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Temporal Trends in Hepatitis C–Related Hospitalizations, United States, 2000–2019

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Abstract

Background.—Hospitalization burden related to hepatitis C virus (HCV) infection is substantial. We sought to describe temporal trends in hospitalization rates before and after release of direct-acting antiviral (DAA) agents.

Methods.—We analyzed 2000–2019 data from adults aged ≥18 years in the National Inpatient Sample. Hospitalizations were HCV-related if (1) hepatitis C was the primary diagnosis, or (2) hepatitis C was any secondary diagnosis with a liver-related primary diagnosis. We analyzed characteristics of HCV-related hospitalizations nationally and examined trends in age-adjusted hospitalization rates.

Results.—During 2000–2019, there were an estimated 1 286 397 HCV-related hospitalizations in the United States. The annual age-adjusted hospitalization rate was lowest in 2019 (18.7/100 000 population) and highest in 2012 (29.6/100 000 population). Most hospitalizations occurred among persons aged 45–64 years (71.8%), males (67.1%), White non-Hispanic persons (60.5%), and Medicaid/Medicare recipients (64.0%). The national age-adjusted hospitalization rate increased during 2000–2003 (annual percentage change [APC], 9.4%; $P < .001$) and 2003–2013 (APC, 1.8%; $P < .001$) before decreasing during 2013–2019 (APC, −7.6%; $P < .001$). Comparing 2000 to 2019, the largest increases in hospitalization rates occurred among persons aged 55–64 years (132.9%), Medicaid recipients (41.6%), and Black non-Hispanic persons (22.3%).

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Supplementary Data

Supplementary materials are available at *Clinical Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Conclusions.—Although multiple factors likely contributed, overall HCV-related hospitalization rates declined steadily after 2013, coinciding with the release of DAAs. However, the declines were not observed equally among age, race/ethnicity, or insurance categories. Expanded access to DAA treatment is needed, particularly among Medicaid and Medicare recipients, to reduce disparities and morbidity and eliminate hepatitis C as a public health threat.

Keywords

hepatitis C; hospitalization; National Inpatient Sample; direct-acting antiviral; healthcare utilization

Hepatitis C virus (HCV) infection is a major public health problem in the United States (US). During 2013–2016, an estimated 2.4 million adults in the US had current HCV infection; however, only 55.6% of these adults reported being aware that they had hepatitis C [1, 2]. Higher HCV infection prevalence has been observed among Baby Boomers (persons born 1946–1964) compared with other age groups; however, a bimodal age distribution has recently emerged among newly reported chronic hepatitis C cases, consisting of an older cohort of Baby Boomers infected decades ago and a newer cohort of younger persons more recently infected as a consequence of injection drug use during the opioid crisis [3]. Emergence of this younger cohort has been reflected by the increase, since 2009, in the number of acute hepatitis C cases reported to the US National Notifiable Diseases Surveillance System annually [4]. In 2020, an estimated 66 700 acute HCV infections occurred for an incidence of 1.5 per 100 000 population—the highest annual estimated number and rate of acute HCV infections seen in the US in 2 decades [4].

Most persons with acute infection develop chronic hepatitis C and, despite the progression of hepatic injury, most remain asymptomatic for decades [5]. Those identified with and cured of infection (ie, those who achieve posttreatment sustained virologic response [SVR]) generally experience liver disease regression [6]. Persons unaware of their infection, however, may not seek care until they develop severe manifestations, such as decompensated cirrhosis or hepatocellular carcinoma, which, despite intensive medical management, have high mortality rates and frequent hospital readmissions [6-8].

The burden of hospitalization related to HCV infection is substantial. A previous analysis of the Nationwide Inpatient Sample demonstrated that hepatitis C was the principal diagnosis for nearly 65 000 hospitalizations during 2010–2011, resulting in charges totaling $3.5 billion, and that the rate of hospitalizations for hepatitis C in the US increased 190% during 2004–2011 [9]. Concurrently, hepatitis C mortality rates increased from 3.72 deaths per 100 000 population in 2003 to 5.03 deaths per 100 000 population in 2013, representing an average annual percentage increase during 2003–2013 of 3.4% [10]. Beginning in 2013, highly tolerable and effective direct-acting antiviral agents (DAAs) were introduced, which have led to remarkable reductions in severe hepatic outcomes, including liver-related mortality, among persons achieving SVR [6, 11, 12]. Widespread access to DAAs, however, has been limited by the considerable lack of awareness of infection status among people infected with HCV, as well as insurer-implemented treatment restrictions (eg, fibrosis, sobriety, and prescriber restrictions). These restrictions have had disparate and adverse

effects on vulnerable populations in which hepatitis C incidence and prevalence are high (eg, persons who use drugs, underinsured persons) [13-16].

