Perinatal Mood and Anxiety Disorders, Serious Mental Illness, and Delivery-Related Health Outcomes, United States, 2006-2015

CURRENT STATUS: UNDER REVISION

BMC Women's Health  BMC Series

Kimberly Schmitt McKee  kimckee@umich.edu
University of Michigan Medical School
Corresponding Author
ORCiD: 0000-0002-2905-5000

Lindsay K. Admon
University of Michigan Medical School

Tyler N. A. Winkelman
Hennepin Healthcare

Maria Muzik
University of Michigan Medical School

Stephanie Hall
University of Michigan

Vanessa K. Dalton
University of Michigan Medical School

Kara Zivin
University of Michigan Medical School

DOI:
10.21203/rs.2.16956/v1

SUBJECT AREAS
Preventive Medicine  Psychiatry

KEYWORDS
perinatal mood and anxiety disorders, serious mental illness, depression/anxiety, pregnancy, severe maternal morbidity and mortality
Abstract

Purpose: National estimates of perinatal mood and anxiety disorders (PMAD) and serious mental illness (SMI) among delivering women over time, as well as associated outcomes and costs, are lacking. We examined the prevalence of perinatal mood and anxiety disorders and serious mental illness, from 2006-2015 and associated risk of adverse obstetric outcomes, including severe maternal morbidity and mortality (SMMM), and delivery costs.

Methods: We conducted a serial, cross-sectional analysis using National Inpatient Sample data. We estimated the prevalence of PMAD and SMI among delivering women as well as obstetric outcomes, healthcare utilization, and delivery costs using adjusted weighted logistic with predictive margins and generalized linear regression models, respectively.

Results: We identified an estimated 39,025,974 delivery hospitalizations from 2006-2015 in the U.S. PMAD increased from 18.4 (95% CI 16.4-20.0) to 40.4 (95% CI 39.3-41.6) per 1,000 deliveries. SMI also increased among delivering women over time, from 4.2 (95% CI 3.9-4.6) to 8.1 (95% CI 7.9-8.4) per 1,000 deliveries. Medicaid covered 72% (95% CI 71.2-72.9) of deliveries complicated by SMI compared to 44% (95% CI 43.1-45.0) and 43.5% (95% CI 42.5-44.5) among PMAD and all other deliveries, respectively. Women with PMAD and SMI experienced higher incidence of SMMM, and increased hospital transfers, lengths of stay, and delivery-related costs compared to other deliveries ( P <.001 for all).

Conclusion: Over the past decade, the prevalence of both PMAD and SMI among delivering women increased substantially across the United States, and affected women had more adverse obstetric outcomes and delivery-related costs compared to other deliveries.

Introduction

Perinatal mood and anxiety disorders (PMAD), which encompass depression and anxiety,
are among the most common chronic conditions identified during pregnancy and the postpartum period. Serious mental illness (SMI) entails mental, behavioral, or emotional disorders that substantially impact functional impairment, and include bipolar and psychotic disorders (Boukakiou, Glangeaud-Freudenthal, Falissard, Sutter-Dallay, & Gressier, 2018; Munk-Olsen, Laursen, Pedersen, Mors, & Mortensen, 2006). Untreated, mental health conditions in the perinatal period may lead to adverse outcomes for mothers and their children (M. Muzik & Hamilton, 2016; Maria Muzik, Thelen, & Rosenblum, 2011; Waxler, Thelen, & Muzik, 2011), including, preterm birth and maternal suicide, which is a leading cause of maternal morbidity and mortality (Palladino, Singh, Campbell, Flynn, & Gold, 2011). Beyond the immediate perinatal period, the long-term effects on mothers and their families include reductions in infant cognitive and social-emotional development, behavior, and family functioning (Howard, Piot, & Stein, 2014; Santoro & Peabody, 2010; Wyckoff, 2016). Screening by itself is insufficient to improve clinical outcomes, and appropriate follow-up and adherence to adequate treatment to remission is necessary (Cox, Sowa, Meltzer-Brody, & Gaynes, 2016). Despite the significant impact of PMAD and SMI on maternal and child health, national estimates of the prevalence of these conditions and their impact on healthcare utilization and costs are understudied.

