

Calendar Year 2018 Connecticut Hospitalization Tables

Inpatient hospitalizations represent the instances where a person's illness or injury required care at a hospital. As such, counts and rates of hospitalizations are one way to measure morbidity (injury and illness) in Connecticut. The Connecticut Hospitalization Tables provide a series of counts, rates, lengths of stay, charges, rankings, rate ratios and rate differences for select indicators. Diagnosis codes are presented for selected conditions which are either among the most common or for which there exists a particular public health interest (e.g. lead poisoning). These tables provide metrics that can be used to monitor hospitalizations over time and help inform the planning and allocation of resources for treatment.

Methodology

The 2018 Hospitalization Tables continue the methodology and structure first adopted in the 2016 Hospitalization Tables. In October of 2015, all hospitals began reporting diagnostic codes and hospital claims billing data using the ICD-10-CM classification system. The ICD-10 is more than an expansion of the ICD-9; it is a restructuring of the classification system. As a result, some disease categories in ICD-9 have equivalents in ICD-10 and some do not; furthermore, some diseases have come to new prominence. The 2016-2018 Tables will not align with tables from 2015 and earlier. See the 2016 hospitalization narrative for more details.

Table Structure

Table H-1 presents number of discharges, discharge rate, median stay, median charge, and total charge for selected primary diagnoses for Connecticut residents of both sexes, males and females, for all ages, and selected age groups. Table H-2 presents the same categories as H-1, except that race and ethnicity (white non-Hispanic, black non-Hispanic, Hispanic) are shown instead of sex.

Injury and poisoning appear as first diagnosis S and T codes in tables H-1 and H-2 and reflect anatomic site (e.g. spine). Injury and poisoning tables (H-3, H-4), as in past reports, reflect injury and poisoning codes that capture how the event happened (e.g. a fall), and intent (e.g. unintentional), and cannot appear in the primary diagnosis field. The first V, W, X, or Y code to appear in the remaining diagnosis fields was used for tabulation, even when an injury code (S or T code) was not listed as the primary diagnosis. Counts and rates of injury and poisoning as reported in these hospitalization tables may differ from data presented by the Department of Public Health (DPH) Office of Injury Prevention. It has been noted by both that office and the division of Health Statistics and Surveillance which produces this hospitalization report that secondary coding of injury diminished on a facility-specific basis between 2016 and 2018 (the

latest year examined at the time the 2018 hospitalization tables were prepared). It is conceivable that counts and rates decreased unequally among races and ethnicities, because hospitals differ from one another in the proportions of race-ethnicities in the populations that they serve. In 2016 there were 7,761 discharges with a secondary diagnosis of W00-W19, indicating a fall, and falls discharges decreased through 2017 (6,129) and 2018 (5,383), which was 31% lower than 2016. By hospital, coding 2016-2018 ranged from 100% falls decrease to an actual increase. Therefore the data in tables H-3 and H-4 are not comparable across years 2016-2018, nor are these years comparable to earlier years when ICD-9 was used. Tables H-3 and H-4 do not reflect complete or stable secondary coding of injuries. However, the coding of injury as a primary diagnosis (S and T codes) appears to be stable across 2016-2018.

The ranking of leading causes of hospitalization by age and sex appears in table H-5, and by age and race-ethnicity in table H-6. Tables H-7 and H-8 show comparisons (rate ratios and rate differences) of age-adjusted hospitalization rates between the sexes and race-ethnicities, for the diagnoses.

As in past reports of hospitalizations, the major disease categories in tables H-1 and H-2 were used for ranking, except that diseases of the heart and cerebrovascular disease were used in place of diseases of the circulatory system (I00-I99). Hospitalizations related to the major categories for pregnancy and childbirth (O00-O99), for signs and symptoms not elsewhere classified (R00-R99), and for factors influencing health status (Z00-Z99) were not used in rankings (Tables H-5, H-6), as they do not represent diseases.

Appendices appear with inpatient and emergency department counts of visits. These are organized in three ways: by the order of the ICD-10-CM codes (H-9), the ISHMT (H-11), and the Clinical Classifications Software (H-10). The CCS is a tool for grouping together diagnoses which are similar in clinical management. CCS categories based upon secondary injury codes (2601-2621) are no longer presented in table H-10.

