

1999 Connecticut Resident Hospitalizations

INTRODUCTION

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. Hospital discharges are recorded in the state's hospital discharge abstract and billing database, which is maintained by the Connecticut Office of Health Care Access.

Changes to the 1999 Report

For 1999, hospitalization data in Table H-1 have been expanded to include "total charges" for all ages; for other age groups, median charges, alone, is reported. In Table H-2, a row has been added for female breast cancer, and rates of prostate cancer and prostate hyperplasia are now calculated based on the population of males rather than of both sexes. A row has been added at the ends of Tables H-3 and H-4 for hospitalizations due to firearm injuries, all intentions. Otherwise, categories are presented as in the 1998 report [1].

Technical Considerations

Hospitalizations are presented by age and sex (Table H-1) and by age and race/ethnicity (Table H-2). In addition to the selected diagnosis groupings, hospitalizations for injuries, broken out by intent and mechanism (external codes), are presented separately by sex (Table H-3) and by race/ethnicity (Table H-4). Leading causes of hospitalization are ranked by sex in Table H-5 and by race/ethnicity in Table H-2. Finally, the relative risk of hospitalization between the sexes and among the racial ethnic groups is given for selected diagnostic categories (Table H-6) and for injuries by intent and mechanism (Table H-7). The criterion for inclusion in these two tables was a relative risk of 1.5 or greater.

Hospitalizations are reported by number, rate, median length of stay, and median charges (plus total charges for "all ages" in Table H-1). Rates for individual age groups are age specific, whereas those for "all ages" were age-adjusted to the U.S. 2000 standard population (see Appendix III Glossary in the 1998 Registration Report). *Charges* refers to the amount associated with a patient's entire hospitalization, including, but not limited to, treatment associated with the primary reason for admission, and reflecting charges by the hospital only. Physician fees are not included. Charges are not the same as the actual cost of the treatment or the actual payment received by the hospital.

Causes of hospitalization were coded according to the ninth revision of the *International Classification of Diseases, Clinical Modification* or *ICD-9-CM* [2]. A comparison of the diagnosis codes used in this report and by other sources is given in Appendix Table A-I.

Limitations of Hospitalization Data

Hospital discharge data are sometimes used as a proxy for disease incidence, when incidence data are not available. There are several limitations to such use. First, hospital discharges, not individual patients, are recorded; a single individual may thus have multiple hospitalizations. Second, hospitalization rates may reflect a complex interaction of factors beyond merely disease rates. Third, hospitalizations may be a poor measure of certain conditions, because they include only the most severe cases but not those who die before reaching or being admitted overnight to a hospital.

RATES OF ILLNESS-RELATED HOSPITALIZATIONS

The discussion of hospitalizations in this report excludes those related to pregnancy and childbirth. These conditions are discussed at length in the *Births* section of the present year's Registration report.

In 1999, there were 273,090 hospitalizations of Connecticut residents in short-stay hospitals in the state, 53% of which were of females (Table H-1). The age-adjusted hospitalization rate was 7,832 per 100,000 overall, and was higher among males than females. Age-specific hospitalization rates increased with age.

Compared to 1998 hospitalizations, the age-adjusted rate for all conditions excluding pregnancy and childbirth increased by 2.7% for males, 0.2% for females, and 1.4% overall. This contrasts with the changes from 1996 to 1998, [1] when the hospitalization rate decreased 4.0% among males, 2.1% among females, and 2.9% overall.

Comparison with National Hospitalization Rates

Hospitalization rates for Connecticut and the U.S. can be compared for two age groups, 45-64 years and 65+ years. (For younger ages, groupings used in the national report differ from those used for Connecticut.) Compared to 1999 national rates [3], most Connecticut hospitalization rates were either the same or lower for the same conditions (not shown). The CT rate exceeded the national rate by 10% or more only for breast cancer, age 45-64 years, for which the Connecticut rate was 1.49 times greater. This had not been the case in 1998 and was due mainly to a large decrease in the national breast cancer hospitalization rate from 96 per 100,000 in 1998 to 71 per 100,000 in 1999 for that age group [3]. For age 65 and older the Connecticut rate was 1.06 times greater than the national rate [4]. Breast cancer *incidence* rates in Connecticut for both age groups also are elevated relative to those for 11 cancer registries nationally [5].

