



Carbon Monoxide (CO) Poisoning

This metadata page provides a brief summary of this dataset. More detailed data and metadata may be available from the Section of Environmental Epidemiology & Toxicology (SEET) within the Louisiana Office of Public Health (OPH). Please refer to the contact information on the last page under 'Questions?'

Definition

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 in just minutes. For this reason, CO is often referred to as an invisible killer.

Data Sources

- [LDH Bureau of Health Informatics](#)
- [LDH Section of Environmental Epidemiology & Toxicology](#)
- [LDH State Registrar and Vital Records](#)
- [U.S. Census Bureau](#)

The Louisiana Department of Health, SEET-Environmental Public Health Tracking Program ('LDH Tracking') processes carbon monoxide poisoning (CO) data provided by the OPH-Bureau of Health Informatics (BHI) to provide to the US Centers for Disease Control and Prevention (CDC) Tracking Program, through a Cooperative Agreement. Some datasets are processed and created by the LDH Tracking Program specifically for display on Louisiana's Health Data Explorer (<http://ldh.la.gov/tracking>, more information below). Since CO Poisoning is rare, aggregating the data over years or geography allows more data and information to be shared while still maintaining health data privacy.

Vintage: The latest CO Poisoning datasets available from LDH Tracking as of January 2024 include:

- Hospitalizations: data years: **2000 through 2020 by State, 2000-2020 (21-yr) and 2016-2020 (5-yr) combined by LDH Administrative Region**
- Emergency Department (ED) Visits: data years **2000 through 2020 by State, 2000-2020 (21-yr) and 2016-2020 (5-yr) combined by LDH Administrative Region**
- Mortality: data years **2000-2020 (21-yr) and 2016-2020 (5-yr) combined by LDH Administrative Region**

CO Poisoning Data can also be viewed on the CDC Data Explorer at:
<https://ephtracking.cdc.gov/DataExplorer/>

Data Measure(s)

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 for submission to the CDC. 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. Additional measures were developed using ‘repeatable methods’ to analyze health and environmental data as part of the LDH Tracking Program Cooperative Agreement. Please contact the Program for a more detailed description of methods.

The LDH Tracking program collects data on the following measures with a primary diagnosis of CO poisoning:

Statewide, Hospitalizations, ED Visits and Mortality via the [CDC Data Explorer](#):

- Age-adjusted Rate Per 100,000 Population
- Crude Rate Per 100,000 Population
- Annual (Total) Number

Stratifications:

- Cause: Fire
- Cause: Non-Fire
- Cause: Unknown Mechanism or Intent

LDH Administrative Region, Hospitalizations and ED Visits, 5-yr (2016-2020) via the [LDH Data Explorer](#):

- Average Annual
- Total Count

CO Mortality, 5-yr (2016-2020) and 21-yr (2000-2020)

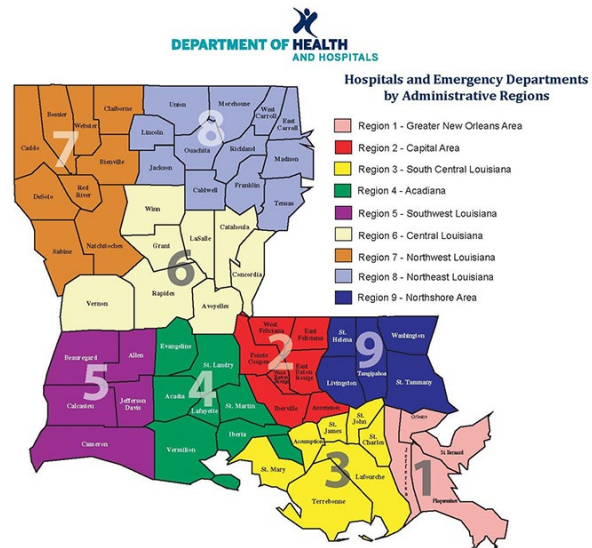
Total Count and Total Percent of CO Poisoning Deaths via the [LDH Data Explorer](#):

- Age-adjusted mortality rates per 1 million population
- Total Count of CO Poisoning Deaths
- Percent of CO Poisoning Deaths

Stratifications:

- Count by Age Group: 21-yr (2000-2020)
 - All Ages
 - 0-19 years
 - 20-44 years
 - 45-64 years
 - 65+ years
- Percent by Gender (Male, Female) and Ethnicity/Race (White/Non-White): 21-yr (2000-2020)

Figure 1. LDH Administrative Regions



Explore Data

The LDH Health Data Explorer (<http://ldh.la.gov/tracking>) is an online query tool which allows health, environmental hazard, exposure and population data to be explored and viewed side-by-side in tables, charts, and maps. Data can be viewed, printed and downloaded for further analysis.