Appendix table H-12 compares discharge counts for the diagnostic codes presented in tables H-1 and H-2 across the years since ICD-10 came into use for hospital discharges. Due to apparent data incompleteness in secondary injury coding, data from tables H-3 and H-4 are not included in appendix H-12.

Summary of 2018 data

Prior to October 2015, hospitals used ICD-9 diagnostic codes. The substantial differences between ICD-9 and currently used ICD-10 coding systems preclude finding one-to-one correspondence for most conditions in the current report compared to previous time periods, and it creates a large discontinuity in reporting.

During 2018 there were 377,035 hospitalizations of Connecticut residents in Connecticut hospitals (Table H-1), with total charges of over 16.4 billion dollars, and an age-adjusted hospitalization rate for all conditions of 9,596 per 100,000 residents. The age-adjusted hospitalization rate for all conditions decreased 1.0% from 9,696 in 2017; the age-adjusted rate for conditions other than pregnancy and birth decreased 0.9% from 7,269 the previous year to 7,206 per 100,000 residents. The lowest rate in 2018 for all conditions was in the 5-14 year old age group (1,343 per 100,000) and highest in the 65 years and over age group (24,726 per 100,000). Overall, the median charge per hospital stay (excluding pregnancy and childbirth) increased 3.9% to \$31,632 (unadjusted for inflation) from the prior year, and the median length of stay remained three days. Among listed conditions, the longest median stays were for Alzheimer's disease and psychoses (each nine days), and the highest median charge was for leukemia (\$96,414). Among major disease categories, the longest median length of stay was for mental and behavioral disorders (six days). The highest median charges were for congenital deformations & chromosomal abnormalities (\$70,930). The largest total charges were for diseases of the heart (2.2 billion dollars).

Heart disease was the leading diagnosis in all residents, among males and among non-Hispanic White residents, and mental and behavioral disorders led among non-Hispanic Black residents. The leading diagnosis was digestive diseases for females, and for Hispanic residents (Tables H-5, H-6). As leading causes are based on counts rather than rates, leading causes for all ages combined are influenced by age distributions.

During ages 0-4 perinatal diseases was the leading cause of hospitalization in among females and among non-Hispanic White residents, while respiratory diseases led among all residents, males, non-Hispanic Black and Hispanic residents. During ages 5-14, 15-24, and 25-44, mental and behavior disorders was the leading cause of hospitalization among all sex and race-ethnicity groups. In ages 45-64, digestive diseases was the leading cause of hospitalization in all groups except males, where mental and behavioral disorders led, and non-Hispanic Black residents, where heart disease led. In ages 65 and older, heart disease was the leading cause of hospitalization in all sex and race-ethnicity groups.

The most common type of injury-related hospitalization among all sex and race-ethnicity groups was an unintentional fall. The longest median stay was for intentional self-harm and for undetermined intent. The highest median injury charge was for assault using firearms (Tables H-3, H-4).

Hospitalization rate ratios between the sexes and by race-ethnicity groups appear in tables H-7 and H-8. Only table H-7 is discussed here due to unstable secondary injury coding.

The female to male ratio of age-adjusted hospitalization rates for all ages and causes of hospitalization was 1.15 (15% higher for females), but was 0.88 (12% lower than males) after excluding pregnancy and childbirth-related causes. During ages 15-24 and 25-44 the

hospitalization rate for all causes other than pregnancy and childbirth was higher in females than in males; it was higher in males before age 15 and after age 44.

