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Healthcare Utilization and Costs Associated With Perinatal Depression Among Medicaid Enrollees

Lisa M. Pollack, PhD, MPH, MPT[1], **Jiajia Chen, PhD**[1], **Shanna Cox, MS**[1], **Feijun Luo, PhD**[2], **Cheryl L. Robbins, PhD, MS**[1], **Heather D. Tevendale, PhD, MA**[1], **Rui Li, PhD**[3], **Jean Y. Ko, PhD**[1,4]

[1]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia

[2]Division of Heart Disease and Stroke Prevention, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia

[3]Division of Research, Office of Epidemiology and Research, Health Resources & Services Administration, Maternal & Child Health, Rockville, Maryland

[4]Commissioned Corps, U.S. Public Health Service, HHS, Rockville, Maryland

Abstract

Introduction: Differences in healthcare utilization and medical expenditures associated with perinatal depression are estimated.

Methods: Using the MarketScan Multi-State Medicaid Database, the analytic cohort included individuals aged 15–44 years who had an inpatient live birth delivery hospitalization between January 1, 2017 and December 31, 2018. Multivariable negative binomial regression models were used to estimate the differences in utilization associated with perinatal depression, and multivariable generalized linear models were used to estimate the differences in expenditures associated with perinatal depression. Analyses were conducted in 2021.

Results: The cohort included 330,593 individuals. Nearly 17% had perinatal depression. Compared with individuals without perinatal depression individuals with perinatal depression had a larger number of inpatient admissions (0.19, 95% CI=0.18, 0.20), total inpatient days (0.95, 95% CI=0.92, 0.97), outpatient visits (14.02, 95% CI=13.81, 14.22), emergency department visits (1.70, 95% CI=1.66, 1.74), and weeks of drug therapy covered by a prescription (28.70,

Address correspondence to: Lisa M. Pollack, PhD, MPH, MPT, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Highway, Atlanta GA 30341. qkz8@cdc.gov.

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95% CI=28.12, 29.28) and larger total expenditures ($5,078, 95% CI=$4,816, $5,340). Non-Hispanic Black individuals had larger differences in utilization and expenditures for inpatient services and outpatient visits but smaller differences in utilization for pharmaceutical services associated with perinatal depression than non-Hispanic White individuals. Hispanic individuals had larger differences in utilization for outpatient visits but smaller differences in utilization for pharmaceutical services associated with perinatal depression than non-Hispanic White individuals.

Conclusions: Individuals with perinatal depression had more healthcare utilization and medical expenditures than individuals without perinatal depression, and differences varied by race/ethnicity. The findings highlight the need to ensure comprehensive and equitable mental health care to address perinatal depression.

INTRODUCTION

Perinatal depression (PND) affects approximately 1 in 7 pregnant and postpartum individuals and includes both major and minor depressive episodes that occur during pregnancy or within the first 12 months after delivery.[1,2] PND can negatively affect the health of the mother[3,4] and child.[5–8] Conflicting evidence exists regarding the prevalence of PND by race/ethnicity,[9] with variation in part owing to whether self-reported[10]/diagnosed depression[11] is studied. Prevalence rates of PND are higher among individuals of low SES, including those with Medicaid.[10] Differences in utilization, treatment, and antidepressant drug use for mental health conditions, including PND, have been noted by race/ethnicity and demographic factors.[12–19]

Left untreated, the U.S. societal cost of perinatal mood and anxiety disorders is estimated to cost $14 billion from conception to 5 years postpartum.[20] Relative to other populations,[21–23] few cost analyses of PND have been conducted on the basis of U.S. populations, with most limited to a single setting or timeframe.[4,8,24] In addition, analyses of healthcare utilization associated with PND are based on older data or limited by sample size and setting.[15,16] Because >40% of U.S. births are Medicaid covered,[25] it is important to quantify the healthcare utilization and medical expenditures for individuals with PND enrolled in Medicaid.

Thus, using claims data, the objective of this study is to estimate the extent to which PND increases healthcare utilization and medical expenditures (subsample analysis) in individuals with PND compared with that in those without PND among individuals continuously enrolled in Medicaid during pregnancy and 1 year postpartum. In addition, utilization and expenditure patterns by race/ethnicity are examined.

