Maternal characteristics associated with newborn exposure to opioids and other substances

Fact Sheet Purpose

The purposes of this fact sheet are to describe 1) the prevalence of newborn *in utero* exposure to opioids and other substances from 2009 through 2014, 2) the maternal characteristics of women who gave birth to a substance exposed infant, and 3) to examine opportunities for identification and intervention to reduce newborn *in utero* exposure to opioids and other substances. This information may be used to guide decision makers to implement programs that improve the health outcomes of the women and infants who rely on Medicaid coverage for their health care services.

Background

About 15% of pregnant women in the US report alcohol or illicit drug use. Reported marijuana and opioid use (e.g., heroin, codeine, oxycodone, methadone) rates have almost doubled in the past decade[1]. Fetal exposure to opioids is associated with neonatal abstinence syndrome (NAS). The US rate of NAS, and other conditions related to *in utero* substance exposure (SE), have more than doubled between 2000 and 2009 (1.2 to 3.4/1000 live births). Newborns with *in utero* SE are at increased risk for adverse birth outcomes such as pre-term birth and respiratory complications[2]. Diagnosed neonates likely reflect a minority of those with *in utero* SE, but may have the most severely addicted mothers. Little data exist to describe the characteristics of women who deliver a newborn exposed to opioids and other substances.

Data Sources

Data for this report were derived from a matched file of the hospital discharge data (HDD) file and the Iowa birth certificate (BC) for singleton births from 2009 through 2014. HDD were used to determine newborn *in utero* exposure to opioids and other substances. County of residence, length of hospital stay, and average charges to Medicaid were also derived from the HDD file. Newborn *in utero* exposure to opioids and other substances was based on the following ICD-9 diagnosis codes reported in the HDD file:

ICD 9 CM code	*Code description*
292.0	Drug withdrawal syndrome
304.9	Unspecified drug dependence
305	Non-dependent abuse of drugs
760.63	Hallucinogenic agents affecting fetus or newborn
760.70	Unspecified noxious substance affecting fetus or newborn via placenta or breast milk
760.71	Alcohol Affecting Fetus or Newborn
760.72	Narcotics affecting fetus or newborn
760.75	Noxious influence on fetus: Cocaine
779.5	Drug withdrawal syndrome in newborn
Other	More than one diagnostic code

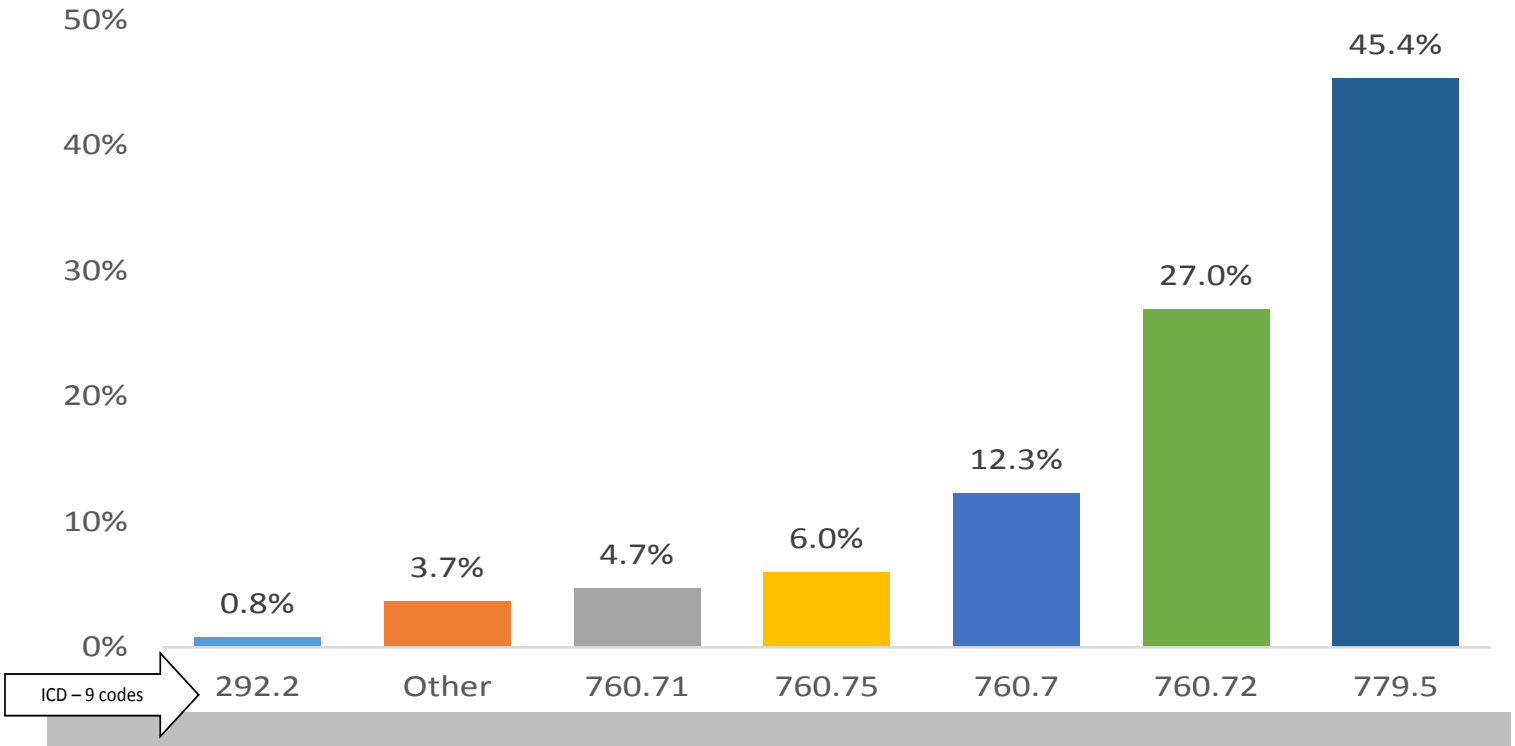
[1] Martin CE, Longinaker N, Terplan M. Recent trends in treatment admissions for prescription opioid abuse during pregnancy. J. Subst. Abuse Treat. 2015;48(1):37–42.

