Neonatal Abstinence Syndrome Surveillance Annual Report 2015

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A Note to the Reader:

Readers should interpret all findings with caution. In some cases (particularly in looking at data at the regional level), the counts included in this report are small and therefore may be statistically unreliable.

We encourage caution in interpreting findings and comparing differences across regions. If you have questions about particular data points or need assistance in interpreting the data, please contact Angela M. Miller, PhD, MSPH.

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Executive Summary

Over the last decade, the use of opioid pain relievers in the US and Tennessee has increased rapidly. Accompanying this increase in drug use has been a ten-fold increase in the incidence of Neonatal Abstinence Syndrome (NAS), a condition in which an infant experiences withdrawal from opioid substances the mother took during pregnancy. In an effort to monitor the extent of the rise in NAS cases, the Tennessee Department of Health established NAS as a reportable condition, effective January 1, 2013.

Since NAS reporting began, there have been over 3,000 reports of NAS cases made to the surveillance portal. While more infants were diagnosed with NAS in 2015 than in the previous two years of surveillance, the case rate, relative to the number of births, did not change significantly. A majority of cases have come from the eastern portions of the state, where opioid drug use is high.

Over 70% of mothers who delivered babies with NAS were taking at least one drug prescribed to them by a physician, either alone or in conjunction with an illegally obtained substance. The percentage of women reporting only prescription drug use has steadily increased over the last two years. In 2015, nearly half of women reported taking only prescription drugs during pregnancy, with 81% of those being on a replacement therapy.

While the count of NAS cases remains high, we are somewhat reassured that the rate is not increasing significantly. This may indicate that the NAS epidemic is reaching a plateau; additional time will be needed to determine this with certainty.

The patterns of exposure highlight continued opportunity for changes in provider prescribing practices as well as for providers promoting effective contraceptive methods among women of childbearing age. Additionally, the findings underscore the continued need for substance abuse treatment resources in Tennessee.

Introduction

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. The most common substances causing NAS are the opioid class of drugs, which includes morphine and heroin. NAS can occur when a pregnant woman takes prescription drugs prescribed to her, an illicit medication, or a prescription medication written for someone else but diverted to her.

Over the last decade, the incidence of NAS in Tennessee has increased by 15-fold, far exceeding the national increase (3-fold over the same time period). A sub-cabinet working group focused on NAS was convened in 2012, 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.

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. The data in this report reflect reporting to this surveillance system for CY2015.

Statewide Data

Highlights: Statewide Reporting

- There has been a non-statistically significant increase in number of NAS cases as a percentage of live births since surveillance began in 2013.
- In CY 2015, more males were affected with NAS than females.
- In CY 2015, most NAS cases were reported by the baby's birth hospital.

Case Reports

During CY2015, providers reported 1,039 cases of NAS to the surveillance portal. An additional 108 cases of infants with *in-utero* drug exposure but no clinical signs of withdrawal were also reported, but are not included in this analysis.

The majority of cases (81.1%; n=843) were reported by birth hospitals, and 18.7% (n=194) were reported after being transported to another facility. Two cases were reported in the outpatient setting or after being readmitted to a hospital.

Cases of NAS were more likely to be male than female (53.3% versus 46.7%; p=0.03).
The Tennessee Department of Health requires that all cases of NAS be reported within 30 days of diagnosis. In 2015, the average of length of time between the date of birth and date of reporting was 20.3 days (range 0-152 days), with 77.2% of cases being reported within 30 days of birth.

Number and Rate of Cases by Month of Birth

In 2015, there were 1,039 cases of NAS, a slight increase in 1,031 cases from 2014 (*See Technical Note*) and 936 cases in 2013 (Figure 1). In 2015, NAS cases represented 1.29% of all live births in Tennessee, an increase of 11% since surveillance began in 2013. This increase was not statistically significant (p=0.18).

