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Teen Hospital Stays for Childbirth, 2004–2013

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Introduction

The national teen birth rate has declined almost continuously over the last several decades, from a high of 61.8 per 1,000 females aged 15–19 years in 1991 to 24.2 in 2014.[1] Nevertheless, the rate remains higher in the United States than in many other industrialized countries.[2] The teen birth rate also remains higher in certain regions of the United States, such as the South.[3]

Not only can teen pregnancy have immediate and long-term social and economic consequences, such as lower educational attainment, unemployment, and poverty,[4] teen mothers and their infants often have poor health outcomes. Compared with older women who give birth, pregnant teens have been found to be more likely to start prenatal care later, to smoke or abuse other substances during pregnancy, and to suffer from mental illness.[5,6] Teens also have higher rates of certain pregnancy-related complications than older women, including pregnancy-induced hypertension and anemia, and they are more likely to deliver a preterm or low-birth-weight infant.[7]

Highlights

- In 2013, childbirth was the leading reason for teen hospital stays, constituting nearly half of all inpatient hospitalizations among females aged 15–19 years.
- Of the 265,370 teen hospital stays for childbirth in 2013, which amounted to $1.1 billion in hospital costs, over 70 percent were paid by Medicaid.
- The rate of teen hospitalizations for childbirth increased from 2004 through 2007 from 41.8 to 44.5 stays per 1,000 females aged 15–19 years but thereafter decreased to 24.9 in 2013.
- From 2007 through 2013, the rate of childbirth hospitalizations decreased faster for teens aged 15–17 years than for those aged 18–19 years (50 vs. 42 percent decrease).
- Across States, the rate of teen hospitalizations for childbirth varied by a factor of 3.
- The rate of teen hospitalizations for childbirth was highest in the South at 80.5 in 2004. Through 2013, the rate decreased by 35 percent in the South compared with a decrease of over 40 percent in other regions. Thus, the rate in the South (52.3) remained higher than in any other region in 2013.
- Teen hospital stays for childbirth also were highest and declined the least in low-income, micropolitan, and rural areas.
- Although teens were less likely to have a C-section than women aged 20–44 years, they were more likely to have pre-eclampsia or eclampsia, poor fetal growth, and anemia.

[1] Hamilton BE, Martin JA, Osterman MJK, Curtin SC. Births: final data for 2014. National Vital Statistics Reports. 2015;64(12):1–64.
[2] United Nations Statistics Division. Demographic Yearbook 2013. Table 10. Live births by age of mother and sex of child, general and age-specific fertility rates: latest available year, 2004 - 2013. New York, NY: United Nations; 2015. http://unstats.un.org/unsd/demographic/products/dyb/dyb2013/Table10.pdf. Accessed July 13, 2016.
[3] Ibid.
[4] The National Campaign to Prevent Teen and Unplanned Pregnancy. Teen Childbearing, Education, and Economic Well-Being. Washington DC: The National Campaign to Prevent Teen and Unplanned Pregnancy; July 2012. https://thenationalcampaign.org/sites/default/files/resource-primary-download/childbearing-education-economicwellbeing.pdf. Accessed July 13, 2016.
[5] The National Campaign to Prevent Teen and Unplanned Pregnancy. Teen Childbearing and Infant Health. Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy; October 2012. https://thenationalcampaign.org/sites/default/files/resource-primary-download/childbearing-infant-health.pdf. Accessed July 13, 2016.
[6] Magill MK, Wilcox R. Adolescent pregnancy and associated risks: not just a result of maternal age. American Family Physician. 2007;75(9):1310–1.
[7] March of Dimes Pregnancy & Newborn Health Education Center. Teen Pregnancy. White Plains, NY: March of Dimes Foundation; July 2012. http://www.marchofdimes.org/materials/teenage-pregnancy.pdf. Accessed July 13, 2016.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief updates a previously published Brief[8] and presents data on hospital stays for childbirth among teens aged 15–19 years from 2004 through 2013. Characteristics and complications of pregnancy among teen stays for childbirth are compared with childbirth stays among women aged 20–44 years in 2013. Trends in the rate of teen hospital stays for childbirth from 2004 through 2013 are presented for patient subgroups, regions of the United States, and individual States. All data are reported for the hospital stay of the mother rather than the newborn. Differences of greater than 10 percent are noted in the text.

Findings

Characteristics of teen hospital stays for childbirth, 2013

Table 1 presents the frequency, population-based rate, mean length of stay, and mean and aggregate costs of hospital stays for childbirth among females aged 15–19 years in 2013, overall and by subgroup.

Table 1. Hospital utilization for childbirth among teens aged 15–19 years, 2013

Characteristic	Number of maternal stays	Rate of stays per 1,000 females[a]	Mean length of stay, days	Mean cost per stay, $	Total cost, $ millions
Overall total	265,370	24.9	2.6	4,300	1,129
Maternal age, years					
15–17	73,570	11.7	2.6	4,200	311
18–19	191,800	44.1	2.6	4,300	818
Expected payer					
Medicaid	190,645	N/A	2.6	4,300	812
Private insurance	60,830	N/A	2.6	4,200	258
Uninsured	6,580	N/A	2.5	4,100	27
Medicare or other	6,885	N/A	2.6	4,300	30
Income in ZIP Code of residence					
Quartile 1 (lowest)	112,790	40.7	2.6	4,100	459
Quartile 2	74,065	28.5	2.6	4,300	318
Quartile 3	52,370	19.5	2.6	4,400	232
Quartile 4 (highest)	20,975	8.1	2.7	4,700	99
Location of patient's residence					
Large metropolitan	123,045	21.6	2.7	4,400	536
Small metropolitan	87,185	26.4	2.6	4,100	354
Micropolitan	32,600	31.4	2.5	4,400	142
Rural (noncore)	21,905	34.6	2.5	4,300	95
Hospital region					
Northeast	30,135	16.2	2.8	4,800	145
Midwest	55,615	14.0	2.6	4,400	243
South	120,865	52.3	2.6	3,700	446
West	58,755	23.3	2.5	5,100	298

Abbreviation: N/A, not available.

Note: Percentages by subgroup are calculated based on stays with nonmissing values for the characteristic.

[a] Females aged 15–19 years; deliveries among females younger than 15 years constituted only 1.2% of all deliveries among females less than 20 years of age in 2013 and are excluded. The rate among females aged 15–17 years is per 1,000 females aged 15–17 years in the population; the rate among females aged 18–19 years is per 1,000 females aged 18–19 years in the population. Population data are not available by payer to calculate stays per 1,000 females.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2013

[8] Mummert A, Nagamine M, Myers M. Childbirth-Related Hospitalizations Among Adolescent Girls, 2004. HCUP Statistical Brief #31. May 2007. U.S. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb31.pdf. Accessed July 14, 2016.

- **In 2013, the rate of hospital stays for childbirth was 24.9 per 1,000 females aged 15–19 years, amounting to over $1.1 billion in hospital costs.**

  In 2013, there were 265,370 hospital stays for childbirth among teens. These stays represented 47.8 percent of all hospital stays among female teens aged 15–19 years, making childbirth the leading reason for hospitalization among females of this age (data not shown). The rate of hospital stays for childbirth was 24.9 per 1,000 females aged 15–19 years. The mean length of stay was 2.6 days, and the average cost per stay was $4,300. The cost of teen hospital stays for childbirth amounted to over $1.1 billion in 2013.

