Emergency Department Visits Involving Influenza and Influenza-Like Illnesses, 2016–2018

STATISTICAL BRIEF #269
December 2020

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Introduction

Each year in the United States, influenza infections result in substantial hospital use and mortality. In recent peak seasons characterized by more severe viral strains, such as 2014–2015, there were 851,000 emergency department (ED) visits, 223,000 hospitalizations, and 51,000 deaths.[1,2] These statistics may be underestimates because they do not include influenza-like illnesses, such as bronchitis and viral pneumonia, which have clinically important flu-like signs and symptoms. Understanding patterns in hospital utilization for influenza and influenza-like illnesses, both hereafter referred to as *ILI*, is important to ensure hospitals have adequate capacity to respond to emerging influenza-related public health threats.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on ILI-related ED visits from 2016 through 2018. The HCUP State Inpatient Databases (SID) were used to identify ED visits resulting in inpatient admission, and the State Emergency Department Databases (SEDD) were used to identify treat-and-release ED visits from 34 States and the District of Columbia. Three measures characterize ILI-related ED utilization: the population rate of ED visits involving ILI, the percentage of ILI-related ED visits resulting in inpatient admission, and the percentage of total ED visits involving ILI—a measure of the transmissibility and clinical severity of an influenza epidemic.[3] First, monthly trends in ED visits involving ILI are shown. Second, the three metrics are examined across patient and community characteristics. Finally, State variation in the population rate of ILI-related ED visits is shown overall and by age, race/ethnicity, and location of residence. Race/ethnicity statistics are presented for a subset of 27 States with reliable data on race/ethnicity. Because of the large sample size of the SID and SEDD data, small differences can be statistically significant. Thus, only differences greater than or equal to 10 percent are discussed in the text.

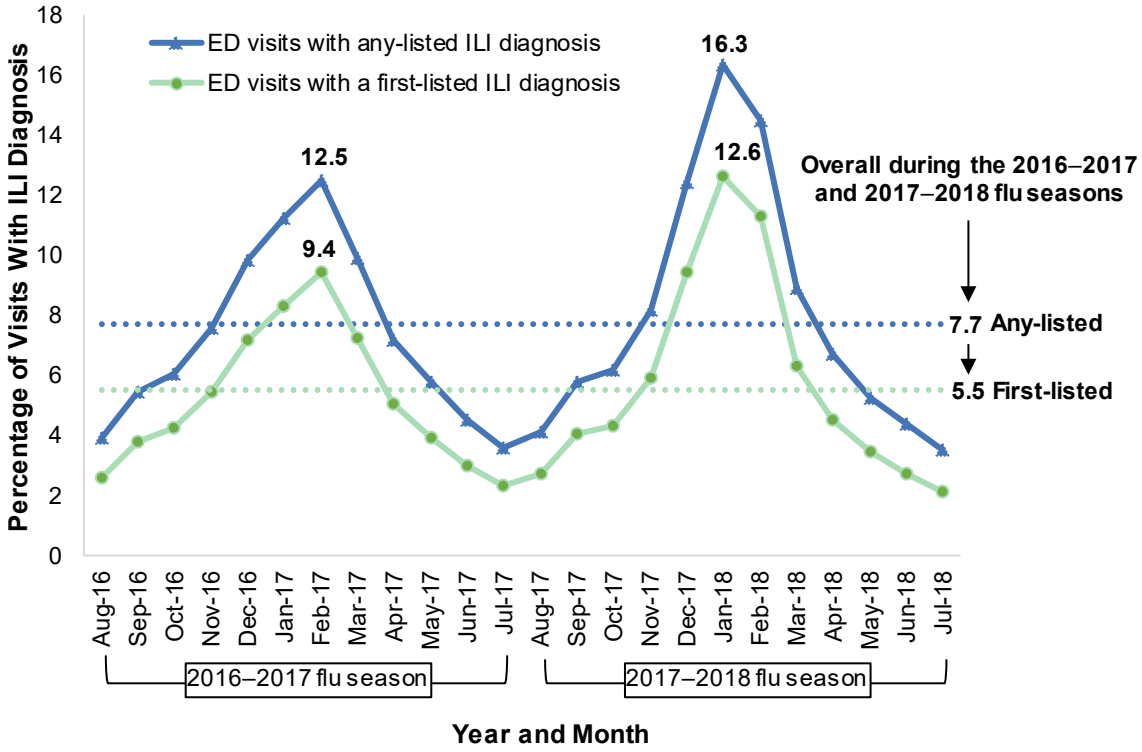
Highlights

- On average from August 2016 to July 2018, nearly 8 percent of emergency department (ED) visits had any-listed influenza or influenza-like illness (ILI) diagnosis, with peaks in February 2017 (13 percent) and January 2018 (16 percent).
- Between August 2016 and July 2018, there were 3,346 ILI-related ED visits per 100,000 population, of which 22 percent resulted in inpatient admission.
- Rates of ILI-related ED visits were higher for populations aged <18 years (5,178 per 100,000 population) and 65+ years (4,812) than aged 18–64 years (2,304), and higher for Black (5,867) than for White (3,042), Hispanic (3,012), and Asian/Pacific Islander (1,051) populations.
- Rates of ILI-related ED visits were higher in rural metro-adjacent, rural remote, and lower income areas than in metropolitan and higher income areas.
- States with the highest rates of ILI-related ED visits (3,843–5,820 per 100,000 population) were concentrated in the Midwest and in the South, whereas the lowest rates (1,933–2,458 per 100,000 population) were generally in northern States.
- A Black-White disparity in the rate of ILI-related ED visits existed in all States examined.

Findings

Monthly trends in influenza and influenza-like illness (ILI)-related emergency department (ED) visits, 2016–2017 and 2017–2018 flu seasons
Figure 1 presents monthly percentages of total ED visits with any-listed ILI diagnosis or a first-listed ILI diagnosis. These statistics are also provided for the 2016–2017 and 2017–2018 flu seasons combined.

Figure 1. Percentage of total ED visits with an ILI diagnosis, August 2016–July 2018, 34 States and the District of Columbia



Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

Notes: ED visits include treat-and-release visits and those admitted to inpatient care.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 34 States and the District of Columbia, 2016–2018

- **During the 2016–2017 and 2017–2018 flu seasons, the highest percentage of ED visits that involved ILI occurred in January or February.**

  The percentage of ED visits involving any-listed diagnosis of ILI was highest in February 2017 and January 2018 (12.5 and 16.3 percent, respectively). This pattern also was observed for ED visits with a first-listed diagnosis of ILI (9.4 and 12.6 percent, respectively). Most often, ILI was the first-listed diagnosis. For instance, 77.3 percent of ILI-related visits in January 2018 had a first-listed ILI diagnosis (e.g., 12.6 of 16.3 percent).

