

Introduction and Objectives

INTRODUCTION

- Postpartum depression (PPD) affects approximately 10–20% of women following childbirth, corresponding to an estimated annual rate of 500,000–750,000 women.^{1,2}
 - Symptoms may include diminished interest/pleasure, depressed mood, difficulty bonding with the baby, insomnia, and thoughts of suicide.^{3,4}
- PPD has multiple definitions. The American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (5th Edition) characterizes PPD as a major depressive episode with peripartum onset or within 4 weeks of childbirth.⁵ In clinical practice, PPD is often recognized as depression that occurs between 4 weeks and up to 1 year after childbirth.^{6,7}
- Medicaid, the federal-state health insurance program, covers all pregnant women with income <133% of the federal poverty level.⁸
 - Pregnant women are covered during pregnancy and up to 60 days postpartum, regardless of income, thus limiting the data and possible observation to 60 days
- While nearly 50% of US deliveries are covered by the program, there have been no recent estimates of PPD prevalence rates using Medicaid data.⁹

OBJECTIVE
To estimate the rate of PPD within the population of patients covered by Medicaid.

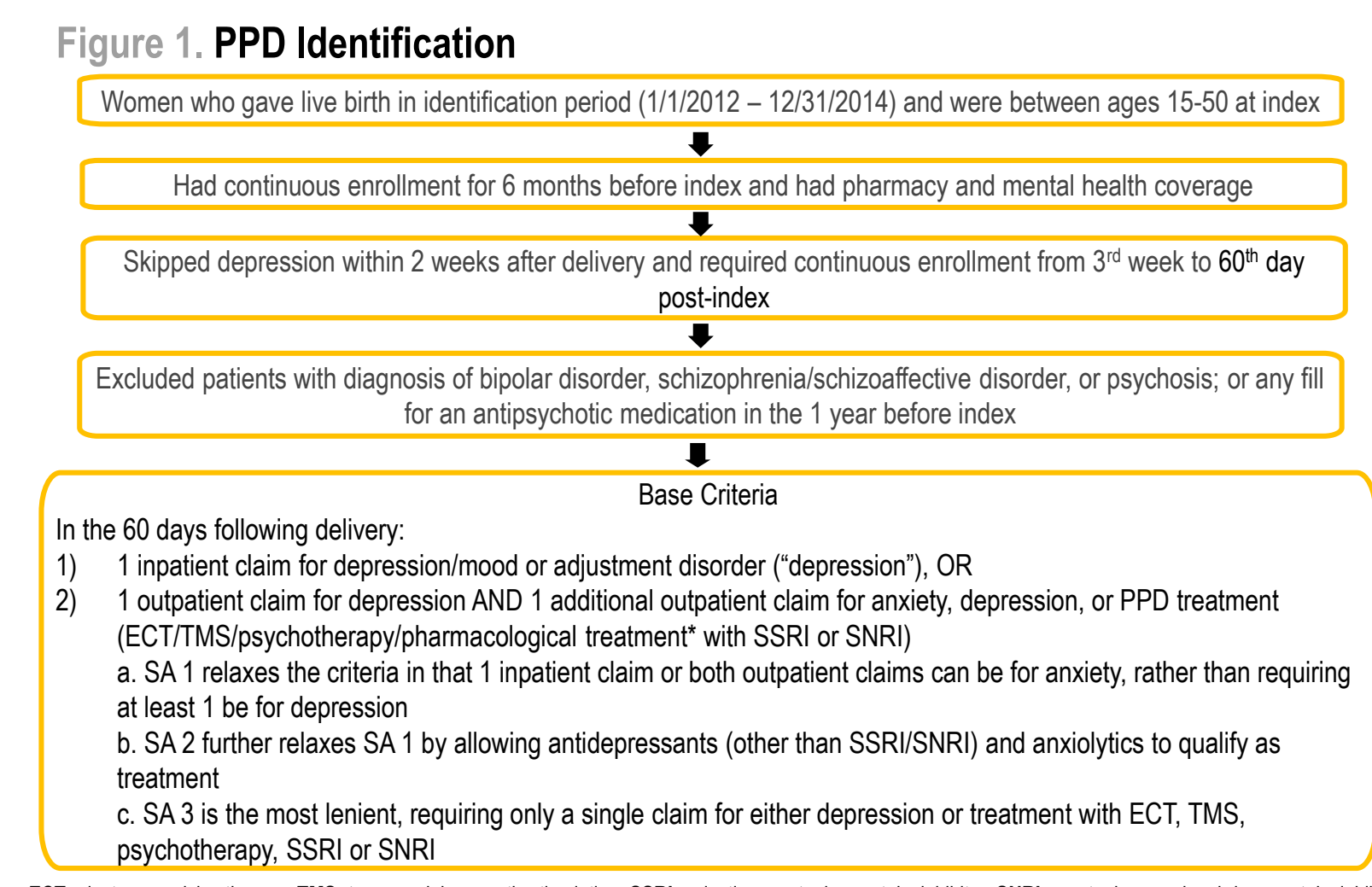
Methods

STUDY DESIGN AND DATA SOURCE

- Retrospective cohort study using de-identified Medicaid data from the Truven MarketScan®.
- Claims-based algorithm for PPD case identification derived from exploratory analysis.

PATIENT POPULATION AND TIME FRAME

- Women who had a claim for a live birth (see full code list in **Fig. 1**) in index period (1/1/2012-12/31/2014) and who were between the ages of 15 and 50 years (**Fig. 1**) were identified.
 - Date of first delivery in identification period was defined as the index date.
 - Subsequent claim with a delivery code was considered new pregnancy if claim was greater than 6 months from previous delivery date.
- Patients were required to have continuous enrollment for at least 6 months before and 60 days after the index delivery date and to have both pharmacy and mental health coverage.
- To avoid identifying short term, non-major depression (“baby blues”) we did not look for depression in the first 2 weeks after delivery.
- Patients were identified as having PPD (i.e., cases) if they had claims for certain conditions (e.g., depression or adjustment disorder; see full code list in **Fig. 1**) and treatment (e.g., psychotherapy, ECT, or pharmacologic treatment) in the inpatient, outpatient, or pharmacy claims (**Fig. 1**).
