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Practice Summary & Implementation Guidance

NAS Surveillance Program

In 2013, Tennessee became the first state in the nation to require reporting of NAS for public health surveillance purposes. Providers are required to report all diagnoses of NAS within 30 days of diagnosis.

Cutting-Edge | Emerging | **Promising** | Best

Location	Topic Area	Setting
Tennessee	Mental Health/Substance Use	Clinical

Population Focus	NPM	Date Added
Perinatal/Infant Health; Child Health; Women's/Maternal Health	NPM 14.1: Smoking – Pregnancy	August 2021

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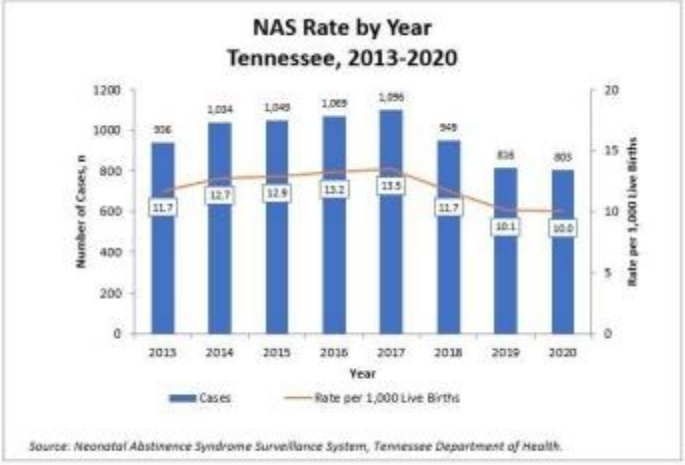
Section 1: Practice Summary

PRACTICE DESCRIPTION

Neonatal Abstinence Syndrome (NAS) is a condition in which an infant undergoes withdrawal from a substance to which he or she was exposed in-utero. Different classes of substances, including opioids, antidepressants, and barbiturates, may cause NAS when used during pregnancy. The most common substances causing NAS are opioids. This can include legally prescribed opioids (such as pain relievers like morphine and medication assisted treatment opioids such as buprenorphine and methadone) or illegally obtained opioids, e.g., heroin. In addition, a pregnant woman may obtain a substance through drug diversion, i.e. transfer of legally prescribed controlled substance from the individual for whom it was prescribed to another person for any illicit use.

Since the early 2000s, the incidence of NAS in Tennessee increased by 10-fold, far exceeding the national 3-fold increase over the same time period. A sub-cabinet working group focused on NAS and consisting of Commissioner-level representation from the Departments of Health, Children's Services, Mental Health and Substance Abuse Services, Medicaid (TennCare), Safety and the Children's Cabinet convened from 2012 to 2019. This group aligned efforts across state agencies, with a focus on upstream (primary) prevention strategies.

In 2013, Tennessee became the first state in the nation to require reporting of NAS for public health surveillance purposes. Providers are required to report all diagnoses of NAS within 30 days of diagnosis. Since 2013, Tennessee had seen annual increases in the number of cases of NAS until CY2018, which marked the first decrease in the number of cases.



Number of Cases of Neonatal Abstinence Syndrome as a Percentage of Live Births, Tennessee 2013-2020.

The Tennessee Department of Health was recently awarded short-term funding through the Council of State and Territorial Epidemiologists (CSTE) to implement a new standardized case definition for Neonatal Abstinence Syndrome (NAS). Currently, the use of diagnostic criteria and diagnostic codes for NAS varies between states, hospitals, and providers. The implementation of a new standardized

case definition will result in a better understanding of NAS and allow for more reliable comparisons between states. Detailed information about the CSTE standardized case definition can be found here. Infants will be classified as **confirmed**, **probable**, or **suspect** cases. To meet the requirements of the case definition, new questions were added to the REDCap survey.

The key population it impacts:

- The NAS surveillance program impacts pregnant women and infants or children.

What it intends to accomplish:

- NAS surveillance data helps to inform data-driven decision-making including policies and prevention measures. Indeed, the CSTE NAS standardized surveillance case definition will aid in making consistent, timely and accurate comparisons in NAS trends and incidences across the TN jurisdictions and nationally. For example, understanding the main exposure sources or geographic distribution of infants with NAS help guide targeted prevention measures.

Any relevant background information such as the history behind the development of the practice and/or any principles or values that support it:

- Since the establishment of NAS as a reportable condition in Tennessee in 2013, NAS case surveillance classification has largely depended on clinical case definition of infants presenting with NAS. This case definition can be subjective and subsequently may not allow consistent comparisons of NAS case trends and NAS incidences across jurisdictions. To address this concern, CSTE developed and ratified the CSTE NAS standardized surveillance case definition in 2019. Subsequently, funds were released to aid select states in the implementation of the new NAS case definition. Tennessee was one of the four jurisdictions that was awarded the CSTE/CDC grant to participate in piloting the CSTE NAS standardized surveillance case definition in 2020.