METHODS

Study Sample

The 2016–2019 IBM MarketScan Multi-State Medicaid Database was used, which included individual-level claims and expenditure data for inpatient, outpatient, and pharmaceutical services for individuals enrolled in a Medicaid fee-for-service/managed care healthcare plan from 8 to 12 unidentified states. It contains a unique identifier to follow individuals over time.[26] Because MarketScan data are deidentified, this study was not considered human subjects research by the Centers for Disease Control and Prevention and did not require IRB approval.

The analytic cohort included female individuals aged 15–44 years who had an inpatient live birth delivery hospitalization between January 1, 2017 and December 31, 2018 and were continuously enrolled in Medicaid from 3 months before pregnancy through 12 months after the end of the pregnancy, had specified gestational age >20 weeks and <42 weeks at delivery, had prescription drug coverage, and had an indicator for fee-for-service/ managed care (Appendix Figure 1, available online). Delivery hospitalizations were identified using ICD-10-CM diagnosis and procedure codes and diagnosis-related group codes (Appendix Table 1, available online). For individuals with >1 delivery hospitalization during the study period, 1 delivery episode was randomly selected to reduce bias caused by multiple delivery–related hospitalizations by the same individual.

Measures

The *pregnancy episode* was defined as the start of the pregnancy through the delivery hospitalization discharge date, determined using ICD-10-CM gestational age codes recorded during the delivery hospitalization (Appendix Table 1, available online). The start of the pregnancy was identified as the difference between the delivery hospitalization discharge date and days of gestation. In instances of multiple ICD-10-CM codes with different gestational age information (~34%), the maximum was selected under the assumption that different codes were present owing to prolonged hospital stay while the pregnancy progressed.

This study defined *PND* as ≥1 inpatient admission or ≥2 outpatient healthcare encounters ≥30 days apart with a diagnosis of depression based on ICD-10-CM codes (Appendix Table 1, available online) from the start of the pregnancy episode through 1 year postpartum.[27] Whether the first documented depression diagnosis occurred during pregnancy (by trimester), early postpartum (up to 6 weeks postpartum), or late postpartum (>6 weeks to 1 year postpartum) was identified. Also identified was the prevalence of depression during 3 months before pregnancy, but it was not included in the definition for PND.

Outcome measures included patient-level healthcare utilization and medical expenditures from the start of the pregnancy episode to 1-year postpartum. Healthcare utilization included (1) the number of inpatient admissions, including direct hospitalizations and emergency department (ED) visits resulting in hospitalization; (2) total inpatient length of stay from all inpatient admissions (i.e., total inpatient days), including the delivery episode; (3) the number of outpatient visits, including visits in a doctor's office, hospital outpatient facility, or other outpatient facilities[28]; (4) the number of ED visits not ending in inpatient admission; and (5) the number of weeks of drug therapy covered by a prescription (drug therapy). For inpatient admissions and total inpatient days, if an individual had ≥2 inpatient claims and the start date on the second claim came before or was equal to the end date on the earlier claim, then the claims were grouped into the same admission. For outpatient and ED visits, claims incurred on the same day were counted as 1 outpatient/ED visit.

Total medical expenditures were measured as the sum of inpatient, outpatient, ED, and outpatient pharmaceutical payments. Inpatient payments include the total paid to the providers serving the patient while in the hospital (this can be the facility and any ancillary/ professional providers that also billed for services and includes payments for ED visits resulting in hospitalization and pharmaceuticals given in a hospital).[28] Outpatient and ED payments include the total paid to the provider for a service that did not occur during a period of hospitalization.[28] Outpatient pharmaceutical payments include the total paid to the pharmacy for the prescription filled by the pharmacy (retail or mail order).[28] All payments included patient liability amounts (deductible, coinsurance, and copay) and coordination of benefit amounts.[28] Further reported were medical expenditures by service type (inpatient, outpatient, ED, outpatient pharmaceutical) and the share of the difference in the expenditure of each service type among the total difference in expenditure associated with PND. All expenditures were adjusted to 2019 U.S. dollars using the medical care component of the Consumer Price Index.[29]

Patient characteristics included age (15–18, 19–24, 25–29, 30–34, 35–39, and 40–44 years), race/ethnicity (non-Hispanic White [NHW], non-Hispanic Black [NHB], Hispanic, and all other [Asian/Hawaiian/Pacific Islander/American Indian/Alaskan Native/other/mixed/ missing/unknown]), and comorbidities defined by ICD-10-CM codes [30–32] (diabetes, hypertension, obesity, alcohol use disorder, substance use disorder, tobacco use) (Appendix Table 1, available online). Race/ethnicity data are collected by the payer, provided by the customer/beneficiary in most cases.[28] Multiple races were collapsed into the other category by the database to maintain the anonymity of its source.[28]

