Mental Health Disorders Among Delivery Inpatient Stays by Patient Race and Ethnicity, 2020

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Introduction

Mental health disorders are common during and following pregnancy and may contribute to poorer maternal and neonatal outcomes.[1] For example, maternal depression is associated with a higher rate of premature delivery and low birth weight infants.[2] The proportion of delivery hospital stays involving a mental health disorder diagnosis has increased from 0.6 percent of delivery stays in 2000 to 7.3 percent of delivery stays in 2018.[3] Moreover, this increasing trend was exacerbated in 2020 when pregnant women experienced COVID-19 pandemic-related stress associated with factors such as job loss, feeling unprepared for birth, and fear of COVID-19 infection.[4-6]

The prevalence of mental health disorders is generally similar across racial and ethnic groups in the United States.[7] However, little is known about racial and ethnic differences in the rates of mental health disorders among women during pregnancy and delivery. Given the high prevalence of mental health disorders among delivery stays, especially during the COVID-19 pandemic, it is important to understand how mental health disorder diagnoses differ by patient race and ethnicity in order to address existing disparities and prevent widening disparities among maternal and neonatal outcomes.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents statistics on mental health disorders during delivery inpatient stays by patient race and ethnicity using weighted estimates from the 2020 National Inpatient Sample (NIS). First, changes in the rate of delivery stays with any mental health disorder diagnosis are presented by patient race and ethnicity from 2017 to 2020. Second, the distribution of delivery stays with and without a mental health disorder diagnosis is presented by patient race and ethnicity. Third, the rate of delivery stays with any mental health disorder diagnosis is presented by patient race and ethnicity for select patient and hospital characteristics and for specific and prevalent mental health disorders. Finally, the rate is provided by patient race and ethnicity for delivery stays involving common obstetric risk factors and either a concurrent mental health disorder diagnosis or no concurrent mental health disorder diagnosis. Because of the large sample size of the NIS data, small differences can be statistically significant but not clinically important. Thus, only differences greater than or equal to 10 percent are discussed in the text.

Highlights

- In 2020, White non-Hispanic women had the highest rate of delivery stays involving mental health disorders (14.0 per 100 delivery stays), and Asian/Pacific Islander non-Hispanic women had the lowest (3.6 per 100 delivery stays).

- Between 2017 and 2020, the rate of delivery stays involving mental health disorders increased 52 percent, with the lowest rate of increase among Black non-Hispanic women (47 percent) and the highest rate of increase among other non-Hispanic race/ethnicity women (71 percent).

- Anxiety and obsessive-compulsive disorders were the most common type of mental health disorder among delivery stays in 2020, with the highest rate among White non-Hispanic women and the lowest rate among Asian/Pacific Islander non-Hispanic women (9.6 and 2.2 per 100 delivery stays, respectively).

- The rate of delivery stays involving anxiety and obsessive-compulsive disorders increased 74 percent between 2017 and 2020.

- Select obstetric risk factors were more common among delivery stays involving at least one mental health disorder than among delivery stays with no mental health disorders (79.1 vs. 62.5 per 100 delivery stays, respectively).

Prevalence of mental health disorder diagnoses among delivery stays, by patient race and ethnicity, 2020
Figure 1 displays the rate of delivery stays involving at least one mental health disorder diagnosis per 100 delivery stays from 2017 to 2020.

Figure 1. Rate of delivery stays involving a mental health disorder diagnosis, by patient race and ethnicity, 2017–2020
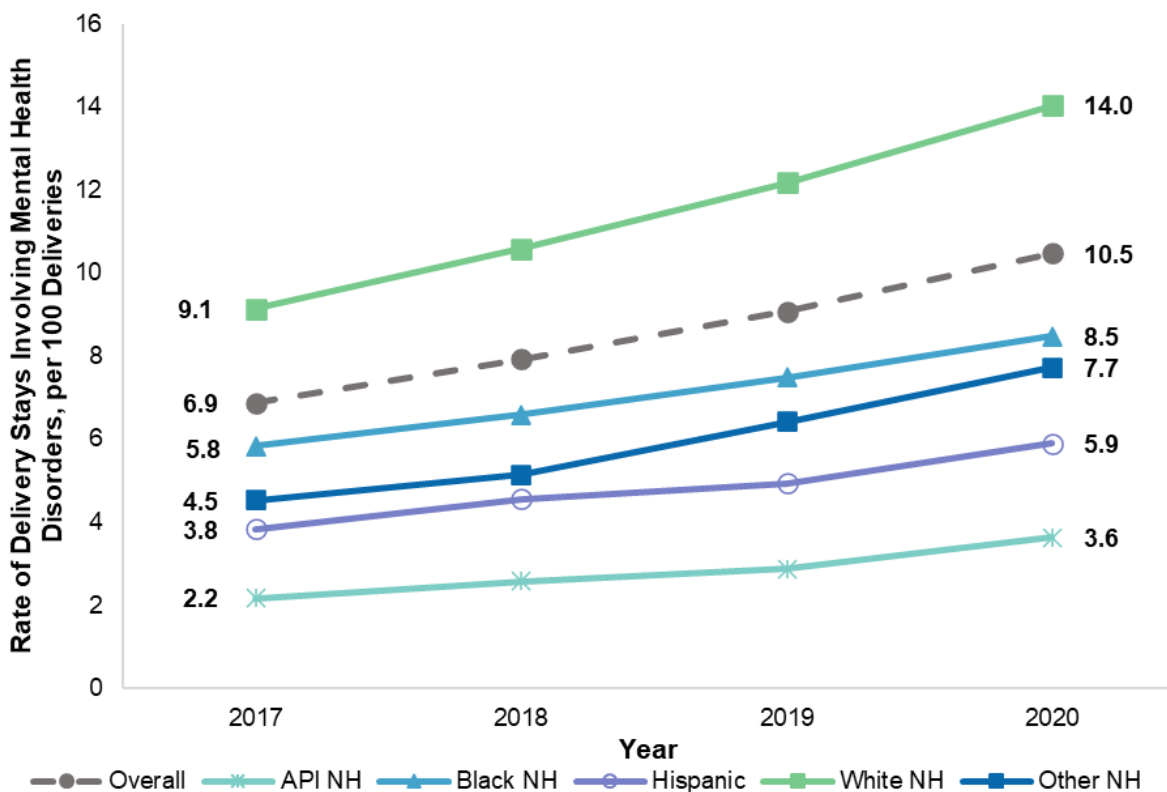
Abbreviations: API, Asian/Pacific Islander; NH, non-Hispanic