CORE COMPONENTS & PRACTICE ACTIVITES

The goal of the TDH NAS surveillance was to monitor and improve identification of infants with NAS and report the cases within 30 days of identification, with a focus on primary prevention measures. The key components included leveraging the existing TDH's online REDCap NAS surveillance system to incorporate new data elements based on the new NAS case definition (e.g. demographic and toxicology results of both infant and mother), to allow implementation of the CSTE NAS standardized surveillance case definition across the state, training of the hospital staff who use the TDH NAS surveillance portal, reporting of cases into the surveillance portal, sharing data with the CDC and data analysis and report production and connecting mother/child to needed services.

Effective January 1, 2013, Neonatal Abstinence Syndrome was made a reportable condition in Tennessee, with cases to be reported within 30 days of diagnosis. Cases are submitted from hospitals and providers through an online portal, with information collected on the infant's sex, county of residence, and exposure to substances thought to cause withdrawal in the infant. Data captured from the surveillance system allows for real time estimates of NAS incidence and exposure source at the

county, regional and state levels. Weekly, monthly, and annual surveillance reports are prepared and distributed to stakeholders. Stakeholders may use this data to develop programs and place them in areas of greatest need and/or evaluate the effects of their programs.

Core Components & Practice Activities

Core Component	Activities	Operational Details
Updating the existing TDH REDCap NAS Surveillance system	Incorporated new data variables into the existing TN NAS surveillance portal including demographics of the infant and mother, toxicology results of infant and mother, maternal history of drug use, and ICD-10 codes associated with NAS.	The lead investigator of the CSTE case definition grant, the NAS epidemiologist and clinical application coordinator were involved in creating new fields in REDCap and testing the new data tool before going live.
Training of staff	Training of the hospital and staff users of the TDH NAS surveillance portal.	The Lead Investigator and the Lead Epidemiologists prepared training materials and provided virtual seminars/webinars as well as sharing training materials via emails and posting the materials online. All users from the reporting hospitals were given the opportunity to attend the training and/or review the materials.
Reporting of Cases	Hospital or provider of infants with NAS reporting to TDH and, to the CDC	Designated hospital staff from each birthing/reporting hospital received a refresher training on the REDCap surveillance system, a REDCap account with a unique user ID and password protection is created for new user(s) as per need. Data entry for NAS cases is done in an ongoing basis within 30 days of case identification.
Data Analysis and Reports	Data analysis and production of surveillance reports	Hospital staff enter data, NAS lead epidemiologist downloads data from the online portal, cleans (including deduplication and assessment for accuracy and completeness) and

		analyzes data using statistical software, and prepares surveillance reports.
Connecting/linking	Mother/infant are referred external services/resources	TDH Clinical Health Medical Consultant reviews cases of NAS reported to the TDH surveillance portal and provides referrals, for any mother/infant that has not already been referred by reporting provider/hospital, to relevant needed social/health/behavioral services or community resources.