Connecticut hospitalization rates were considerably lower than national rates--ratio <0.67 (i.e., national hospitalization rates exceeded CT rates by 1.50 times or greater) for the following conditions and age groups: diseases of the genitourinary system (45-64 years);

infectious and parasitic diseases, septicemia, and asthma (65+ years); endocrine, nutritional, metabolic, and immunological disorders, diabetes, volume depletion/dehydration, diseases of blood and blood-forming organs, diseases of the nervous system, and chronic bronchitis (45-64 years and 65+ years). Differences were particularly striking for diabetes, where the national rates were 1.84 and 1.77 times greater than CT rates for ages 45-64 and 65+ years, respectively. The lower Connecticut rates may reflect, at least in part, lower prevalence of diabetes [6] and greater access to and utilization of primary health care services.

Between 1998 and 1999 in Connecticut, the greatest increases in hospitalization rates were related to respiratory diseases. The overall age-adjusted hospitalization rate for respiratory diseases increased 9.0%, including an increase of 11.1% for chronic obstructive pulmonary disease (COPD). The overall age-adjusted COPD hospitalization rate did not vary significantly between 1993 and 1997. In 1998, however, the rate was significantly lower than in 1993 ($p<0.05$), and in 1999 the rate was significantly higher than in any year from 1993 to 1997 (each comparison, $p<0.05$) or 1998 ($p<0.01$) [7].

Significant increases in age-adjusted hospitalization rates from 1998 to 1999 also occurred for “all conditions excluding newborn and pregnancy-related” (1.4%), endocrine, nutritional, metabolic, and immunological disorders (6.3%), volume depletion/dehydration (8.7%), mental disorders (2.8%), psychoses excluding alcohol & drug (3.5%), pneumonia & influenza (7.6%), all bronchitis (13.5%), asthma (10.3%), diseases of the digestive system (3.0%), diverticula (12.1%), and renal failure/nephritis (10.7%). Significant rate decreases were observed for diseases of the nervous system (8.6%) and cerebrovascular disease (5.1%). The rate of non-fatal spinal injury hospitalizations declined 27.9%, but this change was not statistically significant [7].

LEADING CAUSES OF HOSPITALIZATION BY AGE AND SEX

Categories of leading causes of hospitalization (shown in boldface in Tables H-1 and H-2) are based on the largest disease and injury headings of the ICD-9-CM [2]; they are identical to the highest level of the multi-level Clinical Classification Software diagnosis labels [8], except that “diseases of the circulatory system” are further divided into “diseases of the heart” and “cerebrovascular disease” (stroke plus transient cerebral ischemia).

Heart disease was the leading cause of hospitalization for both males and females of all ages combined. The leading causes of hospitalization differed by age and by sex, however, in some age groups (Table H-5). Respiratory diseases were the leading cause of hospitalization before 15 years of age. Mental disorders were the leading cause of hospitalization between 15 and 44 years of age overall and in females. In males, injury and poisoning was the leading cause of hospitalization for ages 15-24, and mental disorders for ages 25-44. Beyond 44 years of age, heart disease was the leading cause of hospitalization

for both sexes combined, males, and females 65+ years of age. In females 45-64 years of age, however, neoplasms caused the most hospitalizations.