Note: Patient race and ethnicity information was missing for less than 5.5% of delivery stays involving a mental health disorder in any year (i.e., 5.3% missing in 2017, 3.2% missing in 2018, 3.0% missing in 2019, and 3.0% missing in 2020).

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2017–2020

- **The rate of delivery stays with at least one mental health disorder diagnosis increased 52 percent between 2017 and 2020.**

  From 2017 through 2020, the rate of delivery stays with a mental health diagnosis increased from 6.9 to 10.5 per 100 delivery stays, a 52 percent increase. The rate increased for all racial and ethnic groups over the 4-year period. The rate increase was highest for other non-Hispanic (NH) race/ethnicity women at 71 percent (from 4.5 to 7.7 per 100 delivery stays) and lowest for Black NH women at 47 percent (from 5.8 to 8.5 per 100 delivery stays).

- **White non-Hispanic women had the highest rate and Asian/Pacific Islander non-Hispanic women had the lowest rate of delivery stays with a mental health disorder diagnosis.**

  Across years, White NH women had the highest rate of delivery inpatient stays with a mental health disorder (14.0 per 100 delivery stays in 2020), which was nearly four times higher than the rate among Asian/Pacific Islander NH women (3.6 per 100 delivery stays in 2020).

Figure 2 presents the distribution of delivery stays with and without a mental health disorder diagnosis in 2020 by patient race and ethnicity.

Figure 2. Distribution of delivery stays with and without a mental health disorder diagnosis, by patient race and ethnicity, 2020
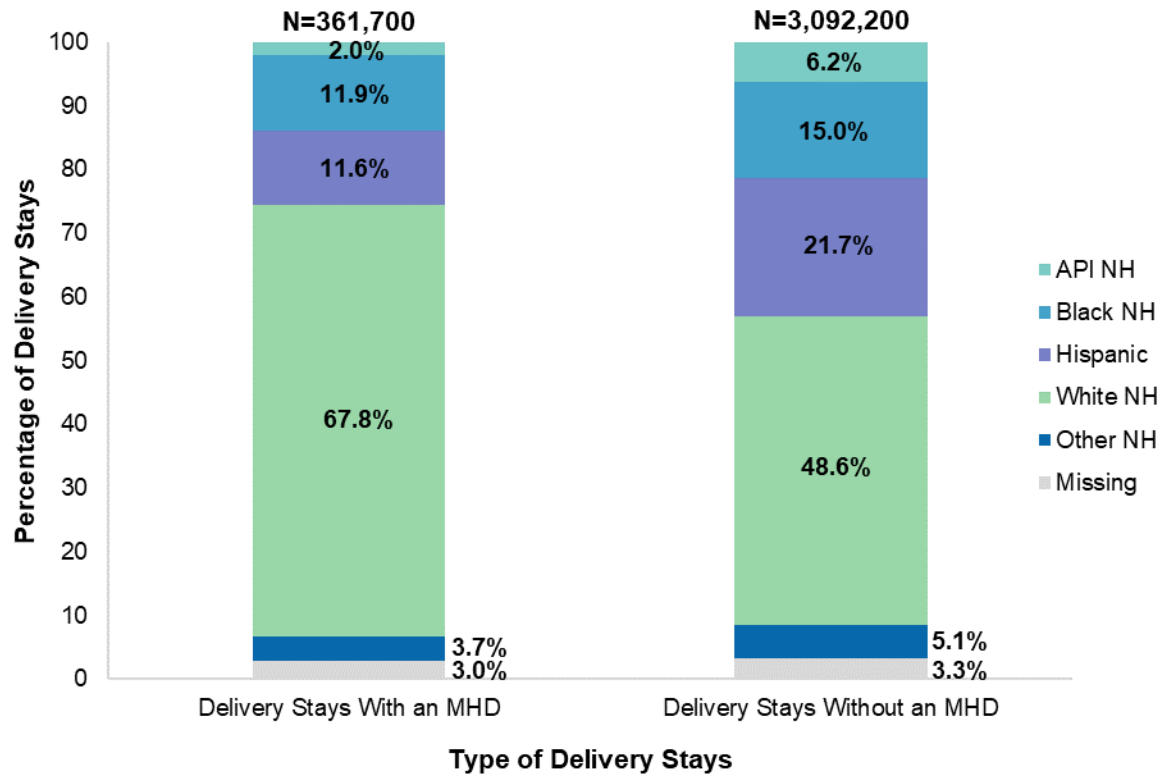
Abbreviations: API, Asian/Pacific Islander; MHD, mental health disorder; NH, non-Hispanic