- **Nearly three-fourths of teen hospital stays for childbirth were among teens aged 18–19 years.**

  The majority (72.3 percent) of teen hospital stays for childbirth were among older teens aged 18–19 years, and only 27.7 percent were among younger teens aged 15–17 years. The 191,800 hospital stays for childbirth among females aged 18–19 years accounted for $818 million in hospital costs (72.4 percent of all hospital costs).

- **The rate of teen hospital stays for childbirth was approximately 4 times higher among females aged 18–19 years than among females aged 15–17 years.**

  In 2013, there were 44.1 teen hospital stays for childbirth per 1,000 females aged 18–19 years, compared with 11.7 stays per 1,000 females aged 15–17 years.

- **The vast majority of teen hospital stays for childbirth had an expected payer of Medicaid.**

  In 2013, Medicaid accounted for 190,645—or 72.0 percent—of teen hospital stays for childbirth. These stays accounted for $812 million in aggregate hospital costs.

- **The rate of teen hospital stays for childbirth was highest in low-income areas, in small metropolitan and nonmetropolitan counties, and in the South.**

  In 2013, the rate of teen hospital stays for childbirth was over 5 times higher in the lowest income areas (40.7 per 1,000 females aged 15–19 years, quartile 1) compared with female teens who resided in the highest income areas (8.1, quartile 4).

  The rate of teen hospital stays for childbirth also was higher among teens who resided in small metropolitan (26.4 per 1,000 females aged 15–19 years), micropolitan (31.4), and rural (34.6) areas, compared with large metropolitan areas (21.6).

  The highest rate of teen hospital stays for childbirth among any subgroup was observed for hospital stays that occurred in the South (52.3 per 1,000 females aged 15–19 years). The rate in the South was over twice as high as in the West (23.3) and over 3 times higher than in the Northeast (16.2) and Midwest (14.0).

Hospital stays for childbirth among teens compared with other women of childbearing age, 2013
Table 2 presents characteristics of teen hospital stays for childbirth in 2013, compared with other women of childbearing age.

Table 2. Characteristics of hospital stays for childbirth among teens and other women of childbearing age, 2013

Characteristic	Females aged 15–19 years		Females aged 20–44 years	
	Number of maternal stays	Maternal stays, %	Number of maternal stays	Maternal stays, %
Overall total	**265,370**	**100.0**	**3,461,605**	**100.0**
Expected payer				
Medicaid	190,645	72.0	1,428,125	41.3
Private insurance	60,830	23.0	1,803,655	52.2
Uninsured	6,580	2.5	95,175	2.8
Medicare or other	6,885	2.6	130,210	3.8
Income in ZIP Code of residence				
Quartile 1 (lowest)	112,790	43.3	897,890	26.4
Quartile 2	74,065	28.5	862,445	25.3
Quartile 3	52,370	20.1	875,615	25.7
Quartile 4 (highest)	20,975	8.1	770,140	22.6
Location of patient's residence				
Large metropolitan	123,045	46.5	1,942,165	56.3
Small metropolitan	87,185	32.9	1,009,555	29.2
Micropolitan	32,600	12.3	305,510	8.9
Rural (noncore)	21,905	8.3	194,265	5.6
Hospital region				
Northeast	30,135	11.4	570,400	16.5
Midwest	55,615	21.0	737,475	21.3
South	120,865	45.5	1,309,265	37.8
West	58,755	22.1	844,465	24.4

Note: Percentages by subgroup are calculated based on stays with nonmissing values for the characteristic.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2013

- **The percentage of childbirth stays paid by Medicaid was nearly 2 times higher among teens than among women aged 20–44 years.**

  Medicaid was the expected payer for 72.0 percent of teen hospital stays for childbirth, compared with 41.3 percent of childbirth-related stays among women aged 20–44 years. In contrast, private insurance was the expected payer for only 23.0 percent of teen hospital stays for childbirth, compared with 52.2 percent of childbirth-related stays among women aged 20–44 years. Very few hospital stays for childbirth were uninsured or had a payer other than Medicaid or private insurance.

  The percentage of teen hospital stays for childbirth by State and payer in 2013 is provided in Appendix A.

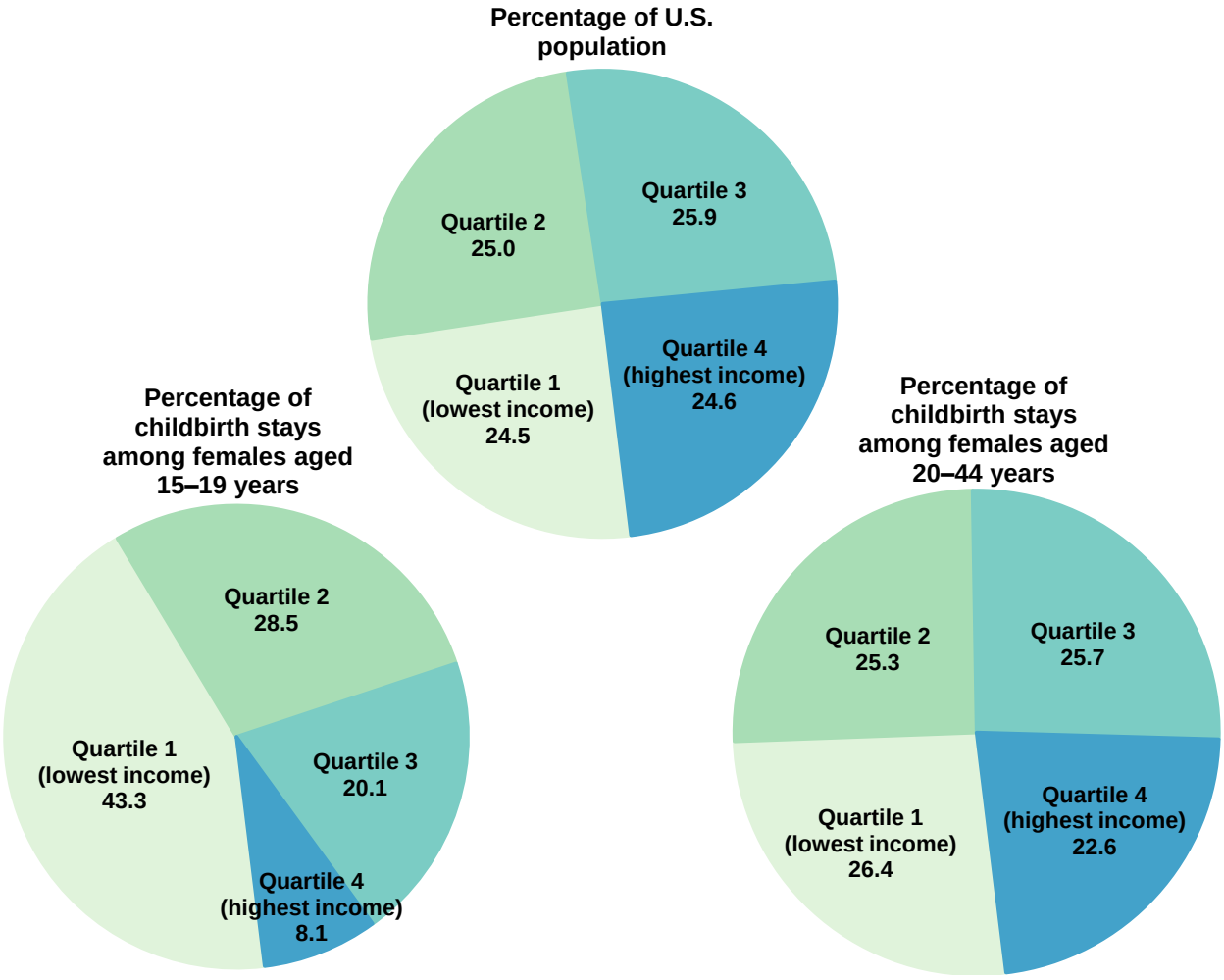
- **Compared with other women of childbearing age, teens with a childbirth-related stay were more likely to reside in small metropolitan or nonmetropolitan areas. Teen hospital stays for childbirth also were more likely to occur in the South.**