[2] Patrick SW, Schumacher RE, Benneyworth BD, et al. Neonatal Abstinence Syndrome and Associated Health Care Expenditures, United States, 2000-2009. JAMA. 2012;307(18):1934–1940.

Medicaid status was determined by a linkage of the birth certificate to Medicaid paid claims. Maternal and newborn characteristics were derived from the birth certificate. We obtained demographic variables (maternal race/ethnicity, age, education), behavioral variables (maternal smoking during pregnancy and breastfeeding at hospital discharge), and access to care variables (prenatal care initiation and mother's participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)) from the BC.

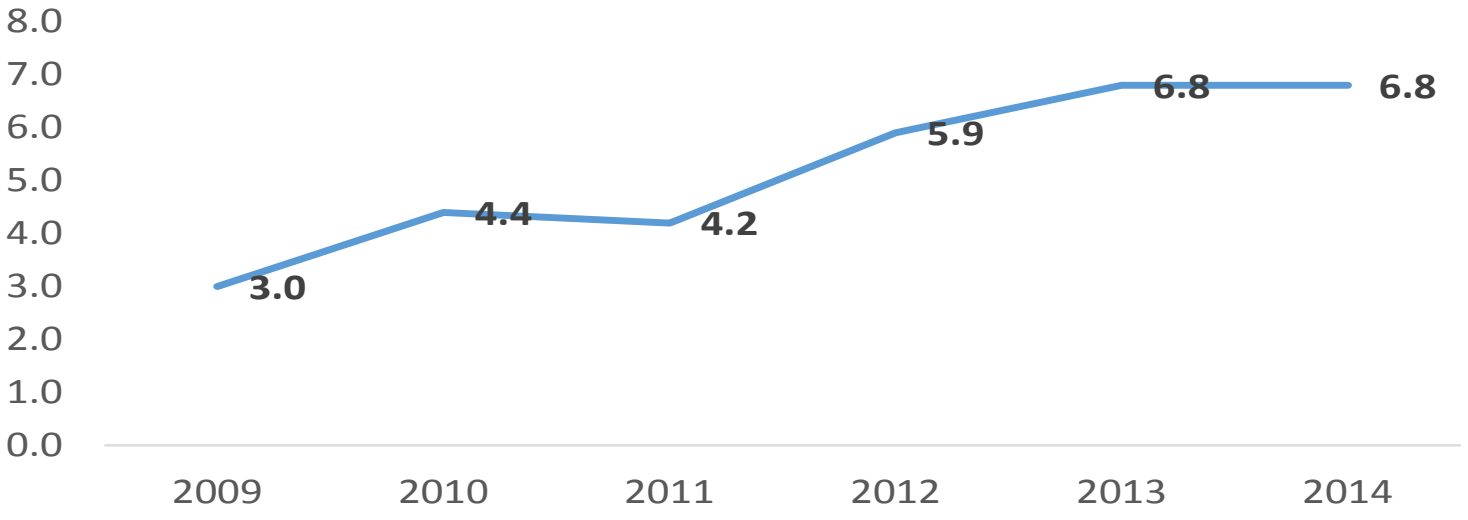