- **On average from August 2016 to July 2018, nearly 8 percent of ED visits had an ILI diagnosis.**

  On average during the 2016–2017 and 2017–2018 flu seasons combined 7.7 percent of ED visits had any ILI diagnosis. On average, 5.5 percent of ED visits had a first-listed ILI diagnosis.

Disparities in ILI-related ED visits, 2016–2017 and 2017–2018 flu seasons
Table 1 presents hospital utilization characteristics for ILI-related ED visits by patient and community characteristics for the 2016–2017 and 2017–2018 flu seasons combined. The same statistics for ED visits with no ILI diagnosis are shown for comparison.

Table 1. Disparities in ILI-related ED visits by patient and community characteristics, August 2016–July 2018, 34* States and the District of Columbia

Characteristic	ILI-related ED visits				Total ED visits with or without ILI, N, millions[§]
	Total, N, millions,[†]	Population rate[‡]	Of all ED visits, %	Admitted as inpatient from ED, %	
Any ILI diagnosis	**17.0**	**3,346**	**7.7**	**21.5**	**220.9**
Flu season 2016–2017	8.1	3,183	7.3	21.6	110.5
Flu season 2017–2018	8.9	3,508	8.1	21.3	110.4
ILI diagnosis type					
Influenza only	2.5	486	1.1	11.6	220.9
Influenza-like illness only	14.3	2,811	6.5	22.6	220.9
Both	0.2	49	0.1	55.8	220.9
Age, years					
<18	6.0	5,178	14.1	4.4	42.5
18–64	7.2	2,304	5.4	17.0	134.9
65+	3.8	4,812	8.7	57.1	43.5
Race/ethnicity*					
Asian/Pacific Islander	0.3	1,051	7.0	22.6	4.1
Black	3.4	5,867	8.1	13.5	41.4
Hispanic	2.9	3,012	8.2	11.6	35.2
White	7.7	3,042	7.4	29.1	104.6
Other	0.6	4,905	7.5	15.0	8.4
Primary expected payer					
Medicare	4.4	—[§]	8.5	53.2	52.1
Medicaid	6.9	—[§]	9.6	8.7	71.6
Private insurance	3.6	—[§]	5.9	13.9	61.5
Self-pay/No charge[|]	1.6	—[§]	6.1	6.7	26.8
Other	0.4	—[§]	4.9	17.4	8.5
Location of residence					
Metro	14.0	3,175	7.6	22.1	185.0
Rural metro adjacent	2.1	4,497	8.6	18.5	23.9
Rural remote	0.9	4,092	8.5	18.2	10.7
Community income					
Quartile 1 (lowest)	6.2	4,856	8.3	18.9	74.5
Quartile 2	4.7	3,731	8.0	20.7	59.1
Quartile 3	3.6	2,807	7.4	23.4	48.0
Quartile 4 (highest)	2.3	1,801	6.4	26.7	35.6
Household overcrowding[¶]					
Quartile 1 (lowest)	0.6	2,653	7.2	26.5	8.9
Quartile 2	3.9	2,863	7.4	25.1	52.3
Quartile 3	5.5	3,502	7.8	21.8	70.4
Quartile 4 (highest)	6.9	3,619	7.9	18.7	88.3
No ILI diagnosis	**203.9**	**40,106**	**92.3**	**13.3**	**220.9**

Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

* Data come from 34 States and the District of Columbia for all statistics except race/ethnicity, for which data are from 27 States.

[†] Denominator for the percentage of ED visits with an ILI diagnosis that were admitted to inpatient care from the ED.

[‡] Population rate per 100,000. Population denominators are unavailable for payer.

[§] Denominator for the percentage of all ED visits with an ILI diagnosis.

[|] Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment.

[¶] Defined as the percentage of occupied households in the patient's ZIP Code of residence with more people than rooms.

Sources: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 34 States and the District of Columbia (all statistics except race/ethnicity) and for 27 States (for race/ethnicity), 2016–2018; U.S. Census Bureau's American Community Survey data for quartile designations of household overcrowding, 2016 five-year estimates

- **Population rates of ILI-related ED visits were highest for the youngest and oldest individuals.**

  Individuals aged younger than 18 years had the highest population rate of ILI-related ED visits (5,178 per 100,000 population), followed by adults aged 65 years and older (4,812). These rates were more than double the rate for adults aged 18–64 years. The percentage of ILI-related ED visits out of total ED visits also was higher for patients aged <18 years and those aged 65+ years (14.1 and 8.7 percent, respectively) compared with those aged 18–64 years (5.4 percent). Among ILI-related ED visits for patients aged 65+ years, 57.1 percent were admitted to inpatient care. The percentage of visits admitted to inpatient care was lower for patients aged 18–64 years (17.0 percent) and much lower for those under 18 years old (4.4 percent).

- **Compared with White individuals, Black individuals had a higher population rate of ILI-related ED visits, but a greater percentage of White patients with ILI were admitted to inpatient care.**

  The population rate of ILI-related ED visits was nearly twice as high for Black as for White individuals (5,867 vs. 3,042 per 100,000 population), was similar for White and Hispanic (3,012) individuals and was lowest for Asian/Pacific Islander individuals (1,051). Among those with an ILI-related ED visit, a higher percentage of White patients were admitted to inpatient care than other racial/ethnic groups (29.1 percent vs. 22.6 percent for Asian/Pacific Islander patients, 13.5 percent for Black patients, and 11.6 percent for Hispanic patients). The rate of inpatient admission for ILI-related ED visits overall (21.5 percent) was much higher than for ED visits without an ILI diagnosis (13.3 percent; Table 1 bottom row).