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2020

■ **White non-Hispanic women accounted for a larger proportion of delivery stays with a mental health disorder diagnosis than delivery stays with no mental health disorder diagnosis.**

In 2020, more than 10 percent of the 3.5 million total delivery stays involved a mental health disorder diagnosis. The distribution of patient race and ethnicity differed for delivery stays that included a mental health disorder diagnosis versus those that did not. More than two-thirds of delivery stays involving a mental health disorder diagnosis were for White non-Hispanic women, compared with less than half of delivery stays that did not involve a mental health disorder diagnosis (67.8 vs. 48.6 percent).

Table 1 presents the rate of delivery stays with a mental health disorder diagnosis per 100 delivery stays by patient race and ethnicity across select patient and hospital characteristics in 2020.

Table 1. Number and rate of delivery stays with a mental health disorder diagnosis per 100 delivery stays, by patient and hospital characteristics and patient race and ethnicity, 2020

Characteristic	All		API NH		Black NH		Hispanic		White NH		Other NH	
	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
All MHD-related delivery stays	361,700	10.5	7,300	3.6	43,000	8.5	42,100	5.9	245,300	14.0	13,300	7.7
Age group, years												
12–19	16,500	10.6	100	4.8	3,100	8.8	2,900	6.0	9,100	15.7	800	10.0
20–24	68,000	10.7	600	4.6	10,400	8.4	9,200	5.7	43,100	15.0	2,600	8.3
25–34	206,800	10.4	4,100	3.3	23,000	8.5	22,300	5.9	144,000	13.6	7,200	7.4
35–55	70,400	10.6	2,500	4.0	6,600	8.1	7,600	6.2	49,100	14.4	2,700	7.7
Primary expected payer												
Medicaid	153,400	10.7	1,800	3.6	29,100	9.3	24,600	5.6	87,100	16.9	6,300	7.6
Private	187,000	10.3	5,100	3.7	10,700	6.3	15,000	6.5	144,500	12.7	6,200	8.0
Self-pay/ No charge*	4,300	5.2	100	1.5	600	7.3	800	2.9	2,500	7.8	200	3.9
Other payers‡	16,500	14.2	300	5.2	2,600	13.8	1,600	10.4	11,000	16.7	500	9.6
Community-level income												
Quartile 1 (lowest)	90,700	9.6	700	3.2	20,800	8.6	12,700	5.2	50,500	13.6	3,300	7.7
Quartiles 2 and 3	188,700	10.9	3,100	3.8	17,700	8.3	21,400	5.9	134,600	14.5	6,300	7.7
Quartile 4 (highest)	79,400	10.5	3,500	3.6	4,100	7.7	7,600	7.5	58,700	13.4	3,500	7.6
Patient location												
Large metropolitan	185,900	9.5	5,500	3.5	27,600	8.4	27,400	5.9	113,900	13.6	7,900	7.0
Small metropolitan	122,900	11.9	1,500	4.1	12,600	9.2	12,400	6.2	87,900	15.2	3,600	9.1
Nonmetropolitan	52,300	11.3	200	4.2	2,700	6.0	2,100	4.8	43,200	13.2	1,900	9.6
Hospital region												
Northeast	67,600	12.3	1,300	3.5	7,500	10.5	8,300	8.7	46,200	15.6	3,100	8.0
Midwest	94,400	13.1	1,000	3.8	10,000	10.1	4,500	7.5	71,700	15.5	2,000	9.2
South	122,500	8.9	1,300	2.7	21,200	7.1	11,200	4.0	82,500	12.5	4,300	6.1
West	77,100	9.6	3,700	4.1	4,400	10.1	18,100	6.4	44,900	13.7	3,900	9.6

Abbreviations: API, Asian/Pacific Islander; MHD, mental health disorder; NH, non-Hispanic

Notes: Total number of delivery stays is rounded to the nearest 100. Patient race and ethnicity information was missing for 3.0% of delivery stays involving a mental health disorder in 2020.