Statistical Analysis

Chi-square tests were used to compare the differences in proportions for categorical variables by PND status. Per-person differences in healthcare utilization associated with PND were estimated as the differences in adjusted mean utilization between individuals with and without PND, and per-person differences in medical expenditures associated with PND were estimated as the differences in adjusted mean expenditures between individuals with and without PND. Multivariable negative binomial regression models were used to estimate the differences in healthcare utilization associated with PND, and multivariable generalized linear models with log link and gamma distribution were used to estimate the differences in medical expenditures associated with PND, controlling for age, race/ethnicity, and comorbidities. Interaction terms between PND status and race/ethnicity categories were used to calculate race/ethnicity-specific estimates. Models for differences in expenditures were restricted to individuals with fee-for-service (subsample analysis) because MarketScan does not capture capitation payments.[28] Healthcare utilization restricted to this subsample was also estimated. In addition, a sensitivity analysis was conducted to examine whether restricting the continuous enrollment from the pregnancy start date to 60 days postpartum would affect the patient characteristics of the analytic cohort because of pregnancyrelated eligibility for Medicaid coverage after 60 days postpartum.[33] All statistical analyses were performed using SAS, version 9.4, or Stata, version 14.

RESULTS

A total of 480,076 individuals aged 15–44 years had an inpatient delivery hospitalization between January 1, 2017 and December 31, 2018. After applying the exclusion criteria, the analytic cohort included 330,593 individuals (Appendix Figure 1, available online). Nearly 17% of the cohort had PND (Table 1); 1.4% had a depression diagnosis captured 3 months before pregnancy. Among individuals with a depression diagnosis before pregnancy, 77% had PND. Most diagnoses for PND were first noted during pregnancy (78.8%)—first trimester (23.7%), second trimester (15.7%), and third trimester (39.4%)—compared with those noted during the early-postpartum (4.8%)/late-postpartum (16.4%) periods. A larger proportion of individuals with PND were in the age 15–18 years range and in NHW than the proportion of individuals without PND and had a diagnosis of select comorbidities. Continuous enrollment restricted from the pregnancy start date to 60 days postpartum did not affect the patient characteristics of the analytic cohort (Appendix Table 2, available online).

Individuals with PND had larger numbers of inpatient admissions (0.19, 95% CI=0.18, 0.20), total inpatient days (0.95, 95% CI=0.92, 0.97), outpatient visits (14.02, 95% CI=13.81, 14.22), ED visits (1.70, 95% CI=1.66, 1.74), and weeks of drug therapy (28.70, 95% CI=28.12, 29.28) than individuals without PND (Table 2 and Appendix Table 3, available online, provide multivariable regression results).

By race/ethnicity, NHB individuals (0.23, 95% CI=0.21, 0.25) had a larger difference in the number of inpatient admissions associated with PND than NHW individuals (0.16, 95% CI=0.14, 0.17) (Table 2). NHB individuals (1.19, 95% CI=1.15, 1.24) had a larger difference in the number of total inpatient days associated with PND than NHWs (0.79, 95% CI=0.77, 0.82). NHB (14.73, 95% CI=14.35, 15.10) and Hispanic (14.24, 95% CI=13.04, 15.43) individuals had larger differences in the number of outpatient visits associated with PND than NHW individuals (13.46, 95% CI=13.19, 13.72). NHB (1.83, 95% CI=1.75, 1.92) and Hispanic (1.56, 95% CI=1.37, 1.76) individuals had larger differences in the number of ED visits associated with PND than NHWs (1.59, 95% CI=1.54, 1.63). Conversely, NHB (18.57, 95% CI=17.67, 19.47) and Hispanic (29.39, 95% CI=26.22, 32.56) individuals had smaller differences in the number of weeks of drug therapy associated with PND than NHWs (34.98, 95% CI=34.15, 35.82). Findings were similar in the subsample restricted to individuals with fee for service (Appendix Table 4, available online, and Appendix Table 3, available online, provide the multivariable regression results).

