



# Trends and disparities in receipt of pharmacotherapy among pregnant women in publically funded treatment programs for opioid use disorder in the United States

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## ABSTRACT

**Objective:** To describe differences in geographic, demographic, treatment, and substance use characteristics by pharmacotherapy receipt among pregnant women entering publically funded treatment for opioid use disorder (OUD) in the United States.

**Methods:** 1996 to 2014 Treatment Episode Data Set-Admissions data from pregnant admissions with OUD, defined as reporting opioids as the primary substance of use leading to the treatment episode, were analyzed for this cross-sectional study. The proportion of all pregnant admissions with OUD who received pharmacotherapy was calculated by year and U.S. census region. Trends across time were assessed using the Cochrane-Armitage Trend test. Associations between demographic, substance use, and treatment characteristics and pharmacotherapy receipt were assessed using Chi-square tests and multivariable logistic regression.

**Results:** The proportion of pregnant admissions where opioids were the primary substance of use increased from 16.9% to 41.6% during the study period, while the proportion of pregnant admissions with OUD who received pharmacotherapy remained relatively unchanged at around 50%. Overall, pharmacotherapy recipients were generally older and white, more likely to receive treatment in an outpatient setting, be self-referred, and report heroin as the primary substance, daily substance use, and intravenous drug use, and less likely to have a co-occurring psychiatric problem compared to those who did not receive pharmacotherapy. Regional differences in pharmacotherapy utilization exist; the South consistently had the fewest pregnant admissions with OUD receiving pharmacotherapy.

**Conclusion:** Although the proportion of pregnant admissions to substance use treatment centers with OUD has increased since the mid-1990s, the proportion receiving pharmacotherapy has not changed. Significant variations in pharmacotherapy utilization exist by geography and demographic, substance use and treatment characteristics. Utilization of pharmacotherapy at publically funded treatment centers providing care for pregnant women with OUD should be expanded.

## 1. Introduction

Increasing rates of opioid use and opioid use disorder (OUD) during pregnancy and associated adverse perinatal outcomes, such as neonatal abstinence syndrome, have generated significant public health concerns in the United States (Martin, Longinaker, & Terplan, 2015; Patrick, Davis, Lehmann, et al., 2015; Patrick, Schumacher, Benneworth, et al., 2012; Tolia, Patrick, Bennett, et al., 2015). The recommended care for pregnant women with OUD is a comprehensive treatment program,

including individual and group counseling, coordination of prenatal care, and pharmacotherapy (methadone or buprenorphine). This is supported by the American College of Obstetrics and Gynecology (Centers of Disease Control and Prevention, 2014), the American Society of Addiction Medicine (Kampman & Jarvis, 2015), and the World Health Organization (U.S. Department of Health and Human Services, 2011), and is effective in reducing maternal substance use and improving obstetrical and neonatal outcomes (Kaltenbach, Berghella, & Finnegan, 1998).

Abbreviations: MAT, medication-assisted opioid therapy; OUD, opioid use disorder; TEDS-A, Treatment Episode Data Set-Admissions

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Despite its well-established benefits, pharmacotherapy in particular is underutilized relative to its need in the U.S. For example, although the number of individuals reporting primary heroin use at admission to substance use disorder treatment increased, the proportion receiving pharmacotherapy declined between 2004 and 2014 (Substance Abuse and Mental Health Services Administration & Center for Behavioral Health Statistics and Quality, 2016). A similar decline was observed starting in the early 1990s among pregnant women reporting prescription opioid use at admission to substance use disorder treatment (Martin et al., 2015). Geography is one factor that is associated with pharmacotherapy receipt among pregnant women with OUD, with the lowest rates reported in the South U.S. census region in 2013 (Hand, Short, & Abatemarco, 2017). What remains unknown, however, is detailed information on those at risk of not receiving this evidence-based treatment and temporal changes in pharmacotherapy utilization among pregnant women. Thus, the purpose of this study was to describe differences in geographic, demographic, treatment, and substance use characteristics by pharmacotherapy receipt among pregnant women entering treatment for OUD in the U.S. Given what is currently known about OUD and treatment for OUD in the general population and among pregnant women, we hypothesize that differences in characteristics by pharmacotherapy receipt exist, and that during the study period OUD in pregnant women increased while pharmacotherapy utilization did not.

## 2. Materials and methods

The 1996–2014 Treatment Episode Data Set-Admissions (TEDS-A), a national census data system of annual admissions to substance use disorder treatment facilities in the U.S., was used for this cross-sectional study (Beck, Morrow, Lipscomb, et al., 2002). The dataset includes annual data on the number and characteristics of persons admitted to public and private substance use disorder treatment programs that receive public funding. Data are collected by all 50 states, Washington DC and Puerto Rico and is estimated to include 83% of all eligible drug or alcohol treatment admissions in the U.S. The current study was deemed exempt for review by the Thomas Jefferson University Institutional Review Board. Data were downloaded and analyzed in 2017.

