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PRESENTATION TYPE: Oral : Lightning Talk or Poster

TITLE: Tracking Neonatal Abstinence Syndrome in Missouri: Trends and the ICD-CM Transition

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Objective: In this analysis we examine Missouri NAS discharge rates with special focus on the ICD-9-CM/ICD-10-CM transition and changes in code descriptions.

Introduction: Neonatal Abstinence Syndrome (NAS) rates have tripled for Missouri residents in the past three years. NAS is a condition infants suffer soon after birth due to withdrawal after becoming opioid-dependent in the womb. NAS has significant immediate health concerns and can have long term effects on child development and quality of life.[2] The Missouri Department of Health and Senior Services (MODHSS) maintains the Patient Abstract System (PAS), a database of inpatient, emergency room, and outpatient records collected from non-federal hospitals and ambulatory surgical centers throughout the state. PAS records contain extensive information about the visit, patient, and diagnosis. When examining 2015 annual PAS data for NAS-associated discharges, Missouri analysts noticed a greater than 50% increase in discharges, even larger than anticipated in light of the opioid epidemic. Provisional 2016 data produced similar high rates, dispelling the notion that the trend was a transitional problem. In fact, provisional 2016 rates are 115% higher than NAS rates in 2015. In contrast, percentage change of opioid misuse emergency department visits (as defined by MODHSS) for Missouri women age 18-44 was +13% in 2015 and -12% in 2016.

Methods: NAS discharges for Missouri residents under the age of 1 were identified using all available diagnosis fields of the PAS record, using finalized data from 2014 and 2015 and provisional data from 2016. Results were stratified by quarter and ICD-CM code. Rates for each of these stratifications were calculated using Missouri resident live births as the denominator. Adhering to methodology used by MODHSS to calculate significance on its public data query tool, 95% confidence intervals were used to determine statistical significance. Depending on numerator size, either Poisson or the inverse gamma methodology was utilized to analyze changes in discharge rates over time. Two ICD-9-CM codes and four ICD-10-CM codes (identified as equivalents using an in-house crosswalk system) were used as NAS indicators (Figure 1).

Results: An exploration of the data by quarter and diagnosis code (ICD-9-CM or ICD-10-CM), as well as supporting information from the Centers for Medicare & Medicaid Services, show that definitional changes to ICD-10-CM codes P044 and P0449, (previously 76072 in ICD-9-CM coding), was responsible for the majority of the NAS rate increase in Missouri. Annual rates for 76072 and its equivalents jumped significantly from a rate of 3.82 (per 1,000) to 8.22 Q3 to Q4-2015 (95% CI: 3.39-4.29, 7.57-8.87), while ICD-9-CM code 7795 and its equivalents had a more modest rise, from 5.57 to 6.17, which was not statistically significant (95% CI: 5.04-6.13, 5.62-6.76). Once this anomaly was identified, examination of the code's description was conducted. This exposed a change in definition, with the words 'suspected to be' added to the ICD-10-CM long description, which were not present in the ICD-9-CM equivalent. Further complicating matters is a 2017 revision (effective Q3-2016) deleting the 'suspected' language from the description. This reversion to language more closely aligning with prior descriptions may be the reason for the slight decrease in discharges coded to P044 in the provisional Q4-2016 PAS data. Though this dataset is not finalized, there was a decrease in discharges that included code P044 from 27.50 in Q3-2016 to 23.15 in Q4-2016 (Figure 2, Figure 3).

Conclusions: While NAS discharge rates are undoubtedly increasing in Missouri in tune with the opioid epidemic, the extreme escalation from 2014 to 2016 is, at least partially, the result of a definitional change that came with the transition from ICD-9-CM to ICD-10-CM and not a true indication of profound intensification. Indeed, the definitional change of a single ICD-CM code was responsible, in part, for a greater than three-fold increase in NAS discharge rates in Missouri. This analysis will allow public health program planners to better understand NAS trends and adjust intervention strategies accordingly. Further analysis exploring quarterly trends associated with the 2017 ICD-10-CM revision are ongoing.

References: 1. Centers for Medicare & Medicaid Services. ICD-9-CM and ICD-10. https://www.cms.gov/Medicare/Coding/ICD9ProviderDiagnosticCodes/index.html.