In the subsample restricted to fee for service, individuals with PND had larger total medical expenditures ($5,078 larger, 95% CI=$4,816, $5,340) than individuals without PND (Table 3 and Appendix Table 5, available online, provide the multivariable regression results). By service type, individuals with PND had larger inpatient ($1,065 larger, 95% CI=$1,433, $1,777), outpatient ($1,756 larger, 95% CI=$1,665, $1,846), ED ($881, 95% CI=$824, $938), and outpatient ($953 larger, 95% CI= $809, $1,097) pharmaceutical expenditures than individuals without PND.

By race/ethnicity, NHB individuals ($5,412, 95% CI= $4,972, $5,853) and Hispanic individuals ($2,519, 95% CI=$1,703, $3,335) had a larger and smaller difference, respectively, in total expenditures associated with PND than NHW individuals ($3,967, 95% CI=$3,683, $4,252) (Table 3). NHB individuals ($1,779, 95% CI=$1,513, $2,045) and Hispanic individuals ($124, 95% CI= −$363, $612) had a larger difference and a smaller difference, respectively, in inpatient expenditures associated with PND than NHWs ($737, 95% CI=$580, $895). NHB individuals ($1,846, 95% CI=$1,692, $2,000) had a larger difference in outpatient expenditures associated with PND than NHW individuals ($1,522, 95% CI= $1,414, $1,630).

Outpatient expenditures accounted for the largest share of greater expenditures associated with PND for all groups (Figure 1). Inpatient expenditures accounted for 32% of greater expenditures for NHB individuals, 18% of greater expenditures for NHW individuals, and 5% for Hispanic individuals. ED expenditures accounted for 26% of greater expenditures for Hispanic individuals, 19% of greater expenditures for NHB individuals, and 18% for NHW individuals. Outpatient pharmaceutical expenditures accounted for 26% of greater expenditures for NHW individuals, 22% of greater expenditures for Hispanic individuals, and 16% for NHB individuals.

DISCUSSION

In this multistate cohort of individuals continuously enrolled in Medicaid, those with PND during pregnancy and 1 year postpartum had more healthcare utilization (larger numbers of inpatient admissions, total inpatient days, outpatient visits, ED visits, and weeks of drug therapy) than individuals without PND and approximately 54% greater total expenditures, with the largest share attributed to outpatient expenditures. Differences in healthcare utilization and expenditures associated with PND differed by race/ethnicity. The differences in the number of inpatient admissions, total inpatient days, inpatient expenditures, outpatient visits, ED visits, and outpatient expenditures associated with PND were larger among NHB individuals than among NHW individuals. Only the difference in the number of outpatient visit associated with PND among Hispanic individuals was larger than that among NHW individuals. Conversely, the difference in the number of weeks of drug therapy associated with PND among NHB and Hispanic individuals was smaller than that among NHW individuals.

Nearly 17% of individuals with a live birth and continuously enrolled in Medicaid had PND, in line with previous estimates.[2] About 79% of individuals with PND had a diagnosis first documented during pregnancy, and the distribution across trimesters (24% first, 16% second, 39% third) emphasizes the importance of screening throughout pregnancy to identify individuals who may benefit from treatment. Multiple medical societies recommend PND screening in clinical settings[34–36]; specifically, the American College of Obstetricians and Gynecologists recommends that obstetric care providers screen patients for depression and anxiety symptoms at least once during the perinatal period and conduct a full assessment of mood and emotional well-being during the comprehensive postpartum visit.[36]

Greater expenditures are expected among individuals with PND because utilization of mental health and other medical services have associated fees. This is supported by this study's findings and those of others that have shown that individuals with depression incur more healthcare costs than those without depression.[8,24,37,38] This study extends the evidence by focusing on individuals with PND (diagnosis noted during or up to 1 year postpartum). It showed that PND was associated with more healthcare utilization and expenditures and noted significant differences by race/ethnicity, particularly between NHW and NHB individuals. Individuals with PND may have more utilization and expenditures because of treatment for depression, treatment of comorbid medical conditions that may be increasing the likelihood of depression, and increased use of medical services for diagnoses associated with depression (e.g., exacerbation of physical conditions because of untreated depression, comorbid anxiety).