Results

Figure 1. Distribution of newborn in utero exposure to opioids and other substances by diagnostic code, years 2009 through 2014. Less than 50% of in utero newborn substance exposure was detected based on the single diagnosis code of 779.5 (Drug withdrawal syndrome in newborn)



From 2009 through 2014, 381 newborns with evidence of in utero substance exposure. The rate of newborn *in utero* substance exposure increased by 126%, from 3.0/1,000 live births in 2009 to 6.8/1,000 live births in 2014 (Figure 2).

Figure 2. Rate per 1000 live births of newborn in utero exposure to opioids and other substances, 2009 – 2014



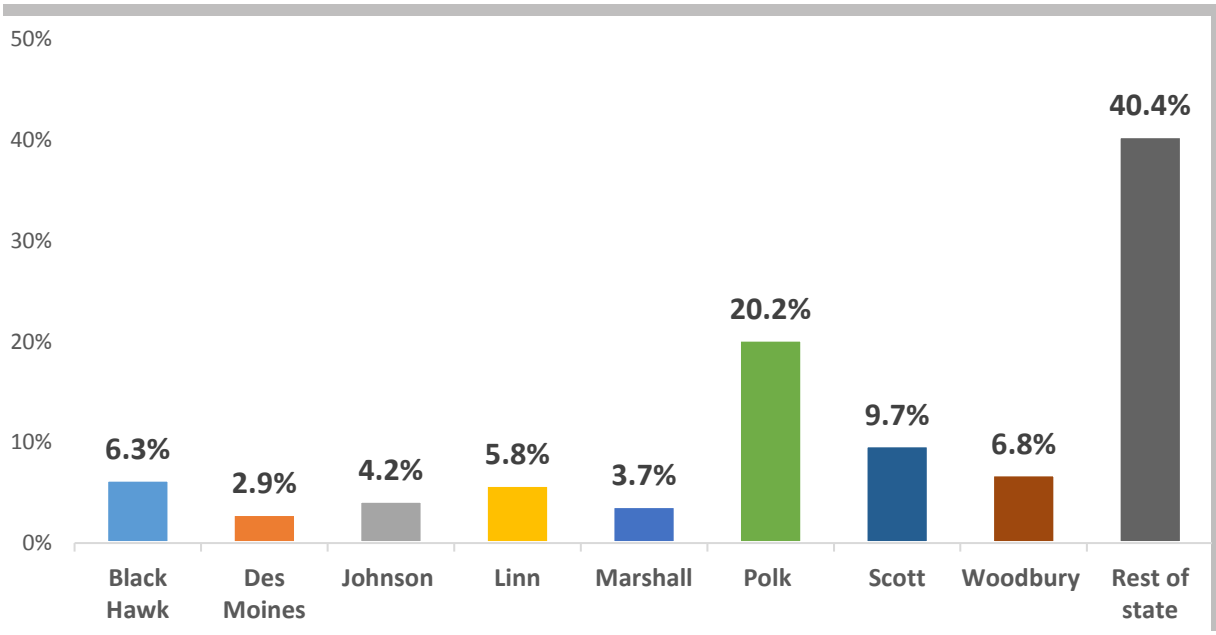
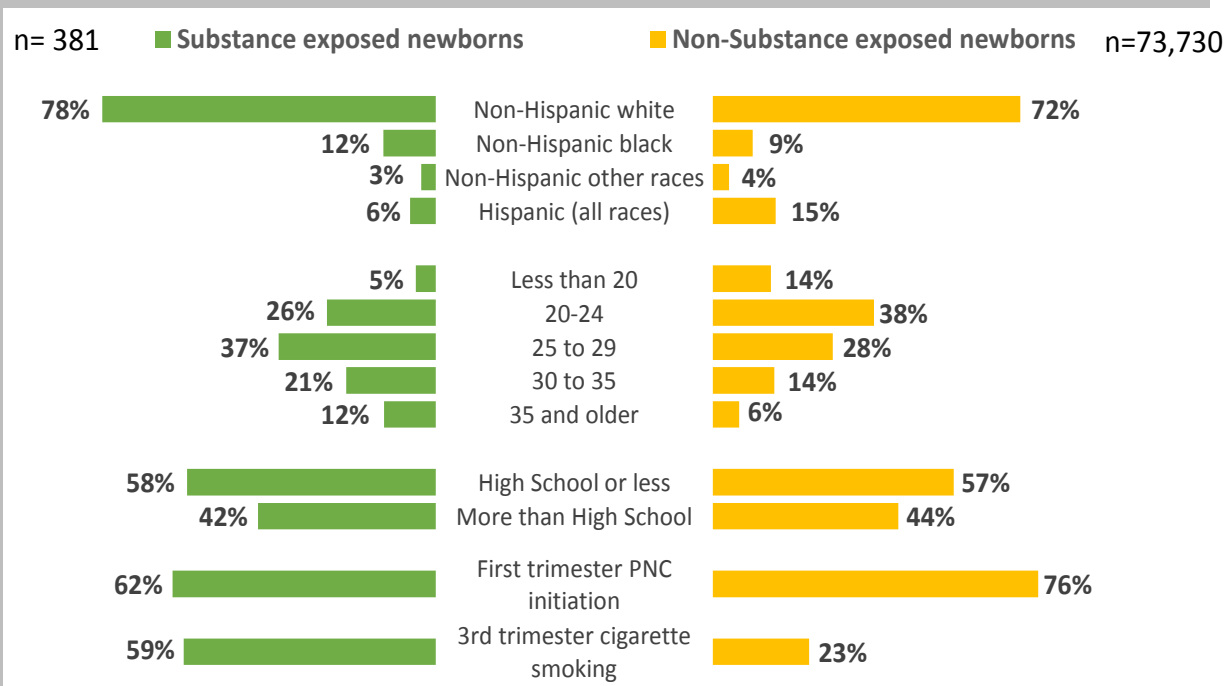