Our objectives, therefore, were to describe temporal trends in the demographic characteristics, in estimated numbers, and in age-adjusted rates of HCV-related hospitalizations during 2000–2019, a 20-year period that encompassed advances in hepatitis C treatment and changes in hepatitis C incidence and mortality. We further examined HCV-related hospitalization rates according to age, sex, race/ethnicity, and payer status using data from the National (Nationwide) Inpatient Sample (NIS), which is representative of nearly all discharges from US community hospitals.

Methods

Data Source

We obtained the data analyzed in this report from the NIS, Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality. The NIS is the largest publicly available all-payer inpatient healthcare database in the US. Prior to 2012, the Nationwide Inpatient Sample was a sample of hospitals from which all discharges were retained. Starting in 2012, the NIS was redesigned as a sample of discharges from all hospitals participating in HCUP that approximates a 20% stratified sample of discharges from US community hospitals, excluding rehabilitation and long-term acute care hospitals, and was renamed the National Inpatient Sample [17]. The 2019 sampling frame includes data from 48 states and the District of Columbia, representing 97% of discharges from US community hospitals [18]. The unit of observation in the NIS is a hospitalization. The analysis period was 2000–2019. This analysis used publicly available data without personal identifiers and did not require institutional review board approval.

Definitions

We defined HCV-related hospitalizations as (1) any hospitalization with hepatitis C as the primary discharge diagnosis or (2) any hospitalization with hepatitis C as any secondary discharge diagnosis if the primary discharge diagnosis was 1 of 14 liver disease–related conditions (ie, alcoholic liver disease, ascites, cirrhosis without mention of alcohol, esophageal varices with and without bleeding, hepatic encephalopathy, hepatic failure, hepatocellular carcinoma, hepatorenal syndrome, jaundice, liver transplant, other sequelae of chronic liver disease, portal hypertension, and spontaneous bacterial peritonitis), according to *International Classification of Diseases, Ninth Revision* and *Tenth Revision, Clinical Modification* diagnostic codes (see Supplementary Table).

Statistical Analysis

We analyzed 2000–2019 discharge data from adults aged ≥18 years in the NIS. We applied NIS sample weights to generate nationally representative estimates and applied NIS trend weights to 2000–2011 data to ensure comparability of estimates throughout the analytic period. We analyzed descriptive characteristics of HCV-related hospitalizations nationally. For each HCV-related hospitalization, we identified patient age, sex, race/ethnicity, urbanicity of residence, insurance type, and median household income. Urbanicity

was defined in accordance with the National Center for Health Statistics urban-rural classification scheme [19]. Expected primary payer was recoded into 5 insurance type categories; self-pay and no charge payers were combined into an “uninsured” category.

We calculated age-adjusted HCV-related hospitalization rates per 100 000 US standard population during 2000 by using the following age group distributions (in years): 18–34, 35–44, 45–54, 55–64, and ≥65 [20]. We used joinpoint regression (Joinpoint Regression Program, version 4.9.0.1; National Cancer Institute) to model the annual percentage change (APC) in HCV-related hospitalization rates over time and determine their statistical significance. The program identifies points (joinpoints) where the slope of the trend line significantly changes and calculates the APC in the rate during the years between joinpoints along with 95% confidence intervals (CIs) for each trend segment. We also calculated the percentage change in age-adjusted HCV-related hospitalization rates by age, sex, race/ethnicity, and insurance type for the overall analytic period (2000 vs 2019) and for periods before and after the introduction of second-generation DAAs (2000 vs 2013 and 2013 vs 2019, respectively). SAS (version 9.4; SAS Institute) was used for all other analyses.

Results

During 2000–2019, there were an estimated 1 286 397 HCV-related hospitalizations in the US (Table 1). The annual estimated number of HCV-related hospitalizations was lowest in 2000 (41 232) and highest in 2012 (79 150), while the annual age-adjusted HCV-related hospitalization rate was lowest in 2019 (18.7 per 100 000 population) and highest in 2012 (29.6 per 100 000 population) (Figure 1). Most HCV-related hospitalizations occurred among persons aged 45–64 years (71.8%), males (67.1%), White non-Hispanic persons (60.5%), urban residents (85.0%), persons with Medicaid or Medicare (64.0%), and persons with median household income ≤50th percentile (61.3%) (Table 1).

