Indicator Template
Content Area: Carbon Monoxide Poisoning
Indicator: Carbon Monoxide Poisoning Hospitalizations

Environmental Public Health Tracking

Type of EPHT Indicator	Health outcome/Exposure
Measures	1. Age-adjusted rate of hospitalization for CO poisoning per 100,000 population 2. Crude rate of hospitalization for CO poisoning per 100,000 population 3. Number of hospitalizations for CO poisoning
Derivation of Measure(s)	*Numerator*: Resident hospitalizations for CO poisoning that meet the 1998 CSTE case definition for public health surveillance for a "Confirmed" or "Probable" case of acute CO poisoning in administrative data sets. Frequencies for three unique groups: Unintentional, non-fire related Unintentional, fire-related Unknown intent *Denominator* : Midyear resident population *Adjustment*: Age-adjustment by the direct method to year 2000 US Standard Population
Unit	1. Age-adjusted rate per 100,000population 2. Rate per 100,000population 3. Number
Geographic Scope	State and national
Geographic Scale	Residents of jurisdiction – State, County
Time Period	Hospital admissions between January 1 to December 31, inclusive, for each year, 2000–
Time Scale	Calendar year
Rationale	Carbon monoxide (CO) is an odorless, colorless gas that usually remains undetectable until exposure results in injury or death. Each year in the United States, an estimated 10,000 persons seek medical attention or lose at least one day of normal activity because of CO intoxication. There is limited information on CO hospitalization. In Florida, 1,494 were hospitalized with a diagnosis of CO poisoning from 1999–2007. Out of which 10% (n=143) were unintentional fire-related, 33% (n=493) were unintentional non-fire-related, and 17% (n=256) were from unknown cause of CO poisoning. During 2000–2009, a total of 68,316 CO exposures were reported to poison centers across United States. Persons hospitalized with CO poisoning are among the most severely poisoned cases. Unintentional CO poisoning is almost entirely preventable. These data are available in most states.
Use of the Measure	These data can be used to assess the burden of severe CO poisoning, monitor trends over time, identify high-risk groups, and enhance prevention, education, and evaluation efforts.

Limitations of the Measure	Hospitalization data, by definition, do not include: persons treated in outpatient settings (e.g., emergency departments, urgent care clinics, clinicians' offices or hyperbaric chambers but not hospitalized); persons who call poison control centers and are managed at the scene, and/or receive medical care but are not hospitalized; persons who do not seek any medical care; or persons who die immediately from CO exposure without medical care.
Data Sources	*Numerator:* State inpatient hospitalization data (using admission date) *Denominator:* US Census Bureau population data
Limitations of Data Sources	*State hospital discharge data:* The use and quality of ICD-9-CM coding varies across jurisdictions; this is especially true of the codes used to describe how an injury occurs, indicated as E-codes. Examples of this variation include: • The number of diagnostic fields available to specify cause of the injury; • Whether E-codes are mandated; • The completeness and quality of E-coding; for example, the reliability of ICD-9-CM coding to distinguish between cases of CO poisoning that are intentional or unintentional, and/or fire-or non-fire related The toxic effects of CO exposure are nonspecific and easily misdiagnosed when CO exposure is not suspected. These misdiagnosed cases will not be counted. These data usually do not include data from federal facilities such as Veteran's Administration hospitals, Indian Health Services, or institutionalized populations (e.g., prisons). These data usually include only cases of state residents treated within the state. Health-care access is not restricted to these political boundaries so patients hospitalized for CO poisoning in another state may not be counted in their own state. Likewise, they may not be counted in the jurisdiction in which they were treated. Currently, few states have access to, or agreements to obtain, hospital discharge data from other states where their state residents may be hospitalized. To the extent that patients are treated out of state, there is undercounting of the rate of state residents poisoned by CO. Differences in rates between jurisdictions may reflect differences in hospital admissions practices for treating persons with severe CO poisoning. For example, some facilities may routinely admit all patients treated with hyperbaric oxygen; other facilities may release patients treated with hyperbaric oxygen after the treatment is completed if they are in stable condition. Race and ethnicity are important risk factors for CO poisoning, yet, many hospitalization data sets do not contain these data. Those that do may have data quality issues. *Census data:* • Only available every 10 years, thus postcensal estimates are needed when calculating rates for years following the census year. • Postcensal estimates at the ZIP code level are not available from the Census

	Bureau. These need to be extrapolated or purchased from a vendor.
Related Indicators	• Age-adjusted rate of emergency department visits for CO poisoning per 100,000 population • Crude rate of emergency department visits for CO poisoning per 100,000 population • Number of emergency department visits for CO poisoning • Annual number of deaths from CO poisoning • Annual crude rate of death from CO poisoning • Annual age-adjusted rate of death from CO poisoning
References	1. Centers for Disease Control and Prevention, Perspectives in Disease Prevention and Health Promotion Carbon Monoxide Intoxication—A Preventable Environmental Health Hazard MMWR, 1982. 31(39): p. 529–31. 2. Centers for Disease Control Prevention, Carbon monoxide exposures—United States, 2000–2009. MMWR, 2011. 60(30): p. 1014–7. 3. Harduar-Morano, L. and S. Watkins, Review of unintentional non-fire-related carbon monoxide poisoning morbidity and mortality in Florida, 1999–2007. Public Health Rep, 2011. 126(2): p. 240–50. 4. King, M.E. and S.A. Damon, Attitudes about carbon monoxide safety in the United States: results from the 2005 and 2006 Health Styles Survey. Public Health Rep, 2011. 126 Suppl 1: p. 100–7.