- For all ages and causes, the non-Hispanic Black to non-Hispanic White ratio was 1.46; the Hispanic to non-Hispanic White ratio was 1.17.
- High male to female ratios (>50% elevated) occurred for hospitalizations related to pancreatic, bladder, and kidney cancer, non-Hodgkin lymphoma, diabetes, alcohol and drugs, psychoses, heart disease, pneumonitis, and head and spinal injury.
- High female to male ratios occurred for breast cancer, in situ and benign neoplasms, and obesity.
- Non-Hispanic White to non-Hispanic Black ratios were especially elevated for hip arthrosis, hip fractures, appendicitis, and primary brain cancer.
- Non-Hispanic White to Hispanic ratios were high for musculoskeletal disorders, hip fractures, bladder and brain cancers, and alcohol-related diagnoses.
- High non-Hispanic Black to non-Hispanic White ratios and high Hispanic to non-Hispanic White ratios occurred simultaneously within several conditions, such as HIV/AIDS, anemias, endocrine and metabolic disorders (including diabetes and obesity), eye diseases, hypertensive heart diseases, influenza, chronic lower respiratory disease (including asthma), and lead poisoning.
- High non-Hispanic Black to non-Hispanic White ratios were also seen in neoplasms (including pancreas, prostate, benign), ear diseases, several forms of heart disease, stroke, renal failure, diseases of the nervous and genitourinary systems, psychoses, and drug use other than alcohol.
- High Hispanic to non-Hispanic White ratios were also seen for gallstones.

Table H-7 also shows rate differences.

- ❖ The hospitalization rates in males exceeded the rates (>100 per 100,000 population) in females within cardiovascular diseases, particularly ischemic heart disease and conduction disorders. Large excesses for males also appeared in mental and behavioral disorders due to alcohol, alcohol dependence, injury and poisoning, and septicemia.
- ❖ No rate differences exceeded 100 per 100,000 for comparisons of female to male, or non-Hispanic White to non-Hispanic Black.
- ❖ The largest excess rate comparing non-Hispanic Black to non-Hispanic White were for cardiovascular disease, especially cerebrovascular disease, and hypertensive heart diseases, for anemias, psychoses, diabetes, chronic lower respiratory diseases (including asthma), septicemia, and renal failure.
- ❖ The largest non-Hispanic White to Hispanic rate differences was for arthropathies.
- ❖ The liveborn rate comparison reflects that age 0-4 is a smaller proportion within the total CT non-Hispanic white population than within the Hispanic population (4% vs. 8%), while the US standard population age 0-4 proportion is intermediate; thus adjustment to the standard population raises the unadjusted white rate and lowers the Hispanic rate. For birth rates, see the Registration Report for Connecticut.

- ❖ The largest Hispanic to non-Hispanic White differences appeared in chronic lower respiratory diseases (including asthma), diabetes, hypertensive heart diseases, and septicemia.

Appendix H-12 shows changes in the number of discharges between 2016 and 2018 in diagnostic categories used in table H-1. The most extreme changes occurred in congestive heart failure (CHF) and hypertensive heart diseases. Presumably, cases that formerly would have been given a primary code of I50 (CHF) were increasingly given a primary code of I11 or I13 (hypertensive heart diseases). The inter-relationship between CHF and hypertensive heart disease, and their coding is demonstrated in advice from the American College of Physicians.

For coding purposes, whenever a patient has both heart failure and hypertension, it is assumed to be hypertensive heart disease unless specifically stated otherwise by the clinician, and a combination code from category I11 (hypertensive heart disease) is assigned first, followed by codes for the type(s) of heart failure and hypertension. If the patient also has chronic kidney disease, the connection between it, hypertension, and heart failure is also assumed and a code from category I13 (hypertensive heart and chronic kidney disease) is assigned first, followed by codes for all three conditions.¹

The next most extreme variation in 2016 discharges compared to 2018 occurred in influenza (increase), an infectious seasonal respiratory illness that historically varies from year to year. Other notable changes (decreases) were in benign and in situ neoplasms, which are often treated outside the hospital; mental & behavioral disorders due to non-alcohol psychoactive substances; intervertebral disc disorders; and kidney stones.