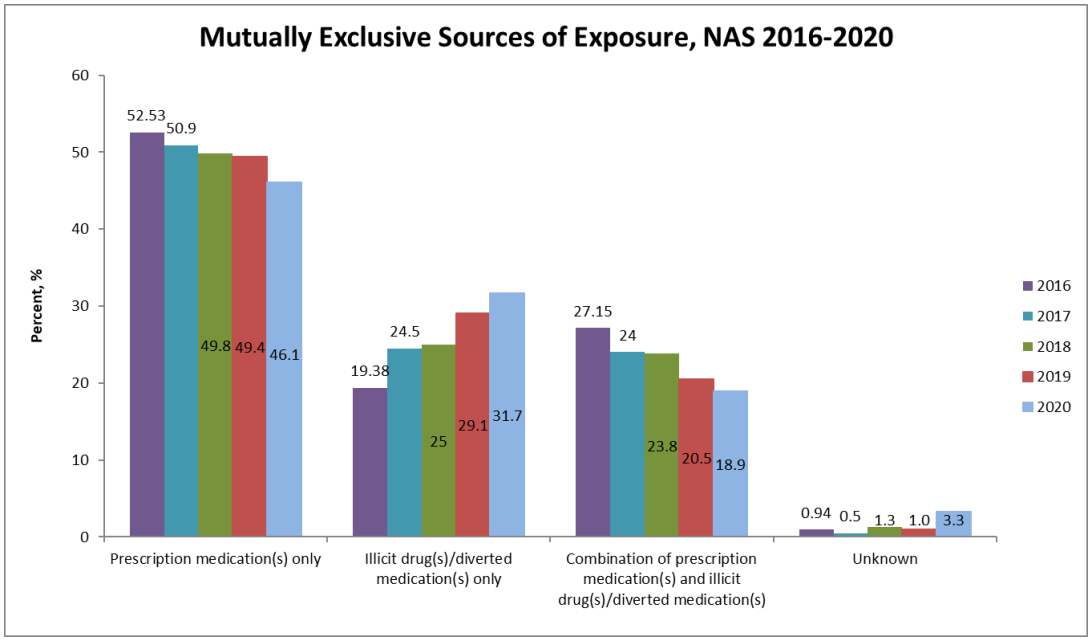
HEALTH EQUITY

The literature on NAS indicate existence of disparities in NAS incidence across rural vs. urban regions and remote rural counties. In addition, the initial implementation of the TDH NAS surveillance system did not include collection of detailed demographic information or toxicology screening on maternal/infant NAS cases due to legal and/or privacy concerns. However, following the implementation of the standardized CSTE NAS case definition in 2020, TDH started collecting data on maternal/infant demographics and toxicology screening results. TDH surveillance team plans to analyze the additional data information to identify any disparities among NAS cases with the hope that this will subsequently inform targeted prevention measures.

EVIDENCE OF EFFECTIVENESS

TDH NAS surveillance relies largely on passive case reporting into the surveillance portal from all TN hospitals. Data elements currently being collected include but not limited to infant and maternal toxicology results and additional details about signs of withdrawal and maternal substance abuse history as well as more detailed demographic information including race/ethnicity. Data is analyzed using SAS software and are broken using descriptive characteristics such as sex of child, geographic distribution of cases and drug exposure types. The data are expressed as numbers, percentages, and incidence rates. Incidence rates are used to make comparisons by geography and exposure types of NAS cases across Tennessee.

Based on trends of the number and the rate of NAS cases in TN, there is some indication that the cases of NAS decreased between 2018 and 2019 although there was a slight increase in CY2020, which might be explained in part by the impact of the COVID-19 pandemic. Of note, there has been an overall decline in the percent of NAS cases exposed to prescription drugs only, which may be due to efforts being made to regulate prescriptions of opioids/drugs.



Initially TDH NAS surveillance group did not collect demographic variables in the data that would allow us to explore any possible health inequities among the NAS cases. With the added demographic information into the new case definition, we anticipate that we will be able to analyze the TDH NAS surveillance data to understand any existing health inequities among cases.

TDH NAS surveillance is wholly dependent on passive case reporting from hospital staff. Therefore, the completeness, timelines, accuracy, and reliability of data is partly depended on the reporting staff. In addition, any NAS cases reported without laboratory confirmation is largely dependent on clinical determination or self-reported maternal exposure to substance use/abuse. These means of data collection can be hard to ascertain as they present with inherent biases including recall and provider or reporter's judgement on what makes a case. There is a possibility that some mothers might fear to disclose drug use for various reasons including cultural and fear of legal consequences or just the stigma associated with drug use. This may in turn affect the reliability of the surveillance reports that TDH produces. We did not collect any race/ethnicity data elements initially, so we have not explored this aspect.

Section 2: Implementation Guidance

STAKEHOLDER EMPOWERMENT & COLLABORATION

TDH NAS surveillance data is shared with all the reporting hospital and medical providers, TN local health departments (LHDs) and regional office as well as other state agencies/partners to inform prevention strategies and resource allocations. For example, the NAS monthly report is completed in collaboration with the TN Injury program, which houses the Maternal Mortality Review (MMR) program, to incorporate targeted prevention measures for pregnant women before the report is

disseminated statewide or posted online. In addition, we share the reports and educational materials with medical providers. Furthermore, senior leadership and the NAS data team are engaged on local workgroups/committees interested in opioid/drug overdose prevention and maternal child health. These include the TN ASTHO group, TN Maternal Mortality Review committee and the Tennessee Initiative for Perinatal Quality Care (TIPQC). Some of these stakeholders also work with Tennessee Early Intervention System (TEIS), Children's Special Services (CSS), and the care coordination program CHANT (Community Health Access and Navigation in TN), which serves all TN counties. TDH leadership also shares NAS data and discusses prevention strategies with healthcare providers through provider association meetings or other collaboratives.