Figure 3. Distribution of newborn** in utero **exposure to opioids and other substances by maternal county of residence, 2009 through 2014. Eight counties accounted for over 60% of newborn** in utero **exposure to opioids and other substances.

- On average, mothers who delivered newborns with *in utero* substance exposure (SE) initiated prenatal care at 13.6 weeks into their pregnancy. On average, mothers whose newborns did not experience SE, initiated prenatal care 11.6 weeks into their pregnancy.
- Newborns with *in utero* SE were less likely to be breastfed at hospital discharge compared to newborns without SE (38.3% vs. 60.1%).
- Newborns with *in utero* SE were more likely to be admitted to the NICU compared to newborns without SE (43.0% vs. 7.9%).
- The average length of hospital stay for newborns with *in utero* SE was 10.8 days compared to an average length of hospital stay of 3.2 days for newborns without SE.
- Average total charges to Medicaid for newborns with *in utero* SE were $41,470. Whereas, average total charges to Medicaid for infants without SE were $8,474.

Figure 4. The percent of women by race/ethnicity, age, education attainment, prenatal care initiation, and third trimester smoking by newborn diagnosis with** in utero **SE, Iowa 2009-2014 (n=74,111).

The percent of women who delivered SE newborns was higher among non-Hispanic white women and non-Hispanic black women and women older than age 25. The percent of women who delivered SE newborns was also higher among women who reported third trimester smoking.



Adjusted analyses

Logistic regression was used to assess the relationship between maternal characteristics and newborn *in utero* substance exposure (Table 1). The association of newborn *in utero* substance exposure in the 3rd trimester was assessed (SE) by maternal race/ethnicity, maternal age, first trimester prenatal care initiation, and maternal smoking in the 3rd trimester. Maternal education and WIC participation during pregnancy were not included in the adjusted analyses because these variables were not significantly related to newborns with *in utero* SE.

- Medicaid enrolled women who gave birth to an infant exposed to substances *in utero* **were 50% less likely** to initiate prenatal care in the first trimester compared to women who did not give birth to a SE infant.
- Medicaid enrolled **non-Hispanic white women and non-Hispanic black women** were more likely to give birth to newborns with *in utero* SE compared to Hispanic women.
- The risk of newborn *in utero* SE increased with maternal age.
- Mothers of Medicaid infants with *in utero* SE were **5.0 times more likely to smoke in the 3rd trimester of pregnancy** than mothers of Medicaid infants without *in utero* SE.