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

‡ Other payers include Medicare, which provides health insurance for a limited number of individuals with disabilities or with end-stage renal disease under the age of 65 years and was the primary payer for 1.6% of all delivery stays involving a mental health disorder in 2020.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2020

- **Delivery stays for women residing in small metropolitan and nonmetropolitan areas and those living in the Midwest and Northeast had the highest rates of stays involving a mental health disorder.**

  The rate of delivery stays involving a mental health disorder diagnosis was higher for women residing in small metropolitan and nonmetropolitan areas compared with those residing in large metropolitan areas (11.9 and 11.3, respectively, vs. 9.5 per 100 delivery stays).

  Among delivery stays for Black non-Hispanic (NH) and Hispanic women, the rate was approximately 30 and 20 percent lower, respectively, for those residing in nonmetropolitan areas compared with those residing in large metropolitan areas. In contrast, the rate was similar for White NH women residing in nonmetropolitan and large metropolitan areas.
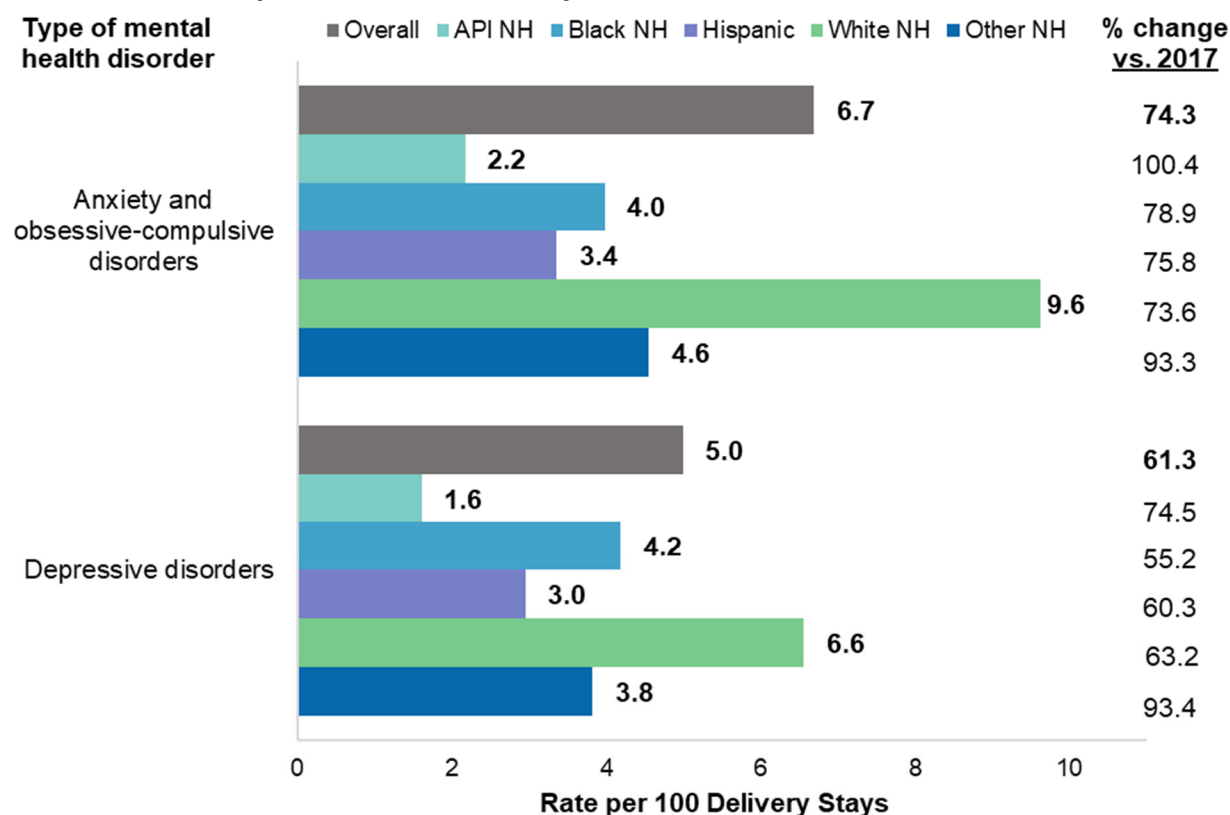
  The rate of delivery stays involving a mental health disorder was higher for women living in the Midwest and Northeast (13.1 and 12.3 per 100 delivery stays, respectively) than those living in the South and West (8.9 and 9.6, respectively). This pattern was observed for Hispanic and White NH women but did not hold for other racial and ethnic groups, for which the rate was lower only in the South.

