



# Opioid-Affected Births to Rural Residents

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## Background and Policy Context

A dire consequence of the U.S. opioid epidemic has been its effect on reproductive-age women and their infants. Hospitalizations involving opioids for reproductive-age women increased 75% from 2005-2015.<sup>1</sup> At the same time, a growing number of infants were being diagnosed with opioid withdrawal after birth—also known as neonatal abstinence syndrome (NAS).<sup>2,3</sup> There are significant health and economic consequences from fetal, infant, and maternal complications of opioid use disorder (OUD), including NAS and preterm delivery.<sup>2,4-6</sup> From 2004-2013, the incidence of both maternal OUD and NAS increased more rapidly in rural counties than in urban counties.<sup>7</sup> Approximately 1 in 4 pregnant rural residents give birth in non-local hospitals, usually because they have clinical complications that require high acuity care not available in many rural communities.<sup>8</sup> Pregnant patients with OUD may be referred to urban teaching hospitals which tend to have greater resources and capacity to diagnose and treat complex conditions, both generally and during childbirth.<sup>9-11</sup> Whether rural residents with maternal OUD give

## Clinician Experts:

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birth in rural or urban settings, or in teaching or non-teaching hospitals, likely affects the care they receive and the clinical support available.<sup>12,13</sup>

We examined rates of diagnosis of maternal OUD and infant NAS at the time of childbirth for rural residents, based on the type of hospital where the birth occurred—rural hospital, urban non-teaching hospital, or urban teaching hospital. We also asked two physicians who care for both rural and urban patients at urban teaching hospitals, and specializing in maternal fetal medicine, and neonatology, respectively, to offer interpretations of these findings.

## Approach

Hospital discharge records of births to rural residents came from the National Inpatient Sample (NIS) and were used to calculate the aggregate prevalence of maternal OUD and NAS from 2007 to 2014. The final samples include 942,798 rural residents and 984,090 infants of rural residents (“rural infants”). Of the 942,798 births to rural residents, 667,047 (71%) occurred in rural hospitals, 139,235 (15%) in urban non-teaching hospitals, and 136,516 (14%) in urban teaching hospitals. Due to the deidentified nature of the NIS, records of rural residents and rural infants were not linked. We compared the aggregate prevalence of maternal OUD and NAS among rural residents based on the type of hospital where the birth occurred (“hospital category”), using a Pearson’s chi-square test.

## Results

The aggregated prevalence of maternal OUD and NAS was significantly higher among rural residents who gave birth / were born at an urban teaching hospital than among those who gave birth / were born at a rural hospital or at an urban non-teaching hospital. The aggregate prevalence of NAS among rural infants (gold bars on Figure 1) was consistently higher than the aggregate prevalence of maternal OUD among rural residents (maroon bars on Figure 1),  $p < 0.001$ , with the largest observable difference between OUD and NAS diagnosis rates occurring among rural residents who gave birth / were born at urban teaching hospitals (Figure 1, next page).

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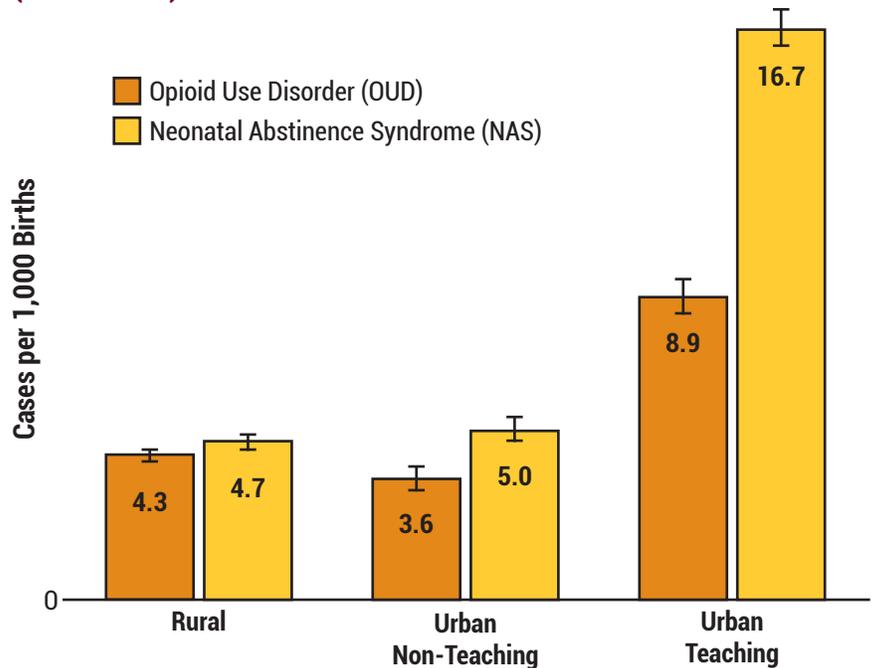
**Cresta W. Jones, MD, FACOG**

