misuse and overdose, must first understand which opioids are contributing to these deaths and which populations are affected. This information can be found in death data.

Opioid-related overdose death data are compiled from individual death certificates, which contain information on primary and contributing causes of death. The diseases and/or health conditions included under these causes are recorded using **International Classification of Diseases (ICD)**² codes. ICD codes provide a common language for reporting and monitoring diseases and health problems across multiple disciplines, and facilitate analysis by enabling the consistent formatting and storage of data. ICD codes are updated periodically; the latest version is the 10th revision, referred to as ICD-10.

This tool is designed to support practitioners in using ICD-10 codes to understand and describe the impact of opioid overdose in their communities. Specifically, it provides:

- Benefits of understanding ICD codes;
- Specific ICD-10 codes for opioid-related overdose deaths;
- Examples of how to use ICD-10 codes to inform prevention planning; and
- Limitations of using these codes, accompanied by potential solutions.

WHY DO PREVENTION PRACTITIONERS NEED TO UNDERSTAND ICD CODES?

Important reasons for understanding and using ICD codes include the following:

- **To find what you're looking for.** Data from all state death certificates is converted into ICD-10 codes before being sent to the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS)—the Federal agency responsible for compiling and releasing cause of death data and statistics in the United States.³

¹ Centers for Disease Control and Prevention, National Center for Health Statistics. Multiple Cause of Death 1999-2016 on CDC WONDER Online Database, released December, 2017.

² Centers for Disease Control and Prevention, National Center for Health Statistics (2016). International Classification of Diseases, Tenth Revision (ICD-10). Retrieved from <https://www.cdc.gov/nchs/icd/icd10.htm>

³ Centers for Disease Control and Prevention, National Center for Health Statistics (2017). Instructions for Classifying the Underlying Cause of Death. Retrieved from https://www.cdc.gov/nchs/data/dvs/2a_2017.pdf

- **To understand local problems.** NCHS uses ICD-10 codes to generate raw mortality data files and populate CDC’s Wide-ranging Online Data for Epidemiologic Research (WONDER). CDC WONDER is used by public health professionals and researchers to obtain opioid-overdose death data for their states and communities.
- **To make comparisons.** Since ICD-10 codes provide a standard coding language within and across states, prevention practitioners can use these codes to identify high-need communities within their state, and compare their state estimates to national and/or other state estimates.

CRACKING THE CODE

The National Center for Health Statistics (NCHS) captures causes of deaths from death certificates using the codes included in ICD-10. All death certificates include a primary or *underlying cause of death* and up to 20 non-primary or *contributing* causes of deaths. Each code includes a letter followed by a number.

- Codes for **underlying cause of overdose death** include the letter X or Y (for example, X40: accidental poisoning, X60: intentional self-harm).
- Codes for **opioid-related contributing cause of overdose death** include a T (for example., T40.1: heroin, T40.4: other synthetic opioids).

The ICD codes for opioid-overdose related deaths are provided in Table 1, below.

NCHS data is compiled in the CDC WONDER online tool (<https://wonder.cdc.gov>). To retrieve these data from the tool:

- Select the [Multiple Cause of Death \(Detailed Mortality\)](#) query system;
- Select table layout (for example, by year, state, county); and
- Supply the appropriate underlying codes (X and Y code) and contributing codes (T codes) presented in Table 1.

So, for example, if you were interested in identifying heroin-related accidental poisoning rates for Baltimore, MD among African American men between 1999–2016, you would go to the CDC WONDER website, select the Multiple Causes of Death database, and do the following:

- Highlight year = all years, state = Maryland, and county = Baltimore City;
- Select race = Black or African American from demographics;
- Select X40–X44 from the underlying cause of death codes; and
- Select T40.1 (heroin) from the multiple cause of deaths.

Please note: X and Y codes *must* be used in combination with T codes to identify opioid-related deaths. For more information, go to <https://wonder.cdc.gov/mcd-icd10.html>.