Other Sources of Connecticut Hospitalization Data

The Connecticut State Innovation Model Dashboard tracks ambulatory care sensitive hospitalizations.² The Office of Health Strategy makes available facility level charge, charity care, and bed utilization data.³ The DPH Environmental Public Health Tracking program Data Explorer makes available hospitalization and ED visit counts and rates by year, county, age, sex, race and ethnicity for selected conditions,⁴ as well as non-hospitalization data (e.g. suspected and confirmed Lyme disease). The DPH Healthcare Associated Infections and Antimicrobial Resistance (HAI-AR) program publishes data from hospitals and other facilities.⁵ The DPH

¹ RD Pinson, "Heart failure documentation and coding challenges"; <https://acphospitalist.org/archives/2019/02/coding-corner-heart-failure-documentation-challenges.htm>

² <https://health.uconn.edu/population-health/hospital-admissions-overall/>

³ <https://portal.ct.gov/OHS/Health-Systems-Planning/Hospital-Financial-Data/Annual-and-12-Month-Filing-Reports>

⁴ <https://stateofhealth.ct.gov/HealthEffects>. The conditions are asthma, 16 cancers, COPD, carbon monoxide poisoning, and heart attack.

⁵ <https://portal.ct.gov/DPH/HAI/Healthcare-Associated-Infections-and-Antimicrobial-Resistance>

syndromic surveillance for influenza ED visits is also on the DPH website.⁶ The DPH Office of Injury Prevention publishes statistics that include injury hospitalizations and ED visits.⁷ Current counts of people hospitalized with COVID-19 diagnosis appear on the Connecticut COVID-19 Response page.⁸

Limitations of Hospitalization Data

Hospitalization refers to any discharge from a non-federal, short-stay, acute-care general hospital in Connecticut. Hospitalizations are expressed as numbers of discharges, not as unduplicated patients; a single patient with multiple hospitalizations can thus be counted more than once. These data do not capture conditions treated on an outpatient basis or that result in death prior to transport to the hospital, nor can they reflect the movement of some treatments from an in-patient to an outpatient setting. As used in this report, race and ethnicity categories are mutually exclusive. Determination of race and ethnicity in billing data may vary from hospital to hospital, sometimes based on self-report and other times on attribution by hospital staff from appearance or surname. Counts of race other than white or black were too small in Connecticut to yield stable rates, nor do hospital race attributions for Asian, Pacific Islander, and Native American (used in rate numerators) match exactly with those from the US census (used in rate denominators). Charge data are easily collected but are not the same as costs or payments. They include facility charges but do not include physician charges.

Medical practices may vary across the United States, so caution should be used if comparing Connecticut with other states. It has been proposed that aspiration pneumonia and pneumonitis form a spectrum of diseases of the lung,⁹ implying that in a locality where infection is ruled out more thoroughly than elsewhere, diagnoses would be relatively shifted from pneumonia to pneumonitis. For some conditions, hospitalization rates are also associated with bed availability. The number of hospital beds per 100,000 population varies by geography: country, state, and urban versus rural area.¹⁰

For the most accurate record of Connecticut resident births and related risk factors and outcomes, see the Registration Reports in the “Vital Statistics” section of the DPH website.¹¹ For the most accurate record of Connecticut resident cancer risk factors and outcomes, see the

⁶ <https://portal.ct.gov/DPH/Epidemiology-and-Emerging-Infections/Influenza-Surveillance-and-Statistics>

⁷ <https://portal.ct.gov/DPH/Health-Education-Management--Surveillance/The-Office-of-Injury-Prevention/Office-of-Injury-Prevention>

⁸ <https://portal.ct.gov/Coronavirus>

⁹ Neill S, Dean N. Aspiration pneumonia and pneumonitis: a spectrum of infectious/noninfectious diseases affecting the lung. *Current Opinion in Infectious Disease* 2019; 32: 152-57.

¹⁰ <https://www.dartmouthatlas.org/faq/>

¹¹ <https://portal.ct.gov/DPH/Health-Information-Systems--Reporting/Hisrhome/Vital-Statistics-Registration-Reports>

Data and Statistics page in the “Tumor Registry” (CTR) section of the DPH website.¹² Reportable infectious disease counts, including those not requiring hospitalization, are found at the DPH web page for Epidemiology and Emerging Infections.¹³

¹² <https://authoring.ct.gov//DPH/Tumor-Registry/Data--Statistics>

¹³ <https://portal.ct.gov/DPH/Epidemiology-and-Emerging-Infections/Infectious-Diseases-Statistics>