

Methods Report: Documentation and Analysis of Fatal Overdose Data

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Introduction

Public Health – Seattle & King County (PHSKC) presents close to real-time information about overdose incidence and trends on the [Fatal Overdose Dashboard](#), a public-facing Tableau dashboard. This dashboard is widely used by PHSKC, community partners, and concerned residents to monitor the overdose crisis in King County.

This report describes the procedures in place to monitor overdose death trends, known methodological limitations, and describes the ascertainment of demographic variables that are presented on the [Fatal Overdose Dashboard](#).

Data Collection and Processing

The King County Medical Examiner's Office (KCMEO) investigates and certifies all deaths that occur in King County that are unexpected, sudden, violent, suspicious, unnatural, and/or lack a known cause. Drug overdose deaths typically meet at least one of these criteria. After analysis of the death scene, autopsy, and toxicology evaluation, KCMEO completes the death certificate literal fields indicating cause of death (COD), other significant conditions, and circumstances of death.^{1,2} The completed death certificate is submitted to the Washington State Department of Health (WADOH) via the Electronic Death Registration System. WADOH compiles all death certificates from across the state and submits them to the National Center for Health Statistics (NCHS), which uses a software program, SuperMICAR, to assign ICD-10 codes to the literal text fields. Although all literal COD text fields are given ICD-10 codes and considered contributing causes of death, only one COD and corresponding ICD-10 code is assigned as the underlying COD, i.e. the cause that initiated the sequence of events leading to death. This process for assigning ICD-10 codes is standardized for all jurisdictions and states.

Overdose Death Case Definition

The updated dashboard makes it possible to view overdose statistics based on two varying case definitions that correspond to their underlying data sources: 1) Vital Statistics death data and 2) Medical Examiner's Office data. Table 1 summarizes the differences between the two case definitions. More detail about the two definitions is provided hereafter.

To identify drug poisoning deaths in vital statistics records, many public health agencies, including CDC and the WADOH, query death certificates for ICD-10 codes that indicate the underlying COD was drug poisoning, including X40-X44 (unintentional), X60-X64 (suicide), X85 (assault), and Y10-Y14 (undetermined intent). The residential address listed on the death certificate, typically provided by an informant to the funeral home, is used to attribute overdose deaths to sub-jurisdictions. This approach narrows the case definition of "King County Drug Overdose Death" to decedents with an underlying ICD-10 code indicative of drug poisoning and a King County residential address. Due to the inherent delays involved in the submission of death certificates, issuance of ICD-10 codes, and release of processed data

¹ Slavova S, O'Brien DB, Creppage K, et al. Drug Overdose Deaths: Let's Get Specific. *Public Health Rep.* 2015;130(4):339-342.

² Council for State and Territorial Epidemiologists Recommendations and Lessons Learned for Improved Reporting of Drug Overdose Deaths on Death Certificates. https://cdn.ymaws.com/www.cste.org/resource/resmgr/PDFs/PDFs2/4_25_2016_FINAL-Drug_Overdos.pdf

to local health jurisdictions, Vital Statistics data is available to PHSKC 10-21 months after the death occurred.

PHSKC primarily uses data directly from the KCMEO to monitor overdose incidence and trends, because information about a suspected or confirmed overdose death is available within days of the death's occurrence. As described elsewhere³, KCMEO reviews information from autopsy examination, bystander report, and description of death scene and documents whether the death is a suspected (probable) overdose. During investigations of suspected overdose deaths, biological samples (e.g. blood, urine) and drug evidence collected at the death scene (if any) undergo toxicology testing conducted by KCMEO *and* an accredited toxicology laboratory (Washington State Patrol (WSP) Toxicology Laboratory or NMS Labs).^{4,5} If two or more KCMEO toxicology test results are positive for the same drug class, the cause of death is preliminarily attributed to "*acute (combination) drug intoxication including [specific drug(s) identified]*" and is represented as a confirmed drug overdose death on the Fatal Overdose Dashboard and other reports. The cause of death is amended (as needed) once additional results are released by WSP or NMS Laboratories.^{5,6} Suspected overdose deaths with <2 consistent KCMEO toxicology results that are undergoing toxicology evaluation by WSP or NMS Laboratories are classified as "suspected overdose, pending toxicology" until MEO receives toxicology results from WSP or NMS Laboratories.

PHSKC evaluated the implications of each case definition on how overdose incidence is measured and characterized.⁶ The estimated number of overdose deaths occurring in King County is 14% greater when based upon the KCMEO data rather than the Vital Statistics data, which is largely due to discrepancies between the county of death versus county of residence indicated on the death certificate. Overdose deaths that met the MEO case definition but not the Vital Statistics definition were significantly more likely to have occurred among persons living homeless, at a hospital, and involved multiple modes of injury or disease.