Inpatient and emergency care may represent more acute and severe forms of depression.[39] These findings suggest that NHB individuals had larger differences in utilization and expenditures associated with PND for inpatient services and larger differences in utilization associated with PND for emergency services than NHW individuals. This could be an indication of more severe depressive episodes or a shift of healthcare utilization to higher-acuity settings owing to unmet needs. NHB and Hispanic individuals had larger differences in the number of outpatient visits but smaller differences in the number of weeks of drug therapy associated with PND than NHWs. These findings could indicate unmet needs for drug therapy treatment during the perinatal period or a preference for nonpharmaceutical treatment (e.g., behavioral health therapy). Previous studies have noted differences by race/ethnicity in the receipt of mental health treatment.[12–19] Although data for this study are not specific to antidepressant drug utilization, lower antidepressant drug use among Black, Hispanic, and Asian individuals than among White individuals has been reported.[13] Structural racism such as residential segregation that limits access to healthcare services (or to appropriate/ early care), implicit bias that translates into disparate care, and cultural differences have been cited as explanations for differences in healthcare utilization and treatment by race/ ethnicity.[14,40,41] Increased access to and reduced inequities in access to appropriate mental health care may reduce the differences in utilization and expenditures associated with PND and differences by race/ethnicity.

Limitations

Strengths of this study include the use of a large longitudinal cohort of publicly insured individuals to examine healthcare utilization and medical expenditure patterns, including inpatient and outpatient services claims. However, the findings should be interpreted in the context of several limitations. Gestational age information recorded during the delivery hospitalization with ICD-10-CM codes was used to identify the pregnancy episode; however, >90% of claims had this information.[42] It was not possible to disentangle the patterns for smaller race/ethnicity groups.[28] Because classification of the delivery hospitalization, PND, and comorbidities were based on ICD-10-CM/diagnosis-related group coding, misclassification is possible. Only 25% of individuals were on a fee-for-service plan; thus, expenditure estimates may differ for other payment structures. Estimates for the number of weeks of drug therapy may not reflect actual prescription drug use and may reflect medications for other conditions besides depression.

Owing to the continuous enrollment restriction, comorbidities could only be assessed 3 months before and during pregnancy, resulting in underidentification of these conditions. However, estimates of PND[1,2] and comorbidities[43] are comparable with previous reports. In addition, because of the continuous enrollment restriction, the study cohort is not typical of most pregnant individuals covered by Medicaid because many individuals only become eligible for Medicaid when they become pregnant and lose coverage after 60 days postpartum. Consequently, the results are not generalizable to all Medicaid recipients. However, the continuous enrollment restriction was varied from the beginning of the pregnancy to 60 days postpartum, and patient characteristics were similar between the 2 cohorts.

To avoid overfitting the models, history of depression, anxiety, or other mental illness shown to be associated with increased costs[38] was not controlled for, and information on the severity of depressive symptoms was not available. Furthermore, there is variation in PND screening, diagnosis, and treatment by state,[10] which was not examined because states were not identifiable. Many pregnant and lactating individuals prefer psychotherapy over medication; however, office visits for behavioral health treatment were not separated from other office visits because the main purpose of this analysis was to look at healthcare utilization and expenditures associated with PND globally rather than at mental health/ PND-specific utilization and expenditures. Undiagnosed PND was not captured, and thus utilization and expenditures associated with PND are likely underestimated because untreated mental health disorders are costly,[20] potentially undervaluing intervention efforts aimed at reducing PND. Finally, data do not include out-of-hospital births; however, <20% of home births were paid for by Medicaid in 44 states[44]; therefore, only a small proportion of the population of interest may not be represented in this study.