MEDIAN LENGTH OF STAY

The median length of stay (LOS) in 1999 for all ages and conditions was 4.0 days for females and for both sexes combined (the same as in 1998), and 5.0 days for males, an increase of 1.0 days from the 1998 value (Table H-1). Median LOS increased with age, from 2.0 days for 0-4 years of age to 4.0 days for 65+ years of age. Among major categories of disease (shown in boldface in Table H-1) for all ages, the greatest median length of stay was for mental disorders (5.0 days). Among sub-categories, the greatest median lengths of stay were for diabetes with amputation, and leukemia (each 8.0 days). Between 1998 and 1999 the median LOS for Alzheimer's disease decreased from 9.5 to 7.0 days. Lead poisoning increased from 4.5 to 5.0 days.

MEDIAN AND TOTAL CHARGES

The median charge for hospitalizations (all ages and conditions) was \$8,815, which represented a 2.7% increase from 1998. Median charge increased with age from \$3,972 before 5 years of age to \$10,260 after 64 years of age. The highest median charges were for nonfatal spinal cord injury (\$28,175), leukemia (\$20,761), osteoarthritis (\$18,795), and diseases of the arteries, arterioles, and capillaries (\$18,256). The highest total charges were for diseases of the circulatory system, at over one billion dollars. Among sub-categories the greatest total charges were for treating patients with a primary diagnosis of ischemic heart disease.

SEX DIFFERENCES IN HOSPITALIZATIONS

Relative Risk

Excluding hospitalizations for sex-specific conditions like breast and prostate cancers, the relative risk of hospitalization (calculated as a ratio between the hospitalization rates among males and females for the same conditions) was greater by 50% or more among males than among females for 33 categories of disease and injury, including HIV/AIDS, alcohol-related mental disorders, heart disease, bladder and brain neoplasms, and 14 types of injuries (Tables H-6 and H-7). Relative risk of hospitalization was greater among females than males for six categories, including benign and *in situ* neoplasms, intentional self-injury, and hip fracture.

Median Length of Stay

The median LOS for leukemia was 2 days longer for females than for males in 1999, opposite to the relationship in 1998. The median LOS for *in situ* neoplasms was three days

longer for males than for females, similar to the gap observed the year before. The median LOS for meningitis was 2 days longer for females than for males, a difference also noted in 1998.

In 1999, cholecystectomy (gall bladder removal) was performed laparoscopically in 68% of operations on males (vs. 62% in 1998), and 81% of operations on females (same as 1998)[6], but there was no sex difference in the median LOS.

The health of Connecticut women is discussed in greater detail in the report, *Connecticut Women's Health* [8].

HOSPITALIZATIONS BY RACE AND ETHNICITY

White non-Hispanic, Black non-Hispanic, and Hispanic

Race and ethnicity in hospital discharge data were determined by hospital staff, not patient self-report. Race was often not specified with patients of Hispanic ethnicity, a problem overcome here by grouping all Hispanic patients together, and comparing them to those of non-Hispanic white and black race. Race/ethnicity categories are thus mutually exclusive.

Compared to non-Hispanic whites, the overall age-adjusted hospitalization rate for non-Hispanic blacks was higher, and the rate for Hispanics was almost the same (Table H-2).

The top three leading causes of hospitalization among white non-Hispanics were diseases of the heart, respiratory diseases, and digestive diseases. Among black non-Hispanics, the order was respiratory, heart, and digestive diseases. Among Hispanics, respiratory diseases, mental disorders, and digestive diseases resulted in the most hospitalizations. As these “top” lists are based upon counts rather than age-adjusted rates, the higher fraction of the elderly among whites leads to greater influences in their list of diseases which are most prevalent among the elderly.

The age-adjusted relative risk of hospitalization among non-Hispanic blacks exceeded that for non-Hispanic whites by 50% or more in 31 categories of disease and injury (Tables H-6 and H-7), including HIV/AIDS, prostate cancer, diabetes, anemias and diseases of blood, meningitis, congestive heart failure, stroke, asthma, renal failure, and 11 categories of injury. The relative risk of hospitalization for white non-Hispanics exceeded that for black non-Hispanics by 50% or more for seven categories, including brain cancer, kidney stone, and hip fracture. Relative risk among Hispanics was 1.5 or more times greater compared to non-Hispanic whites for 19 conditions, including HIV/AIDS, diabetes, liver disease, asthma, and 10 categories of injury.