TABLE 1. ICD-10 CODES FOR OPIOID-RELATED DEATHS

Manner of Death	Underlying Cause of Death	Contributing Cause of Death
<p>Accidental Poisoning</p>	<p>X40: Accidental poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics</p> <p>X41: Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified</p> <p>X42: Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified</p> <p>X43: Accidental poisoning by and exposure to other drugs acting on the autonomic nervous system</p> <p>X44: Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances</p>	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>
<p>Intentional Self-Poisoning (Suicide)</p>	<p>X60: Intentional self-poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics</p> <p>X61: Intentional self-poisoning by and exposure to antiepileptic, sedative-hypnotic, anti-parkinsonism and psychotropic drugs, not elsewhere classified</p> <p>X62: Intentional self-poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified</p> <p>X63: Intentional self-poisoning by and exposure to other drugs acting on the autonomic nervous system</p> <p>X64: Intentional self-poisoning by and exposure to other and unspecified drugs, medicaments and biological substances</p>	<p>T40.0: Poisoning by Opium</p> <p>T40.1: Poisoning by Heroin</p> <p>T40.2: Poisoning by Other Opioids</p> <p>T40.3: Poisoning by Methadone</p> <p>T40.4: Poisoning by Other Synthetic Narcotics</p> <p>T40.6: Poisoning by Other and Unspecified Narcotics</p>

Manner of Death	Underlying Cause of Death	Contributing Cause of Death
Assault (Homicide)	X85: Assault by drugs, medicaments and biological substances	T40.0: Poisoning by Opium T40.1: Poisoning by Heroin T40.2: Poisoning by Other Opioids T40.3: Poisoning by Methadone T40.4: Poisoning by Other Synthetic Narcotics T40.6: Poisoning by Other and Unspecified Narcotics
Poisoning: Undetermined Intent	Y10: Poisoning by and exposure to non-opioid analgesics, antipyretics and anti-rheumatics, undetermined intent Y11: Poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified, undetermined intent Y12: Poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified, undetermined intent Y13: Poisoning by and exposure to other drugs acting on the autonomic nervous system, undetermined intent Y14: Poisoning by and exposure to other and unspecified drugs, medicaments and biological substances, undetermined intent	T40.0: Poisoning by Opium T40.1: Poisoning by Heroin T40.2: Poisoning by Other Opioids T40.3: Poisoning by Methadone T40.4: Poisoning by Other Synthetic Narcotics T40.6: Poisoning by Other and Unspecified Narcotics

WHAT ARE THE LIMITATIONS OF ICD CODES?

There are important limitations to consider prior to using ICD codes to analyze opioid-related hospitalizations and overdose deaths. These include the following:

-  **Drug overdose deaths can be hard to categorize.** In approximately 1 in 5 drug overdose deaths, no specific drug is listed on death certificates.⁴ Even when a drug is listed, a significant number of opioid-related poisonings are coded into broader categories such as *other opioids* (T40.2) and *other and unspecified narcotics* (T40.6).
-  **Multiple opioids (for example, heroin and methadone) and/or opioids combined with other drugs (for example, methadone and sleep medications) are often involved in overdose incidences.** This can make it difficult to identify specific opioid(s) responsible for overdose(s). In such cases, consider assigning partial attribution to the different opioids involved (for example, overdose incidence where both heroin and methadone are involved can be attributed as 0.5 each). This can prevent overestimating the impact of any particular opioid. When presenting data on such incidences, it is also helpful to provide a footnote that specifies the different opioids and/or other drugs involved.
-  **Some synthetic opioids do not yet have designated codes.** For example, overdose deaths involving synthetic opioids such as fentanyl have gone up significantly in recent years.⁵ However, because there is no specific ICD-10 code for fentanyl, it can be difficult to make fentanyl-related overdose estimates. Where available, toxicology reports from coroner or medical examiner offices can facilitate identification of fentanyl-related cases. It can also be helpful to look at data sources that capture fentanyl-related data. For example, the National Forensic Laboratory Information System (https://www.nflis.deadiversion.usdoj.gov/DesktopModules/ReportDownloads/Reports/11350_R1_NFLIS_Research_Brief_Fentanyl.pdf) provides information on drug products obtained by law enforcement that tested positive for fentanyl, and the National Poison Data System (<http://www.aapcc.org/data-system/>) provides information on poison center calls regarding fentanyl overdose.

⁴ Rudd, R.A., Seth, P., David, F., & Scholl, L. (2016). Increases in Drug and Opioid-Involved Overdose Deaths — United States, 2010–2015. *MMWR Morb Mortal Wkly Rep* 65(50-51), 1445–1452. doi:10.15585/mmwr.mm655051e1

⁵ Centers for Disease Control and Prevention. (2017). Fentanyl. Retrieved from <https://www.cdc.gov/drugoverdose/opioids/fentanyl.html>