Estimated age-adjusted rates of HCV-related hospitalizations by demographic characteristics appear in Figure 2. The rate was highest among persons aged 45–54 years during 2000–2013 and then among persons aged 55–64 years from 2014 to 2019. In terms of insurance type, the rate was highest for Medicaid recipients during all but 2 years of the analysis period (2000, when private insurance recipients had the highest rate, and 2013, when Medicare recipients had the highest rate). The rate was highest among White non-Hispanic persons, followed by Hispanic persons and then Black non-Hispanic persons throughout the analytic period. The rate was higher among males than females throughout the analytic period.

Two joinpoints (in 2003 and 2013) and 3 segments were identified in the joinpoint regression analysis (Figure 3). The national age-adjusted HCV-related hospitalization rate increased significantly during 2000–2003 (APC, 9.4% [95% CI, 5.5%–13.5%]; $P <$ .001) and 2003–2013 (APC, 1.8% [95% CI, 1.3%–2.4%]; $P <$ .001) before decreasing significantly during 2013–2019 (APC, −7.6% [95% CI, −8.5% to −6.6%]; $P <$ .001) (Figure 3).

Percentage change in the annual age-adjusted HCV-related hospitalization rates by selected demographic characteristics appear in Table 2. Comparing 2000 to 2019, persons aged 55–

64 years experienced a 132.9% increase in HCV-related hospitalization rate, while persons aged 35–44 years and 45–54 years experienced rate decreases of −47.0% and −43.7%, respectively. From 2000 to 2019, the highest increase in HCV-related hospitalization rate occurred among Black non-Hispanic persons (22.3%), followed by White non-Hispanic persons (18.1%); the largest decline in hospitalization rate occurred among Asian/Pacific Islander persons (−22.5%). Comparing 2000 to 2019, HCV-related hospitalization rates increased for Medicaid (41.6%) and Medicare (9.5%), while rates for private insurance and uninsured declined −57.1% and −10.7%, respectively. Age-adjusted HCV-related hospitalization rates declined for every demographic category examined when comparing rates in 2013 to rates in 2019.

Discussion

In this analysis of 20 years of pre-COVID-19 pandemic NIS data, we found that HCV-related hospitalizations predominantly occurred among persons aged 45–64 years, males, White non-Hispanic persons, and persons with Medicaid or Medicare insurance. Overall HCV-related hospitalization rates increased significantly prior to the availability of DAAs during 2000–2013, and then decreased significantly during 2013–2019 after DAAs became available; the 2019 age-adjusted HCV-related hospitalization rate was the lowest in 20 years. However, the decline in hospitalization rate was not observed equally among all age, race/ethnicity, or insurance categories.

We observed a decline in the trajectory of the increase (ie, a reduction in slope) in the age-adjusted HCV-related hospitalization rates beginning in 2003. The introduction of pegylated interferon as a hepatitis C treatment in 2001 might have contributed to the change in rates observed in 2003. Prior studies have demonstrated associations between achieving SVR from interferon-based treatments and hepatic benefits, including hepatic fibrosis regression, cirrhosis resolution, decreased portal hypertension complications, and lower liver failure risk [21-24]. Additionally, several recent studies support the overall trend of decreased HCV-related hospitalizations in the era of DAAs observed in our analysis. In Canada, researchers analyzed administrative and pharmacy data and found a modest decline in HCV- and liver-related hospitalizations following significant uptake of second-generation DAAs [25]. In the US, the Chronic Hepatitis Cohort Study (CHeCS) demonstrated that patients with chronic hepatitis C who achieved SVR after DAA treatment had significantly lower rates of all-cause and liver-related hospitalizations compared with chronic hepatitis C patients who had not received DAA treatment [26]. Two large cohort studies from the Veterans Administration published in 2017 demonstrated that achieving SVR from DAA treatment was associated with a reduced risk of hepatocellular carcinoma [27, 28]. Additionally, a cohort study of 245 596 adults with chronic hepatitis C found that DAA treatment was independently associated with a lower risk of mortality and liver- and non-liver-related outcomes compared with no treatment [29].