- **Rates of ILI-related ED visits and the percentage of ILI-related ED visits out of total ED visits were higher in areas that are rural, lower income communities, and areas that have more household overcrowding.**

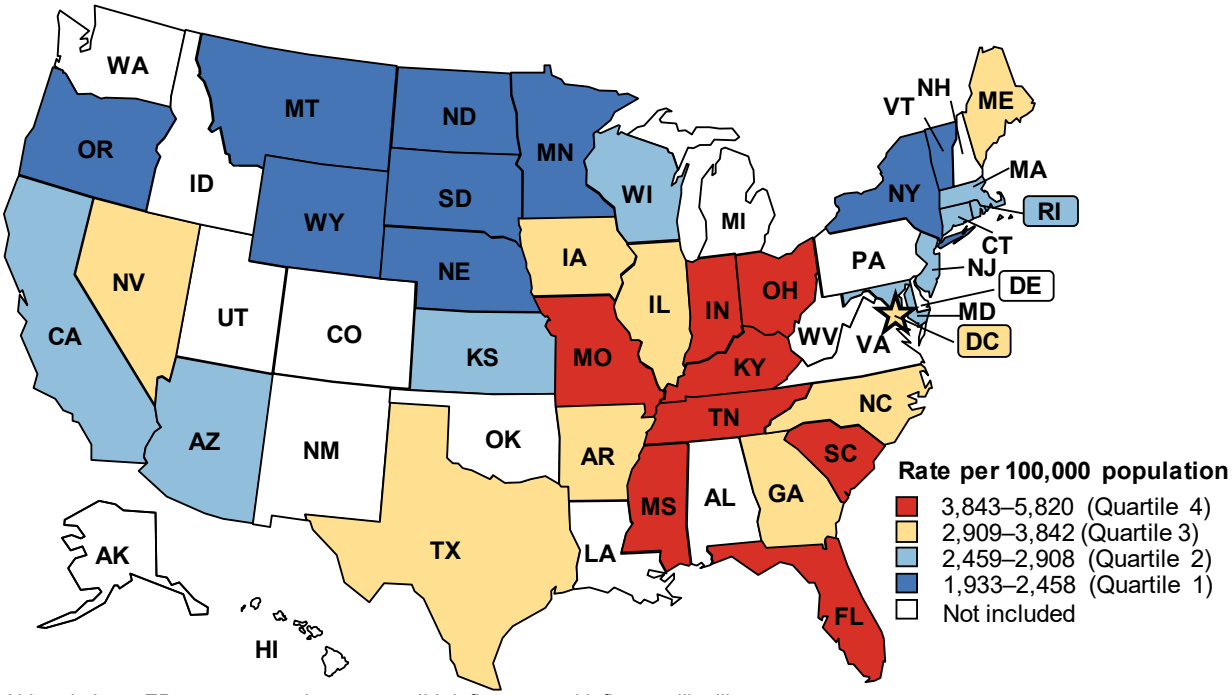
  The population rate of ILI-related ED visits was higher in rural metro-adjacent and rural remote areas (4,497 and 4,092 per 100,000 population, respectively) than in metro areas (3,175). The rate was also higher in lower income than in higher income communities (quartile 1: 4,856 vs quartile 4: 1,801). Areas where the percentage of households with overcrowding[a] was highest (quartile 4) also had the highest population rate of ILI-related ED visits (3,619) compared with areas with less household overcrowding (quartile 1: 2,653). The percentage of ILI-related ED visits out of total ED visits also was higher in rural areas (8.5–8.6 percent) and lower income communities (quartile 1: 8.3 percent) than in metro areas (7.6 percent) and higher income communities (quartile 4: 6.4 percent). However, inpatient admission rates for ILI-related ED visits were higher in metro areas and higher income communities.

[a] *Overcrowding* was defined as the percentage of occupied households in the patient's ZIP Code of residence with more people than rooms and is described further in the Definitions section.

State variation in ILI-related statistics overall and for select populations, 2016–2017 and 2017–2018 flu seasons combined

Figures 2 through 4 display the population rate of ILI-related ED visits by State, overall (Figure 2), by age (Figure 3), and by race/ethnicity (Figure 4). For Figure 2, States were ranked by their overall rate of ILI-related ED visits and categorized into quartiles. For Figure 3, quartile cut-offs were determined by ranking all State rates for all age groups. For Figure 4, quartile cut-offs were determined by a single ranking of all State rates for Black, Hispanic, and White individuals.

Figure 2. Population rate of ILI-related ED visits by State, August 2016–July 2018, 34 States and the District of Columbia



Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

Note: Quartiles were determined based on the distribution of rates across States.

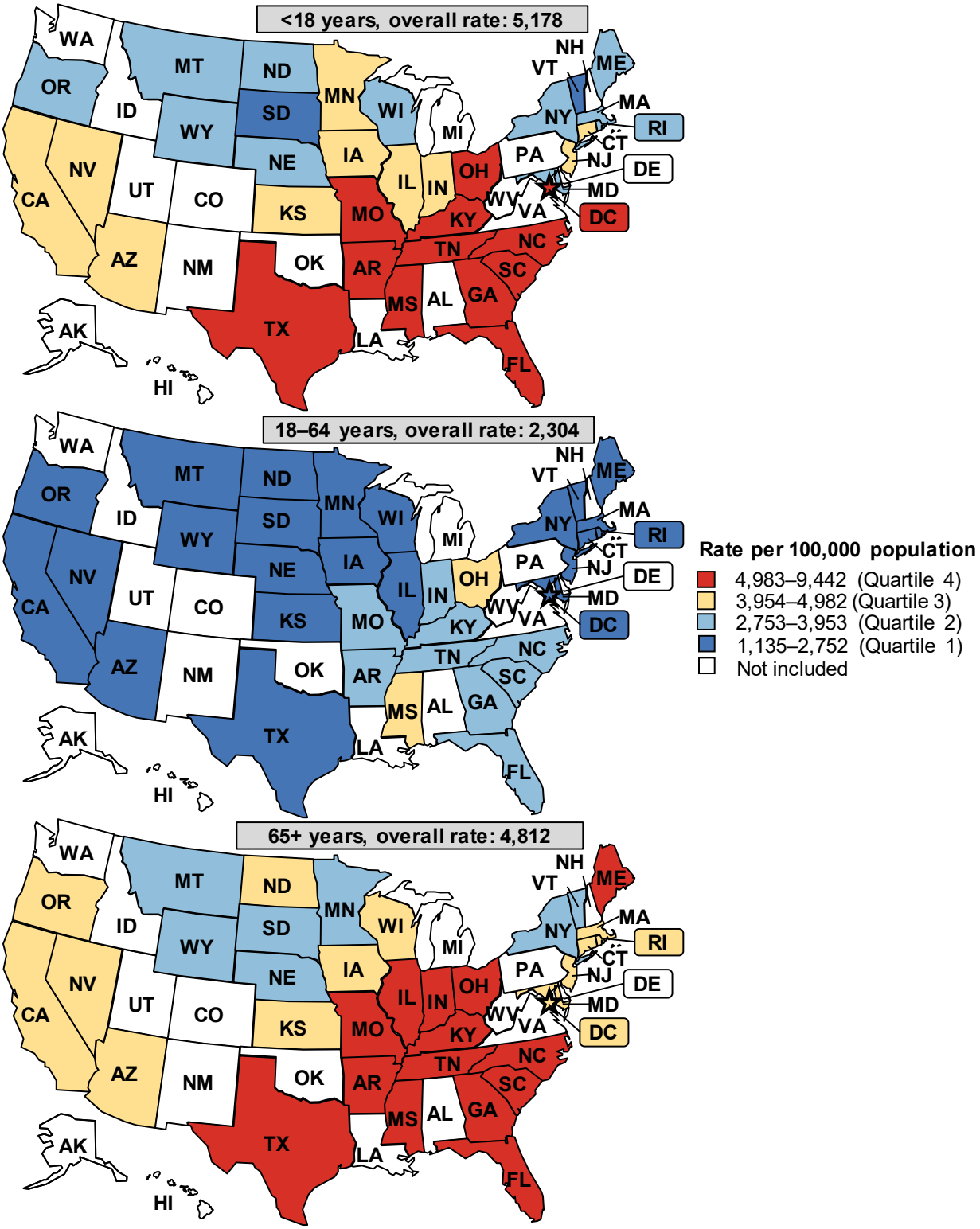
Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 34 States and the District of Columbia, 2016–2018

