Carbon Monoxide Poisoning

About

Carbon monoxide (CO) is a tasteless, odorless and colorless gas. Carbon monoxide is present when fuel is burned in engines, furnaces and open fires. Fuels that can produce CO when burned include gasoline, wood, coal, natural gas, propane, oil and methane. Breathing high levels of CO causes CO poisoning, which can cause severe illness or even death is just minutes. For this reason, CO is often referred to as an invisible killer.

About the Measures

Although CO poisoning can almost always be prevented, every year over 400 deaths in the United State are estimated to occur as a result of accidental, non-fire related exposure to this toxic gas. Also, every year tens of thousands more people across the United States require emergency medical care for illness caused by CO poisoning. The primary risk for carbon monoxide poisoning comes from home and garage operation of gas generators and malfunctioning fuel-burning appliances such as home stoves, water heaters and space heaters. Operating such engines and appliances in a confined space can cause CO to accumulate to toxic concentrations very quickly. Tobacco smoke also contains carbon monoxide and smokers generally have higher concentrations of carbon monoxide in their bloodstream than non-smokers. Combination smoke and CO detectors can alert people to the presence of CO and save lives.

These measures were developed following the Centers for Disease Control and Prevention (CDC) Standards for Nationally Consistent Data and Measures (NCDMs) within the Environmental Public Health Tracking Network. The purpose of NCDMs is to ensure compatibility and comparability of data and measures useful for understanding the impact of our environment on our health.

The LDH Tracking program collects data on the following measures for deaths, emergency department visits, and hospitalizations with a primary diagnosis of CO poisoning:

- Age-Adjusted Rate
- Crude Rate
- Annual Number

For a detailed definition of each measure, please refer to the LDH Tracking Glossary of Terms

CDC Tracking measures for CO poisoning are derived based on the CSTE case definition for public health surveillance for a confirmed or probable case of acute CO poisoning in administrative data sets. These data are grouped and presented in three unique categories based on cause of injury:

- Unintentional, non-fire related
- Unintentional, fire-related
- Unknown intent

About the Data

The following data limitations may exist for this dataset:

- Records are selected using primary or any secondary discharge diagnosis or cause of injury code. Therefore a case may not actually be caused by CO poisoning. The use and quality of hospitalization diagnostic codes to describe how an injury occurs varies widely. This generalization decreases the ability to distinguish between cases of CO poisoning that are intentional or unintentional and cases or between cases that are fire-related or non-fire related.
- Cases of intentional injury or poisoning, where it can be identified, are excluded from this data.
- Emergency department data includes both inpatient and outpatient records. Patients who visit the emergency department may be treated and released, or they may be admitted to a hospital through the emergency department. Therefore, there is an overlap between emergency department and hospitalization indicators. Due to this overlap, emergency department counts and hospitalization counts cannot be combined to create a total count of events.
- Hospitalization and Emergency Department data should not be considered complete until the subsequent year of data has been published. Since the source data capture hospital discharges (rather than admissions), patients admitted toward the end of the year and discharged the following year will be omitted from the current year dataset. This may lead to the number of hospitalization admissions in the most recent year of published Tracking data to be understated.
- Data is generally updated on an annual basis. It is however important to note that there is usually a one to two year lag period before data are available from the data owner.
- Fluctuations in rates from year to year between parishes may occur, that do not reflect a true change in health outcomes over time or geography. These can complicate trend analysis. Distortion may occur from several identified quality controls related to data entry, transfer, or extraction; hospital closure or reorganization; incomplete hospital reporting; limitations of the geocode; major population shifts due to hurricanes; and other possible factors. Rate fluctuations have been found to impact both populous and rural parishes. Work is ongoing to identify and improve both the data source(s) and processing steps along the workflow.
- Counts and rates based on 5 or fewer cases are suppressed where population is less than 100,000. Suppressed rates are indicated with an asterisk (*). Since many parishes have very few CO poisoning cases, measures are sometimes aggregated by region to minimize suppression. Suppression is a statistical practice that is used to protect patient confidentiality and potentially identifying information by withholding or excluding small numbers within a specific demographic or geography. This is a standard procedure used to comply with the federal Health Insurance Portability and Accountability Act's Privacy Rule.
- Rates shown in italics have a relative standard error greater than or equal to 30% and may be unreliable. Rates calculated based on small numbers, generally less than 12, may be unstable and should be interpreted with caution.
- The 95% confidence intervals (CI) for rates are shown as error bars on corresponding graphs. Statistical significance is determined by comparing 95% confidence intervals. If the confidence intervals of two rates do not overlap, there is a statistically significant difference between them.
- Numbers and rates may differ slightly from those contained in other publications. These differences may be due to file updates, differences in calculating rates, diagnostic techniques reported, NCDMs standards for processing, and updates in population estimates.

- Practice patterns and payment mechanisms may also affect diagnostic coding and decisions by health care providers to hospitalize patients.
- Records for persons receiving care at home and in outpatient settings are not included in these data. Not all hospitals report data from emergency departments.
- Veterans Affairs, Indian Health Services and institutionalized (e.g. prison) population records are also not included in these data.
- Records for persons living in Louisiana may not be included if the hospitalization occurred out of state.
- Patients may be exposed to environmental triggers in multiple locations, but hospital discharge geographic information is limited to patient residence and hospital location.
- Differences in rates by area may be due to different socio-demographic characteristics and associated behaviors. When rates across geographic areas are compared, many non-environmental factors, such as access to medical care, personal behaviors, health status, and diet can affect the likelihood of a person being hospitalized for CO. Differences in rates by time or area may reflect differences or changes in diagnostic techniques and criteria and in the coding of CO.
- Persons hospitalized for CO multiple times throughout the year may be counted for each hospitalization, thereby raising the rates. Although duplicate records, the measures are based upon events. When multiple admissions are not identified, the true prevalence will be overestimated.
- The measure of all CO hospitalizations may include some transfers between hospitals for the same person for the same event. Thus, variations in the percentage of transfers or readmissions for the same event may vary by geographic area and impact rates.
- Because census data are only available every ten years, the postcensal population estimates are used when calculating rates for the intervening years. These estimates may not accurately reflect demographic changes for years in which large population shifts occur.

Disclaimer

Data are intended to spur further research and should be used only as a starting point to understanding how the environment and other contributing factors may be connected to disease. Datasets presented on this site are intended to answer some basic questions, but should ultimately lead to further inquiry and more detailed study.

Data limitations should be noted if conducting exploratory ecological studies with these data. Limitations may include data gaps, reporting discrepancies (for example, a disruption of reporting or instrument recording following hurricanes) and insufficient data on all potentially confounding factors. There are numerous additional factors which may contribute to disease onset. These include genetics, access to health care, existing health conditions, medicines, other chemical substances we come into contact with or ingest, nutrition, route and duration of exposure, level of activity, level of stress, and many others.

Responsible use of this data therefore requires exercising caution when drawing conclusions based solely on views of the limited available data. Any perceived relationship, trend, or pattern apparent in the data should not be interpreted to imply causation; may in fact be unrelated; and should be regarded as preliminary, and potentially erroneous, until more in-depth study and if applicable, statistical

evaluation, can be applied. The LDH Bureau of Health Informatics and Environmental Public Health Tracking Program cannot guarantee the completeness of the information contained in these datasets and expressly disclaim liability for errors and omissions in their content.

Data Sources

- LDH State Registrar and Vital Records
- LDH Bureau of Health Informatics
- U.S. Census Bureau

Additional Information

- Agency for Toxic Substances and Disease Registry – Carbon Monoxide
- CDC Carbon Monoxide Poisoning

Questions

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