Prior to 2013, the age-adjusted HCV-related hospitalization rate was highest among persons aged 45–54 years. However, persons aged 55–64 years experienced the largest increase in HCV-related hospitalization rate during the pre-DAA portion of the analysis period and ended up as the age group with the highest age-adjusted HCV-related hospitalization rate

after 2013. Although the HCV-related hospitalization rates declined for all age groups during 2013–2019, the declines were notably smaller among those 35–44 years old and 18–34 years old during this period, which is likely a reflection of increasing HCV infection incidence and prevalence in those age groups [4]. Improving access to curative DAA agents among younger persons more recently infected has the potential to interrupt further HCV transmission and prevent future morbidity that could develop if recent HCV infections are left untreated.

Age-adjusted HCV-related hospitalization rates were highest among White non-Hispanic persons throughout the entire analytic period and were approximately 3-fold higher than the rates among Hispanic persons and 4-fold higher than the rates among Black non-Hispanic persons. Despite these comparatively lower rates, however, the rate of HCV-related hospitalizations among Black non-Hispanic persons increased 22.3% during 2000 to 2019, which was the largest increase among all race/ethnicity categories. An explanation for this shift could be reduced or delayed access to DAAs among Black non-Hispanic persons relative to other racial/ethnic categories. This is to some degree supported by cohort analyses conducted after DAAs were released that indicated racial differences in frequencies of initiation. Notably, a cohort study of hepatitis C patients treated at the Veterans Administration found that Black patients had lower odds of receiving treatment in the DAA era than White patients, while a CHeCS analysis found that Black non-Hispanic race/ethnicity was associated with noninitiation of DAA treatment [30, 31]. Disparities in access to treatment could have led to an accumulation of untreated HCV-infected Black non-Hispanic persons in the US who progressed to severe liver disease, requiring HCV-related hospitalization, compared with persons who had earlier access to DAA treatment. Further research is warranted to identify the causes of these race/ethnicity differences, including the role of differential access to healthcare in general and DAAs in particular.

The temporal shift to Medicaid and Medicare for insurance coverage of HCV-related hospitalizations is a noteworthy finding that can influence future health policy decisions. During the analysis period, the rates of HCV-related hospitalizations paid for by private insurance decreased, while the rates of hospitalizations paid for by Medicaid or Medicare increased. In contrast to expenditures for hospitalization, a recent analysis of national pharmacy claims data demonstrated that during 2014–2020, Medicare and Medicaid paid the pharmacy claims for 54% of persons treated with DAAs [32]. In 2014, the Affordable Care Act (ACA) was implemented in the US, expanding health insurance coverage and reducing uninsured rates [33]. Implementation of the ACA is likely partially responsible for the uptick in the rates of HCV-related hospitalizations paid for by Medicaid from 2013 to 2014, and the concomitant decline in the rates of hospitalizations among uninsured persons. Although many US states have expanded DAA access for Medicaid recipients, restrictions related to prescriber type, substance use, and hepatic fibrosis persist [34]. Given the well-documented benefits of treating HCV infection early to prevent end-stage liver disease [6], optimization of DAA treatment expenditures by public and private payers is likely to reduce the future burden of disease and related medical costs.

Alternative classification schemes might have produced different estimates of the HCV-related hospitalization burden. We performed a sensitivity analysis (data not shown)

examining the annual proportion of overall adult hospitalizations attributable to several different HCV-related classification schemes. During the analysis period, the proportion of adult hospitalizations with hepatitis C as a primary discharge diagnosis ranged from a peak of 0.11% in 2011–2013 to a low of 0.01% in 2017–2019; the proportion with hepatitis C classified according to the definition used in our analysis ranged from a peak of 0.26% in 2012–2014 to a low of 0.14% in 2000; and the proportion with hepatitis C as any discharge diagnosis ranged from a peak of 2.19% in 2015 to a low of 0.80% in 2000. Our goal was to produce a conservative estimate of the hospitalization burden that could legitimately be attributed to hepatitis C; utilizing our classification scheme, which was geared toward capturing end-stage manifestations of HCV infection (eg, more sensitive than solely using hospitalizations with hepatitis C as a primary discharge diagnosis and more specific than using hospitalizations with hepatitis C as any discharge diagnosis) accomplished this aim. Additionally, we justified inclusion of alcoholic liver disease as a liver disease–related condition in our HCV-related hospitalization definition due to the pervasiveness of alcohol use among patients with hepatitis C and the inability to rule out contributions of HCV-mediated liver injury to hospitalizations where alcoholic liver disease was the primary diagnosis and hepatitis C was a secondary diagnosis.