- **Rates of ILI-related ED visits were highest in multiple States in the Midwest and the South and generally lowest in northern States.**

  Multiple States in the Midwest (Indiana, Missouri, Ohio) and in the South (Florida, Kentucky, Mississippi, South Carolina, Tennessee) had a rate of ILI-related ED visits that was in the top quartile, ranging from 3,843–5,820 per 100,000 population. These regions also had multiple States with a rate in the third quartile, ranging from 2,909–3,842, including Arkansas, the District of Columbia, Georgia, Illinois, Iowa, North Carolina, and Texas. Additionally, Maine and Nevada had rates in the third quartile. The overall rate across the 34 States and the District of Columbia was 3,346 ILI-related ED visits per 100,000 population (see Table 1).

  Rates of ILI-related ED visits were lowest (quartile 1: 1,933–2,458 per 100,000 population) in northern States, including Minnesota, Montana, Nebraska, New York, North Dakota, Oregon, South Dakota, Vermont, and Wyoming.

Figure 3. Population rates of ILI-related ED visits, by age group and State, August 2016–July 2018, 34 States and the District of Columbia



Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

Notes: Quartiles were determined based on the distribution of age group-specific rates across States.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 34 States and the District of Columbia, 2016–2018

- **In all States examined but Mississippi and Ohio, the ILI-related ED visit rate was in the bottom two quartiles for individuals aged 18–64 years.**

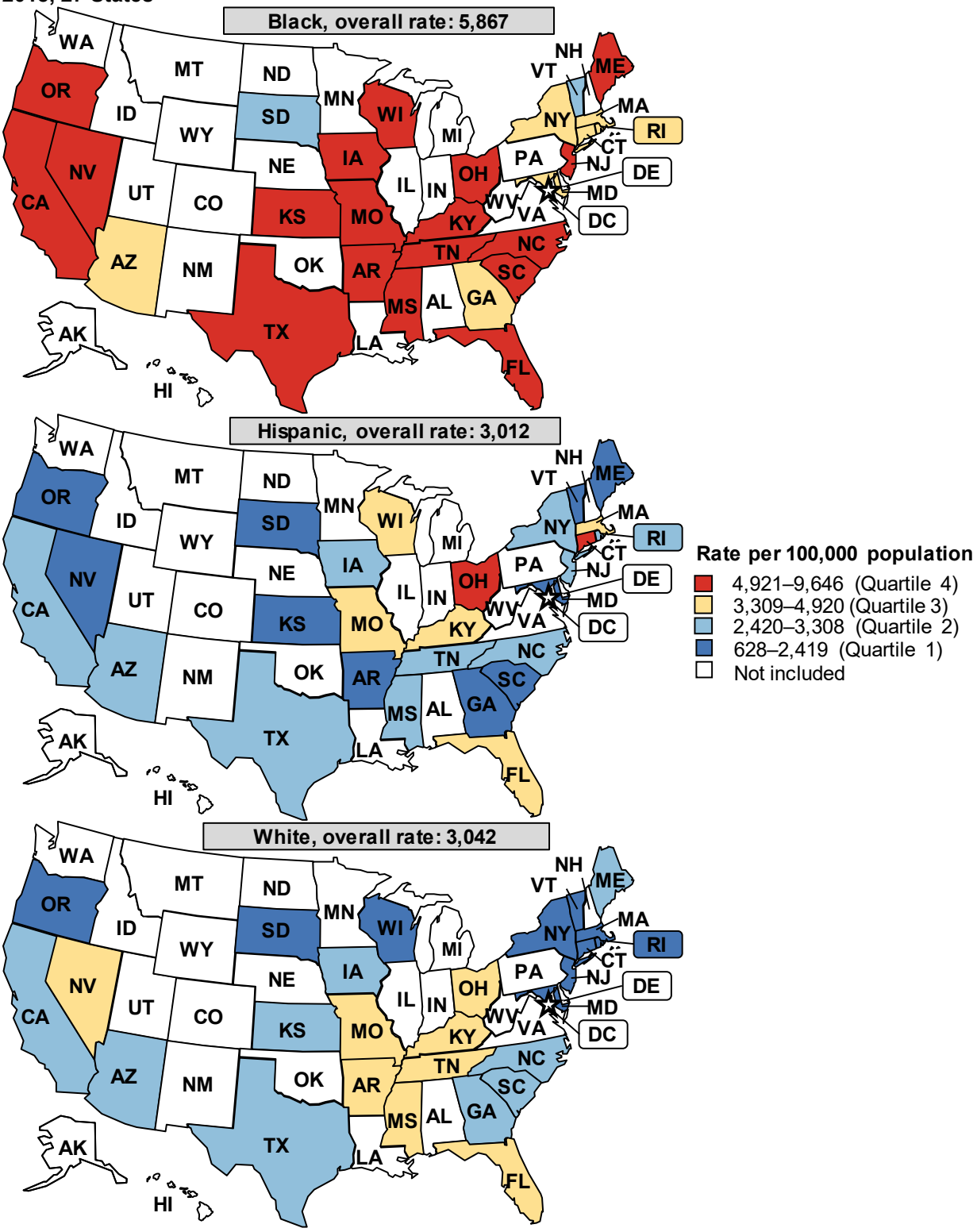
  Two States (Mississippi and Ohio) had an ILI-related ED visit rate in the highest two quartiles for all three age groups. In these States, the rate for individuals aged 18–64 years was in quartile 3 (3,954–4,982 per 100,000 population), which was higher than the overall rate of ILI-related ED visits for individuals aged 18–64 years (2,304).