Analyses were restricted to admissions of pregnant women with OUD, defined as pregnant admissions who reported opioids (i.e., heroin, other opiates and synthetics and/or non-prescription methadone) as the primary substance leading to the treatment episode. The pregnancy variable was reported as a yes or no regarding whether the individual was pregnant at the time of admission for treatment. No additional data regarding pregnancy are available in the dataset.

Additional data included U.S. census region and demographic, substance use and treatment characteristics. The four geographic regions included the Northeast, Midwest, South and West and were based on regions defined by the U.S. Bureau of Census, 1970 Census of Population.

Demographic characteristics assessed included: age in years (< 21, 21–24, 25–29, 30–34, 35 or greater), race (black, white, other), ethnicity (Hispanic, non-Hispanic), marital status (married, never married, other), highest level of education (less than high school, high school or greater), employment status (employed, not employed), current living arrangement (homeless, dependent living, independent living), and current psychiatric diagnosis in addition to substance use disorder (yes, no).

All substances use data contained in TEDS-A are self-reported by the individual at the time of treatment admission. Substance use characteristics assessed in this analysis included: primary substance used (prescription opioid or heroin), frequency of opioid use (less than daily, daily), current intravenous drug use (IDU; yes, no), polysubstance use (yes, no), and other substance(s) reported at admission (i.e., alcohol, cocaine, marijuana, amphetamines, benzodiazepines, and other [non-benzodiazepine tranquilizers, barbiturates, non-barbiturate sedatives or

hypnotics, inhalants, over the counter medications, other including but not limited to diphenylhydantoin, GHB/GBL, ketamine]). Prescription opioid use was defined as the reported use of other opiates and synthetics (i.e., codeine, hydrocodone, hydromorphone, meperidine, morphine, opium, oxycodone, pentazocine, propoxyphene, tramadol, and any other drug with morphine-like effects) or non-prescription methadone or buprenorphine at the time of treatment admission. Those reporting a secondary or tertiary substance other than heroin or a prescription opioid leading to the admission were classified as exhibiting polysubstance use.

Characteristics of the current treatment admission, identified and reported by the treatment facility, assessed included: receipt of pharmacotherapy (yes, no), treatment setting (outpatient, intensive outpatient, residential, detoxification), and principal source of referral (individual, court/criminal justice, other). Receipt of pharmacotherapy was defined as planned use of medication-assisted opioid therapy (MAT; i.e., methadone or buprenorphine) for the current admission.

The proportion of pregnant admissions with OUD and the proportion of pregnant admissions with OUD who received pharmacotherapy were calculated by year and U.S. census region. Trends across time in OUD and pharmacotherapy receipt were assessed using the Cochrane-Armitage Trend test. The crude associations between demographic, substance use and treatment characteristics and pharmacotherapy receipt by year were determined using Chi-square tests. We examined independent associations between characteristics and pharmacotherapy receipt using multivariable logistic regression. Multivariable logistic regression analyses were completed controlling for all demographic, substance use and treatment variables, year, and state. Results were expressed as odds ratios along with their corresponding 95% confidence intervals. Due to the high percentage of missing values, current psychiatric diagnosis (25%), current living arrangement (12%), and marital status (16%) were not included in the final models. Sensitivity analyses were performed by repeating the multivariable logistic regression analyses with missing current psychiatric diagnosis data. Admissions to detoxification treatment settings were excluded from bivariate and multivariable analyses as MAT would not have been available in these treatment settings and the purpose of these analyses was to identify characteristics associated with the receipt of pharmacotherapy. *P* values of  $P < .05$  were considered to be significant. All statistical analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC, U.S.).

## 3. Results

To limit table sizes, results are presented for years 1996, 2002, 2008 and 2014. From 1996 to 2014, 395,811 admissions to treatment facilities in the U.S. were of pregnant women. During this time period, the total number of pregnant admissions with primary OUD more than tripled from 2909 to 8850 (Table 1). While the proportion of pregnant admissions with primary OUD increased nearly 2.5-fold from 1996 to 2014 from 16.9% to 41.6%, the proportion of pregnant admissions with primary OUD who received pharmacotherapy remained relatively unchanged at around 50% (Fig. 1).

The increase in OUD among pregnant admissions occurred in all U.S. census regions; however, the proportion of admissions receiving pharmacotherapy differed markedly by region. The South consistently had the fewest pregnant admissions with OUD receiving pharmacotherapy (Table 1). Between 1996 and 2014, approximately one-third of pregnant admissions with OUD in the South received pharmacotherapy. During the study period, the proportion of admissions receiving pharmacotherapy increased in the Northeast, while the proportion of admissions receiving pharmacotherapy decreased in the West and Midwest regions by 28 and 36%, respectively.

For all years combined, the majority (90.7%) of admissions was to non-detoxification treatment settings (i.e., outpatient, intensive outpatient, residential settings). Pregnant admissions with OUD receiving

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