  Compared with women aged 20–44 years hospitalized for childbirth, teens with a childbirth-related stay were more likely to reside in a small metropolitan, micropolitan, or rural area (53.5 vs. 43.7

percent). Nearly half of teen hospital stays for childbirth occurred in the South (45.5 percent) compared with only 37.8 percent of childbirth-related stays among women aged 20–44 years.

Figure 1 shows the distribution by income quartile for hospital stays among teens and other women of childbearing age compared with the distribution of the U.S. population overall.

Figure 1. Income in ZIP Code of residence for childbirth stays and the U.S. population, 2013



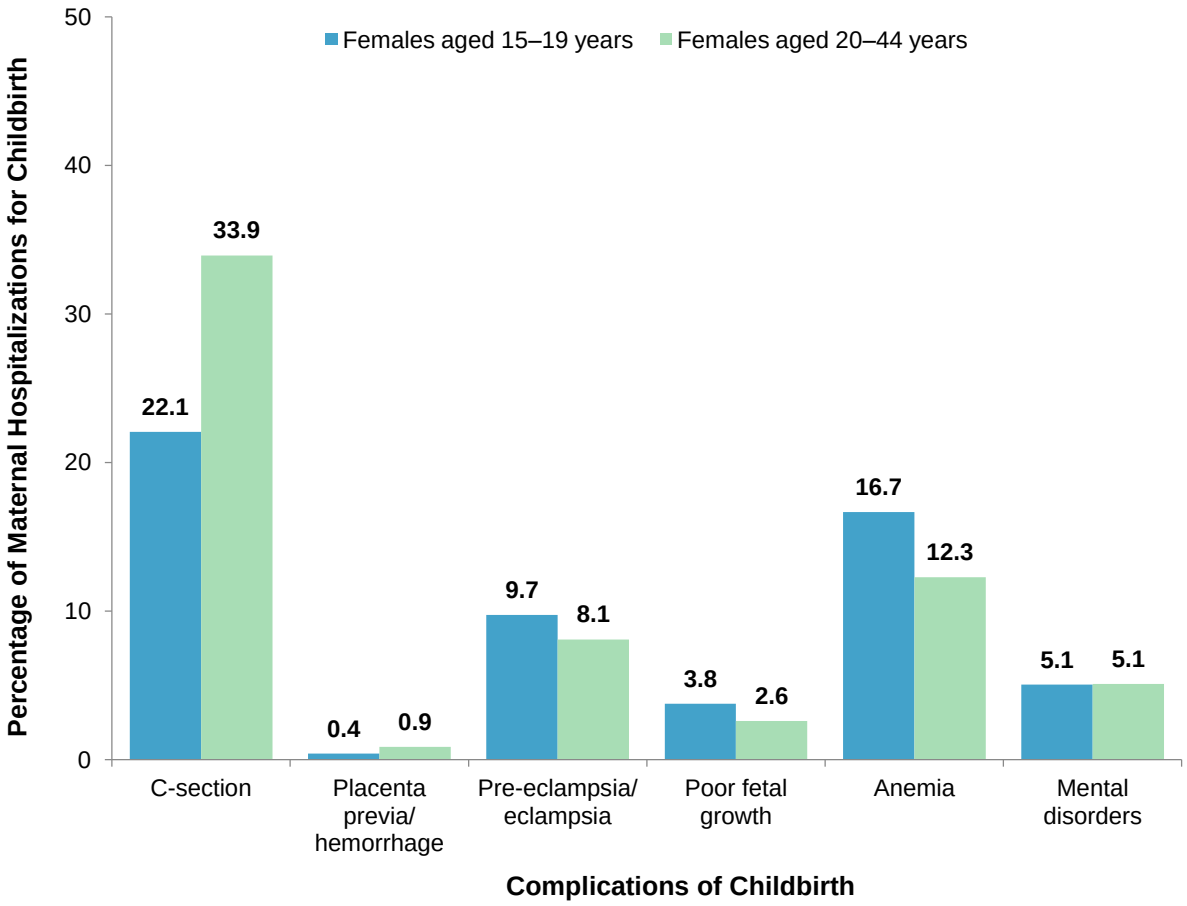
Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2013; ZIP Code demographic data from the Nielsen Company, 2013

- **Whereas childbirth stays among women aged 20–44 years were distributed equally across income levels of the patient's residence, over 40 percent of all teen childbirth stays were among patients who resided in the lowest income areas (quartile 1).**

  Approximately one-fourth of women aged 20–44 years hospitalized for childbirth resided in each quartile of neighborhood income, similar to the distribution of the general U.S. population. In contrast, 43.3 percent of teens with a childbirth-related stay lived in the lowest income areas (quartile 1) and only 8.1 percent lived in the highest income areas (quartile 4).

Figure 2 presents complications among teen hospital stays for childbirth, compared with those among other women of childbearing age in 2013.

Figure 2. Complications of childbirth among teens and other women of childbearing age, 2013



Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2013

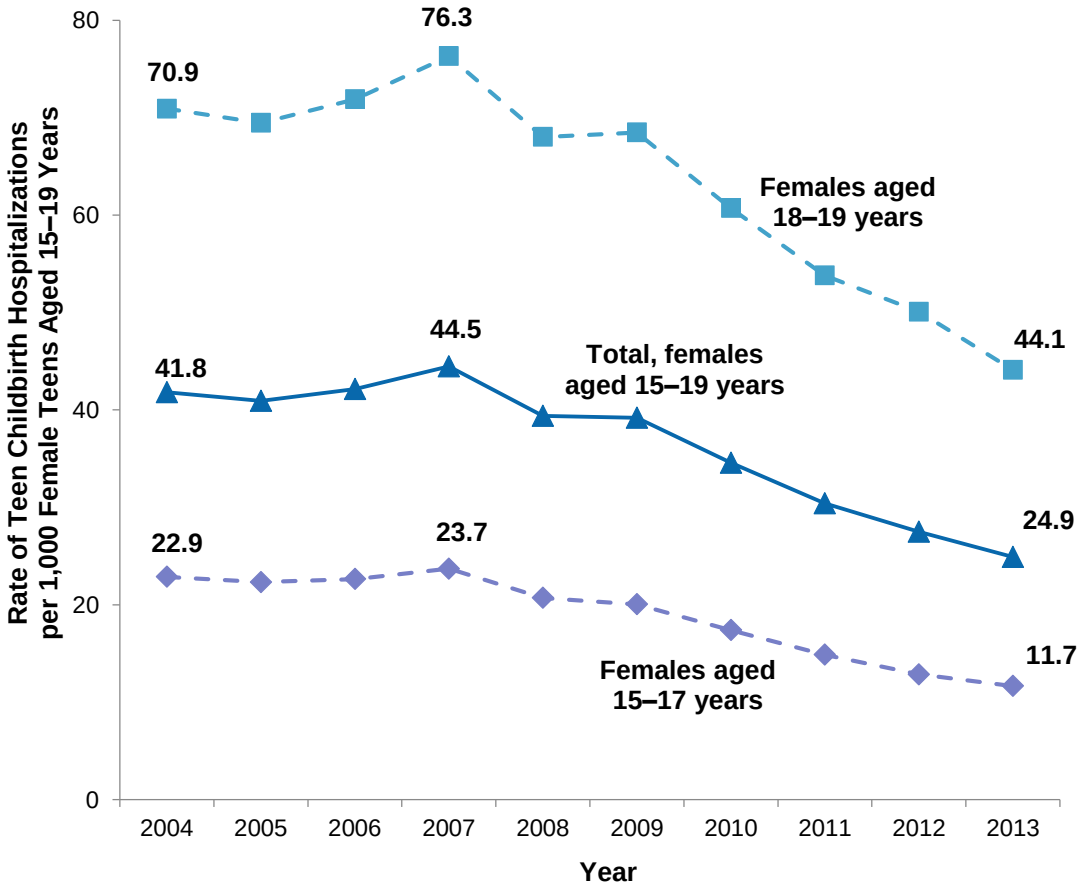
- **Compared with hospital stays for childbirth among other women of childbearing age, those among teens were less likely to result in a C-section but more likely to have preeclampsia or eclampsia, poor fetal growth, and anemia.**