- **Among Black non-Hispanic and White non-Hispanic women, those with Medicaid as the primary expected payer had higher rates of delivery stays involving a mental health disorder than those with private insurance as the expected payer; the reverse was true for Hispanic women.**

  Among Black NH women, the rate of delivery stays involving a mental health disorder was higher for stays expected to be paid by Medicaid (9.3 per 100 delivery stays) versus private insurance (6.3) or stays expected to be self-pay/no charge (7.3). Among White NH individuals, the rate also was higher for Medicaid (16.9) versus private insurance (12.7) or self-pay/no charge (7.8). In contrast, for Hispanic individuals, the rate of delivery stays involving a mental health disorder was higher for stays expected to be paid by private insurance (6.5) versus Medicaid (5.6) or self-pay/no charge (2.9). The highest rate of delivery stays involving a mental health disorder diagnosis was observed among delivery stays for women with other expected payers, which comprise a variety of Federal payers, including Medicare.

Figure 3 displays the rate of delivery stays involving the two most common mental health disorders of the 13 examined in 2020.

Figure 3. Rate of delivery stays involving a mental health disorder diagnosis, by type of mental health disorder and patient race and ethnicity, 2020

Abbreviations: API, Asian/Pacific Islander; NH, non-Hispanic

Notes: Patient race and ethnicity information was missing for less than 5.5% of delivery stays involving a mental health disorder (5.3% missing in 2017 and 3.0% missing in 2020). Diagnoses are selected from mental health-related Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses categories (www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp). Diagnosis categories are not mutually exclusive.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2017 and 2020

■ **Anxiety and obsessive-compulsive disorders were the most common type of mental health disorder diagnosis among delivery stays in 2020.**

Overall, 6.7 per 100 delivery stays in 2020 involved anxiety and obsessive-compulsive disorders, followed by depressive disorders at a rate of 5.0 per 100 delivery stays. Anxiety and obsessive-compulsive disorders were the most common type of mental health disorder among delivery stays for all racial and ethnic groups except for Black non-Hispanic (NH) women, for whom anxiety and obsessive-compulsive disorders and depressive disorders were equally common.

■ **The rate of delivery stays involving anxiety and obsessive-compulsive disorders and depressive disorders increased 60–70 percent between 2017 and 2020.**

Comparing 2017 and 2020, the rate of delivery stays involving anxiety and obsessive-compulsive disorders increased 74.3 percent. The percentage increase was high for all racial and ethnic groups, ranging from 73.6 percent for White NH women to 100.4 percent for Asian/Pacific Islander NH women. Similarly, the rate of delivery stays involving depressive disorders increased 61.3 percent between 2017 and 2020, ranging from 55.2 percent for Black NH women to 93.4 percent for other NH race/ethnicity women.

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Maternal risk factors among delivery stays involving a mental health disorder diagnosis, by patient race and ethnicity, 2020

Table 2 presents the rate of delivery stays involving 12 common obstetric risk factors among delivery stays with and without a co-occurring mental health disorder diagnosis by patient race and ethnicity in 2020.[8] Risk factors are listed from highest to lowest rate of delivery stays with a co-occurring mental health disorder for all races and ethnicities in 2020. Only risk factors with at least 5 percent prevalence across all racial and ethnic groups are included.

Table 2. Rate of delivery stays with obstetric risk factors per 100 delivery stays, by presence of a co-occurring mental health disorder diagnosis and patient race and ethnicity, 2020

Type of obstetric risk factor	Overall		API NH		Black NH		Hispanic		White NH		Other NH	
	MHD	No MHD	MHD	No MHD	MHD	No MHD	MHD	No MHD	MHD	No MHD	MHD	No MHD
Number of deliveries (thousands)	361.7	3,092.3	7.3	192.7	43.0	464.8	42.1	671.7	245.3	1,502.6	13.3	159.2
Rate per 100 delivery stays												
Anemia, preexisting	20.5	14.9	20.4	14.4	37.1	27.1	24.4	15.9	16.9	10.8	22.2	16.3
Maternal age >35 years	19.5	19.1	34.0	30.6	15.3	16.0	18.2	17.4	20.0	19.3	20.7	20.4
Previous cesarean birth	18.1	17.8	16.9	16.6	22.2	20.5	19.3	19.4	17.3	16.4	18.4	18.3
Substance use disorder	16.9	5.2	5.5	0.9	22.6	7.1	10.8	1.9	17.4	6.8	16.7	4.4
Asthma, acute or moderate/severe	15.6	5.6	14.7	3.7	22.3	8.9	17.3	4.9	14.4	5.3	15.5	5.2
Preterm birth	14.3	9.5	12.6	8.1	19.7	13.7	13.5	9.6	13.4	8.3	14.8	9.7
Preeclampsia without severe features or gestational hypertension	13.2	9.7	11.3	6.6	13.0	11.7	11.7	8.4	13.6	10.3	13.1	8.6
Gastrointestinal disease	13.0	5.5	11.0	4.9	12.1	5.3	13.4	5.8	13.3	5.5	12.3	5.8
Gestational diabetes mellitus	9.7	9.1	17.6	17.5	7.1	7.3	11.0	10.4	9.7	7.8	10.9	11.0
Neuromuscular disease	7.3	1.8	8.7	1.5	8.1	2.1	8.1	1.5	7.1	1.9	7.1	1.7
Preeclampsia with severe features	7.1	3.9	7.2	3.0	11.4	6.8	6.8	3.9	6.4	3.2	7.3	3.8
Chronic hypertension	6.7	3.4	5.8	2.3	12.4	6.8	5.8	2.5	5.9	3.0	6.4	2.9
At least one of the 12 common risk factors	79.1	62.5	79.5	65.5	86.6	71.4	78.4	60.8	78.1	60.2	79.0	63.2