Given the recently documented temporal increase in chronic medical conditions among delivering women, and their contribution to rising maternal morbidity and mortality (Admon et al., 2018), we hypothesized that PMAD and SMI have increased nationally over time as well, and that they are associated with adverse birth outcomes and severe maternal morbidity and mortality (SMMM), greater health care utilization, and higher delivery costs. Therefore, in this paper we assessed national trends in the prevalence of PMAD and SMI among delivering women and associated obstetric outcomes including SMMM, healthcare utilization, and delivery-related costs. These data are critical to
quantify the burden of mental health conditions among delivering women, identify women that would most benefit from evidence-based treatments, and prioritize allocation of limited resources in efforts to address rising maternal mortality and morbidity.

Materials And Methods

**Study Sample**

We conducted a serial, cross-sectional analysis using 2006-2015 data from the National Inpatient Sample (NIS) (Agency for Healthcare Research and Quality, 2018b), the largest nationally representative sample of hospital deliveries in the United States. The NIS is a stratified sample of 20% of all discharges from community-based hospitals in the United States administered by the Agency for Healthcare Research and Quality’s Healthcare Cost and Utilization Project. All analyses conform to the methodological standards for research using the NIS (Khera et al., 2017). Sample weights allow for nationally representative estimates (Kuklina et al., 2008). We identified delivery hospitalizations using previously published methods (Kuklina et al., 2008).

**Independent Variables**

We defined PMAD and SMI using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes (Table 1). Covariates included maternal age, payer (i.e., Medicaid, private insurance, or uninsured), ZIP code income quartile, rural compared with urban residence, and hospital census region. We defined location of residence as rural or urban using the National Center for Health Statistics Classification and Urban Influence codes (Centers for Disease Control and Prevention, 2014).

**Table 1. International Classification of Diseases, Ninth Revision, Clinical Modification Codes for Perinatal Mood and Anxiety Disorders and Serious Mental Illness Conditions and Delivery-Related Outcomes**
| Depression       | 296.20 296.21 296.22 296.23 296.24 296.25 296.26 296.30 296.31 296.32 296.35 296.36 300.4 311 |
|------------------|------------------------------------------------|
| Anxiety          | 293.84 300.00 300.01 300.02 300.09 300.10 300.20 300.21 300.22 300.23 300.5 300.89 300.9 308.0 308.1 308.2 308.3 308.4 308.9 309.81 313.0 313.30 313.82 313.83 |
| Bipolar disorder | 296.00 296.01 296.02 296.03 296.04 296.05 296.06 296.07 296.08 296.10 296.11 296.12 296.15 296.16 296.20 296.21 296.22 296.23 296.24 296.40 296.41 296.42 296.43 296.44 296.45 296.46 296.50 296.53 296.54 296.55 296.56 296.60 296.61 296.62 296.63 296.64 296.65 296.70 296.80 296.81 296.82 296.83 296.84 296.85 296.90 296.99 |
| Psychotic Disorders | 293.81 293.82 295.00 295.01 295.02 295.03 295.04 295.05 295.10 295.11 295.14 295.15 295.20 295.21 295.22 295.23 295.24 295.25 295.30 295.31 295.34 295.35 295.40 295.41 295.42 295.43 295.44 295.45 295.50 295.51 295.54 295.55 295.60 295.61 295.62 295.63 295.64 295.65 295.70 295.71 295.74 295.75 295.80 295.81 295.82 295.83 295.84 295.85 295.90 295.91 295.94 295.95 297.0 297.1 297.2 297.3 297.8 297.9 298.0 298.1 298.2 298.3 298.4 298.8 298.9 |

Maternal race and ethnicity for the years in which these data were reliably available (2012-2015) (Agency for Healthcare Research and Quality, 2019. Race and ethnicity categories included non-Hispanic white, non-Hispanic black, Hispanic, Asian/Pacific Islander (API), and American Indian/Alaska Native (AIAN). Based on prior work, we also included identification of at least one comorbid substance use disorder (Admon et al., 2017; Heslin, Elixhauser, & Steiner, 2015).