  Only 22.1 percent of teen hospital stays for childbirth resulted in a C-section, compared with over one-third of childbirth-related stays among women aged 20–44 years. In contrast, teen hospital stays for childbirth were more likely to have a diagnosis for preeclampsia or eclampsia, poor fetal growth, or anemia. Diagnoses for placenta previa or hemorrhage were rare, but over 2 times higher among females aged 20–44 years compared with teens. The prevalence of mental health diagnoses among childbirth-related stays was the same across the two age groups.

  The percentage of teen hospital stays with specific complications of childbirth by State in 2013 is provided in Appendix B.

Trends in teen hospital stays for childbirth, 2004–2013
Figure 3 presents the rate of hospital stays for childbirth among all teens aged 15–19 years and separately for teens aged 15–17 years and 18–19 years, from 2004 through 2013.

Figure 3. The rate of teen hospital stays for childbirth by age group, 2004–2013



Notes: The rate among females aged 15–17 years is per 1,000 females aged 15–17 years in the population; the rate among females aged 18–19 years is per 1,000 females aged 18–19 years in the population; the rate among females aged 15–19 years is per 1,000 females aged 15–19 years in the population.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National (Nationwide) Inpatient Sample (NIS), 2004–2013

- **Between 2004 and 2013, the rate of teen hospital stays for childbirth among females aged 15–19 years peaked in 2007 and thereafter decreased by 44.0 percent from 2007 through 2013.**

  Over the 10-year period examined, the rate of teen hospital stays for childbirth peaked in 2007 at 44.5 per 1,000 females aged 15–19 years. Thereafter, the rate of teen hospital stays for childbirth decreased by 44.0 percent to 24.9 per 1,000 females aged 15–19 years in 2013.

- **From 2007 through 2013, the percentage decrease in the rate of teen hospital stays for childbirth was greater among younger teens aged 15–17 years than among older teens aged 18–19 years.**

  Consistent with the trend for all teen hospital stays for childbirth, the rate of childbirth-related stays among females aged 15–17 years and aged 18–19 years peaked in 2007 (23.7 and 76.3, respectively). From 2007 through 2013, the percentage decrease in the rate of hospital stays for childbirth among females aged 15–17 years was greater than that among females aged 18–19 years (50.8 vs. 42.2 percent decrease, respectively).

- **In absolute terms, between 2007 and 2013, the decrease in childbirth stays among older teens aged 18–19 years was nearly 3 times greater than the decrease among teens aged 15–17 years.**

  Although the percentage decrease in the rate of hospital stays for childbirth from 2007 to 2013 was greater among younger teens than among older teens, there were 32.2 fewer hospital stays for childbirth per 1,000 teens aged 18–19 years from 2007 through 2013 compared with 12.0 fewer stays per 1,000 teens aged 15–17 years. This decrease among the older teens was nearly 3 times greater than the absolute decrease in childbirth stays among the younger teens.

Table 3 presents the number and rate of hospital stays for childbirth among teens aged 15–19 years, overall and by subgroup, in 2004 and 2013.

Table 3. Hospital stays for childbirth among teens aged 15–19 years, 2004 and 2013

Characteristic	2004		2013		Percentage change in rate, 2004–2013
	Number of maternal stays	Rate of stays per 1,000 females[a]	Number of maternal stays	Rate of stays per 1,000 females[a]	
Overall total	424,785	41.8	265,370	24.9	–40.4
Maternal age, years					
15–17	140,715	22.9	73,570	11.7	–49.0
18–19	284,075	70.9	191,800	44.1	–37.8
Expected payer					
Medicaid	303,475	N/A	190,645	N/A	N/A
Private insurance	95,270	N/A	60,830	N/A	N/A
Uninsured	128,330	N/A	99,815	N/A	N/A
Medicare or other	10,030	N/A	6,885	N/A	N/A
Income in ZIP Code of residence					
Quartile 1 (lowest)	183,015	63.5	112,790	40.7	–35.9
Quartile 2	117,130	45.6	74,065	28.5	–37.6
Quartile 3	75,870	32.7	52,370	19.5	–40.4
Quartile 4 (highest)	40,250	16.8	20,975	8.1	–52.1
Location of patient's residence					
Large metropolitan	202,310	38.6	123,045	21.6	–44.0
Small metropolitan	138,595	44.2	87,185	26.4	–40.1
Micropolitan	50,415	47.1	32,600	31.4	–33.2
Rural (noncore)	32,125	45.5	21,905	34.6	–24.0
Hospital region					
Northeast	49,485	27.6	30,135	16.2	–41.5
Midwest	88,555	24.3	55,615	14.0	–42.2
South	188,400	80.5	120,865	52.3	–35.0
West	98,345	41.2	58,755	23.3	–43.6

Abbreviation: N/A, not available

[a] Females aged 15–19 years; deliveries among females younger than 15 years constituted only 1.2% of all deliveries among females less than 20 years of age in 2013 and are excluded. Population data are not available by payer to calculate stays per 1,000 females.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), 2004 Nationwide Inpatient Sample (NIS) and 2013 National Inpatient Sample (NIS)

- **From 2004 through 2013, the rate of teen hospital stays for childbirth decreased by 40.4 percent overall and by at least 24 percent across all patient subgroups.**

  From 2004 through 2013, the rate of hospital stays for childbirth among 15–19 year olds decreased by 40.4 percent overall. A decrease in rate of at least 24 percent was observed among female teens regardless of age, payer, income in ZIP Code of residence, urban/rural location of residence, and region of the hospital stay.

