On September 17, 2012 a revised version of this dataset was posted to the Open Data Portal. See **Version History** on page 3 of this document for details.

Title: Asthma hospitalizations in Chicago, 2000-2011

Brief Description: This dataset contains the annual number of hospital discharges, crude hospitalization rates with corresponding 95% confidence intervals, and age-adjusted hospitalization rates (per 10,000 children and adults aged 5 to 64 years) with corresponding 95% confidence intervals, for the years 2000 – 2011, by Chicago U.S. Postal Service ZIP code or ZIP code aggregate.

Description: The Chicago Department of Public Health (CDPH) calculated the indicators using annual hospital discharge datasets supplied by the Illinois Department of Public Health (IDPH). A hospitalization was classified as being due to asthma if the ICD-9-CM code *493* was recorded as the primary discharge diagnosis.

The crude hospitalization rate is the number of hospital discharges attributed to residents of a geographic area (ZIP code, city, etc.) divided by the total population for the same geographic area for a specified time period. Crude hospitalization rates are not necessarily appropriate for comparison of different populations or geographic areas due to the significant impact of age in hospital discharge data and differing age-distributions between populations.

The age-adjusted hospitalization rate controls for the effects of differences in population age distributions. The age-adjusted rate is hypothetical, and is useful only for comparing populations, either over time, by geographic area, by sex or by racial/ethnic subgroups. Age-adjusted rates do not reflect the absolute frequency of the event in a population in the way crude rates do. The age-adjusted hospitalization rate is the weighted average of the age-specific death rates observed in a population, with the weights derived from the age distribution of an external population standard, such as the U.S. 2000 standard population. Different standard populations have different age distributions and the choice will affect the resulting age-adjusted rate. For this dataset, age-adjustment was done using the weights indicated in Distribution #21 of year 2000 standard population (http://www.cdc.gov/nchs/data/statnt/statnt20.pdf). Rates are expressed per 10,000 residents.

Rates are presented with the lower and upper confidence intervals computed at the 95 percent level. A confidence interval is a range of values used to describe the uncertainty around a measurement (e.g., rate) and serves as a measure of the variability in the data. Confidence intervals are calculated based on the standard error of the rate, which is based on the rate and the number of events (e.g., hospitalizations). Most confidence intervals are calculated as 95% confidence intervals by convention. The 95% confidence interval can best be understood that if the measurement were conducted 100 times, 95 times the true value would be within the calculated confidence interval and 5 times the true value would be either higher or lower than the range of the confidence interval. For example, an age-adjusted hospitalization rate of 10 discharges per 10,000 with a lower limit of 8 and an upper limit of 12 means that there is a 95 percent chance that the rate was between 8 and 12 hospitalizations per 10,000. Conversely, there is a 5 percent chance that the rate was lower than 8 or higher than 12.

In the case of hospitalization data, rates are subject to random error, arising from random fluctuations in the number of hospitalizations over time or between different populations. The 95% confidence

interval reflects the stability of the rates. A stable rate is one that would be close to the same value if the measurement were repeated, i.e., if the rate did not vary greatly from one year to the next. An unstable rate is one that would vary from one year to the next due to chance alone. Wider confidence intervals in relation to the rate indicate instability. Narrow confidence intervals indicate stability, and large fluctuations from year to year would not be expected. If differences are observed between stable rates (those with narrow confidence intervals), then it is likely that the differences represent true variations, rather than random fluctuations in the number of hospitalizations. In general, if the 95% confidence intervals of two rates do not overlap, they are likely significantly different. For a description of the approach used to calculate confidence intervals for the crude rates in this dataset, see page 94 of the March 28, 2000 *National Center for Vital Statistics Reports* publication at http://www.cdc.gov/nchs/data/nvsr/nvsr48/nvs48_03.pdf. For more information on the Tiwari method of confidence interval calculation for age-adjusted rates, see http://www.idph.state.il.us/cancer/11/county_rpt/County_Appendix_C_Formulas_for_Rates.pdf.

The source of age-specific population estimates by ZIP code was a linear interpolation of counts from the 2000 and 2010 United States Census ZIP code tabulation area files, using the method described in *Trend Analysis and Interpretation: Key Concepts and Methods for Maternal and Child Health Professionals* (see page 8 of http://mchb.hrsa.gov/publications/pdfs/trendanaylsis.pdf). 2010 population counts were also used for 2011 calculations.

U.S. Postal Service ZIP Codes are designed to meet the day-to-day operational needs of the U.S. Postal Service and tend to change more frequently than every ten years. To account for this instability, as well as the emergence of new ZIP codes over the course of the decade and low population estimates in certain ZIP codes (i.e., less than 20,000 residents), the following steps were taken:

- The total number of hospitalizations and total population of ZIP codes 60707, 60638, and 60827 were included, regardless of whether the hospitalized individual resided within the Chicago city limits.
- 60610 includes 60654
- 60707 includes 60635
- 60622 includes 60642
- 60606, 60607, and 60661 are combined
- 60601, 60602, 60603, 60604, 60605, and 60611 are combined
- 60827 and 60633 are combined

Rate estimates for Chicago as a whole are provided in the final row of the table. The total number of hospitalizations and total population of ZIP codes 60707, 60638, and 60827 were included in the calculations. The annual number of hospitalizations for Chicago is not given because it includes discharges attributed to residents of 60707, 60638, and 60827, regardless of whether the hospitalized individual resided within the Chicago city limits.

Nationally, 11.1 hospitalizations for asthma per 10,000 children and adults aged 5 to 64 years occurred in 2007 (age adjusted to the year 2000 standard population). The Healthy People 2020

target is 8.6. (See http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=36, item RD 2.2.)

Disclaimers: IDPH specifically disclaims responsibility for any analysis, interpretations, or conclusions. Because the IDPH dataset provides information on hospital discharges and not individual persons, the counts and rates reported may not necessarily reflect rates per person; that is, persons who are hospitalized more than once in a year may be counted more than once. When fewer than 20 hospitalizations during the period of study were recorded, the rate and confidence interval estimates are unreliable; this instability should be considered when making comparisons. The population counts used in the calculations are estimates, and this potential source of error should be taken into account when considering the precision of the indicators. See http://www.census.gov/geo/ZCTA/zcta.html for specific information on the estimation of ZIP code population counts. Methods and data sources may not be identical to those used in CDPH reports published prior to March 2012.

Data Owner: Epidemiology and Public Health Informatics, Chicago Department of Public Health (CDPH).

Time Period: 2000-2011

Frequency: Updated upon receipt of annual hospital discharge datasets and/or updated U.S. Census data.

Related Applications: N/A

Version History: In the dataset posted to the Open Data Portal on August 3, 2012, some rates and confidence intervals were incorrect due to a rounding error. A corrected dataset was posted on September 17, 2012.