Our findings are subject to limitations. First, the unit of observation in the NIS is a hospitalization, not a patient; readmissions for the same patient are counted as new hospitalizations. Persons with advanced liver disease typically require intensive medical management; hospital readmissions during a single calendar year would not be uncommon [8, 35-39]. If a small number of patients accounted for a large number of hospitalizations, they could have disproportionately affected the distribution of demographic characteristics in our analysis, or potentially contributed to an overestimation of the HCV-related hospitalization rates. Although there was a sustained decline in both the estimated number and age-adjusted rates of HCV-related hospitalizations following the introduction of DAAs, other factors, including HCV-related mortality, might have contributed to the decline in HCV-related hospitalizations after 2013. In the context of this analysis, deaths occurring among patients with advanced liver disease would reduce in number the hospitalization-prone segment of the prevalent population and consequently lower the HCV-related hospitalization rate; the magnitude of such an effect would depend on how frequently such a decedent was readmitted in a calendar year (data not available in NIS). Second, changes in coding practices during the analysis period might have influenced the estimated number and rates of HCV-related hospitalizations observed. However, we would expect that any such influence would have been in the direction of increased HCV-related hospitalizations due to increased awareness of hepatitis C over time. Third, this was a retrospective, cross-sectional analysis; causality cannot be inferred. Fourth, despite the NIS being the largest publicly available all-payer inpatient database, our analysis likely underestimates the HCV-related hospitalization burden in the US due to the omission within the NIS of hospitalization data from the Veterans Administration. Finally, we did not include extrahepatic manifestations of HCV infection in the liver disease–related conditions we assessed as part of our HCV-related hospitalization definition. However, a prior NIS study found that the prevalence of extrahepatic manifestations among hospitalizations involving a hepatitis C diagnosis code

was <0.5% during 2004–2011, suggesting that including extrahepatic manifestations would not have substantively altered the results of our analysis [40].

Although multiple factors likely contributed, overall HCV-related hospitalization rates declined steadily after 2013, coinciding with the release of DAAs. However, the declines were not observed equally among age, race/ethnicity, or insurance categories. Expanded access to DAA treatment is needed, particularly among Medicaid and Medicare recipients, to reduce morbidity and mortality, prevent further transmission, eliminate disparities, decrease the healthcare and financial burdens associated with HCV-related hospitalizations, and ultimately eliminate hepatitis C as a public health threat.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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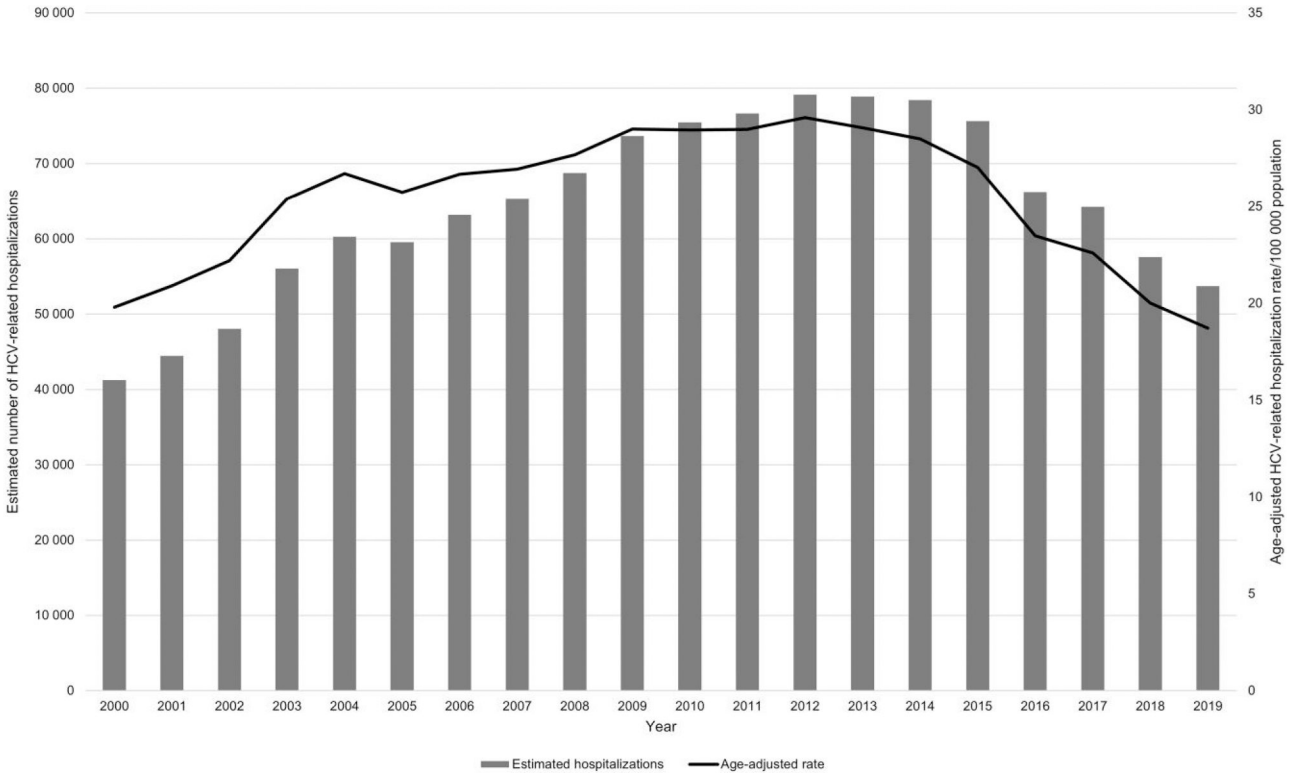