- **Across all of the subgroups considered, the largest percentage decrease in the rate of teen hospital stays for childbirth—a 52.1 percent decrease—was among teens who resided in high-income areas (quartile 4).**

  From 2004 through 2013, the rate of teen hospital stays for childbirth declined the most among female teens who resided in the highest income areas (52.1 percent decrease, quartile 4). The next two largest percentage decreases were among younger teens aged 15–17 years (49.0 percent decrease) and among teens who lived in large metropolitan areas (44.0 percent decrease). The smallest percentage decrease was among teens who resided in rural areas (24.0 percent decrease).

- **The largest absolute decrease in teen childbirth stays occurred in the South.**

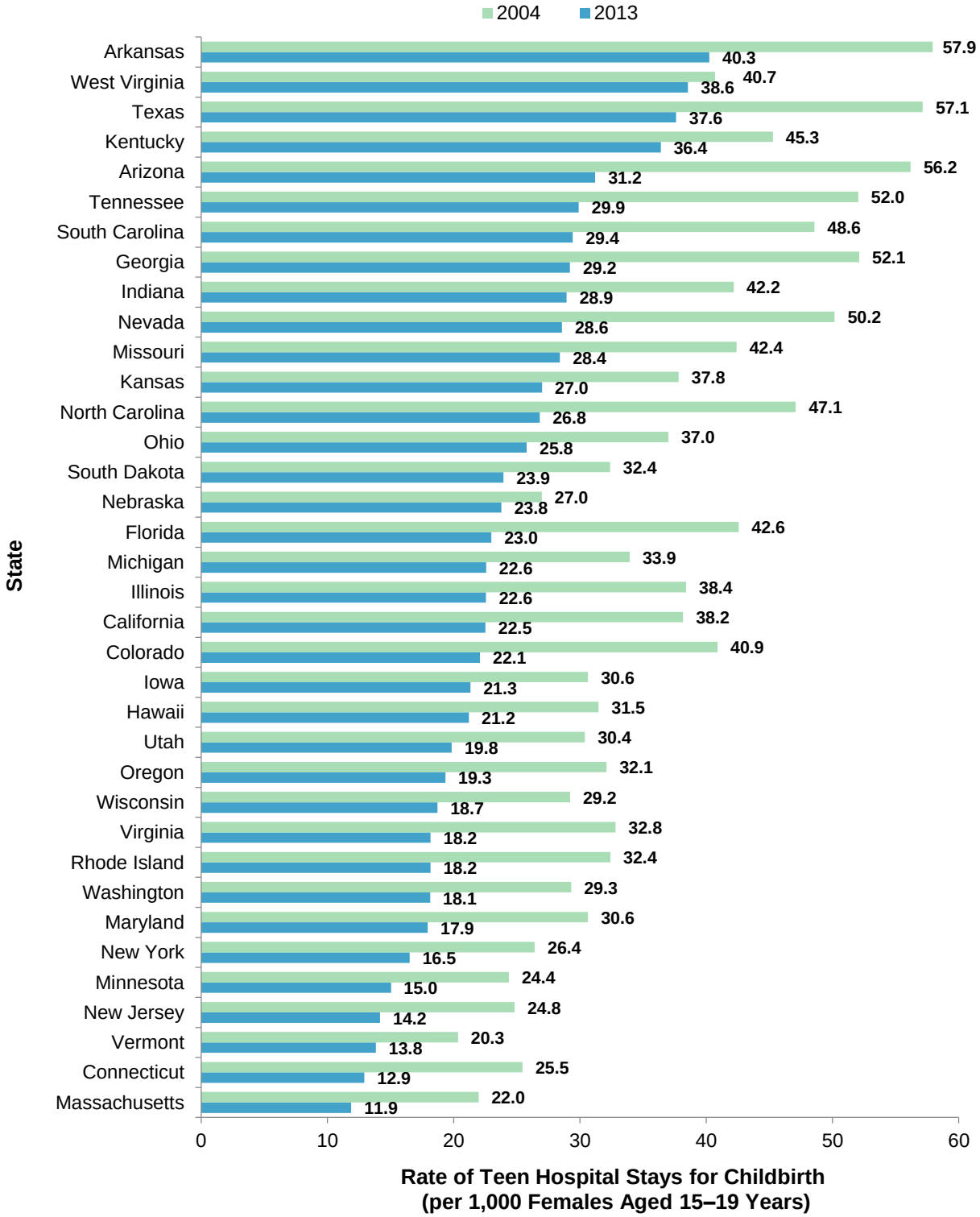
  From 2004 through 2013, the rate of childbirth stays decreased from 80.5 to 52.3 stays per 1,000 females aged 15–19 years in the South—a difference of 28.2 stays. The two next largest absolute decreases in rate were among older teens (decrease of 26.8 stays per 1,000 teens aged 18–19 years) and teens who resided in the lowest (quartile 1) income areas (decrease of 22.8 stays per 1,000 teens aged 15–19 years).

- **Despite decreases in the rate of teen hospital stays for childbirth across all patient subgroups, rates remained highest in low-income and rural areas and in the South.**

  In 2013, the rate of teen hospital stays for childbirth remained higher in the lowest compared with the highest income areas (40.7 vs. 8.1 per 1,000 females aged 15–19 years); in rural compared with large metropolitan areas (34.6 vs. 21.6); and in the South (52.3) compared with the West (23.3), Northeast (16.2), and Midwest (14.0).

Figure 4 presents the rate of hospital stays for childbirth among teens aged 15–19 years in 2004 and 2013 among 36 States with data available in both years. States are ordered according to their rate of teen childbirth stays in 2013.

Figure 4. The rate of hospital stays for childbirth among teens aged 15–19 years by State, 2004 and 2013



Note: Teen hospital stays for childbirth in each State were identified according to the location of the hospital.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), 2004 and 2013 State Inpatient Databases (SID)