**Delivery-related Outcomes**

We examined three types of delivery-related outcomes: 1) obstetric outcomes (cesarean delivery, preterm delivery, and SMMM), 2) healthcare utilization (need for hospital transfer, mean length of stay), and 3) hospital costs. We defined preterm delivery (delivery at less than 37 weeks’ gestation) using ICD-9-CM codes 644.21, cesarean delivery using ICD-9-CM procedure codes 74.0, 74.1, 74.2, 74.4, 74.9x, and SMMM using methods for ICD-9-CM indicators outlined by the Centers for Disease Control and Prevention (CDC) (Callaghan, Creanga, & Kuklina, 2012). We identified mortality using the hospital discharge disposition in the NIS (Agency for Healthcare Research and Quality, 2008a). Transfers indicate that a patient was either transferred in for a delivery hospitalization or out after a delivery hospitalization (Agency for Healthcare Research and Quality, 2008b). We calculated delivery-related hospital costs using HCUP’s cost-to-charge ratio files (Agency for Healthcare Research and Quality, 2018a), inflation-adjusted to 2015.
U.S. dollars.

Statistical Analysis

We used weighted frequencies to describe maternal socio-demographic characteristics across three categories: PMAD, SMI, and all other hospital deliveries. We used weighted logistic regression models with predictive margins to calculate the prevalence of PMAD and SMI per 1,000 delivery hospitalizations for each two-year period. We conducted subgroup analyses by maternal race/ethnicity using pooled data from 2012-2015. We estimated delivery-related outcomes among women with and without PMAD/SMI using adjusted multivariable logistic regression models. We estimated mean length of stay and delivery-related costs using generalized linear models with a log-link function and gamma distribution. We adjusted all models for maternal age, payer, ZIP code income quartile, rural residence, and hospital region. We weighted all estimates and generated post-regression predictive margins tabulated per 100 delivery hospitalizations.

In 2015, ICD-9-CM diagnoses codes were only available for the first three quarters. We adjusted the survey weights in 2015 to generate annualized estimates from the first three quarters of data. We conducted all analyses in STATA 14.2. The University of Michigan Institutional Review Board considered this study exempt from review.

Results

We identified 7,906,820 delivery hospitalizations, representing an estimated 39,025,974 deliveries that occurred between 2006 and 2015. Within this sample, 219,294 deliveries included PMAD (weighted N= 1,107,001), and 50,178 deliveries included SMI (weighted N= 251,381). Medicaid covered 72% (95% CI 71.2-72.9) of all deliveries complicated by SMI compared to 44% (95% CI 43.1-45.0) of deliveries with PMAD and 43.5% (95% CI 42.5-44.5) of all other deliveries (Table 2). Higher proportions of women with SMI lived in the lowest income quartile compared to women with PMAD and all other deliveries. Higher
proportions of women with PMAD and SMI had >= 1 substance abuse disorder [19.1% (95% CI 18.6-19.6) and 37.3% (95% CI 36.5-38.1), respectively] compared to other deliveries [5.4% (95% CI 5.2-5.6)].

The prevalence of PMAD increased from [18.4 (95% CI 16.4-20.0)] to 40.4 (95% CI 39.3-41.6) per 1,000 delivery hospitalizations] between 2006-07 and 2014-15. The prevalence of SMI also increased over time from [4.2 (95% CI 3.9-4.6)] to [8.1 (95% CI 7.9-8.4) per 1,000 delivery hospitalizations] (Figure 1).