Table 1. Logistic regression model of maternal characteristics with an outcome of newborn in utero substance exposure (n = 74,111)

Characteristic	Univariate Odds Ratio (95% CI)	*P* value	Adjusted Odds Ratio (95% CI)	*P* value
Maternal race/ethnicity				
Non-Hispanic white	2.6 (1.7 ,4.0)	<.0001	**1.7 (1.1, 2.6)**	**0.0236**
Non-Hispanic black	3.2 (2.0, 5.3)	<.0001	**2.3 (1.4, 3.9)**	**0.0008**
Non-Hispanic other races	2.2 (1.1, 4.3)	<.0001	1.6 (0.8, 3.2)	0.1750
Hispanic (All races)	Reference		Reference	
Maternal age				
Less than 20	Reference		Reference	
20-24	1.9 (1.2, 3.2)	0.0101	**1.8 (1.1, 3.1)**	**0.0228**
25-29	3.8 (2.3, 6.1)	<.0001	**3.6 (2.2, 6.0)**	**<.0001**
30-34	4.2 (2.5, 7.0)	<.0001	**4.3 (2.5, 7.3)**	**<.0001**
Older than or equal to 35	5.6 (3.2, 9.7)	<.0001	**5.9 (3.4, 10.4)**	**<.0001**
Access to care				
First trimester prenatal care initiation	0.5 (0.4,0.6)	<.0001	**0.5 (0.4, 0.6)**	**<.0001**
Initiated PNC after first trimester	Reference		Reference	
Maternal behaviors				
Maternal smoking in the 3rd trimester	5.0 (4.0,6.1)	<.0001	4.9 (4.0, 6.1)	<.0001

Conclusion

Based on this analysis, first trimester prenatal care may be a key factor in detecting and providing intervention to address maternal substance use and cigarette smoking during pregnancy.

Recommendations

- The American College of Obstetricians and Gynecologists and the American Society of Addiction Medicine agree that medication-assisted treatment (MAT) is the standard of care for pregnant women with opioid use disorders, providing stabilization and improving birth outcomes. While MAT does not eliminate the risk of NAS, it provides the best chance for a healthy mother and newborn and the best chance for a safe recovery.

- Refer pregnant women to the Iowa Department of Public Health - Bureau of Substance Abuse – Residential Treatment for Pregnant & Postpartum Women and/or the Medication Assisted Treatment (MAT) – Iowa program.

- Work with community based organizations such as Title V agencies and public health departments, as well as and the Iowa Managed Care Organizations to ensure that all women initiate prenatal care in their first trimester of pregnancy.

- Encourage primary care providers to screen women of reproductive age for contraceptive use, pregnancy intention, and smoking, illicit drug use, and prescription drug use.

- Consult the Guidelines for Perinatal Services 8th Edition, 2008, updated in 2013, Appendix 19: Perinatal Illicit Substance Exposure in Infants and Pregnant Women. This appendix provides information regarding voluntary recommendations for consent for testing, testing procedures and treatment referrals for mothers who test positive for illicit substances. Appendix 34: Neonatal Abstinence Syndrome provides assessment tools and clinical management guidelines to detect and treat an infant with NAS. Copies of the new appendices were distributed to all Iowa birthing hospitals

- Providers can encourage and support pregnant women to quit smoking during pregnancy through Iowa Medicaid's Smoking Cessation Program.

    - Medicaid members can contact QUITLINE Iowa 1-800-QUIT NOW (1-800-784 8669) for free coaching and materials.

- Encourage primary care providers to discuss a reproductive life plan with women of reproductive age, including current cigarette, prescription, and illegal drug use.

Additional Information[1]

For additional information or to obtain copies of this fact sheet, contact the Iowa Department of Public Health, Bureau of Family Health, at 321 E. 12th Street, Des Moines, IA 50309 or toll-free at 1-800-383-3826.

[1] The Iowa Department of Public Health acknowledges the Maternal and Child Health Epidemiology Program, Field Support Branch, Division of Reproductive Health, National Center for Chronic Disease Prevention and Public Health Promotion, Centers for Disease Control and Prevention for analytic support and preparation of this fact sheet.