Abbreviations: API, Asian/Pacific Islander; MHD, mental health disorder; NH, non-Hispanic

Notes: Obstetric risk factors are presented from highest to lowest rate of delivery stays with a co-occurring mental health disorder diagnosis for all races and ethnicities in 2020. Obstetric risk factors are not mutually exclusive. Only obstetric risk factors with at least 5% prevalence across all racial and ethnic groups are included. Patient race and ethnicity information was missing for 3.0% of delivery stays involving a mental health disorder and 3.3% of delivery stays with no mental health disorders in 2020.

Source: Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2020

■ **Obstetric risk factors were more common among delivery stays with a mental health disorder diagnosis than among delivery stays with no mental health disorders.**

Overall, 79.1 per 100 delivery stays with a mental health disorder diagnosis also included at least one of 12 common obstetric risk factors, compared with 62.5 per 100 delivery stays without a mental health disorder diagnosis. This differential held across all racial and ethnic groups.

The rate of delivery stays involving most of the specific obstetric risk factors, including anemia, asthma, and preterm birth, was higher overall and for each racial and ethnic group when the delivery stay also involved at least one mental health disorder. For example, the rate of delivery stays involving asthma was two to three times higher when the stay included a mental health disorder versus when the stay did not (e.g., 15.6 vs. 5.6 per 100 delivery stays overall). The rate of delivery stays involving maternal age older than 35 years, previous cesarean birth, and gestational diabetes mellitus was similar among delivery stays that involved a mental health disorder diagnosis and stays without mental health disorders.

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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 2020 National Inpatient Sample (NIS). Historical data were drawn from the 2017–2019 NIS.

Definitions

Diagnoses, ICD-10-CM, Clinical Classifications Software Refined (CCSR) for ICD-10-CM/PCS, 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 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.

ICD-10-CM/PCS is the International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System. There are over 70,000 ICD-10-CM diagnosis codes and 75,000 ICD-10-PCS procedure codes.

The CCSR aggregates ICD-10-CM diagnosis codes into a manageable number of clinically meaningful categories.[a] The CCSR is intended to be used analytically to examine patterns of healthcare in terms of cost, utilization, and outcomes; rank utilization by diagnoses; and risk-adjust by clinical condition. The

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[a] Agency for Healthcare Research and Quality. Clinical Classifications Software Refined (CCSR) for ICD-10-CM Diagnoses. Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality. Updated February 2022. www.hcup-us.ahrq.gov/toolssoftware/ccsr/dxccsr.jsp. Accessed March 9, 2022.

CCSR capitalizes on the specificity of the ICD-10-CM coding scheme and allows ICD-10-CM codes to be classified in more than one category. Approximately 10 percent of diagnosis codes are associated with more than one CCSR category because the diagnosis code documents either multiple conditions or a condition along with a common symptom or manifestation. All CCSR categories were considered in identifying mental health disorder diagnoses for this Statistical Brief. ICD-10-CM coding definitions for each CCSR category presented in this Statistical Brief can be found in the *CCSR reference file*, available at www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp#download. For this Statistical Brief, a custom version of v2022.1 of the CCSR was used; see below for further details on the differences.

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
Inpatient delivery stays were identified using the ICD-10-CM/PCS and DRG codes in Table 3. Delivery stays were defined as records that included a delivery code and did not include an abortion code.