Table 2. Characteristics of Delivering Women with PMAD and SMI, National

| Inpatient Sample, 2006-2015 (Unweighted N= 7,906,820)¹ |
|---------------------------------------------------------|
| All Other Hospital Deliveries (unweighted N=7,637,348)   |
| Weighted % (95% CI)                                      |
| 27.8 (27.7-27.9)                                        |
| PMAD (unweighted N=219,294)                             |
| Weighted % (95% CI)                                      |
| 29.7 (28.6-28.8)                                        |
| SMI (unweighted N=50,178)                               |
| Weighted % (95% CI)                                      |
| 72.0 (71.2-72.6)                                        |
| Insurance Payer                                         |
| Medicaid                                               |
| 43.5 (42.5-44.5)                                       |
| 44.0 (43.1-45.0)                                       |
| Private                                                |
| 50.4 (49.3-51.5)                                       |
| 51.2 (50.2-52.2)                                       |
| Uninsured                                              |
| 6.1 (5.7-6.5)                                          |
| 4.8 (4.5-5.0)                                          |
| Income                                                 |
| Bottom quartilec                                      |
| 27.6 (26.6-28.6)                                       |
| 23.9 (23.0-24.8)                                       |
| 35.9 (34.8-37.1)                                       |
| Residence                                              |
| Rural                                                  |
| 14.4 (13.8-15.1)                                       |
| 15.8 (15.0-16.6)                                       |
| 16.0 (15.2-16.8)                                       |
| Hospital Region                                        |
| Northeast                                              |
| 15.9 (14.9-16.9)                                       |
| 19.5 (18.0-21.0)                                       |
| 19.4 (18.0-20.8)                                       |
| Midwest                                                |
| 21.2 (20.0-22.5)                                       |
| 27.0 (25.5-28.5)                                       |
| 25.4 (23.7-27.2)                                       |
| South                                                  |
| 38.2 (36.5-39.9)                                       |
| 31.2 (29.5-32.9)                                       |
| 36.6 (34.7-38.5)                                       |
| West                                                   |
| 24.7 (23.3-26.2)                                       |
| 22.4 (20.9-23.9)                                       |
| 18.7 (17.4-20.1)                                       |
| >1 Co-morbid substance use disorder                    |
| 5.4 (5.2-5.6)                                          |
| 19.1 (18.6-19.6)                                       |
| 37.3 (36.5-38.1)                                       |

¹All proportions are represented as Weighted % (95% Confidence Interval) unless otherwise noted. Boldface indicates statistical significance (P <0.001).

²Weighted mean (95% Confidence Interval)

³Represents patients living in a ZIP code with a median household income in the bottom national income quartile.
Figure 1. Trends in PMAD and SMI at Delivery in the United States, 2006-2015
(N=7,906,820)\textsuperscript{a}