 - Patients with bipolar disorder, schizophrenia/schizoaffective disorder, or psychosis coding or use of prescription anti-psychotic medication in the year prior to index delivery were excluded.
 - The base case inclusion criteria were then modified according to conditions, treatment, or observation time to create 3 sensitivity analysis definitions (SA1-SA3) to identify upper and lower bound estimates of PPD rate (**Fig. 1**).
 - The observation period for Medicaid patients was 14 to 60 days after delivery. This observation period was applied to the base criteria and all SAs.



ECT: electroconvulsive therapy; TMS: transcranial magnetic stimulation; SSRI: selective serotonin reuptake inhibitor; SNRI: serotonin-norepinephrine reuptake inhibitor.
Delivery codes: Diagnosis: ICD-9 650, 651.x1, 644.21, 645.11, 645.21, 649.81, 649.82, 669.70, 669.71, V27.0, V27.2, V27.5, V27.9; Procedure codes: CPT 59409, 59410, 59514, 59612, 59614, 59620; ICD-9 72.0, 72.1, 72.21, 72.29, 72.31, 72.39, 72.4, 72.51-72.54, 72.6, 72.71, 72.79, 72.8, 72.9, 73.22, 73.59, 73.6, 74.0-74.2, 74.4, 74.99; DRG 370-375, 765-768, 774, 775; Stillbirth: ICD-9 V27.1, V27.3, V27.4, V27.6, V27.7, 651.31, 651.41, 651.51, 651.61
Diagnosis codes: Depression/mood or adjustment disorder: ICD-9 648.40-648.44, 311, 296.20, 296.22, 296.23, 296.25, 296.26, 296.30-296.33, 296.35, 296.36; ICD-10 F32.0, F32.1, F32.2, F32.4, F32.5, F32.8, F32.9, F33.0-F33.2, F33.4, F33.8, F33.9, F34.8, F34.9, F43.2, O90.6, R45.8; Anxiety: ICD-9 300.0, 293.84, 309.24, 309.28, 296.9, 309.0, 309.1; ICD-10 F06.4, F41.0, F41.1, F41.3, F41.8, F41.9, F43.0, F43.8, F43.9; Bipolar: ICD-9 296.0, 296.1, 296.4, 296.5, 296.6, 296.7, 296.8; Schizophrenia: ICD-9 295.x, 290.x; Psychosis: ICD-9 291.x-294.x, 296.24, 293.89, 296.34
 *Pharmacological treatment must be preceded by diagnosis

STUDY MEASURES

- Baseline measures included age at delivery and race.
- Rate of PPD was measured overall and by calendar year.
 - Overall rate, defined as the proportion of women identified with PPD during the observation period among women who gave birth within the entire multi-year study period
 - Yearly rate, defined as the proportion of women identified with PPD during the observation period among women who gave birth during the specified calendar year of delivery
- PPD-related medication use was measured by counting in pharmacy claims the number of distinct pharmacological treatments (at the drug level) used for symptoms related to depression.