Table 3. Clinical codes used to identify delivery stays

Code type	Code	Description
Delivery codes		
ICD-10-CM	Z370	Single live birth
ICD-10-CM	Z371	Single stillbirth
ICD-10-CM	Z372	Twins, both liveborn
ICD-10-CM	Z373	Twins, one liveborn and one stillborn
ICD-10-CM	Z374	Twins, both stillborn
ICD-10-CM	Z3750	Multiple births, unspecified, all liveborn
ICD-10-CM	Z3751	Triplets, all liveborn
ICD-10-CM	Z3752	Quadruplets, all liveborn
ICD-10-CM	Z3753	Quintuplets, all liveborn
ICD-10-CM	Z3754	Sextuplets, all liveborn
ICD-10-CM	Z3759	Other multiple births, all liveborn
ICD-10-CM	Z3760	Multiple births, unspecified, some liveborn
ICD-10-CM	Z3761	Triplets, some liveborn
ICD-10-CM	Z3762	Quadruplets, some liveborn
ICD-10-CM	Z3763	Quintuplets, some liveborn
ICD-10-CM	Z3764	Sextuplets, some liveborn
ICD-10-CM	Z3769	Other multiple births, some liveborn
ICD-10-CM	Z377	Other multiple births, all stillborn
ICD-10-CM	Z379	Outcome of delivery, unspecified
ICD-10-CM	O80	Vaginal delivery
ICD-10-CM	O82	C-section
ICD-10-CM	O7582	C-section
MS-DRG v.33-35	765	Vaginal Delivery with CC/MCC
MS-DRG v.33-35	766	Vaginal Delivery without CC/MCC
MS-DRG v.33-35	767	Vaginal Delivery with Sterilization and/or D&C
MS-DRG v.33-35	768	Vaginal Delivery with O.R. Procedures except Sterilization and/or D&C
MS-DRG v.33-35	774	Vaginal Delivery with Complicating Diagnosis
MS-DRG v.36	768	Vaginal Delivery with O.R. Procedures except Sterilization &/or D&C
MS-DRG v.36	783	Cesarean Section with Sterilization with MCC
MS-DRG v.36	784	Cesarean Section with Sterilization with CC
MS-DRG v.36	785	Cesarean Section with Sterilization without CC/MCC
MS-DRG v.36	786	Cesarean Section without Sterilization with MCC
MS-DRG v.36	787	Cesarean Section without Sterilization with CC
MS-DRG v.36	788	Cesarean Section without Sterilization without CC/MCC
MS-DRG v.36	796	Vaginal Delivery with Sterilization/D&C with MCC

Code type	Code	Description
MS-DRG v.36	797	Vaginal Delivery with Sterilization/D&C with CC
MS-DRG v.36	798	Vaginal Delivery with Sterilization/D&C without CC/MCC
MS-DRG v.36	805	Vaginal Delivery without Sterilization/D&C with MCC
MS-DRG v.36	806	Vaginal Delivery without Sterilization/D&C with CC
MS-DRG v.36	807	Vaginal Delivery without Sterilization/D&C without CC/MCC
ICD-10-PCS	10D00Z0	Extraction of Products of Conception, High, Open Approach
ICD-10-PCS	10D00Z1	Extraction of Products of Conception, Low, Open Approach
ICD-10-PCS	10D00Z2	Extraction of Products of Conception, Extraperitoneal, Open Approach
ICD-10-PCS	10D07Z3	Extraction of Products of Conception, Low Forceps, Via Natural or Artificial Opening
ICD-10-PCS	10D07Z4	Extraction of Products of Conception, Mid Forceps, Via Natural or Artificial Opening
ICD-10-PCS	10D07Z5	Extraction of Products of Conception, High Forceps, Via Natural or Artificial Opening
ICD-10-PCS	10D07Z6	Extraction of Products of Conception, Vacuum, Via Natural or Artificial Opening
ICD-10-PCS	10D07Z7	Extraction of Products of Conception, Internal Version, Via Natural or Artificial Opening
ICD-10-PCS	10D07Z8	Extraction of Products of Conception, Other, Via Natural or Artificial Opening
ICD-10-PCS	10E0XZZ	Delivery of Products of Conception, External Approach
Abortion codes (for exclusion)		
ICD-10-CM	O00	Ectopic pregnancy
ICD-10-CM	O01	Hydatidiform mole
ICD-10-CM	O02	Other abnormal products of conception
ICD-10-CM	O03	Spontaneous abortion
ICD-10-CM	O04	Complications following (induced) termination of pregnancy
ICD-10-CM	O07	Failed attempted termination of pregnancy
ICD-10-CM	O08	Complications following ectopic and molar pregnancy
ICD-10-PCS	10A00ZZ	Abortion of Products of Conception, Open Approach
ICD-10-PCS	10A03ZZ	Abortion of Products of Conception, Percutaneous Approach
ICD-10-PCS	10A04ZZ	Abortion of Products of Conception, Percutaneous Endoscopic Approach
ICD-10-PCS	10A07Z6	Abortion of Products of Conception, Vacuum, Via Natural or Artificial Opening
ICD-10-PCS	10A07ZW	Abortion of Products of Conception, Laminaria, Via Natural or Artificial Opening
ICD-10-PCS	10A07ZX	Abortion of Products of Conception, Abortifacient, Via Natural or Artificial Opening
ICD-10-PCS	10A07ZZ	Abortion of Products of Conception, Via Natural or Artificial Opening
ICD-10-PCS	10A08ZZ	Abortion of Products of Conception, Via Natural or Artificial Opening Endoscopic

Abbreviations: CC, complications or comorbidities; D&C, dilation and curettage; ICD-10-CM/PCS, International Classification of Diseases, Tenth Revision, Clinical Modification/Procedure Coding System; MCC, major complications or comorbidities; MS-DRG, Medicare Severity Diagnosis Related Group; O.R., operating room

Delivery stays involving a mental health disorder diagnosis were identified based on the presence of any CCSR category listed in Table 4 for any-listed diagnosis on the hospital discharge record. The two specific mental health disorder categories presented in Figure 3 were defined by the following CCSR categories: anxiety and obsessive-compulsive disorders (MBD005 and MBD006) and depressive disorders (MBD002). Among the other CCSR categories involving less common mental health disorders that were not presented in Figure 3, all showed an increase in the rate per 100 deliveries between 2017 and 2020 except for schizophrenia spectrum and other psychotic disorders (MBD001) and somatic disorders (MBD011); however, these two CCSR categories involved very small sample sizes.