  However, for most States, the rates of ILI-related ED visits for individuals aged <18 years and 65+ years were in quartile 3 (3,954–4,982 per 100,000 population) or quartile 4 (4,983–9,442) and the rate for individuals aged 18–64 years was lower (in quartiles 1 or 2). These States were Arkansas, Arizona, California, Connecticut, the District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Missouri, Nevada, New Jersey, North Carolina, South Carolina, Tennessee, and Texas.

  For seven States the ILI-related ED visit rate was in quartiles 3 or 4 (3,954–9,442 per 100,000 population) for individuals aged 65+ years but was in quartiles 1 or 2 (1,135–3,953) for individuals aged <18 years and 18–64 years: Maine, Maryland, Massachusetts, North Dakota, Oregon, Rhode Island, and Wisconsin. The rates for the youngest age group were lower than the overall rate of ILI-related ED visits for individuals aged <18 years (5,178).

  Six States had an ILI-related ED visit rate in the lowest two quartiles (1,135–3,953 per 100,000 population) for all three age groups: Montana, Nebraska, New York, South Dakota, Vermont, and Wyoming. The rates in the youngest and oldest age groups for these States were lower than the overall rate of ILI-related ED visits for individuals aged <18 years (5,178) and those aged 65+ years (4,812).

Figure 4. Population rates of ILI-related ED visits, by race/ethnicity and State, August 2016–July 2018, 27 States



Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

Notes: Quartiles were determined based on the distribution of race/ethnicity-specific rates across States.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 27 States, 2016–2018

- **In every State, there was a Black-White disparity in the rate of ILI-related ED visits.**

  In every State, the quartile of the ILI-related ED visit rate was higher for the Black population than for the White population. The rate of ILI-related ED visits among the Black population was in the top two quartiles in nearly every State examined. However, in South Dakota and Vermont, the rate of ILI-related ED visits among the Black population was in quartile 2 (2,420–3,308 per 100,000 population), which was lower than the overall rate for Black individuals (5,867). However, Black-White disparities still existed in these States, with the White population having rates in quartile 1 in both States versus quartile 2 for the Black population.

- **In seven States, the rate of ILI-related ED visits for the Hispanic population was in a higher quartile than the rate for the White population.**

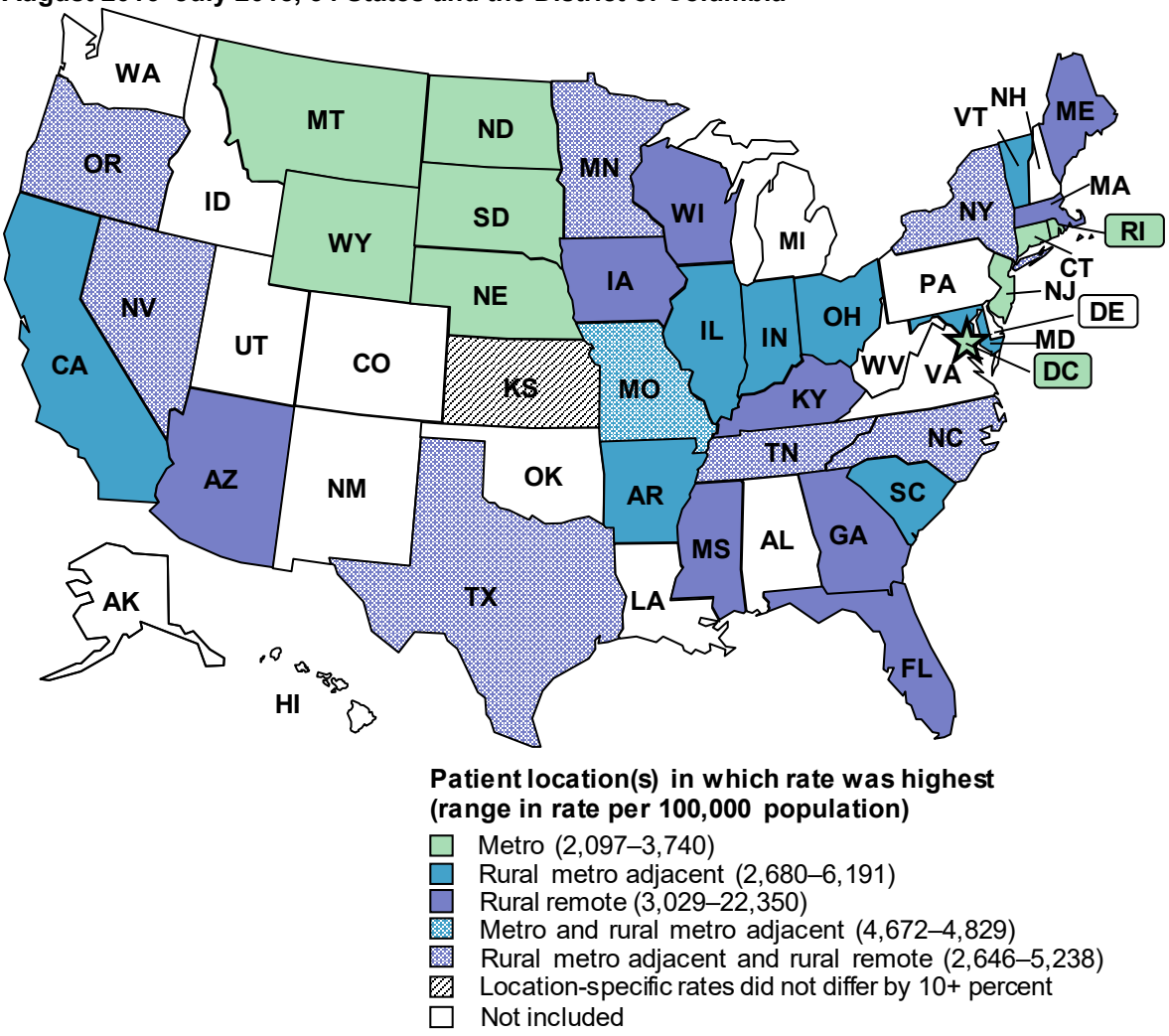
  In Connecticut, Massachusetts, New Jersey, New York, Ohio, Rhode Island, and Wisconsin, the rate of ILI-related ED visits for the Hispanic population was in a higher quartile than the rate for the White population. In four of these States (Connecticut, Massachusetts, Ohio, and Wisconsin) the rate for the Hispanic population was in quartile 3 (3,309–4,920 per 100,000 population) or quartile 4 (4,921–9,646), which was higher than the overall rate for Hispanics (3,012). In Florida, Kentucky, and Missouri, the ILI-related ED visit rate for the Hispanic population also was in quartiles 3 or 4, and so was the rate for the White population.