Stakeholder Empowerment and Collaboration		
Stakeholder	**How are they involved in decision-making throughout practice processes?**	**Does this stakeholder have lived experience/come from a community impacted by the practice?**
Birthing hospitals/medical providers	Constitute the birthing hospitals and therefore are the main source of NAS cases reported to TN NAS surveillance portal.	Yes- All hospitals in TN, which provide medical services to most Tennesseans including those located in disparate areas are required to report any NAS cases to the TDH NAS surveillance portal.
Regional/Local health department	Conduct education efforts related to opioid prescribing and pain management and to the expansion of family planning services	YES- Local health departments (LHDs)/regionals stakeholders serve respective local population.
TN Perinatal Advisory Committee	Provides guidance on the care of NAS infants and has disseminated information regarding best practices.	Yes
TDH Maternal Mortality Review (MMR) Program	Involved in prevention of opioid use disorder, especially in pregnant women.	Yes

REPLICATION

Since the implementation of TDH NAS surveillance in 2013, the TDH team has been involved in collaborative efforts with other states to help establish of NAS surveillance program(s). Such states include Georgia and Massachusetts. In addition, TDH NAS surveillance team has contributed to several publications including articles in MMWR, AMCHP's database as a Cutting edge article, National Academy for State Health policy publication (NASHP) NAS Brief as well as other peer-review articles so that other states have access and can use the information to replicate the practice. TDH NAS team is also involved in ASTHO's efforts to develop a national NAS registry and CSTE's efforts to pilot and implement the CSTE NAS case definition.

INTERNAL CAPACITY

Currently, TDH NAS surveillance is housed within the Early Childhood section in the Division of Family and Health Wellness. The Child Health Medical Consultant works hand in hand with the NAS epidemiologist in leading the efforts towards data collection and management, report production and dissemination. With availability of funds the team hopes to incorporate a program staff/coordinator to help with coordination of case management, and a junior epidemiologist to help with data quality and management efforts.

PRACTICE TIMELINE

TDH's NAS surveillance system has been running since 2013. The implementation of the Phase I of the new CSTE's NAS case definition started in June 2020. TN is now in Phase II of the implementation of the new NAS case definition. This Phase will continue until the middle of 2022. However, NAS will remain a reportable condition, and NAS surveillance efforts will continue. Like most surveillance systems, once TDH NAS surveillance system was up and running, it has remained more self-sustaining. Importantly, continued involvement or collaboration from various stakeholders are vital to the sustainability and the growth of the surveillance system. For example, sharing of data and engaging stakeholders in data-driven prevention measures.

PRACTICE COST

The TDH NAS surveillance team utilized in-house REDCap expertise to develop the NAS REDCap project; therefore, funds were not spent on buying a new surveillance system. The new data elements from the CSTE's NAS case definition were incorporated into the existing REDCap surveillance portal. Subsequently, much of the CSTE's funding for the implementation for the new NAS case definition effort has been spent on personnel salaries including an epidemiologist. In addition, some of the

funding will support the development of a NAS case management module that will be housed within TDH's newborn screening and birth defects case management system.

LESSONS LEARNED

Planning, implementation, and execution phases, all require bringing the right stakeholders to the table to establish a functional surveillance system. It required concerted efforts i.e. involvement of different stakeholders to come to the table to make recommendations on data driven policies and decisions to prevent the initial rise of NAS cases that paralleled the opioid crisis in TN.

Being open-minded and listening to others as one develops a surveillance system.

Tennessee NAS surveillance team is excited over the new opportunities to implement the new CSTE standardized NAS case definition.

NEXT STEPS

TDH NAS surveillance team plans to continue collecting more data using the new NAS case definition. The new data elements will be analyzed in detail to allow TDH to make comparisons with the old TDH's case definition. Based on the outcome of the analysis relevant recommendations will be made accordingly and shared with the TDH leadership and other stakeholders including the CDC/CSTE and ASTHOS and medical providers. The TDH NAS team would also like to analyze the data for peer-review publication as a state or in collaboration with other states participating in the CSTE's standardized NAS case definition. Other plans include: -

- moving the NAS surveillance into a more advanced surveillance system to allow incorporation of the NAS Case Management module into the NAS surveillance.
- Continue CSTE project and provide feedback on the case definition
- Development of public-facing NAS data dashboard
- Continued partnership with Health Information Network (HIN) to identify cases
- Continue to create MPH practicum opportunities for expanded partnership and development of public health capacity in TN.
- Partnership with perinatal quality collaborative to determine how to best capture exposed newborn babies.

RESOURCES PROVIDED

- TDH NAS website: https://www.tn.gov/health/nas.html
- CSTE NAS standardized case definition: https://cdn.ymaws.com/www.cste.org/resource/resmgr/2019ps/final/19-MCH-01_NAS_final_7.31.19.pdf

APPENDIX

- TDH NAS Surveillance Info Link
- NAS Patient Brochure Link