Table 4. Clinical codes used to identify mental health disorder diagnoses

CCSR category	CCSR category description
MBD001	Schizophrenia spectrum and other psychotic disorders
The following two ICD-10-CM diagnosis codes were also considered as schizophrenia spectrum and other psychotic disorders for this Statistical Brief: • F53, Mental and behavioral disorders associated with the puerperium, not elsewhere classified (from CCSR MBD013, Miscellaneous mental and behavioral disorders/conditions) • F531, Puerperal psychosis (from CCSR MBD013, Miscellaneous mental and behavioral disorders/conditions)	
MBD002	Depressive disorders
The following two ICD-10-CM diagnosis codes were also considered as depressive disorders for this Statistical Brief: • F530, Postpartum depression (from CCSR MBD013, Miscellaneous mental and behavioral disorders/conditions) • O906, Postpartum mood disturbance (from CCSR PRG027, Complications specified during the puerperium)	
MBD003	Bipolar and related disorders
MBD004	Other specified and unspecified mood disorders
MBD005	Anxiety and fear-related disorders
MBD006	Obsessive-compulsive and related disorders
MBD007	Trauma- and stressor-related disorders
MBD008	Disruptive, impulse-control and conduct disorders
MBD009	Personality disorders
MBD010	Feeding and eating disorders
MBD011	Somatic disorders
MBD012	Suicidal ideation/attempt/intentional self-harm
MBD013	Miscellaneous mental and behavioral disorders/conditions

Abbreviations: CCSR, Clinical Classifications Software for ICD-10-CM Diagnoses; ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification

Obstetric risk factors were defined with ICD-10-CM codes based on a validated obstetrics comorbidity scoring system developed by Leonard et al.[b] that used birth data from California during 2016 and 2017 to select 27 patient-level risk factors associated with severe maternal morbidity.

Percentage change
Percentage change between years was calculated using the following formula:

$$\text{Percentage change} = \left(\frac{\text{2020 value} - \text{2017 value}}{\text{2017 value}} \right) \times 100$$

Types of hospitals included in the HCUP National Inpatient Sample
The National 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 center 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 a psychiatric or chemical dependency condition in a community hospital, the discharge record for that stay will be included in the NIS.

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.

[b] Leonard SA, Kennedy CJ, Carmichael SL, Lyell DJ, Main EK. An expanded obstetric comorbidity scoring system for predicting severe maternal morbidity. Obstetrics & Gynecology. 2020;136(3):440–9.

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

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

Hospital stays that were expected to be billed to the State Children's Health Insurance Program (SCHIP) are included under Medicaid.

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

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 the total U.S. population is evenly distributed.

Location of patients' residence
Place of residence is based on a simplified adaptation of the Urban Influence Codes (UIC) developed by the United States Department of Agriculture (USDA) Economic Research Service (ERS). Starting with 2014 data, the county-level designation is based on the 2013 version of the UIC. Prior to 2014, the categorization was based on the 2003 version of the UIC. The 12 categories of the UIC are combined into 3 broader categories that differentiate between large metropolitan counties (include one or more urbanized areas with at least 1 million residents), small metropolitan counties (include one or more urbanized areas with 50,000–999,999 residents), and nonmetropolitan counties (i.e., micropolitan counties (include at least one urbanized area with 10,000–49,999 residents) or nonurban residual counties (rural)).

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

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 and ethnicity for the following

categories: Asian/Pacific Islander non-Hispanic (NH), Black NH, Hispanic, White NH, and other NH race and ethnicity (including American Indian/Alaska Native and 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
Alaska Hospital and Healthcare Association
Arizona Department of Health Services
Arkansas Department of Health
California Department of Health Care Access and Information
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
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
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 Health Authority
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
Wisconsin Department of Health Services
Wyoming Hospital Association

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 96 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 unweighted sample size for the 2020 NIS is 6,471,165 (weighted, this represents 32,355,827 inpatient stays).

For More Information

For other information on hospitalizations related to mental health disorders and maternal health, refer to the Mental and Substance Use Disorders, Race and Ethnicity, Pregnancy and Childbirth, and Women's Health HCUP Statistical Briefs topic areas located at www.hcup-us.ahrq.gov/reports/statbriefs/sbtopic.jsp.

For additional HCUP statistics, visit:

- HCUP Fast Stats at https://datatools.ahrq.gov/hcup-fast-stats for easy access to the latest HCUP-based statistics for healthcare information topics
- HCUPnet, HCUP's interactive query system, at https://datatools.ahrq.gov/hcupnet
- HCUP Summary Trend Tables at www.hcup-us.ahrq.gov/reports/trendtables/summarytrendtables.jsp for monthly information on hospital utilization

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 National Inpatient Sample (NIS), 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 September 2021. www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed March 9, 2022.

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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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