\textbf{FIG 1} The prevalence of both perinatal mood and anxiety disorders and serious mental illness among delivering women increased across the United States from 2006-2015. We found differences in the incidence of PMAD and SMI at delivery by race/ethnicity from 2012-2015. Non-Hispanic white women had higher prevalence of PMAD and SMI at delivery [75.3\% (95\% CI 3.9-4.6) and 67.6\% (95\% CI 66.6-68.5), respectively] compared to deliveries without either condition [55.4 \% (95\% CI 54.7-56.0)]. Black women had a higher proportion of deliveries with SMI [21.1 \% (95\% CI 20.2-22.0)] compared to those with PMAD [10.6\% (95\% CI 10.1-11.00) or neither [15.4\% (95\% CI 15.0-15.8)]. Hispanic and Asian/Pacific Islander women had a lower prevalence of PMAD [11.5\% (95\% CI 11.0-12.50) and 1.9\% (95\% CI 1.7-2.0), respectively] and SMI [9.4\% (95\% CI 8.9-10.0) and 1.1\% (95\% CI 0.9-1.3), respectively] at delivery compared to that among other hospital deliveries (22.3\% (95\% CI 21.7-22.9) and 6.1 \% (95\% CI 5.9-6.4), respectively). The incidence of preterm delivery was higher among women with PMAD [9.7 (95\% CI 9.4-10.0)] and SMI [10.8 (95\% CI 10.4-11.1)] compared to deliveries without either condition [6.7 (95\% CI 6.7-7.0) per 100 deliveries]. Delivering women with PMAD and SMI experienced greater incidence of SMMM [2.3 (95\% CI 2.2-2.4)] and [2.1 (95\% CI 1.9-2.2), respectively] compared to [1.5 (95\% CI 1.5-1.5) per 100 deliveries] (Table 3) than those without PMAD and SMI. Deliveries with PMAD and SMI had more hospital transfers and longer lengths of stay, respectively, compared to those without either condition. Women with PMAD had higher mean delivery-related costs ($5,200; 95\% CI $5,100-5,200) and SMI ($5,300; 95\% CI $5,200-5,400) compared to other deliveries ($4,400; 95\% CI $4,300-4,500).

\textbf{Comment}
Principal Findings

Our findings provide national estimates of the growing burden of PMAD and SMI among delivering women, and indicate that PMAD and SMI are associated with adverse obstetric outcomes, including SMMM, greater health care utilization, and more expensive deliveries. We also identified disparities among deliveries with SMI and PMAD including those among non-Hispanic black women and women with Medicaid.

Results

Our results provide national estimates that are consistent with increases in PMAD over time. We found one previous study that demonstrated a 65% increase in mental health conditions among perinatal women from in California (Fridman et al., 2014). Less research addresses SMI among obstetric populations, and our results indicate not only that SMI is increasing among delivering women, but also that women with SMI may be at increased risk of multiple adverse outcomes and costly deliveries. Previous work demonstrated rising incidence of SMMM (MacDorman, Declercq, Cabral, & Morton, 2016) and preterm birth (Martin & Osterman, 2018), and our results suggest PMAD and SMI among delivering women may be contributing in part to these recent trends.

Table 3. Adjusted Obstetric Outcomes, Healthcare Utilization and Expenditures

Among Women with Depression/Anxiety and Serious Mental Illness, 2006-2015

(N=7,906,820)a

| Obstetric outcomes                      | All Other Hospital Deliveries (n=7,637,348) | PMAD (n=219,294) | SMI (n=50,178) |
|----------------------------------------|--------------------------------------------|------------------|----------------|
| Severe maternal morbidity/mortality    | 1.5 (1.5-1.5)                              | 2.3 (2.2-2.4)    | 2.1 (1.9-2.2)  |
| Preterm delivery                       | 6.7 (6.7-7.0)                              | 9.7 (9.4-10.0)   | 10.8 (10.4-1)  |
| Cesarean delivery                      | 32.7 (32.4-33.0)                           | 37.7 (37.3-38.1) | 38.8 (38.2-3)  |
| Healthcare utilization                 |                                            |                  |                |
| Hospital transfer                      | 0.7 (0.7-0.8)                              | 1.5 (1.4-1.6)    | 2.2 (2.0-2.4)  |
| Mean Length of stay (days)c            | 2.6 (2.6-2.6)                              | 3.1 (3.0-3.1)    | 3.1 (3.1-3.2)  |
| Healthcare expenditures                |                                            |                  |                |
| Mean cost per delivery hospitalization (USD, mean)d | 4,400 (4,300-4,500) | 5,200 (5,100-5,200) | 5,300 (5,200) |
All proportions are survey-weighted and represented as rate per 100 delivery hospitalizations (95% Confidence Interval) unless otherwise noted. Adjusted for maternal age, payer, ZIP code income quartile, rural residence, hospital region. $P<0.001$ for all comparisons.

Delivery at less than 37 weeks gestational age

Means are reported with 95% confidence intervals.