To *Explore Data* on the query tool:

Step 1: *Select Criteria*

Category: **Exposures**

Topic(s): **Hospitalizations** or Topic: **Emergency Department Visits**

<or>

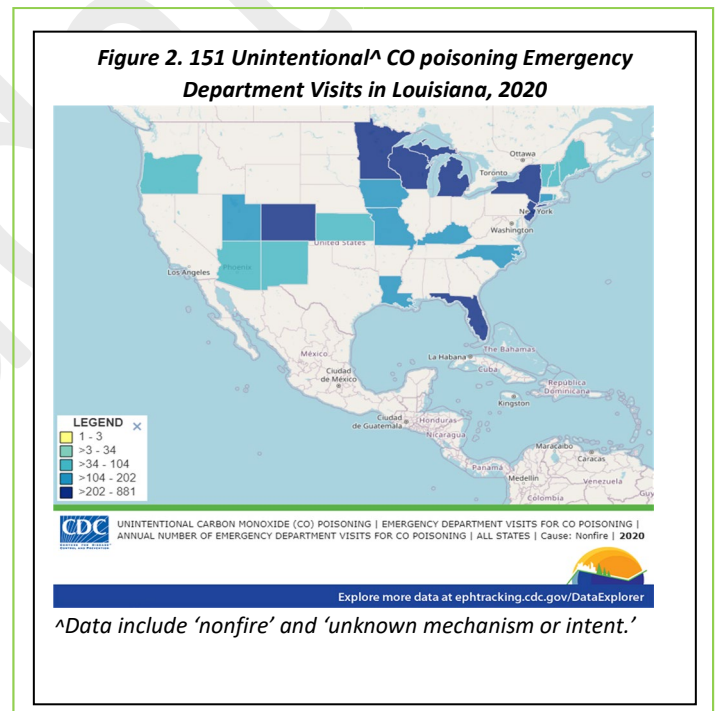
Category: **Health Outcomes**

Topic: **Carbon Monoxide (CO) Poisoning**

Focus: **Carbon Monoxide (CO) Poisoning Mortality**

Carbon Monoxide and your Health

According to a recent US CDC study, “unintentional carbon monoxide poisoning is preventable yet remains a leading cause of poisoning-related deaths in the United States” (CDC 2023). Carbon monoxide can be produced 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, and could lead to death. The most common symptoms of CO poisoning are headache, dizziness, weakness, upset stomach, vomiting, chest pain and confusion. Open your windows and doors to introduce outdoor air or go outside immediately if you suspect possible CO poisoning. Install a CO detector in your home and check/replace batteries. Combination smoke and CO detectors can alert people to the presence of CO and save lives.



Carbon Monoxide poisoning and the Environment

In Louisiana, following Hurricane Ida in fall 2021, over 140 emergency department visits and four deaths were reported due to unintentional CO poisoning, likely from portable or stand-by generators (LDH 2021). 51 cases of CO poisoning resulting in five deaths were reported in several southern states after Hurricane Katrina in 2005 (CDC MMWR 2005). Across the US, up-to-date surveillance reporting from four different data sources indicated that unintentional carbon monoxide poisonings were most often reported in the winter months of December and January. Generator use following hurricanes to respond to power outages remains a serious risk in Louisiana if not properly ventilated. Be aware of CO Poisoning risk.

Data Methods

Data Privacy and Suppression. These data were prepared to provide datasets by LDH Administrative Region (See Figure 1) for rare events of CO Poisoning for the Tracking Program. Parish data were aggregated by 5 and 21 years to allow more data to be shown. Data were suppressed for counts <5 for geographies with < 100,000 people. Suppressed values are not displayed. Suppression is a method of protecting health data confidentiality when small numbers are reported. Suppression rules, which vary by data source, generally restrict the extent to which health data can be shared publically. Primary and secondary suppression techniques are used to prevent someone's personal health information from being discoverable by the general public.