Table 1: Case Definition of Drug Overdose Death		
Data Source:	KC Medical Examiner Office	Washington State Vital Statistics Washington State Department of Health, Center for Health Statistics, Death Certificate Data
Includes overdose deaths that occurred	In King County	Among King County residents
Defined "drug overdose" by...	Searching across literal cause of death text fields for key words connoting acute drug intoxication or poisoning.	Searching the underlying cause of death field for ICD-10 codes indicative of drug poisoning (X40-X44, X60-X64, X85, Y10-Y14)
Advantages	Available in real-time	Standardized across health jurisdictions, facilitating cross-jurisdiction comparisons

³ Vannice K, Hood J, Yarid N, Kay M, Harruff R, Duchin J. Accuracy of Medical Examiner's Assessment for Near-Real-Time Surveillance of Fatal Drug Overdoses, King County, Washington, March 2017-February 2018. *Public Health Rep.* 2022;137(3):463-470.

⁴ Harruff R, Simpson CM, Gifford AL, Yarid N, Barbour WL, Heidere C. Evaluation of "Real-Time" Fatal Drug Overdose Surveillance by King County Medical Examiner's Office, Seattle, Washington. *Am J Forensic Med Pathol.* 2023;44(1):11-16.

⁵ Harruff RC, Yarid NA, Barbour WL, Martin YH. Medical examiner response to the drug overdose epidemic in King County Washington: "Real-time" surveillance, data science, and applied forensic epidemiology. *J Forensic Sci.* 2023;68(5):1632-1642.

⁶ Whitney H HR, Duchin J, Hood J. Evaluation of Overdose Fatality Surveillance in King County, Washington: Comparing Medical Examiner's Office Records with Vital Statistics Data, 2017. CSTE 2017; 2017.

	Overdose locations, rather than official residence, may serve as better proxy for overdose risk locations	Facilitates estimation of mortality rates, given the alignment of the numerator (# of overdose deaths in King County) and denominator (# of King County residents).
Disadvantages	Non-standardized definition, complicating comparisons with other jurisdictions Imperfect estimates of mortality rates given the discrepancy between numerator (# of overdose deaths in King County) and denominator (# of King County residents)	Delayed availability May inadvertently exclude deaths resulting from multiple contributing causes Official residence may poorly align with actual residence, especially in the context of unstable housing

Ascertainment of Decedent Characteristics

Since it is impossible to ascertain decedents' self-reported racial, ethnic, and gender identities at time of death, demographic information is ascertained through other means. KCMEO documents age, gender, race, and ethnicity in its internal database based upon information that is available at the time of death investigation and autopsy, which includes: information provided by next of kin and others present at the death scene, review of available medical records and driver's license, and autopsy examination. The demographic fields on the official death certificate and Vital Statistics record are entered by funeral directors in consultation with the family-designated agent responsible for coordinating the decedent's funeral-related services.

Discrepant demographic information is sometimes recorded in Vital Statistics and KCMEO records. When this occurs, overdose-related analyses use the information recorded in Vital Statistics. If the Vital Statistics demographic information is missing or inaccessible (which is more common in recent years), the demographic information indicated in KCMEO record is analyzed.

Race/Ethnicity

The Fatal Overdose Dashboard presents two different options to view race and ethnicity data. Mutually exclusive categorization assigns individuals to a single race/ethnicity category, with multiracial individuals assigned to a separate, heterogeneous category comprising many different combinations of race and ethnicity. This approach may simplify comparisons across groups and align with common practice, but it can obscure the complexity of multiracial identities and reduce visibility for smaller racial or ethnic populations. The second approach ("alone or in combination") assigns individuals to all racial and ethnic groups, with multiracial individuals represented in multiple racial and ethnic categories. By capturing full group membership, this approach may better reflect the racial/ethnic diversity within a broad racial category, shared influences, and population size.

For the American Indian/Alaska Native (AIAN) population, these two definitions result in drastically different rate and disparity estimates as there are a few unique challenges specific to generating

rates among the AIAN population. First, racial misclassification is common for AIAN people in public health data, including in death data.⁷ In an evaluation of overdose deaths in Washington, the estimated drug overdose rate was 43% greater in a dataset that linked Vital Statistics records with the Northwest Tribal Registry compared to the Vital Statistics data alone.⁸ In a national evaluation of all-cause mortality data, 51% of decedents who had self-reported AIAN as their race when they participated in a national survey were indicated as AIAN on their death certificate.⁹ In addition, utilizing mutually exclusive categories ignores the fact that AIAN people are more likely to be multi-racial.¹⁰ However, both categorization methods have an additional challenge due to the misalignment in the two data sources used to generate rates: death data (“numerator” data) and US Census data (population “denominator” data). In 2020 the US Census adopted a broader approach to measuring race/ethnicity, which resulted in a near doubling of the estimated size of the AIAN population compared to 2010 population estimates.^{11,12} In particular, the multi-racial AIAN population grew drastically.¹² The large change in the denominator impacts the rate estimates generated. While both definitions are presented in the dashboard, it is important to know the complexities when interpreting the rate estimates for the AIAN population.

