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Neonatal Abstinence Syndrome Surveillance in New Mexico

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Neonatal Abstinence Syndrome (NAS) has been defined as a group of symptoms that occur in newborns exposed to addictive substances while in utero.[1] In New Mexico (NM), substance use disorder (SUD) has been a major public health problem for decades.

This report aims to: a) provide an initial report on NAS prevalence in NM, b) describe how NAS surveillance is performed, c) present data from NM's NAS surveillance, and d) describe some current efforts made to improve both surveillance and provision of services for pregnant women with SUD.

Methods

NM NAS passive surveillance data came from the NM Hospital Inpatient Discharge Database (HIDD) for years 2008-2017. NAS cases were identified by the presence of the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) code 779.5 (drug withdrawal syndrome in newborn), for the period 2008-through third quarter of 2015; and by the ICD-10-CM code P96.1 (neonatal withdrawal symptoms from maternal use of drugs of addiction), since then. Liveborns were identified by the ICD-9-CM code V3* (liveborn infants according to type of birth) or ICD-10-CM Z38 (liveborn infants according to place of birth and type of delivery). Cases were deduplicated (meaning that subsequent visits with NAS codes were not counted), and re-tabulated by year of birth. Rates of NAS were calculated by dividing the number of NAS cases by the number of livebirths (presented per 1,000 livebirths). Liveborn and NAS data for the United States (US) were obtained from the Healthcare Cost and Utilization Project (HCUP) - National (Nationwide) Inpatient Sample (NIS), both through queries and processing of the NIS datasets, used the same codes as for NM-HIDD.

Results

In NM, the rate of NAS increased 324% between 2008 (3.3 per 1,000 livebirths) and 2017 (14.0). In the US, the rate increased by 207% between 2008 (2.8) and 2016 (8.6) (Figure 1).

Between 2008-2017, 2,072 NAS cases were identified in NM through HIDD. 53.1% of NAS cases were male infants (Table). When compared over time, female infants showed the highest percent change in the rate of NAS, 394.0% between 2008 (2.8 per 1,000 livebirths) and 2017 (13.7). Male NAS cases increased by 287.5% during the same period (3.8 and 14.7, respectively),

Hispanic infants (Table) accounted for 48.0% of NAS cases, White for 30.9%, and American Indian/Alaska Native for 5.0%. When compared over time, American Indian/Alaska Natives showed the highest percent change in the rate of NAS, 698.2% between 2008 (0.8 per 1,000 livebirths) and 2017 (6.4), followed by Whites (510.1%; 2.7 and 16.3, respectively), and Hispanics (222.4%; 4.0 and 13.0, respectively) (Figure 2).

The largest number of cases were born to residents of the Metro Region (54.9%), followed by those residing in the Northeast Region (23.2%). (Table) When compared over time, the Southwest Region experienced the largest percent change (573.9%) between 2008 (1.6 per 1,000 livebirths) and 2017 (11.0), followed by the Northeast Region (467.4%; 5.2 and 29.5, respectively), and the Southeast Region (441.8%; 0.6 and 3.5, respectively).

Finally, the healthcare costs for the majority of NAS cases were covered by Medicaid (74.0%), followed by self-payment (4.6%).

Discussion

NM has experienced a continuous increase in the number of identified NAS cases. In 2017, 330 cases were

identified, for a rate of 14.0 per 1,000 livebirths, an increase of 59.3% in the last five years, and of 324% since 2008.

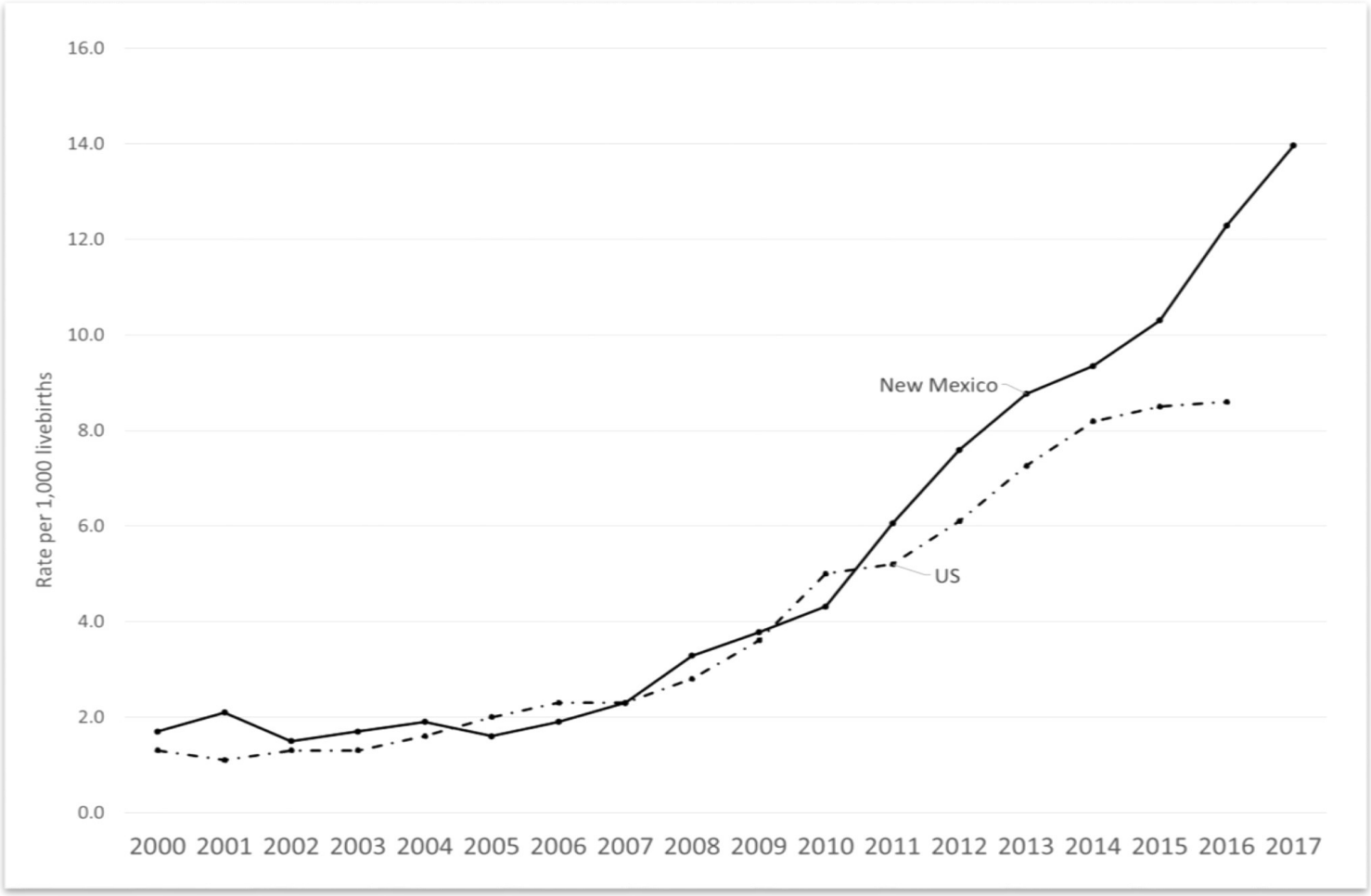
In NM, most of the healthcare costs for NAS cases have been covered by Medicaid, similar to what has been found in other studies.[2,3] Although NM NAS cases were more likely to be male, Hispanic, and reside in the Metro Region, the largest increases since 2008 occurred among female infants, American Indian/Alaska Natives, and those residing in the Southwest Region.