- **In eight States, the rate of ILI-related ED visits for the White population was in a higher quartile than the rate for the Hispanic population.**

  In Arkansas, Georgia, Kansas, Maine, Mississippi, Nevada, South Carolina, and Tennessee the rate of ILI-related ED visits for the White population was in a higher quartile than the rate for the Hispanic population. No State had a rate of ILI-related ED visits for the White population in quartile 4, but four of these States did have rates in quartile 3 (3,309–4,920 per 100,000 population): Arkansas, Mississippi, Nevada, and Tennessee. These rates were higher than the overall rate of ILI-related ED visits for White individuals (3,042). In Florida, Kentucky, Missouri, and Ohio the ILI-related ED visit rate for the White population also was in quartile 3, and the rate for the Hispanic population was in quartiles 3 or 4.

Figure 5 displays the patient residence location within each State in which the rate of ILI-related ED visits was highest: metropolitan, rural metropolitan adjacent, and rural remote. If the rate in an area was not 10 percent different from the rate in another area of the State, it was assigned to a separate category (i.e., metro and rural metro adjacent; rural metro adjacent and rural remote).

Figure 5. Patient residence location where the rate of ILI-related ED visits was highest, by State, August 2016–July 2018, 34 States and the District of Columbia



Abbreviations: ED, emergency department; ILI, influenza and influenza-like illness

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for 34 States and the District of Columbia, 2016–2018

- **States where population rates of ILI-related ED visits were highest in metro areas were in the northcentral and northeastern United States.**

  Five States located in the northcentral part of the country had rates of ILI-related ED visits that were highest in metro (compared with rural) areas: Montana, Nebraska, North Dakota, South Dakota, and Wyoming. Four States in the northeastern part of the country—Connecticut, the District of Columbia, New Jersey, and Rhode Island—also had the highest rates in metro areas; however, in the two latter States and the District of Columbia, no areas are defined as rural metro adjacent or rural remote, and in Connecticut, no areas are defined as rural remote. Metro-specific rates of ILI-related ED visits ranged from 2,097 to 3,740 per 100,000 population.

- **In most States examined, the rate of ILI-related ED visits was highest in rural areas.**

  For eight States, the highest rate of ILI-related ED visits was in rural metro-adjacent areas: Arkansas, California, Illinois, Indiana, Maryland, Ohio, South Carolina, and Vermont. Among these States, the rate ranged from 2,680 to 6,191 per 100,000 population.

  For nine States, the highest rate of ILI-related ED visits was in rural-remote areas (Arizona, Florida, Georgia, Iowa, Kentucky, Maine, Massachusetts, Mississippi, and Wisconsin), ranging from 3,029 to 22,350 per 100,000 population.

  Finally, for seven States, the rates of ILI-related ED visits in rural metro-adjacent and rural-remote areas were similar, and both areas had higher rates than did metro areas: Minnesota, Nevada, New York, North Carolina, Oregon, Tennessee, and Texas. Among these States, the rate ranged from 2,646 to 5,238 per 100,000 population.

References

[1] Fingar KR, Liang L, Stocks C. Inpatient Hospital Stays and Emergency Department Visits Involving Influenza, 2006–2016. HCUP Statistical Brief #253. October 2019. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb253-Influenza-Hospitalizations-ED-Visits-2006-2016.pdf. Accessed August 29, 2020.
[2] Centers for Disease Control and Prevention. Burden Estimates for the 2014–2015 Influenza Season. Page last reviewed October 25, 2018. www.cdc.gov/flu/about/burden/2014-2015.html. Accessed August 29, 2020.
[3] Reed C, Biggerstaff M, Finelli L, Koonin LM, Beauvais D, Uzicanin A, et al. Novel framework for assessing epidemiologic effects of influenza epidemics and pandemics. Emerging Infectious Diseases. 2013;19(1):85–91.

About Statistical Briefs

Healthcare Cost and Utilization Project (HCUP) Statistical Briefs provide basic descriptive statistics on a variety of topics using HCUP administrative healthcare data. Topics include hospital inpatient, ambulatory surgery, and emergency department use and costs, quality of care, access to care, medical conditions, procedures, and patient populations, among other topics. The reports are intended to generate hypotheses that can be further explored in other research; the reports are not designed to answer in-depth research questions using multivariate methods.

Data Source

The estimates in this Statistical Brief are based upon data from the HCUP 2016–2018 State Inpatient Databases (SID) and State Emergency Department Databases (SEDD). The SID capture all inpatient admissions (including those that originate in the emergency department [ED]), whereas the SEDD capture all ED visits that do not result in admission. Generally, statistics presented in this Statistical Brief include 34 States and the District of Columbia, except for those on race/ethnicity, which are based on data from 27 States which had less than 6 percent of records in the 2016–2018 SID and SEDD missing data on race/ethnicity (see Figures 2–5 for States included).

Supplemental sources include population denominator data for use with HCUP databases, derived from information available from Claritas, a vendor that produces population estimates and projections based on data from the U.S. Census Bureau.[b] Data on community-level household crowding by ZIP Code was obtained from the U.S. Census Bureau's 2016 American Community Survey, five-year estimates.

Definitions

Diagnoses and ICD-10-CM
The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are conditions that coexist at the time of admission that require or affect patient care treatment received or management, or that develop during the inpatient stay. *All-listed diagnoses* include the principal diagnosis plus the secondary conditions.

For emergency department (ED) visits that are treated and released, the *first-listed diagnosis* represents the condition, symptom, or problem identified in the medical record to be chiefly responsible for the ED services provided. In cases where the first-listed diagnosis is a symptom or problem, a diagnosis has not been established (confirmed) by the provider. For ED visits that result in an inpatient admission, the first-listed diagnosis is the *principal diagnosis*, the condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are conditions that coexist at the time of the ED visit or inpatient admission, that require or affect patient care treatment received or management, or that develop during the inpatient stay. *All-listed diagnoses* include the first-listed (principal) diagnosis plus the secondary conditions.