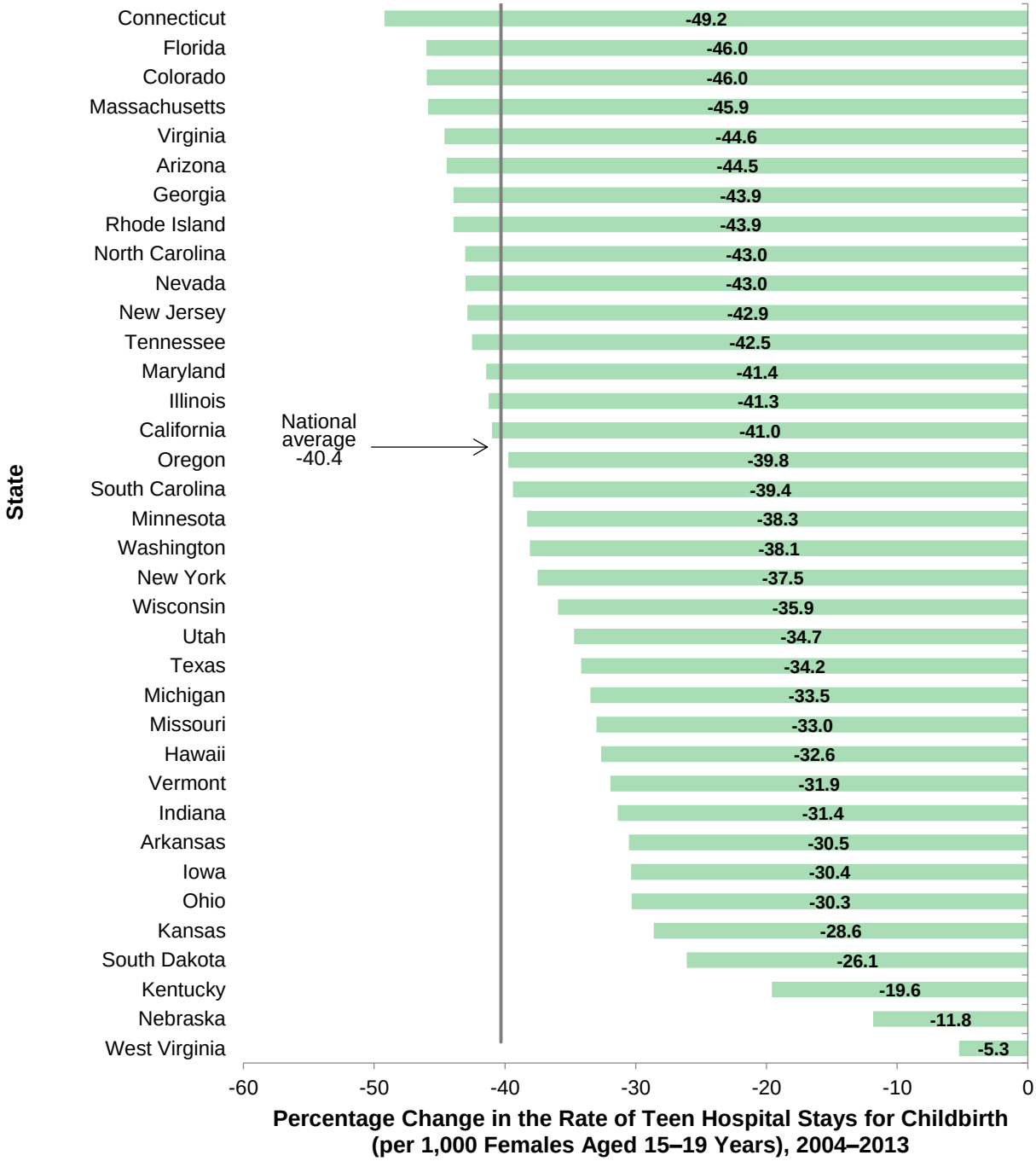
- **The rate of teen hospital stays for childbirth varied by a factor of 3 across States with data available in both 2004 and 2013.**

  In 2004, the highest rate of teen hospital stays for childbirth was seen in Arkansas (57.9 stays per 1,000 females aged 15–19 years) and was nearly 3 times greater than the lowest rate, seen in Vermont (20.3). Following Arkansas, Texas (57.1) and Arizona (56.2) had the second and third highest rates of teen hospital stays for childbirth. Following Vermont, Massachusetts (22.0) and Minnesota (24.4) had the second and third lowest rates.

  In 2013, the rate of teen hospital stays for childbirth remained highest in Arkansas (40.3 stays per 1,000 females aged 15–19 years), followed by West Virginia (38.6) and Texas (37.6). The rate was lowest in Massachusetts (11.9), followed by Connecticut (12.9) and Vermont (13.8). In 2013, the highest (Arkansas) and lowest (Massachusetts) rates varied by a factor of 3.4.

Figure 5 presents the percentage change in the rate of hospital stays for childbirth among teens aged 15–19 years from 2004 to 2013 among 36 States with data available in both years. States are ordered according to the percentage change in their rate of teen childbirth stays from 2004 through 2013.

Figure 5. Percentage change in the rate of hospital stays for childbirth among teens aged 15–19 years by State, 2004–2013



Notes: Teen hospital stays for childbirth in each State were identified according to the location of the hospital.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), 2004 Nationwide Inpatient Sample (NIS), 2013 National Inpatient Sample (NIS), and 2004 and 2013 State Inpatient Databases (SID)

- **From 2004 through 2013, the largest decrease in the rate of teen hospital stays for childbirth was in Connecticut—a decrease of nearly 50 percent.**

  In 2004, Connecticut had the fifth lowest rate of teen hospital stays for childbirth (25.5 stays per 1,000 females aged 15–19 years). By 2013, this rate had decreased by 49.2 percent to 12.9. Following Connecticut, the largest percentage decreases in rate were in Florida (from 42.6 in 2004 to 23.0 in 2013, by 46.0 percent) and in Colorado (from 40.9 to 22.1, also by 46.0 percent).

- **In only three States was the decrease in the rate of teen hospital stays for childbirth less than 25 percent.**

  The rate of teen hospital stays for childbirth changed very little in West Virginia from 2004 through 2013, from 40.7 to 38.6 stays per 1,000 females aged 15–19 years—a decrease of only 5.2 percent. The other two States with decreases of less than 25 percent were Nebraska (11.8 percent decrease) and Kentucky (19.6 percent decrease).

Additional State-level data on the expected payer and complications of teen hospital stays for childbirth are presented in Appendices A and B.

Appendix A. Expected payer of childbirth stays among teens aged 15–19 years by State, 2013

State	Number of teen hospital stays for childbirth	Expected payer for teen hospital stays for childbirth, %			
		Medicaid	Private	Uninsured	Medicare or other
United States total	**265,370**	**72.0**	**23.0**	**2.5**	**2.6**
Arizona	6,975	74.8	17.6	3.4	4.2
Arkansas	4,004	76.0	17.3	3.6	3.1
California	30,067	78.5	17.9	2.5	1.2
Colorado	3,731	77.6	18.6	1.0	2.8
Connecticut	1,591	78.6	18.7	1.3	1.4
Florida	13,665	81.3	14.3	2.2	2.1
Georgia	10,189	79.3	13.3	1.8	5.7
Hawaii	894	66.1	31.5	–[a]	–[a]
Illinois	9,997	73.5	22.8	2.7	1.0
Indiana	6,650	64.2	29.8	1.8	4.3
Iowa	2,241	64.9	32.6	1.5	1.1
Kansas	2,707	53.2	28.6	4.6	13.5
Kentucky	5,243	75.8	21.3	1.9	1.1
Maryland	3,555	76.6	21.7	0.7	1.0
Massachusetts	2,695	73.7	24.5	0.6	1.2
Michigan	7,785	65.6	33.6	0.4	0.4
Minnesota	2,717	42.6	44.6	1.3	11.6
Missouri	5,790	70.2	25.4	2.2	2.1
Nebraska	1,506	36.9	60.6	0.9	1.7
Nevada	2,534	69.0	20.6	9.5	0.9
New Jersey	4,130	53.7	35.4	9.4	1.6
New York	10,736	73.6	22.6	1.9	2.0
North Carolina	8,727	79.2	15.6	2.1	3.1
Ohio	10,113	70.3	25.0	2.3	2.4
Oregon	2,399	62.7	24.8	1.0	11.5
Rhode Island	664	77.7	20.8	–[a]	–[a]
South Carolina	4,629	78.6	15.2	1.1	5.1
South Dakota	679	64.7	30.9	1.6	2.8
Tennessee	6,352	74.8	19.8	1.0	4.5
Texas	35,336	68.3	26.9	3.4	1.5
Utah	2,205	58.8	35.6	3.3	2.3
Vermont	295	70.8	26.4	–[a]	–[a]
Virginia	4,976	62.2	31.4	3.1	3.3
Washington	4,101	61.5	34.9	1.6	2.0
West Virginia	2,186	74.2	22.6	0.8	2.5
Wisconsin	3,635	69.8	27.9	1.3	1.0

Note: Teen hospital stays for childbirth in each State were identified according to the location of the hospital.