On the LDH Health Data Explorer, numbers and rates that are suppressed are displayed as asterisks (*) and are cross-hatched in grey on graphs and maps.

Total population of the aggregated regions in this dataset over the aggregated years >100,000.

Total Count of CO Poisoning ED & Hospitalization for each LA Administrative Region over 5 years ≥ 5 for all Regions; Data Suppression not required. 5-year aggregates by Louisiana OPH Administrative Region are protective of health privacy as denominator populations exceed 100,000 for total counts and average annual admissions.

**Figure 3. Louisiana Administrative Regions
Population Estimates**

| Administrative Regions: Population Estimates | Total Population (Denominator) |
|---|-----------------------------------|
| | 2016-2020 |
| 1 Greater New Orleans | >100,000 |
| 2 Capital Area | >100,000 |
| 3 South Central | >100,000 |
| 4 Acadiana | >100,000 |
| 5 Southwest | >100,000 |
| 6 Central | >100,000 |
| 7 Northwest | >100,000 |
| 8 Northeast | >100,000 |
| 9 Northshore | >100,000 |

Information on special circumstances such as fire, non-fire and unintentional etc. are not broken out in this dataset. All event types/conditions are therefore included.

Rate Stability. Calculated rates are flagged as unstable (or unreliable) if the relative standard error (RSE) calculation $> 30\%$. Rates, proportions, and percentages are checked for their stability, so that trends over time and between geographic areas or populations can be evaluated with reasonable confidence. Unstable or unreliable rates, proportions, or percentages can arise from a small number of cases or events or from small populations. Rate or Percentage Stability is not required since percentages are based on numbers ≥ 5 and Total Population by Region over the 21 year aggregation $> 100,000$.

Only 'non-smoothed' data values are included in this dataset. Smoothed rates or measures are available by the [CDC Tracking Program](#) for some datasets to include stratifications for age group, gender or race/ethnicity which can be used to identify patterns or trends across a state or group of counties.

Data Limitations and Important Considerations

The following data limitations may exist for this dataset:

- a. 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.
- b. Cases of intentional injury or poisoning, where it can be identified, are excluded from this data.
- c. 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.
- d. 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.
- e. 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.
- f. 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.
- g. 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.
- h. Any 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.
- i. 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.
- j. Practice patterns and payment mechanisms may also affect diagnostic coding and decisions by health care providers to hospitalize patients.
- k. 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.

- l. Veterans Affairs, Indian Health Services and institutionalized (e.g. prison) population records are also not included in these data.
- m. Records for persons living in Louisiana may not be included if the hospitalization occurred out of state.
- n. Patients may be exposed to environmental triggers in multiple locations, but hospital discharge geographic information is limited to patient residence and hospital location.
- o. Differences in rates by area may be due to different socio-demographic characteristics and associated behaviors. When rates across geographic areas are compared, many nonenvironmental 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.
- p. 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.
- q. 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.
- r. 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.

Data Re-release

This is a public dataset which can be freely shared. Personally identifiable health information has been removed. Please refer to the Data Methods section of these metadata from more information.

Data Citations

Please cite the US CDC, LDH Environmental Public Health Tracking Program Cooperative Agreement NUE1EH001490, and any data source(s) listed on Page 1 when re-sharing or applying these data in analyses or publications.

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 the LDH Health Data Explorer site are intended to answer some basic questions, but should ultimately lead to further inquiry and more detailed study.

Data limitations should be noted when conducting exploratory ecological studies with these data. Limitations may include data gaps, reporting discrepancies (for example, a disruption of reporting or instrument recording) and insufficient data are 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 others.

Responsible use of this data 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.

Additional Information

Please visit the following links for more information:

- [CDC | Carbon Monoxide Poisoning](#)
- [Louisiana Poison Control Center](#)
- [LDH and Office of the State Fire Marshal Generator Safety Reminders following Hurricane Ida \(Press Release, 2021\)](#)

Questions?

- Email: healthdata@la.gov
- Website: <http://ldh.la.gov/tracking>
- Toll free Phone: 1-888-293-7020