Costs are inflation-adjusted to 2015 U.S. dollars (USD)

Clinical Implications

Multiple factors could explain the observed increase in the prevalence of PMAD and SMI among delivering women. First, increased awareness and screening guidelines may have led to better detection across the study period. The American College of Obstetricians and Gynecologists (ACOG) has issued universal screening guidelines to screen patients at least once during the perinatal period for depression and anxiety symptoms (American College of Obstetricians and Gynecologists, 2018). It is also likely that the rise of patient advocacy and support organizations (e.g. 2020mom.org) have led to greater public and professional awareness of perinatal mood disorders and their impact. Second, an increase in availability of treatment options for pregnant women may facilitate patients’ willingness to be diagnosed (M. Muzik & Hamilton, 2016). Treatment options range from evidence-based psychotherapies, complementary and alternative approaches, and medications (Kallen & Otterblad Olausson, 2007; Kimmel, Cox, Schiller, Gettes, & Meltzer-Brody, 2018; M. Muzik & Hamilton, 2016; Reza, Deligiannidis, Eustis, & Battle, 2018; Tosato et al., 2017; Tuccori et al., 2010). Although national estimates of the use of psychotropic medications during pregnancy are limited (Abel, 2013; Toh et al., 2013), their use in pregnancy appears
to be rising (Andrade et al., 2008; Bakker, Kolling, van den Berg, de Walle, & de Jong van den Berg, 2008). Women may be more comfortable navigating treatment options and thus may be more comfortable disclosing illness and seeking help.

Although we did not assess screening in our study, data from smaller studies suggest that despite growing awareness and screening efforts, only a small portion of affected women get screened and treated (Cox et al., 2016). Screening alone is insufficient to improve clinical outcomes, and follow-up and adherence to adequate treatment to remission is necessary (Cox et al., 2016). A recent meta-analysis estimated only 10% of women receive adequate treatment, and less than 5% of women with perinatal depression achieve remission (Cox et al., 2016). Although ACOG and the Council on Patient Safety in Women's HealthCare are working to develop evidence-based clinical practice strategies (Kendig et al., 2017), future research should examine how well screening guidelines are implemented, and how these guidelines impact obstetric outcomes and costs.

Our study revealed interesting differences in prevalence rates of PMAD and SMI for non-Hispanic white and black women. In this nationally representative sample, white women had a higher prevalence of PMAD and SMI than non-Hispanic black and women of other races, although deliveries involving SMI were disproportionately higher among non-Hispanic black women compared to all other races. These results are consistent with a previous study from California (Bresnahan et al., 2007) and among the general population (Schwartz & Blankenship, 2014), and may be driven by several unmeasured factors that contribute to racial/ethnic differences in the detection and prevalence of PMAD and SMI during the perinatal period, in addition to differences in access, attitudes and stigma related to maternal mental health and SMI treatment, which should be explored in future analyses.

Research Implications
Given that increases in PMAD and perinatal SMI are associated with adverse obstetric outcomes and higher delivery costs, our results underscore the burden perinatal mental health conditions place on both pregnant women and the healthcare system. For example, women with preexisting SMI are predisposed to relapse with psychotic breakdown at birth, necessitating psychiatric admissions (Bergink et al., 2015; Kendell, Chalmers, & Platz, 1987; Munk-Olsen et al., 2006), which may be one factor explaining their increased length of hospital stays and delivery costs. Thus, although evidence is limited and beyond the scope of our analysis, screening and treatment for PMAD and SMI in the perinatal period may be cost-effective (A. Bauer, Knapp, & Parsonage, 2016 Annette Bauer, Parsonage, Knapp, Iemmi, & Adelaja, 2014 Wilkinson, Anderson, & Wheeler, 2017) rather than not treating them, and may increase the value of obstetric care by reducing costs and improving outcomes (Woo, Lundeen, Matula, & Milstein, 2017). The Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA) and the Affordable Care Act (ACA) of 2010 funded one of the largest expansions of mental health coverage (Beronio, Glied, & Frank, 2014), including an unprecedented opportunity to support comprehensive perinatal mental health treatment, which underscore the economic imperative to investigate whether these policies are reaching women most in need.