[a] Suppressed because of cell size of less than 11 stays

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), 2013 National Inpatient Sample (NIS) and 2013 State Inpatient Databases (SID)

Appendix B. Complications of childbirth among teens aged 15–19 years by State, 2013

State	Number of teen hospital stays for childbirth	Complications of teen hospital stays for childbirth, %					
		C-section	Placenta previa/ hemorrhage	Pre-eclampsia/ eclampsia	Poor fetal growth	Anemia	Mental disorders
United States Total	**265,370**	**22.1**	**0.4**	**9.7**	**3.8**	**16.7**	**5.1**
Arizona	6,975	17.0	1.3	9.0	3.1	15.4	3.8
Arkansas	4,004	26.3	0.8	9.8	2.4	12.7	3.4
California	30,067	20.8	1.2	7.5	2.3	14.9	4.0
Colorado	3,731	16.8	1.6	9.4	3.9	18.0	6.8
Connecticut	1,591	22.1	1.0	7.7	3.2	14.2	6.9
Florida	13,665	25.0	1.3	10.4	3.4	15.4	4.1
Georgia	10,189	23.6	1.6	11.3	5.4	18.0	2.8
Hawaii	894	14.0	–[a]	8.9	2.1	27.6	3.1
Illinois	9,997	20.0	1.2	9.5	3.9	21.0	5.1
Indiana	6,650	20.6	1.3	9.5	4.5	17.6	5.1
Iowa	2,241	21.9	1.3	7.9	3.5	14.8	6.6
Kansas	2,707	20.2	1.5	9.6	3.0	20.3	4.2
Kentucky	5,243	26.0	1.5	10.9	5.8	18.5	4.7
Maryland	3,555	22.8	1.8	10.4	5.7	28.2	10.3
Massachusetts	2,695	16.6	1.4	7.8	4.8	15.4	11.4
Michigan	7,785	22.0	1.4	9.3	4.6	16.1	8.5
Minnesota	2,717	15.1	1.0	7.8	2.9	20.6	10.6
Missouri	5,790	20.9	2.0	9.8	4.7	16.1	6.9
Nebraska	1,506	18.9	1.3	8.0	4.2	13.6	5.4
Nevada	2,534	22.6	1.7	5.4	4.1	6.4	2.2
New Jersey	4,130	23.3	1.4	9.3	3.2	16.2	6.2
New York	10,736	21.1	1.5	9.6	3.8	18.9	7.4
North Carolina	8,727	19.7	1.6	11.2	3.9	19.6	5.8
Ohio	10,113	20.6	2.0	9.2	4.7	18.2	7.8
Oregon	2,399	17.5	1.2	9.9	3.6	19.2	10.8
Rhode Island	664	12.3	–[a]	11.3	5.9	17.8	9.6
South Carolina	4,629	23.2	1.3	10.4	6.0	19.5	4.7
South Dakota	679	17.8	1.6	7.1	4.9	16.1	6.3
Tennessee	6,352	24.2	1.6	11.3	5.0	13.2	4.0
Texas	35,336	25.1	1.2	10.3	3.0	16.3	1.9
Utah	2,205	15.3	1.4	8.6	3.8	10.5	6.5
Vermont	295	18.6	–[a]	7.8	3.7	9.5	13.9
Virginia	4,976	23.3	1.4	9.4	5.4	15.0	5.2
Washington	4,101	17.2	0.9	8.4	3.5	15.9	8.7
West Virginia	2,186	27.9	2.2	10.8	6.0	14.0	6.8
Wisconsin	3,635	16.6	1.2	9.0	4.7	18.9	8.7

Notes: Teen hospital stays for childbirth in each State were identified according to the location of the hospital.

[a] Suppressed because of cell size of less than 11 stays

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), 2013 National Inpatient Sample (NIS) and 2013 State Inpatient Databases (SID)

Data Source

The estimates in this Statistical Brief are based upon data from the Healthcare Cost and Utilization Project (HCUP) 2013 National Inpatient Sample (NIS) and the 2013 State Inpatient Databases (SID). Historical data were drawn from the 2004–2012 National (Nationwide) Inpatient Sample (NIS) and the 2004 SID. The 2004 and 2013 SID were available for 36 States: Arizona, Arkansas, California, Colorado, Connecticut, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, Ohio, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin. Supplemental sources included population denominator data for use with HCUP databases, derived from information available from the Nielsen Company.[9]

Definitions

Diagnoses, ICD-9-CM, and diagnosis-related groups (DRGs)
The *principal diagnosis* is that condition established after study to be chiefly responsible for the patient's admission to the hospital. *Secondary diagnoses* are concomitant conditions that coexist at the time of admission or develop during the stay. *All-listed diagnoses* include the principal diagnosis plus these additional secondary conditions.

ICD-9-CM is the International Classification of Diseases, Ninth Revision, Clinical Modification, which assigns numeric codes to diagnoses and procedures. There are approximately 14,000 ICD-9-CM diagnosis codes. There are approximately 4,000 ICD-9-CM procedure codes.

DRGs comprise a patient classification system that categorizes patients into groups that are clinically coherent and homogeneous with respect to resource use. DRGs group patients according to diagnosis, type of treatment (procedure), age, and other relevant criteria. Each hospital stay has one assigned DRG.

Case definition
For this report, the following ICD-9-CM diagnosis codes and DRGs were used to identify maternal hospitalizations related to childbirth and to assess complications of childbirth among females aged 15–44 years (Table 4). We chose select complicating conditions of childbirth on the basis of a prior Statistical Brief.[10] The codes came from the ICD-9-CM section on "Complications mainly related to pregnancy" (codes 640–649) from the chapter titled "Complications of Pregnancy, Childbirth, and the Puerperium."

[9] Barrett M, Hickey K, Coffey R, Levit K. Population Denominator Data for Use with the HCUP Databases (Updated with 2014 Population Data). HCUP Methods Series Report #2015-07. September 1, 2015. U.S. Agency for Healthcare Research and Quality. http://www.hcup-us.ahrq.gov/reports/methods/2015-07.pdf. Accessed February 17, 2016.
[10] Moore JE, Witt WP, Elixhauser A. Complicating Conditions Associated With Childbirth, by Delivery Method and Payer, 2011. HCUP Statistical Brief #173. May 2014. Agency for Healthcare Research and Quality, Rockville, MD. http://www.hcup-us.ahrq.gov/reports/statbriefs/sb173-Childbirth-Delivery-Complications.pdf. Accessed July 14, 2016.

Table 4. Study inclusion/exclusion criteria and codes used to define the leading reason for female teen hospital stays and complications of childbirth

Study inclusion/exclusion criteria	Codes
Maternal hospitalizations for childbirth among females aged 15–44 years	DRG 370–375 (2004–September 2007) DRG 765–768, 774, 775 (October 2007–2013)
Complications of pregnancy	**Codes**
C-section	DRG 370, 371 (2004–September 2007) DRG 765, 766 (October 2007–2013)
Placenta previa/hemorrhage	641.x
Pre-eclampsia/eclampsia	642.3–.7
Anemia	648.2
Poor fetal growth	656.5
Mental disorders	648.4

Types of hospitals included in the HCUP National (Nationwide) Inpatient Sample
The National (Nationwide) Inpatient Sample (NIS) is based on 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). The NIS includes obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Beginning in 2012, long-term acute care hospitals are also excluded. However, if a patient received long-term care, rehabilitation, or treatment for psychiatric or chemical dependency conditions in a community hospital, the discharge record for that stay will be included in the NIS.