CONCLUSIONS

In this multistate study of individuals continuously enrolled in Medicaid, individuals with PND had more healthcare utilization and medical expenditures than individuals without PND, and most of the larger differences in spending associated with PND occurred in the outpatient setting. In addition, differences in utilization and expenditures associated with PND differed by race/ ethnicity. These findings can inform system-level policy solutions to address PND (e.g., support for depression assessment, referral to treatment, continuity of care). Furthermore, the cost estimates could be used to estimate the potential economic benefits of PND intervention efforts and inform policymakers about the efficient allocation of resources to manage them.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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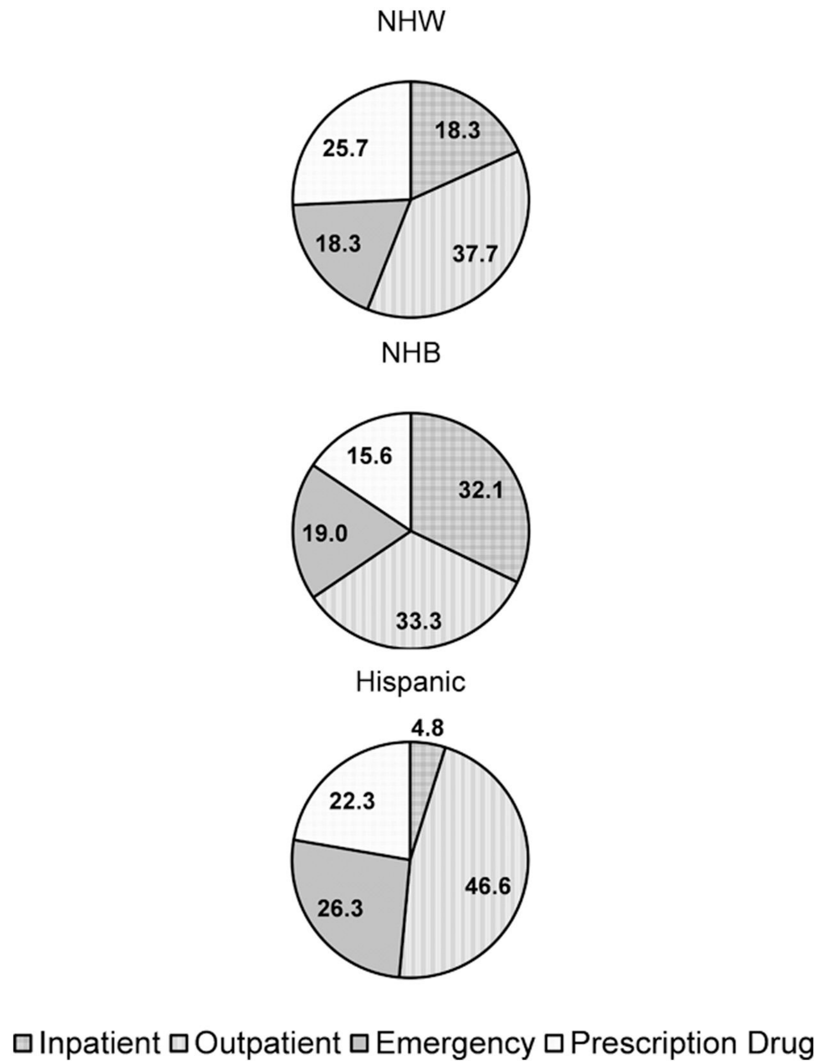

Figure 1.

Percent share of greater expenditures associated with PND.

NHB, non-Hispanic Black; NHW, non-Hispanic White; PND, perinatal depression.

Source: 2016–2019 IBM MarketScan Multi-State Medicaid Database, restricted to individuals with fee for service (N=80,856).

Table 1.

Characteristics of Individuals With and Without PND, 2016–2019 IBM MarketScan Multi-State Medicaid Database

Characteristics	All N=330,593, *n* (%)	No PND *n*=275,327, *n* (%)	PND *n*=55,266, *n* (%)	*p*-Value[a]
Age, years				
15–18	15,038 (4.6)	12,097 (4.4)	2,941 (5.3)	<0.0001
19–24	121,663 (36.8)	102,055 (37.1)	19,608 (35.5)	<0.0001
25–29	106,278 (32.2)	88,564 (32.2)	17,714 (32.1)	0.5986
30–34	58,247 (17.6)	48,096 (17.5)	10,151 (18.4)	<0.0001
35–39	24,267 (7.3)	20,244 (7.4)	4,023 (7.3)	0.5461
40–44	5,100 (1.5)	4,271 (1.6)	829 (1.5)	0.3725
Race/ethnicity				
NHW	161,097 (48.7)	127,401 (46.3)	33,696 (61.0)	<0.0001
NHB	119,219 (36.1)	105,293 (38.2)	13,926 (25.2)	<0.0001
Hispanic	12,661 (3.8)	11,307 (4.1)	1,354 (2.5)	<0.0001
All other[b]	37,616 (11.4)	31,326 (11.4)	6,290 (11.4)	0.9807
Comorbidity				
Diabetes[c]	19,960 (6.0)	16,125 (5.9)	3,835 (6.9)	<0.0001
Hypertension[d]	54,484 (16.5)	43,871 (15.9)	10,613 (19.2)	<0.0001
Obesity	64,420 (19.5)	51,607 (18.7)	12,813 (23.2)	<0.0001
Alcohol use disorder	1,974 (0.6)	896 (0.3)	1,078 (2.0)	<0.0001
Substance use disorder	31,477 (9.5)	20,374 (7.4)	11,103 (20.1)	<0.0001
Tobacco use	62,160 (18.8)	44,439 (16.1)	17,721 (32.1)	<0.0001
Payment plan				<0.0001
Managed care	249,737 (75.5)	207,586 (75.4)	42,151 (76.3)	
Fee-for-service	80,856 (24.5)	67,741 (24.6)	13,115 (23.7)	
Prior depression[e]	4,741 (1.4)	1,075 (0.4)	3,666 (6.6)	<0.0001
First PND claim				
1st trimester	—	—	13,093 (23.7)	—
2nd trimester	—	—	8,678 (15.7)	—