Strengths and Limitations

Although our study provides comprehensive national estimates of PMAD and SMI among pregnant women, we recognize several limitations inherent in using administrative datasets. The relative increases in prevalence of PMAD and SMI we observed during the study period may be related to temporal increases in detection, yet our results likely underestimate the true burden, because they are based on codes from the delivery record. Relatedly, maternal mortality was limited to cases that occurred during the delivery hospitalization rather than after hospital discharge. Due to the cross-sectional design of
our study, we were also unable to estimate the prevalence of mental health conditions prior to or after delivery, and our estimates do not reflect treatment or remission of symptoms. Lastly, due to the constraints of using a de-identified dataset, women may have given birth to more than one child over the study period, and thus, records may not reflect unique observations.

Conclusions

We observed a steady increase in the prevalence of PMAD and SMI among delivering women in the U.S. between 2006 and 2015. SMI was higher among women who were publicly insured. PMAD and SMI were associated with SMMM, adverse obstetric outcomes, and more expensive deliveries. These national findings highlight the importance of addressing perinatal mental health conditions during pregnancy to prevent adverse obstetric outcomes including SMMM and contain delivery-related costs.

Declarations

Ethics approval and consent to participate

The de-identified, publicly available data was deemed exempt from regulation from the University of Michigan Internal Review Board.

Consent for publication

Consent for publication is not applicable.

Competing interests

Vanessa Dalton is a paid consultant for Bayer. The other authors report no conflicts of interest.

Funding

No funding supported the work of this study.

Authors' contributions
Kimberly McKee and Kara Zivin conceived the design of the study and wrote the manuscript. Lindsay Admon acquired and analyzed the data. Tyler Winkelman, Maria Muzik, Stephanie Hall, and Vanessa Dalton helped to interpret the data and substantially revise the writing of the manuscript.

Acknowledgements

None.

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**Table 1**

Table 1. International Classification of Diseases, Ninth Revision, Clinical Modification
Codes for Perinatal Mood and Anxiety Disorders and Serious Mental Illness Conditions and Delivery-Related Outcomes

| PMAD       | Depression                  | 296.20 296.21 296.22 296.23 296.24 296.25 296.26 296.30 296.31 296.32 296.35 296.36 300.4 311 |
|------------|-----------------------------|----------------------------------|
|            | Anxiety                      | 293.84 300.00 300.01 300.02 300.09 300.10 300.20 300.21 300.22 300.23 300.5 300.89 300.9 308.0 308.1 308.2 308.3 308.4 308.9 309.81 313.0 31 |
| SMI        | Bipolar disorder             | 296.00 296.01 296.02 296.03 296.04 296.05 296.06 296.10 296.11 296.12 296.15 296.16 296.40 296.41 296.42 296.43 296.44 296.45 296.46 296.5C 296.53 296.54 296.55 2 |
|            | Psychotic Disorders          | 293.81 293.82 295.00 295.01 295.02 295.03 295.04 295.05 295.10 295.11 295.14 295.15 295.20 295.21 295.22 295.23 295.24 295.25 295.30 295.31 295.34 295.35 295.40 295.41 295.42 295.43 295.44 295.45 295.50 295.51 295.54 295.55 295.60 295.61 295.62 295.63 295.64 295.65 295.70 295.71 295.74 295.75 295.80 295.81 295.82 295.83 295.84 295.85 295.90 295.91 295.94 295.95 297.0 297.1 297.2 297.3 297.8 297.9 298.0 298.1 298.2 298.9 |

Figures
Figure 1

Trends in PMAD and SMI at Delivery in the United States, 2006-2015

(N=7,906,820)a