STATISTICAL ANALYSIS

- Descriptive statistics were conducted to generated frequencies and proportions of PPD cases for each calendar year and overall.
- Sensitivity analyses were conducted using modified claims-based definitions of PPD (**Fig. 1**) to assess the impact of variable definitions on estimates of PPD rates.

Results

- A total of 549,585 deliveries were identified from 2012-2014; 11,040 had a diagnosis of PPD under the base case criteria, translating to a rate of PPD of 2.0% (**Table 1**).
- In terms of age group, the rate of PPD was 2.6% in women ≤17 years old, 2.0% in women 18-34, and 2.3% in women ≥35 (**Table 1**).
- Rate of PPD increased over the 3-year study period, from 1.8% (2012) to 2.0% (2013) to 2.2% (2014).
- In the sensitivity analyses, the PPD rate across all years ranged from 2.4% (SA1) to 9.9% (SA3) (**Table 2**).
 - The trend of increasing rate of PPD over time was also observed with the modified diagnostic criteria in SA1-SA3.
- Overall, 43.5% used 1 PPD-related pharmacological treatment and 23.8% used at least 2 different medications (**Fig. 2**). Nearly one-third (32.7%) did not use a PPD-related medication.

Table 1. Overall Rate of PPD (2012-2014): Base Case

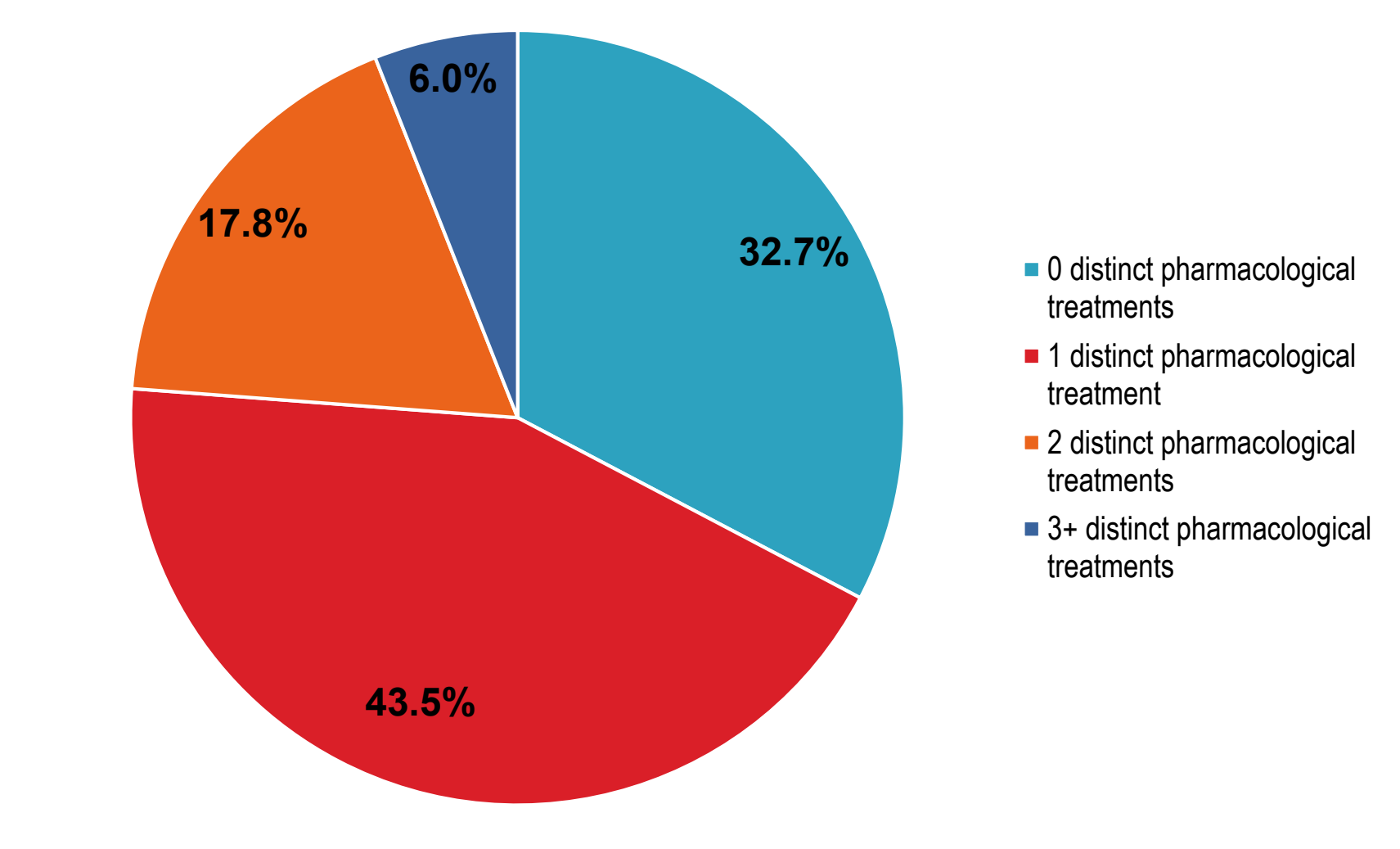
	All Deliveries		
	PPD, N	Deliveries, N	Prevalence, %
All	11,040	549,585	2.0%
Age at delivery			
<=17	398	15,588	2.6%
18-34	9,746	495,316	2.0%
>=35	896	38,681	2.3%
Race			
White	7,329	298,637	2.5%
Black	2,867	195,554	1.5%
Hispanic	252	20,164	1.2%
Other	592	35,230	1.7%