[b] Claritas. Claritas Demographic Profile by ZIP Code. https://claritas360.claritas.com/mybestsegments/. Accessed February 3, 2020.

ICD-10-CM is the International Classification of Diseases, Tenth Revision, Clinical Modification. In October 2015, ICD-10-CM replaced the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis coding system for most inpatient and outpatient medical encounters. There are over 70,000 ICD-10-CM diagnosis codes.

Case definition
The ICD-10-CM codes defining influenza/influenza-like illnesses are shown in Table 2.

Table 2. Case definition of ILI

ICD-10-CM code	Description
Influenza	
J1000	Influenza due to other identified influenza virus with unspecified type of pneumonia
J1001	Influenza due to other identified influenza virus with the same other identified influenza virus pneumonia
J1008	Influenza due to other identified influenza virus with other specified pneumonia
J101	Influenza due to other identified influenza virus with other respiratory manifestations
J102	Influenza due to other identified influenza virus with gastrointestinal manifestations
J1081	Influenza due to other identified influenza virus with encephalopathy
J1082	Influenza due to other identified influenza virus with myocarditis
J1083	Influenza due to other identified influenza virus with otitis media
J1089	Influenza due to other identified influenza virus with other manifestations
J1100	Influenza due to unidentified influenza virus with unspecified type of pneumonia
J1108	Influenza due to unidentified influenza virus with specified pneumonia
J111	Influenza due to unidentified influenza virus with other respiratory manifestations
J112	Influenza due to unidentified influenza virus with gastrointestinal manifestations
J1181	Influenza due to unidentified influenza virus with encephalopathy
J1182	Influenza due to unidentified influenza virus with myocarditis
J1183	Influenza due to unidentified influenza virus with otitis media
J1189	Influenza due to unidentified influenza virus with other manifestations
J09X1	Influenza due to identified novel influenza A virus with pneumonia
J09X2	Influenza due to identified novel influenza A virus with other respiratory manifestations
J09X3	Influenza due to identified novel influenza A virus with gastrointestinal manifestations
J09X9	Influenza due to identified novel influenza A virus with other manifestations
Influenza-like illness	
J069	Acute upper respiratory infection, unspecified
J399	Disease of upper respiratory tract, unspecified
J200	Acute bronchitis due to Mycoplasma pneumoniae
J201	Acute bronchitis due to Hemophilus influenzae
J202	Acute bronchitis due to streptococcus
J203	Acute bronchitis due to coxsackievirus
J204	Acute bronchitis due to parainfluenza virus
J205	Acute bronchitis due to respiratory syncytial virus
J206	Acute bronchitis due to rhinovirus
J207	Acute bronchitis due to echovirus
J208	Acute bronchitis due to other specified organisms
J209	Acute bronchitis, unspecified
J210	Acute bronchiolitis due to respiratory syncytial virus
J211	Acute bronchiolitis due to human metapneumovirus
J218	Acute bronchiolitis due to other specified organisms

ICD-10-CM code	Description
J219	Acute bronchiolitis, unspecified
J40	Bronchitis, not specified as acute or chronic
B012	Varicella pneumonia
B052	Measles complicated by pneumonia
B0681	Rubella pneumonia
B250	Cytomegaloviral pneumonitis
J120	Adenoviral pneumonia
J121	Respiratory syncytial virus pneumonia
J122	Parainfluenza virus pneumonia
J123	Human metapneumovirus pneumonia
J1281	Pneumonia due to SARS-associated coronavirus
J1289	Other viral pneumonia
J129	Viral pneumonia, unspecified
J440	Chronic obstructive pulmonary disease with acute lower resp infection
J441	Chronic obstructive pulmonary disease with (acute) exacerbation
J470	Bronchiectasis with acute lower respiratory infection
J471	Bronchiectasis with (acute) exacerbation

Abbreviations: ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification; ILI, influenza and influenza-like illness; SARS, severe acute respiratory syndrome

Types of hospitals included in HCUP State Inpatient Databases
This analysis used State Inpatient Databases (SID) limited to data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). Community hospitals include obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical center hospitals. Excluded for this analysis are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. However, if a patient received long-term care, rehabilitation, or treatment for a psychiatric or chemical dependency condition in a community hospital, the discharge record for that stay was included in the analysis.

Types of hospitals included in HCUP State Emergency Department Databases
This analysis used State Emergency Department Databases (SEDD) limited to data from community hospitals with a hospital-owned ED. Community hospitals are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). Community hospitals include specialty, pediatric, public, and academic medical center hospitals. Excluded for this analysis are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals.

Unit of analysis
The unit of analysis is the ED visit, not a person or patient. This means that a person who is seen in the ED multiple times will be counted each time as a separate visit in the ED.

Population rates
Rates per 100,000 population were calculated as follows for the 2016–2017 and 2017–2018 flu seasons. For the combined results, the numerator and denominator for each season were summed together.

2016–2017

- Numerator used 5 months of HCUP data from August 2016 to December 2016 and 7 months of data from January 2017 to July 2017
- Denominator used 5/12 of the State populations for 2016 and 7/12 of the State populations for 2017

2017–2018

- Numerator used 5 months of HCUP data from August 2017 to December 2017 and 7 months of data from January 2018 to July 2018
- Denominator used 5/12 of the State populations for 2017 and 7/12 of the State populations for 2018

Location of patients' residence
Place of residence is based on the rural-urban continuum codes (RUCC) for U.S. counties developed by the United States Department of Agriculture (USDA).[c] For this Statistical Brief, we collapsed the RUCC codes into the following three categories:

Metropolitan (metro) area:

- Counties in metro areas of 1 million population or more
- Counties in metro areas of 250,000 to 1 million population
- Counties in metro areas of fewer than 250,000 population

Rural-adjacent to metro area:

- Urban population of 20,000 or more, adjacent to a metro area
- Urban population of 2,500 to 19,999, adjacent to a metro area
- Completely rural or less than 2,500 urban population, adjacent to a metro area

Rural-remote area:

- Urban population of 20,000 or more, not adjacent to a metro area
- Urban population of 2,500 to 19,999, not adjacent to a metro area
- Completely rural or less than 2,500 urban population, not adjacent to a metro area

Community-level income
Community-level income is based on the median household income of the patient's ZIP Code of residence. Quartiles are defined so that each State's population is evenly distributed. Cut-offs for the quartiles are determined annually using ZIP Code demographic data obtained from Claritas, a vendor that produces population estimates and projections based on data from the U.S. Census Bureau.[d] The value ranges for the income quartiles vary by year. The income quartile is missing for patients who are homeless or foreign.