Figure 1.

Estimated number and age-adjusted rate of hepatitis C–related hospitalizations, United States, 2000–2019.

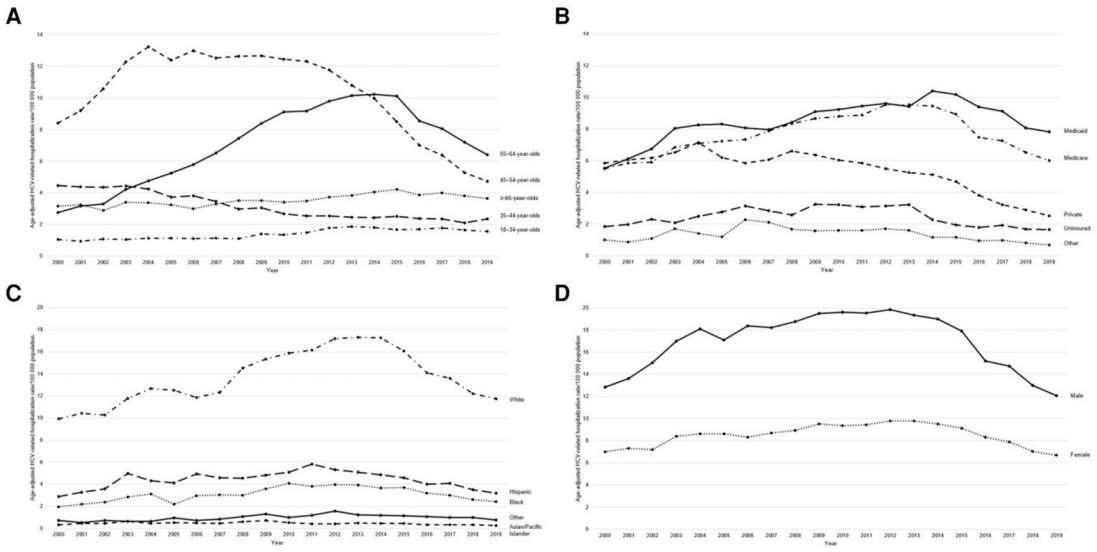

Figure 2.

Estimated age-adjusted rates of hepatitis C–related hospitalizations by age (*A*), payer (*B*), race/ethnicity (*C*), and sex (*D*), United States, 2000–2019.