In NM, NAS passive surveillance is conducted by locating the aforementioned diagnostic codes on any of the diagnosis fields of the neonate's entries on HIDD. In 2017-2018, NMDOH was one of three recipients of the "Building on Existing Infrastructure of Population-Based Birth Defects Surveillance Systems to Estimate the Incidence of Neonatal Abstinence Syndrome" funding from March of Dimes (MoD) to assess NAS surveillance using a 2015 birth cohort. Pursuant to this grant, chart reviews for mother and infant for all 2015-born NAS cases were conducted.

NAS cases were considered confirmed following parameters reported previously by Lind et al .[4] Initial results of that project revealed that ICD-9-CM code 779.5 and ICD-10-CM code P96.1 had a combined positive predictive value of 70.2%. Although the results indicate that NAS has been overestimated, the sensitivity and specificity of these same codes still need to be assessed.

Amidst the opioid epidemic in the US, the term neonatal opioid withdrawal syndrome (NOWS) has been coined to refer to NAS due specifically to opioids,[5] either illegal or prescribed. Methadone and buprenorphine are medications used to treat opioid addiction, with the latter being found to show better results in reducing abstinence symptoms in newborns. [6,7] Data from the aforementioned March of Dimes NAS study found that 39.0% of mothers of NAS cases were on either methadone or buprenorphine treatment. The percent was 69.3% among those with a confirmed NAS diagnosis.

Figure 1. Trends of NAS, New Mexico (2000-2017) and U.S. (2000-2016)



This report is the first of its kind on NAS surveillance in NM. As stated, it is based on a particular set of diagnosis codes. Although used widely in many jurisdiction, these codes are but one of the methodologies used across the US to perform NAS surveillance, which include some states having made NAS a notifiable condition. Efforts like the MoD NAS project and the work of the Conference of State and Territorial Epidemiologist (CSTE) NAS Workgroup seek to find common standard definitions for NAS, which would allow for a better representation of this problem and permit adequate comparison across jurisdictions.

Recommendations

1. Having a standardized NAS case definition for surveillance is required to allow for sound comparison between jurisdictions and over time, to better estimate the impact of NAS.
2. Linking mother and infant records as part of NAS routine surveillance may allow for a more complete view of this problem, as maternal elements (i.e.., controlled-substance prescription history, ongoing medical-assisted treatment) may help better ascertain NAS cases.
3. Calculating sensitivity and specificity of the codes used may help determine how informative current passive surveillance efforts are using diagnosis codes.
4. Training healthcare professional to diagnose NAS in a systematic and standardized manner would improve data quality and surveillance.
5. Offering comprehensive services to mothers with substance use disorder as part of their pre-natal care (i.e., buprenorphine treatment) may improve outcomes for both the mothers and their infants.

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Table. Selected Demographics of Neonatal Abstinence Syndrome Cases, New Mexico, 2008-2017

Sex	Percent (Rate*)
Male	53.1% (8.1)
Female	46.9% (7.4)
Race/Ethnicity	
American Indian/Alaska Native	5% (3.1)
Asian/Pacific Islander	0.3% (1.7)
Black	1.6% (6.5)
Hispanic	48% (6.7)
White	30.9% (8.5)
Other/Unknown	14.2% (N/A)
Health Region of Residence	
Northwest	3.2% (1.9)
Northeast	23.2% (16.0)
Metro	54.9% (10.5)
Southeast	4.7% (2.2)
Southwest	13.1% (5.4)
Other/Unknown	0.8% (N/A)

*Rate per 1,000 live births

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Figure 2. Rate of NAS by Race/Ethnicity, New Mexico, 2008-2017