Sex/Gender

There is growing heterogeneity in as to whether the single “sex” field in Vital Statistics and MEO death records reflects gender at time of death or sex assigned at birth. The current dashboard reflects whatever information is indicated in the Vital Statistics record and, if it is unavailable, the KCMEO record. PHSKC plans to explore alternative approaches to capturing and presenting gender for future mortality risk assessments.

Presumed Living Situation

The King County Medical Examiner’s Office (KCMEO) documents the presumed living situation for all deaths investigated by their office. Although Washington State Vital Statistics recently added a field to capture housing status on the Electronic Death Registration System, this information is not readily available to PHSKC analysts.¹³ KCMEO Medicolegal death investigators categorize living situation based on where the decedent was living at the time of death based on information collected from place and circumstances of death and/or testimony from witnesses or next of kin. The categories are:

- **Outdoors, homeless shelter, or vehicle:** This category includes encampments, vehicles, abandoned buildings, parks, other outdoor locations, emergency shelter.

⁷ Gartner, D, Maples C, Nash M, Howard-Bobiwash H. Misracialization of Indigenous people in population health and mortality studies: a scoping review to establish promising practices. *Epidemiol Rev.* 2023;45(1):63-81.

⁸ Joshi S, Weiser T, Warren-Mears V. Drug, Opioid-Involved, and Heroin-Involved Overdose Deaths Among American Indians and Alaska Natives - Washington, 1999-2015. *MMWR Morb Mortal Wkly Rep.* 2018;67(50):1384-1387.

⁹ Arias E, Heron M, National Center for Health S, Hakes J, Bureau USC. The Validity of Race and Hispanic-origin Reporting on Death Certificates in the United States: An Update. *Vital Health Stat 2.* 2016(172):1-21.

¹⁰ Rubin V, Ngo D, Ross A, et al. Counting a Diverse Nation: Disaggregating Data on Race and Ethnicity to Advance a Culture of Health. Available at: https://www.policylink.org/sites/default/files/Counting_a_Diverse_Nation_08_15_18.pdf

¹¹ Arias E, Liebler C, Garcia, M, Saenz, R. Data impacts of changes in U.S. Census Bureau procedures for race and ethnicity data. *SSM-Population Health.* 2025 (29).

¹² Race and Ethnicity in the United States: 2020 Census. United States Census Bureau. 2021.

¹³ HSKC. Report On Deaths Among Presumed Homeless Individuals Investigated By The King County Medical Examiner January 1, 2012-December 31, 2021 2022; <https://kingcounty.gov/~media/depts/health/medical-examiner/documents/presumed-homeless-deaths.ashx>.

- **Housing service site:** This category includes permanent supportive housing, income-restricted units, recovery housing.
- **Privately owned or rented residence:** This category includes properties without known connections to governmental or social service programs.
- **Other temporary arrangement:** This category reflects a number of housing situations including short-term stays with friends/acquaintances.
- **Unknown**

Ascertainment of housing status can be complicated by scarcity of information, conflicting information, and dynamic nature of housing service programs and locations. The categories are not necessarily mutually exclusive, meaning that some housing situations, like staying at a shelter, in a hotel/motel, in an RV, and couch-surfing may be inconsistently categorized. These categories do not align with other local or federal definitions. Public Health - Seattle & King County is considering strategies to improve its assessment of the housing status of overdose decedents and updates may be made in response to new information.

Incidence Measures

The dashboard presents the following measures of overdose incidence:

- **Counts:** The estimated number of overdose deaths that occurred in a specified period. This information can be helpful for understanding the magnitude of the problem.
- **Year-to-date (YTD) Counts:** The estimated number of overdose deaths that occurred from January 1st to the current date in each year. This information allows for comparison of the current year to the same point in time in previous years.
- **Rates:** Rate represents the number of overdose deaths that occurred in a specified population over a specified period. Rates facilitate comparisons across sub-groups and over time by accounting for varying population sizes between groups and over time. Rates presented for King County (overall) and stratified by gender, race/ethnicity, and region are adjusted for the distribution of age in the underlying population, minimizing the likelihood that observed differences between groups or across years are due to differences in the distribution of age in the underlying population. The calculation of age-adjusted rates is described here: <https://doh.wa.gov/sites/default/files/legacy/Documents/5300/TechnicalNotes.pdf>

When only 1 to 9 overdose deaths occurred in a certain sub-group in a specified period, the count and rate information is not shown in order to protect decedent confidentiality.

Population data are reported from Washington State's Office of Financial Management and used to calculate rates.

To view fatal overdose trends:

Go to the [Fatal Overdose Dashboard](#). If you hover over graphs, an interpretation of the data point will be visible.