Dr. Jones is a maternal-fetal medicine physician and assistant professor at the University of Minnesota Medical School. She completed her medical degree at the Medical College of Wisconsin, and her OB/gyn residency and maternal-fetal medicine fellowship at the University of Vermont College of Medicine. Her clinical focus is opioid use disorders in pregnancy, and she currently serves as the physician lead in an inpatient substance use disorders in pregnancy program in the Minneapolis-St. Paul area.

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Dr. Patrick is an Assistant Professor of Pediatrics and Health Policy at Vanderbilt University School of Medicine and an attending neonatologist at Monroe Carell Jr. Children's Hospital at Vanderbilt. His National Institute on Drug Abuse-funded research focuses on improving outcomes for opioid-exposed infants and women with substance-use disorder and evaluating state and federal drug control policies. He previously served as Senior Science Policy Advisor to the White House Office of National Drug Control Policy and has testified before Congress on the rising numbers of newborns being diagnosed with opioid withdrawal after birth. Dr. Patrick's awards include the American Medical Association Foundation Excellence in Medicine Leadership Award, the Academic Pediatric Association Fellow Research Award Tennessee Chapter of the American Academy of Pediatrics Early Career Physician of the Year, and the Nemours Child Health Services Research Award. His research has been published in leading scientific journals including the *New England Journal of Medicine*, *JAMA*, *Pediatrics*, and *Health Affairs*.

**Figure 1: Prevalence of Maternal OUD and Infant NAS by Delivery Hospital Geography and Category, among Rural U.S. Residents (2007-2014)**



**What is your clinical takeaway from this figure?**

Dr. Jones: Not all infants with prenatal exposure to opioids will develop NAS. Therefore, the number of NAS infants should actually be lower than the number of mothers who have a diagnosis of OUD for all hospital categories. This may signify that: 1) screening for OUD continues to miss women who are suffering from OUD, and at risk of delivering an infant with NAS; 2) women may have prescribed chronic opioid use for other indications, which places their infants at risk of NAS even if they do not carry a diagnosis of OUD; and/or 3) a lack of accurate documentation in the medical records.

Dr. Patrick: This figure reflects what we see in my clinical practice. I work at an urban teaching hospital, and disproportionately, the patients I see with NAS are from rural areas. Even when babies are born in rural hospitals, many are transferred to tertiary care hospitals if they develop NAS.

**Why might the difference between rural infant NAS diagnosis rates and rural maternal OUD diagnosis rates be greater in urban teaching hospitals than in other hospital settings?**

Dr. Jones: Urban teaching centers often have specialty programs which are not accessible at either rural hospitals or even urban non-teaching hospitals. These programs may include specialty clinics in which medically-indicated chronic opioid prescribing continues, e.g., those focused on treating sickle cell disease or chronic pain. Patients

on chronic opioids for pain management often do not carry a diagnosis of OUD, but will still have infants at risk of developing NAS.

Dr. Patrick: It may have to do with how frequently infants are transferred from rural hospitals to urban teaching hospitals. Many rural pregnant women with OUD who have an otherwise uncomplicated pregnancy may be cared for locally, but an infant with drug withdrawal is likely to be transferred from a rural hospital to a tertiary care setting.