Community-level household crowding
Community-level household crowding is based on the percentage of occupied housing units with more people than rooms out of all occupied housing units, as estimated by the U.S Census Bureau's American Community Survey, in the patient's ZIP Code of residence. Quartiles are defined so that that the total U.S. population is evenly distributed. Household overcrowding is a measure of social vulnerability to hazardous events, including disease outbreaks, as defined by the Centers for Disease Control and Prevention's (CDC's) Social Vulnerability Index.[e]

Expected payer
To make coding uniform across all HCUP data sources, the primary expected payer for the hospital stay or ED visit combines detailed categories into general groups:

- Medicare: includes fee-for-service and managed care Medicare
- Medicaid: includes fee-for-service and managed care Medicaid

[c] United States Department of Agriculture. Rural-Urban Continuum Codes. www.ers.usda.gov/data-products/rural-urban-continuum-codes/. Accessed February 27, 2020.
[d] Claritas. Claritas Demographic Profile by ZIP Code. https://claritas360.claritas.com/mybestsegments/. Accessed February 3, 2020.
[e] Centers for Disease Control and Prevention (CDC). CDC SVI 2018 Documentation. January 31, 2020. www.atsdr.cdc.gov/placeandhealth/svi/documentation/pdf/SVI2018Documentation-H.pdf. Accessed November 1, 2020.

- Private insurance: includes commercial nongovernmental payers, regardless of the type of plan (e.g., private health maintenance organizations [HMOs], preferred provider organizations [PPOs])
- Self-pay/No charge: includes self-pay, no charge, charity, and no expected payment
- Other payers: includes other Federal and local government programs (e.g., TRICARE, CHAMPVA, Indian Health Service, Black Lung, Title V) and Workers' Compensation

Prior to 2017 data, hospital stays and ED visits that were expected to be billed to the State Children's Health Insurance Program (SCHIP) may be classified as Medicaid or Other, depending on the structure of the State program. Because most State data do not identify SCHIP as a separate expected payer, it is not possible to present this information separately. Beginning with 2017 data, hospital stays and ED visits that were expected to be billed to SCHIP are included under Medicaid.

Reporting of race and ethnicity
Data on Hispanic ethnicity are collected differently among the States and also can differ from the census methodology of collecting information on race (White, Black, Asian/Pacific Islander, American Indian/Alaska Native, Other [including mixed race]) separately from ethnicity (Hispanic, non-Hispanic). State data organizations often collect Hispanic ethnicity as one of several categories that include race. Therefore, for multistate analyses, HCUP creates the combined categorization of race and ethnicity for data from States that report ethnicity separately. When a State data organization collects Hispanic ethnicity separately from race, HCUP uses Hispanic ethnicity to override any other race category to create a Hispanic category for the uniformly coded race/ethnicity data element, while also retaining the original race and ethnicity data. This Statistical Brief reports race/ethnicity for the following categories: Hispanic, non-Hispanic White, non-Hispanic Black, non-Hispanic Asian/Pacific Islander, and non-Hispanic Other.

About HCUP

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of healthcare databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). HCUP databases bring together the data collection efforts of State data organizations, hospital associations, and private data organizations (HCUP Partners) and the Federal government to create a national information resource of encounter-level healthcare data. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to healthcare programs, and outcomes of treatments at the national, State, and local market levels.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

Alaska Department of Health and Social Services
Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
Delaware Division of Public Health
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Laulima Data Alliance
Hawaii University of Hawai'i at Hilo
Illinois Department of Public Health
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Office of Health Analytics

Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association
Mississippi State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
Nebraska Hospital Association
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
South Dakota Association of Healthcare Organizations
Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Department of Health and Human Resources, West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About the SID

The HCUP State Inpatient Databases (SID) are hospital inpatient databases from data organizations participating in HCUP. The SID contain the universe of the inpatient discharge abstracts in the participating HCUP States, translated into a uniform format to facilitate multistate comparisons and analyses. Together, the SID encompass more than 95 percent of all U.S. community hospital discharges. The SID can be used to investigate questions unique to one State, to compare data from two or more States, to conduct market-area variation analyses, and to identify State-specific trends in inpatient care utilization, access, charges, and outcomes.

About the SEDD

The HCUP State Emergency Department Databases (SEDD) include information from hospital-owned emergency departments (EDs) from data organizations participating in HCUP, translated into a uniform format to facilitate multistate comparisons and analyses. The SEDD capture the universe of records on ED visits in participating HCUP States that do not result in an admission to the same hospital (i.e., patients who are treated in the ED and then discharged, transferred to another hospital, left against medical advice, or died). The SEDD contain a core set of clinical and nonclinical information on all patients, including individuals covered by Medicare, Medicaid, or private insurance, as well as those whose stays were not expected to be covered by insurance. The SEDD can be used to investigate questions unique to one State, to compare data from two or more States, to conduct market-area variation analyses, and to identify State-specific trends in injury surveillance, emerging infections, and other conditions treated in the ED.

For More Information

For other information on influenza, refer to the HCUP Statistical Briefs located at www.hcup-us.ahrq.gov/reports/statbriefs/sb_lung.jsp.

For additional HCUP statistics, visit:

- HCUP Fast Stats at www.hcup-us.ahrq.gov/faststats/landing.jsp for easy access to the latest HCUP-based statistics for healthcare information topics
- HCUPnet, HCUP's interactive query system, at www.hcupnet.ahrq.gov/

For more information about HCUP, visit www.hcup-us.ahrq.gov/.

For a detailed description of HCUP and more information on the design of the State Inpatient Databases (SID) and State Emergency Department Databases (SEDD), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated November 2019. www.hcup-us.ahrq.gov/sidoverview.jsp. Accessed February 3, 2020.

Agency for Healthcare Research and Quality. Overview of the State Emergency Department Databases (SEDD). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated January 2020. www.hcup-us.ahrq.gov/seddoverview.jsp. Accessed February 3, 2020.

Suggested Citation

Reid LD (AHRQ), Fingar KF (IBM Watson Health). Emergency Department Visits Involving Influenza and Influenza-Like Illnesses, 2016–2018. HCUP Statistical Brief #269. December 2020. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb269-Influenza-ED-Visits-2016-2018.pdf.

Acknowledgments

The authors would like to acknowledge the contributions of Minya Sheng of IBM Watson Health.

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of healthcare in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please email us at hcup@ahrq.gov or send a letter to the address below:

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This Statistical Brief was posted online on December 15, 2020.