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 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 psychiatric or chemical dependency conditions in a community hospital, the discharge record for that stay was included in the analysis.

Unit of analysis
The unit of analysis is the hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in 1 year will be counted each time as a separate discharge from the hospital.

Costs and charges
Total hospital charges were converted to costs using HCUP Cost-to-Charge Ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services (CMS).[11] *Costs* reflect the actual expenses incurred in the production of hospital services, such as wages, supplies, and utility costs; *charges* represent the amount a hospital billed for the case. For each hospital, a hospital-wide cost-to-charge ratio is used. Hospital charges reflect the amount the hospital billed for the entire hospital stay and do not include professional (physician) fees. For the purposes of this Statistical Brief, mean cost per stay is reported to the nearest hundred.

[11] Agency for Healthcare Research and Quality. HCUP Cost-to-Charge Ratio (CCR) Files. Healthcare Cost and Utilization Project (HCUP). 2001–2012. Rockville, MD: Agency for Healthcare Research and Quality. Updated December 2014. http://www.hcup-us.ahrq.gov/db/state/costtocharge.jsp. Accessed February 17, 2016.

How HCUP estimates of costs differ from National Health Expenditure Accounts
There are a number of differences between the costs cited in this Statistical Brief and spending as measured in the National Health Expenditure Accounts (NHEA), which are produced annually by CMS.[12] The largest source of difference comes from the HCUP coverage of inpatient treatment only in contrast to the NHEA inclusion of outpatient costs associated with emergency departments and other hospital-based outpatient clinics and departments as well. The outpatient portion of hospitals' activities has been growing steadily and may exceed half of all hospital revenue in recent years. On the basis of the American Hospital Association Annual Survey, 2012 outpatient gross revenues (or charges) were about 44 percent of total hospital gross revenues.[13]

Smaller sources of differences come from the inclusion in the NHEA of hospitals that are excluded from HCUP. These include Federal hospitals (Department of Defense, Veterans Administration, Indian Health Services, and Department of Justice [prison] hospitals) as well as psychiatric, substance abuse, and long-term care hospitals. A third source of difference lies in the HCUP reliance on billed charges from hospitals to payers, adjusted to provide estimates of costs using hospital-wide cost-to-charge ratios, in contrast to the NHEA measurement of spending or revenue. HCUP costs estimate the amount of money required to produce hospital services, including expenses for wages, salaries, and benefits paid to staff as well as utilities, maintenance, and other similar expenses required to run a hospital. NHEA spending or revenue measures the amount of income received by the hospital for treatment and other services provided, including payments by insurers, patients, or government programs. The difference between revenues and costs include profit for for-profit hospitals or surpluses for nonprofit hospitals.

Location of patients' residence
Place of residence is based on the 2003 Urban Influence Codes:

- Large metropolitan area of 1 million residents or more
- Small metropolitan area of fewer than 1 million residents
- Micropolitan
- Rural (noncore)

Median community-level income
Median community-level income is the median household income of the patient's ZIP Code of residence. Income levels are separated into population-based quartiles with cut-offs determined using ZIP Code demographic data obtained from the Nielsen Company. The income quartile is missing for patients who are homeless or foreign.

Payer
Payer is the expected payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into general groups:

- Medicare: includes patients covered by fee-for-service and managed care Medicare
- Medicaid: includes patients covered by fee-for-service and managed care Medicaid
- Private Insurance: includes Blue Cross, commercial carriers, and private health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- Uninsured: includes an insurance status of *self-pay* and *no charge*
- Other: includes Workers' Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.

Hospital stays billed to the State Children's Health Insurance Program (SCHIP) may be classified as Medicaid, Private Insurance, or Other, depending on the structure of the State program. Because most State data do not identify patients in SCHIP specifically, it is not possible to present this information separately.

[12] For additional information about the NHEA, see Centers for Medicare & Medicaid Services (CMS). National Health Expenditure Data. CMS Web site May 2014. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html?redirect=/NationalHealthExpendData/. Accessed February 17, 2016.
[13] American Hospital Association. TrendWatch Chartbook, 2014. Table 4.2. Distribution of Inpatient vs. Outpatient Revenues, 1992–2012. http://www.aha.org/research/reports/tw/chartbook/2014/table4-2.pdf. Accessed February 17, 2016.

For this Statistical Brief, when more than one payer is listed for a hospital discharge, the first-listed payer is used.

Region
Region is one of the four regions defined by the U.S. Census Bureau:

- Northeast: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
- Midwest: Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
- South: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas
- West: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii

About HCUP

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of health care 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 health care 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 health care 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 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
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health and Hospitals
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 Department of Health
Missouri Hospital Industry Data Institute
Montana MHA - An Association of Montana Health Care Providers
Nebraska Hospital Association

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
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 Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About Statistical Briefs

HCUP Statistical Briefs are descriptive summary reports presenting statistics on hospital inpatient and emergency department use and costs, quality of care, access to care, medical conditions, procedures, patient populations, and other topics. The reports use HCUP administrative health care data.

About the NIS

The HCUP National (Nationwide) Inpatient Sample (NIS) is a nationwide database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, nonrehabilitation hospitals). The NIS includes all payers. It is drawn from a sampling frame that contains hospitals comprising more than 95 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use. Over time, the sampling frame for the NIS has changed; thus, the number of States contributing to the NIS varies from year to year. The NIS is intended for national estimates only; no State-level estimates can be produced.

The 2012 NIS was redesigned to optimize national estimates. The redesign incorporates two critical changes:

- Revisions to the sample design—starting with 2012, the NIS is now a *sample of discharge records from all HCUP-participating hospitals*, rather than a sample of hospitals from which all discharges were retained (as is the case for NIS years before 2012).

- Revisions to how hospitals are defined—the NIS now uses the *definition of hospitals and discharges supplied by the statewide data organizations* that contribute to HCUP, rather than the definitions used by the American Hospital Association (AHA) Annual Survey of Hospitals.

The new sampling strategy is expected to result in more precise estimates than those that resulted from the previous NIS design by reducing sampling error: for many estimates, confidence intervals under the new design are about half the length of confidence intervals under the previous design. The change in

sample design for 2012 necessitates recomputation of prior years' NIS data to enable analysis of trends that uses the same definitions of discharges and hospitals.

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.

For More Information

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

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

For information on other hospitalizations in the United States, refer to the following HCUP Statistical Briefs located at http://www.hcup-us.ahrq.gov/reports/statbriefs/statbriefs.jsp:

- Statistical Brief #180, Overview of Hospital Stays in the United States, 2012
- Statistical Brief #181, Costs for Hospital Stays in the United States, 2012
- Statistical Brief #186, Most Frequent Operating Room Procedures Performed in U.S. Hospitals, 2003–2012
- Statistical Brief #162, Most Frequent Conditions in U.S. Hospitals, 2011

For a detailed description of HCUP and more information on the design of the National (Nationwide) Inpatient Sample (NIS) and State Inpatient Databases (SID), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the National (Nationwide) Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated November 2015. http://www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed February 17, 2016.

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 January 2016. http://www.hcup-us.ahrq.gov/sidoverview.jsp. Accessed February 17, 2016.

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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 health care 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 e-mail us at hcup@ahrq.gov or send a letter to the address below:

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