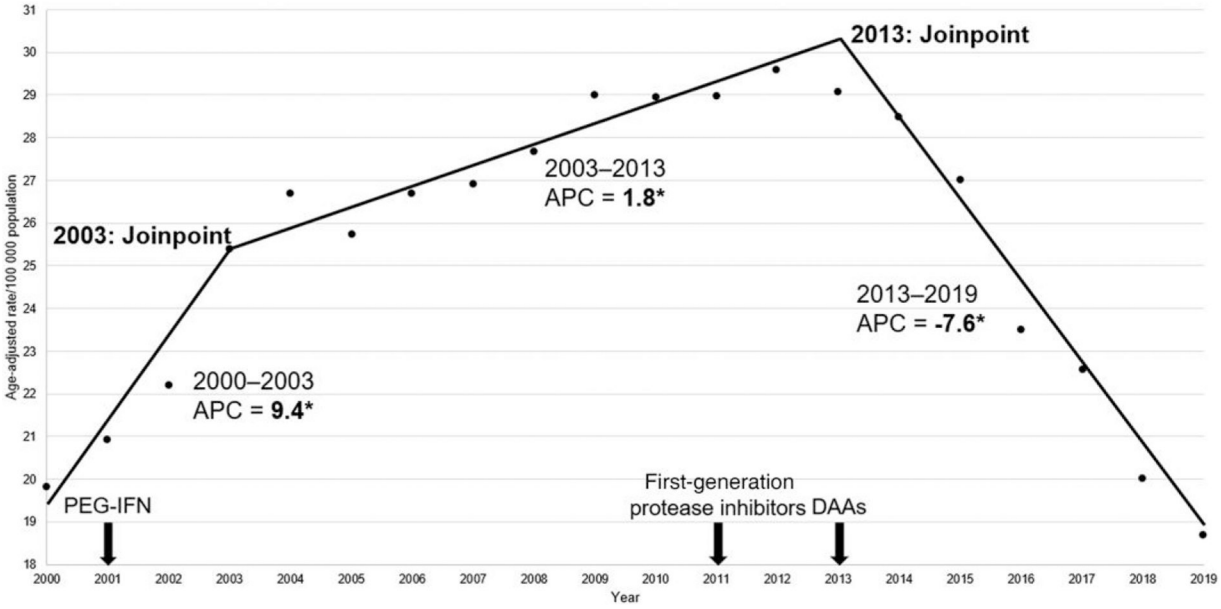

Figure 3.

Age-adjusted hepatitis C–related hospitalization rates per 100 000 population. United States, 2000–2019. *Indicates that the annual percentage change is significantly different from zero at the α = .05 level. Abbreviations: APC, annual percentage change; DAAs, second-generation direct-acting antiviral agents; PEG-IFN, pegylated interferon.

Table 1.

Demographic Characteristics Among Hepatitis C–Related Hospitalizations, United States, 2000–2019

Characteristic	Estimated No. (95% CI)	Column % (95% CI)
Estimated No. of	1 286 397 (911 535–1 661 260)	100.0
HCV-related hospitalizations		
Age-adjusted	25.9 (18.8–33.0)	…
HCV-related hospitalization rate/100 000 population		
Age at admission, y		
18–34	64 496 (61 384–67 608)	5.0 (4.8–5.2)
35–44	122 953 (117 116–128 789)	9.6 (9.3–9.8)
45–54	484 804 (462 501–507 107)	37.7 (37.2–38.2)
55–64	438 185 (422 592–453 777)	34.1 (33.6–34.6)
≥65	175 961 (169 551–182 370)	13.7 (13.4–14.0)
Age, y, median (IQR)	53.7 (47.8–59.7)	…
Sex		
Male	863 438 (829 750–897 126)	67.1 (66.8–67.5)
Female	422 705 (408 047–437 364)	32.9 (32.5–33.2)
Race/ethnicity		
Asian/Pacific Islander	22 812 (20 467–25 156)	2.0 (1.8–2.2)
Black	163 804 (154 782–172 826)	14.3 (13.7–14.8)
White	695 043 (669 536–720 549)	60.5 (59.5–61.5)
Other[a]	48 900 (44 705–53 095)	4.3 (3.9–4.6)
Hispanic	218 378 (202 400–234 356)	19.0 (18.0–20.0)
Urban vs rural residence[b]		
Urban	466 384 (457 996–474 772)	85.0 (84.5–85.5)
Rural	82 576 (79 433–85 718)	15.0 (14.5–15.5)
Payer		
Private insurance	274 587 (258 508–290 666)	21.4 (20.7–22.2)
Medicare	396 702 (383 083–410 321)	30.9 (30.5–31.4)
Medicaid	424 084 (408 240–439 928)	33.1 (32.4–33.7)
Uninsured[c]	118 778 (110 294–127 261)	9.3 (8.7–9.8)
Other[d]	67 934 (59 674–76 193)	5.3 (4.7–5.9)
Median household income		
0–25th percentile	433 403 (412 847–453 960)	35.0 (34.0–36.0)
26th–50th percentile	325 814 (313 299–338 328)	26.3 (25.8–26.9)
51st–75th percentile	272 941 (261 221–284 661)	22.0 (21.5–22.5)
76th–100th percentile	206 560 (193 430–219 689)	16.7 (15.9–17.5)

Abbreviations: CI, confidence interval; HCV, hepatitis C virus; IQR, interquartile range.