2. Stanford Children's Health. Neonatal Abstinence Syndrome. http://www.stanfordchildrens.org/en/topic/default?id=neonatal-abstinence-syndrome-90-P02387.

Brief bio for lead author/ presenter to be used by session moderators at the conference: Whitney Coffey has a background in Anthropology with degrees from Missouri State University (B.S.) and the University of Missouri-Columbia (M.A.). She has been with the Missouri Department of Health and Senior Services since 2013 and in her role as a Research Analyst IV maintains datasets relating to population, hospitalization and emergency room visits, and healthcare-associated infections. In addition to traveling the state teaching users about Missouri's interactive web query system, MOPHIMS, beginning in September 2016 Whitney became part of a team dedicated to the enhanced surveillance of opioid-related morbidity and mortality.

Brief summary (100 words) of Presentation to be Used in Conference Program: This presentation will reference analysis of record-level healthcare discharge data that was used by analysts at the Missouri Department of Health and Senior Services (MODHSS) to study statewide Neonatal Abstinence Syndrome (NAS) trends. A deep dive into an extraordinary data source allowed analysts to identify specific ICD-CM codes that were driving rate increases seen in Missouri and adjust case definitions and data dissemination strategies appropriately.

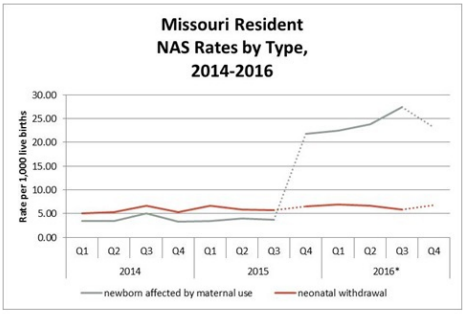
(no table selected)

Missouri Resident NAS Indicator ICD-CM Codes

	ICD-CM Manual	ICD-CM Code	Long Description
2014-Q1 through 2015-Q3	ICD-9-CM (2015)	76072	Narcotics affecting fetus or newborn via placenta or breast milk
		7795	Drug withdrawal syndrome in newborn
2015-Q4 through 2016-Q3	ICD-10-CM (2016)	P044	Newborn (suspected to be) affected by maternal use of drugs of addiction
		P0449	Newborn (suspected to be) affected by maternal use of other drugs of addiction
		P961	Neonatal withdrawal symptoms from maternal use of drugs of addiction
		P962	Withdrawal symptoms from therapeutic use of drugs in newborn
2016-Q4	ICD-10-CM (2017)	P044	Newborn affected by maternal use of drugs of addiction
		P0449	Newborn affected by maternal use of other drugs of addiction
		P961	Neonatal withdrawal symptoms from maternal use of drugs of addiction
		P962	Withdrawal symptoms from therapeutic use of drugs in newborn

Source: Centers for Medicare & Medicaid Services, https://www.cms.gov/Medicare/Coding/ICD9ProviderDiagnosticCodes/index.html

Figure 1.



* provisional data

Dotted lines indicate changes or updates to ICD-CM versions.

Source: Patient Abstract System, Bureau of Health Care Analysis and Data Dissemination, Missouri Department of Health and Senior Services

Figure 2.

Missouri Resident NAS Rates by Type, 2014-2016		
	newborn affected by maternal use	neonatal withdrawal
2014-Q1	3.41	5.00
2014-Q2	3.51	5.29
2014-Q3	4.99	6.62
2014-Q4	3.31	5.29
2015-Q1	3.47	6.61
2015-Q2	4.02	5.87
2015-Q3	3.77	5.68
ICD 9/10-CM change		
2015-Q4	21.81	6.57
2016-Q1*	22.53	6.94
2016-Q2*	23.86	6.71
2016-Q3*	27.50	5.85
2017 ICD-10-CM revision		
2016-Q4*	23.15	6.82

*provisional data
Rates are per 1,000 resident live births.
Source: Patient Abstract System, Bureau of Health Care Analysis and Data Dissemination, Missouri Department of Health and Senior Services

Figure 3.