Characteristics	All N=330,593, *n* (%)	No PND *n*=275,327, *n* (%)	PND *n*=55,266, *n* (%)	*p*-Value[a]
3rd trimester	—	—	21,745 (39.4)	—
Early postpartum	—	—	2,667 (4.8)	—
Late postpartum	—	—	9,083 (16.4)	—

NHB, non-Hispanic Black; NHW, non-Hispanic White; PND, perinatal depression.

[a]Comparing those with and without PND.

[b]Multiple races were collapsed into the other category to maintain the anonymity of their source.

[c]Diabetes includes diabetes with and without complications and gestational diabetes.

[d]Hypertension includes chronic hypertension, maternal hypertension, gestational hypertension, preeclampsia, and eclampsia.

[e]Previous depression in the 3 months before pregnancy.

Table 2.

Adjusted Estimates of Mean Predicted Healthcare Utilization Among Individuals With and Without PND

Predicted utilization	Overall	Non-Hispanic White	Non-Hispanic Black	Hispanic
Inpatient admissions[a]				
With PND	1.28 (1.27, 1.29)	1.24 (1.23, 1.25)	1.35 (1.33, 1.36)	1.25 (1.19, 1.31)
Without PND	1.10 (1.09, 1.10)	1.08 (1.08, 1.09)	1.12 (1.11, 1.13)	1.10 (1.08, 1.12)
Difference[b]	**0.19 (0.18, 0.20)**	0.16 (0.14, 0.17)	**0.23 (0.21, 0.25)**	0.14 (0.08, 0.21)
Total inpatient days[a]				
With PND	3.84 (3.82, 3.87)	3.54 (3.52, 3.57)	4.28 (4.24, 4.33)	3.57 (3.45, 3.69)
Without PND	2.90 (2.89, 2.91)	2.75 (2.74, 2.76)	3.10 (3.09, 3.11)	2.77 (2.73, 2.81)
Difference[b]	**0.95 (0.92, 0.97)**	0.79 (0.77, 0.82)	**1.19 (1.15, 1.24)**	0.78 (0.65, 0.91)
Outpatient[c]				
With PND	35.07 (34.87, 35.27)	35.10 (34.85, 35.35)	34.52 (34.14, 34.90)	36.06 (34.80, 37.32)
Without PND	21.06 (21.00, 21.11)	21.92 (21.84, 22.00)	19.50 (19.41, 19.58)	20.73 (20.47, 20.99)
Difference[b]	**14.02 (13.81, 14.22)**	13.46 (13.19, 13.72)	**14.73 (14.35, 15.10)**	**14.24 (13.04, 15.43)**
Emergency department[c]				
With PND	3.96 (3.92, 4.00)	3.51 (3.47, 3.55)	4.69 (4.60, 4.77)	3.36 (3.16, 3.57)
Without PND	2.26 (2.25, 2.27)	1.97 (1.96, 1.99)	2.80 (2.77, 2.82)	1.69 (1.65, 1.73)
Difference[b]	**1.70 (1.66, 1.74)**	1.59 (1.54, 1.63)	**1.83 (1.75, 1.92)**	**1.56 (1.37, 1.76)**
Drug therapy[d]				
With PND	61.17 (60.60, 61.73)	69.13 (68.32, 69.94)	48.56 (47.68, 49.43)	56.45 (53.19, 59.70)
Without PND	32.47 (32.33, 32.61)	34.21 (34.00, 34.43)	30.00 (29.80, 30.21)	25.85 (25.33, 26.38)
Difference[b]	**28.70 (28.12, 29.28)**	34.98 (34.15, 35.82)	**18.57 (17.67, 19.47)**	**29.39 (26.22, 32.56)**

Source: 2016–2019. IBM MarketScan Multi-State Medicaid [database] (N=330,593).