[a]Includes Native American race.

[b]Restricted to 2003–2019. Urbanicity was categorized according to the National Center for Health Statistics urban-rural classification scheme for counties and county-equivalent entities (https://www.cdc.gov/nchs/data_access/urban_rural.htm). We applied the 1990 census-based scheme to data

from 2003–2005, the 2006 scheme to data from 2006–2012, and the 2013 scheme to data from 2013–2019. Large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan counties were grouped as urban. Micropolitan and noncore counties were grouped as rural.

[c] Uninsured represents a combination of self-pay and no charge expected primary payers.

[d] Other includes worker's compensation, Civilian Health and Medical Program of the Uniformed Services, Civilian Health and Medical Program of the Department of Veterans Affairs, Title V, and other government programs.

Table 2.

Percentage Change in Age-Adjusted Hepatitis C–Related Hospitalization Rates by Demographic Characteristics From 2000 to 2019, National (Nationwide) Inpatient Sample

Characteristic	Rate in 2000 (95% CI)	Rate in 2013 (95% CI)	Rate in 2019 (95% CI)	Rate Change, %, 2000–2013	Rate Change, %, 2013–2019	Rate Change, %, 2000–2019
Age at admission, y						
18–34	1.04 (.84–1.25)	1.85 (1.69–2.02)	1.56 (1.44–1.67)	77.4	−16.0	49.0
35–44	4.46 (3.90–5.01)	2.46 (2.29–2.64)	2.36 (2.16–2.56)	−44.7	−4.1	−47.0
45–54	8.41 (7.27–9.54)	10.80 (10.07–11.53)	4.73 (4.43–5.03)	28.5	−56.2	−43.7
55–64	2.75 (2.33–3.18)	10.13 (9.43–10.83)	6.41 (6.05–6.78)	268.0	−36.7	132.9
≥65	3.15 (2.75–3.55)	3.83 (3.54–4.11)	3.66 (3.44–3.88)	21.5	−4.4	16.2
Sex						
Male	12.82 (8.43–17.21)	19.32 (12.89–25.74)	12.05 (9.00–15.11)	50.6	−37.6	−6.0
Female	6.98 (5.77–8.19)	9.76 (7.72–11.81)	6.67 (5.88–7.45)	39.8	−31.7	−4.5
Race/ethnicity						
Asian/Pacific Islander	0.34 (.25–.43)	0.48 (.31–.64)	0.26 (.19–.33)	40.1	−44.7	−22.5
Black	1.97 (1.34–2.61)	3.92 (2.57–5.26)	2.41 (1.55–3.27)	98.7	−38.5	22.3
White	9.92 (7.15–12.70)	17.28 (12.19–22.37)	11.73 (9.63–13.82)	74.1	−32.1	18.1
Other[a]	0.70 (.47–.92)	1.22 (.91–1.53)	0.76 (.61–.91)	75.3	−37.7	9.1
Hispanic	2.87 (2.25–3.50)	5.09 (3.51–6.66)	3.17 (2.34–4.01)	77.0	−37.6	10.4
Payer						
Private insurance	5.86 (3.71–8.01)	5.25 (3.12–7.37)	2.51 (1.81–3.22)	−10.4	−52.1	−57.1
Medicare	5.49 (3.61–7.37)	9.52 (6.51–12.52)	6.02 (3.58–8.45)	73.2	−36.8	9.5
Medicaid	5.53 (3.64–7.42)	9.41 (6.16–12.67)	7.83 (5.76–9.90)	70.2	−16.8	41.6
Uninsured[b]	1.84 (1.19–2.49)	3.21 (2.21–4.21)	1.64 (1.22–2.07)	74.7	−48.9	−10.7
Other[c]	1.01 (.63–1.39)	1.61 (1.03–2.18)	0.68 (.51–.84)	59.2	−58.0	−33.1

Abbreviation: CI, confidence interval.

[a]Includes Native American race.

[b]Uninsured represents a combination of self-pay and no charge expected primary payers.

[c]Other includes worker's compensation, Civilian Health and Medical Program of the Uniformed Services, Civilian Health and Medical Program of the Department of Veterans Affairs, Title V, and other government programs.