### **What is different about treating rural OUD and NAS patients (vs. urban patients) in urban teaching hospitals?**

Dr. Jones: Rural women who deliver at urban teaching hospitals will not have access to their local healthcare providers, and it may be more difficult for them to disclose substance use or mental health concerns to new providers. They may also be remote from their support networks, which can make remaining in recovery a challenge. Distance from a local support network may place women at an increased risk of relapse, as well as postpartum depression.

Dr. Patrick: There are no major differences in the clinical care provided to rural and urban infants with NAS; however rural infants with complications that necessitate home health may face challenges getting the care they need locally.

### **As a clinician, what are you required to do—from a hospital or state policy perspective—when you diagnose a patient with OUD or NAS?**

Dr. Jones: I am required by state law to report any woman who is pregnant and discloses to me that she is using illicit substances, even if she does not carry a diagnosis of OUD, to allow for services to be offered to the mother, and for child safety to be assured by child protective services. This includes before delivery, during prenatal care.

Dr. Patrick: We are required to report NAS to the state department of health and to the local child welfare agency. At our hospital, a NAS diagnosis also triggers support services. We have a team for opioid-exposed infants, and support for families includes non-pharmacologic care and breastfeeding support.

### **How might access to services after OUD or NAS diagnosis differ for rural and urban patients?**

Dr. Jones: Resources for social services and chemical dependency treatment are often much more robust in urban settings, and therefore inaccessible to rural patients. This may subsequently cause them to be identified as declining or refusing treatment, which may not actually be the case. The basic structure of the process should not differ between rural and urban women.

Dr. Patrick: In my hospital, the services we provide for urban and rural patients are the same, but we only offer support while patients are at the hospital. The broader challenges that patients from rural areas have are still there when they get home, and these challenges include a high degree of variability across counties in early intervention and child welfare services needed to support infants with NAS.

### **What are the implications of these findings for clinicians and hospital administrators in urban teaching hospitals?**

Dr. Jones: It is important to focus on support for families in which prenatal education on NAS might not have occurred, given the number of babies that may not have had NAS risk identified and addressed during pregnancy. Programs may also consider education and outreach programming to partner with hospitals in rural areas to allow more women and infants to stay in local hospitals to allow for proximity to their homes and their local support networks.

Dr. Patrick: From our standpoint at a perinatal regional center doing outreach to rural (Level 1) facilities, we think about how we can help support keeping moms and babies together in their local communities and to partner with local hospitals to make sure they have what they need to take care of mothers and babies.

### **What are the implications of these findings for clinicians and hospital administrators in rural hospitals?**

Dr. Jones: Given the high rate of NAS diagnosis in rural infants born at urban teaching hospitals, priority must be given to standardized screening in pregnancy that will help identify mothers at risk of

delivering babies with NAS, and providers must be adequately prepared to partner with mothers of infants with NAS who not have had adequate family education on NAS during pregnancy. Resources must be used system-wide to focus on nonjudgmental care, as well as provider support, to encourage a trusting relationship with patients so that they feel comfortable disclosing illicit use during screening.

Dr. Patrick: The disproportionate effect that the opioid epidemic has on rural communities is stretching an already-stretched system even more. Some of the resources we consider to be basics (social workers, for example) are a luxury in rural hospitals. To the extent that we can partner more through telemedicine and other means that would help us support rural communities.

### Is there anything else that strikes you as important about these findings?

Dr. Jones: I keep coming back to the unexpectedly high incidence of NAS relative to women diagnosed with OUD. It really seems that we as providers should be doing a better job screening pregnant and reproductive age women for having risk of delivering a baby with NAS, and making an effort to minimize risk when possible (i.e. weaning women off opioids who are being treated for chronic pain). This tells me that we have a lot more we need to understand about the risk of NAS, and that we have a lot more work to do.

Dr. Patrick: There are good examples of rural hospitals that have built programs to care for infants with NAS, including the Mothers and Infants Sober Together (MIST) program in Eastern Tennessee. Locally, hospitals can build up capacity to keep families there, with support from partners at hospitals like ours. To support these local efforts, there is a broader policy need for more resources in rural communities.

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