Note: Boldface indicates statistical significance ($p<0.05$)

For the overall column, boldface indicates statistical significance for the difference between individuals with and without PND. For the non-Hispanic Black and Hispanic columns, boldface indicates the statistical significance of the effects of PND differing between non-Hispanic Black and White race and between Hispanic ethnicity and White race. Data are presented as mean predicted utilization (95% CI). Multivariable negative binomial regression models were used to estimate the differences in healthcare utilization associated with PND, controlling for age, race/ethnicity, and comorbidities. Interaction terms between PND status and race/ethnicity categories were used to calculate race/ethnicity-specific estimates.

PND, perinatal depression.

[a] If an individual had ≥2 inpatient claims and the start date on the second claim came before or was equal to the end date on the earlier claim, then the claims were grouped into the same admission.

[b] Difference in utilization for those with PND compared with that for those without PND.

[c] Claims incurred on the same day were counted as 1 visit.

[d] Number of weeks of drug therapy covered by a prescription.

Table 3.

Subsample Analysis of Adjusted Estimates of Mean Predicted Medical Expenditures (2019 U.S. Dollars) Among Individuals With and Without PND

Predicted expenditure	Overall	Non-Hispanic White	Non-Hispanic Black	Hispanic
Total				
With PND	14,508 (14,256, 14,759)	12,931 (12,667, 13,195)	15,098 (14,671, 15,525)	11,493 (10,651, 12,335)
Without PND	9,430 (9,362, 9,497)	9,021 (8,926, 9,116)	9,685 (9,577, 9,793)	8,826 (8,630, 9,021)
Difference[a]	**5,078 (4,816, 5,340)**	3,967 (3,683, 4,252)	**5,412 (4,972, 5,853)**	**2,519 (1,703, 3,335)**
Inpatient				
With PND	6,374 (6,209, 6,539)	5,167 (5,023, 5,312)	6,581 (6,327, 6,835)	4,811 (4,330, 5,291)
Without PND	4,769 (4,723, 4,815)	4,431 (4,367, 4,494)	4,815 (4,743, 4,887)	4,683 (4,542, 4,824)
Difference[a]	**1,605 (1,433, 1,777)**	737 (580, 895)	**1,779 (1,513, 2,045)**	**124 (−363, 612)**
Outpatient				
With PND	4,571 (4,484, 4,658)	4,305 (4,205, 4,405)	4,671 (4,521, 4,822)	3,980 (3,647, 4,313)
Without PND	2,816 (2,792, 2,839)	2,820 (2,786, 2,854)	2,814 (2,778, 2,851)	2,686 (2,617, 2,754)
Difference[a]	**1,756 (1,665, 1,846)**	1,522 (1,414, 1,630)	**1,846 (1,692, 2,000)**	1,193 (880, 1,506)
Emergency department				
With PND	1,804 (1,748, 1,859)	1,479 (1,425, 1,533)	2,256 (2,141, 2,371)	1,458 (1,266, 1,650)
Without PND	923 (910, 936)	767 (752, 782)	1,195 (1,170, 1,219)	720 (692, 749)
Difference[a]	**881 (824, 938)**	738 (680, 796)	1,050 (934, 1,165)	672 (495, 849)
Outpatient pharmaceutical				
With PND	1,862 (1,721, 2,004)	1,987 (1,797, 2,177)	1,750 (1,519, 1,982)	1,299 (856, 1,741)
Without PND	909 (876, 942)	979 (930, 1,029)	882 (834, 929)	666 (596, 735)
Difference[a]	**953 (809, 1,097)**	1,038 (838, 1,238)	861 (628, 1,093)	570 (167, 972)

Source: 2016–2019. IBM MarketScan Multi-State Medicaid Database, Restricted to Individuals With Fee-for-Service (N=80,856).

Note: Boldface indicates statistical significance ($p<0.05$).

For the overall column, boldface indicates statistical significance for the difference between individuals with and without PND. For the non-Hispanic Black and Hispanic columns, boldface indicates the statistical significance of the effects of PND differing between non-Hispanic Black and White race and between Hispanic ethnicity and White race. Data are presented as mean predicted expenditure (95% CI). Multivariable generalized linear models with log link and gamma distribution were used to estimate the differences in medical expenditures associated with PND, controlling for age, race/ethnicity, and comorbidities. Interaction terms between PND status and race/ethnicity categories were used to calculate race/ethnicity-specific estimates.

PND, perinatal depression.

[a]Difference in expenditures for those with PND compared with those without PND.