Health disparities among racial and ethnic groups in Connecticut are discussed in greater detail in the report, *Multicultural Health: The Health Status of Minority Groups in Connecticut* [9].

INJURIES BY INTENT, MECHANISM, AND PLACE OF OCCURRENCE

Intent and Mechanism

The majority of injuries resulting in hospitalization were unintentional (Tables H-3 and H-7). The main mechanisms of unintentional injury were falls (10,045; 64% females) and motor vehicle traffic (2,719; 62% males). Intentional self-inflicted injuries resulted in 1,822 hospitalizations, 61% of which were of females. Intentional injuries by others resulted in 753 hospitalizations, 81% of which were of males. Males were patients in 90.3% of the 217 hospitalizations related to firearm use.

Compared to non-Hispanic whites, the relative risk of hospitalization related to firearms and intentional injury by another person were, respectively, 16 times and 7 times higher for non-Hispanic blacks and 5 and 4 times greater for Hispanics. Hospitalizations for falls were more likely among non-Hispanic whites, whereas motor-vehicle-related hospitalizations were more likely among non-Hispanic blacks and Hispanics.

Place of Occurrence

Place of occurrence was coded for 34% of all poisoning, 63% of unintentional injury and 53% of intentional injury hospitalizations in 1999 (not shown), virtually the same as the 34%, 62% and 51%, respectively, in 1998. Of primary diagnoses with place of occurrence coded, 60% of injuries (including 90% of hip fractures) occurred in a place of residence (one's home or a residential institution such as hospital, jail, or home for the aged), as did 93% of poisonings. In contrast, 62% of non-fatal head injuries occurred outside a place of residence, including 47% in the street.

Of intentional injuries coded for mechanism and place of occurrence, 92% of self-inflicted injuries, including 88% of self-inflicted cuts/pierces and 96% of self-inflicted poisonings, occurred at home or in a residential institution. In contrast, only 33% of assaults occurred in residential settings, with the balance occurring outside the home (including 34% in the street and 12% in public buildings). Of intentional firearms injuries inflicted by others, 65% occurred in the street.

Of unintentional injuries coded for mechanism and place of occurrence, 88% of poisonings, 94% of suffocations, 84% of falls, 86% of fire-related injuries, and 76% of environmental injuries occurred in a place of residence.

CORRECTIONS TO 1998 HOSPITALIZATION REPORT TABLE H-6.

Relative risks of hospitalizations for the following causes should be:

Psychotic conditions ex/alc. & drug psychoses (290,293-299)	B/W=1.5
Alcohol & drug abuse (291-292,303-305)	B/W=1.8

Alcohol & drug psychoses (291-292)	B/W=2.0
Acute myocardial infarction (410)	M/F=2.1
Coronary atherosclerosis (414.0)	M/F=2.2

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- [2] Commission on Professional and Hospital Activities. 1993. *International Classification of Diseases, 9th Revision, Clinical Modification*. Ann Arbor, MI: Commission on Professional and Hospital Activities.
- [3] Popovic, J.R. 2001. *1999 National Hospital Discharge Survey: Annual Summary with Detailed Diagnosis and Procedure Data* (Table 11). National Center for Health Statistics. *Vital Health Statistics* 13(151). The national HIV/AIDS rate was defined by “any” rather than “first-listed” diagnosis and so was not compared to Connecticut. National hospitalization rates for “all ages” were not age-adjusted and so were not compared.
- [4] It is important to note that breast cancer hospitalization rates exclude breast cancer surgery that does not result in an overnight hospital stay. For breast cancer incidence in 9 registries, including Connecticut, see the SEER website <http://SEER.cancer.gov>.
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