Table 2. Overall and Yearly Rate of PPD: Base Case and Sensitivity Analysis

Criteria	Overall Rate, Range, 2012-2014
Base	
In the 60 days following delivery:	
1) 1 inpatient claim for depression/mood or adjustment disorder (“depression”), OR	2.0%, 1.8% - 2.2%
2) 1 outpatient claim for depression AND 1 additional outpatient claim for anxiety, depression, or PPD treatment (ECT/TMS/psychotherapy/pharmacological treatment* with SSRI or SNRI)	
SA1	
SA 1 relaxes the criteria in that 1 inpatient claim or both outpatient claims can be for anxiety, rather than requiring at least 1 be for depression	2.4%, 2.2% - 2.6%
SA2	
SA 2 further relaxes SA 1 by allowing antidepressants (other than SSRI/SNRI) and anxiolytics to qualify as treatment	2.5%, 2.3% - 2.7%
SA3	
SA 3 is the most lenient, requiring only a single claim for either depression or treatment with ECT, TMS, psychotherapy, SSRI or SNRI	9.9%, 9.2% - 10.4%

* Pharmacological treatment must be preceded by diagnosis.

Figure 2. PPD Medication Utilization: Base Case (N=11,040)



Note: Treatment of PPD cases identified through the base criteria. Treatment was received during the 3 weeks to 60 days after delivery.

Limitations

- Due to restrictions on pregnancy Medicaid coverage, observation greater than 60 days was not possible for a large proportion of patients.
 - Medicaid is administered by states, according to Federal requirements. Federal law requires coverage of low-income pregnant women who are below 133% of the federal poverty level, although most states include women up to 200 or 300% of this level. Although not mandated, most states provide continuous coverage to women during pregnancy and through 60 days postpartum, regardless of changes in income. For this reason, our study of PPD in Medicaid was limited to cases occurring during that brief window.
- Claims are coded for payment rather than research and may be inaccurate.
- The study included only those with adequate follow-up and continuous enrollment, which may have excluded patients who potentially have unenrolled due to severe depression.
- Data are representative of a US sample of Medicaid patients only.

Conclusions

- The rate of PPD among Medicaid patients was lower than previously reported rates due to limited follow-up time.
- Were we to extend the follow-up time based on prior work using commercial claims, the rate of PPD in the Medicaid population would have been nearly 3 times higher over a year of follow-up. However, even with this method the approximated 1-year PPD rate is lower than typical estimates using direct assessment (e.g. interviews, PHQ9, EPDS), suggesting that underdiagnosis is a problem.

FOOTNOTE Results reported in the original abstract were generated as part of an exploratory analysis, on which the present base-case and sensitivity analyses are based.

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DISCLOSURES V. Bonthapally is an employee of Sage. R. Tieu and E. Chang are employees of Partnership of Health Analytic Research, LLC, a health services research company hired by Sage to conduct this research. L. Gannu is a Graduate Teaching Assistant at MCPHS university. S. Meltzer-Brody is the PI and receives research grant funding from Sage Therapeutics.