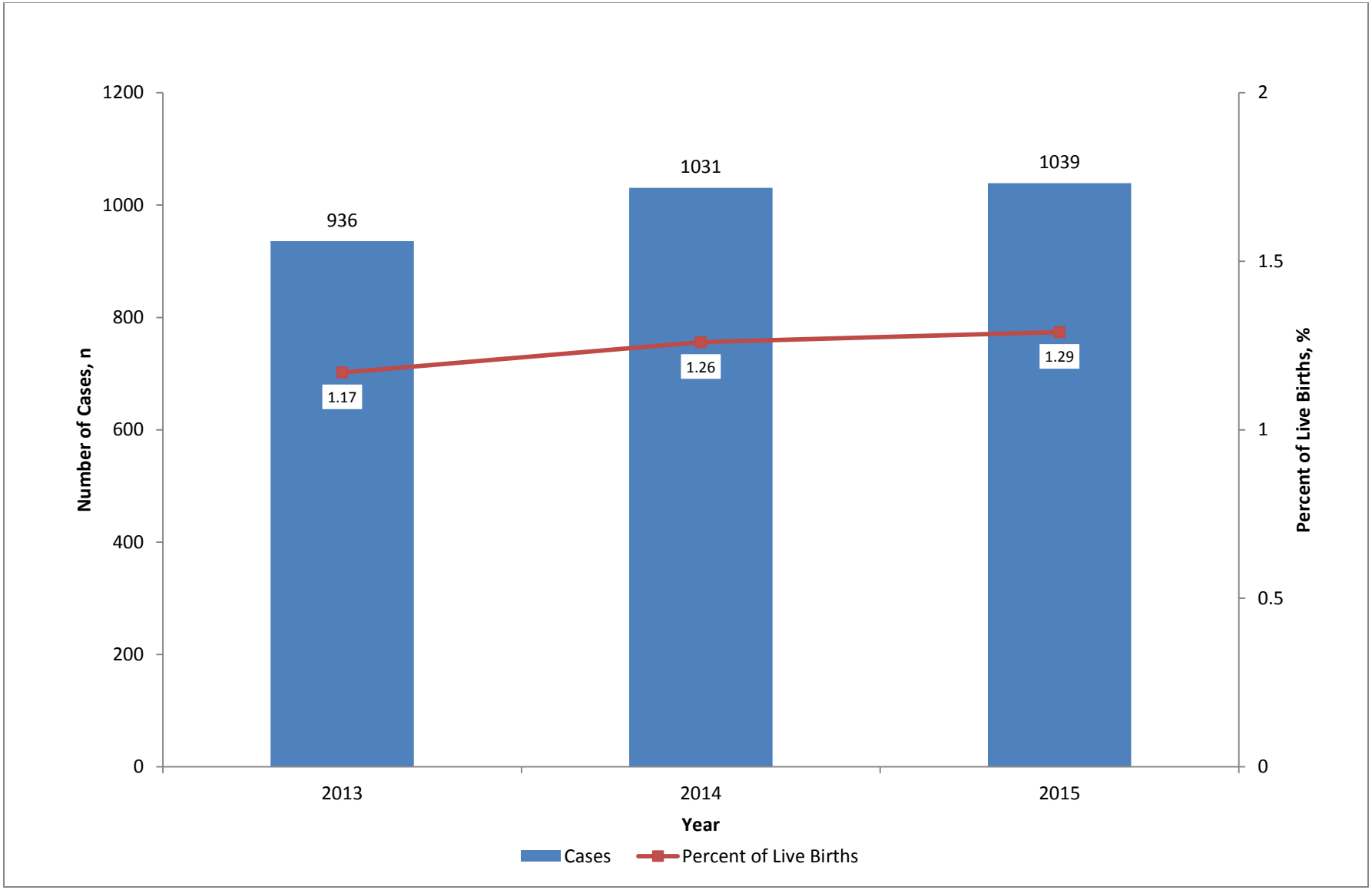

Figure 1: Number of Cases of Neonatal Abstinence Syndrome as a Percentage of Live Births, Tennessee 2013-2015

Source of Exposure for NAS Infants

Highlights: Source of Exposure

- Compared to CY2014, in CY2015 there was a statistically significant increase in exposure to prescribed drugs.
- 72% of infants with NAS were exposed to at least one prescription drug, with or without an illicit drug.
- More than half of infants with NAS were exposed to supervised replacement therapies.

Source of Exposure

The distribution of exposure to substances known to cause NAS for the three years of available data is shown in Table 1. Individual cases could have been exposed to multiple substances. Therefore, the sum of cases reported in Table 1 is greater than the number of NAS cases reported.

When categorized into mutually exclusive categories of exposure, 48.5% of cases were exposed to prescription drugs only, 26.8% were exposed only to illicit or diverted drugs, and 23.2% were exposed to a mix of prescription and illicit or diverted drugs. The remainder (1.5%) had no known exposure, or exposure information was not reported.

Since 2013, there has been a statistically significant **increase** in the percentage of NAS cases exposed only to prescription drugs (p=0.01; Figure 2). There was a non-statistically significant annual **decrease** in the proportion of cases exposed to illicit or diverted drugs (p=0.07). The percentage of cases exposed to both prescription and illicit drugs remains unchanged (p=0.55).

Among the 504 cases exposed to only prescription drugs, 81.3% (n=410) were exposed to medication assisted treatment for the mother's substance abuse problem. Sixteen percent were exposed to prescription pain therapies, and 12.5% were exposed to psychiatric or neurologic therapies (Figure 3).

Table 1: Reported Non-mutually Exclusive Sources of Exposure for Neonatal Abstinence Syndrome Cases, Tennessee 2013-2015

	2013		2014		2015		
Source	**# Cases**	**% Cases**	**# Cases**	**% Cases**	**# Cases**	**% Cases**	**P-value**
Supervised replacement therapy	436	46.6	581	56.4	612	58.9	0.21
Supervised pain therapy	178	19.0	135	13.1	106	10.2	0.12
Therapy for psychiatric or neurological condition	69	7.4	75	7.3	86	8.3	0.39
Prescription substance without a prescription	375	40.1	402	39	343	33	0.24
Non-prescription substance	252	26.9	218	21.1	224	21.6	0.38
No known exposure but clinical signs consistent with NAS	13	1.4	3	0.3	5	0.5	0.44
No response	16	1.7	1	0.1	51	4.9	0.27

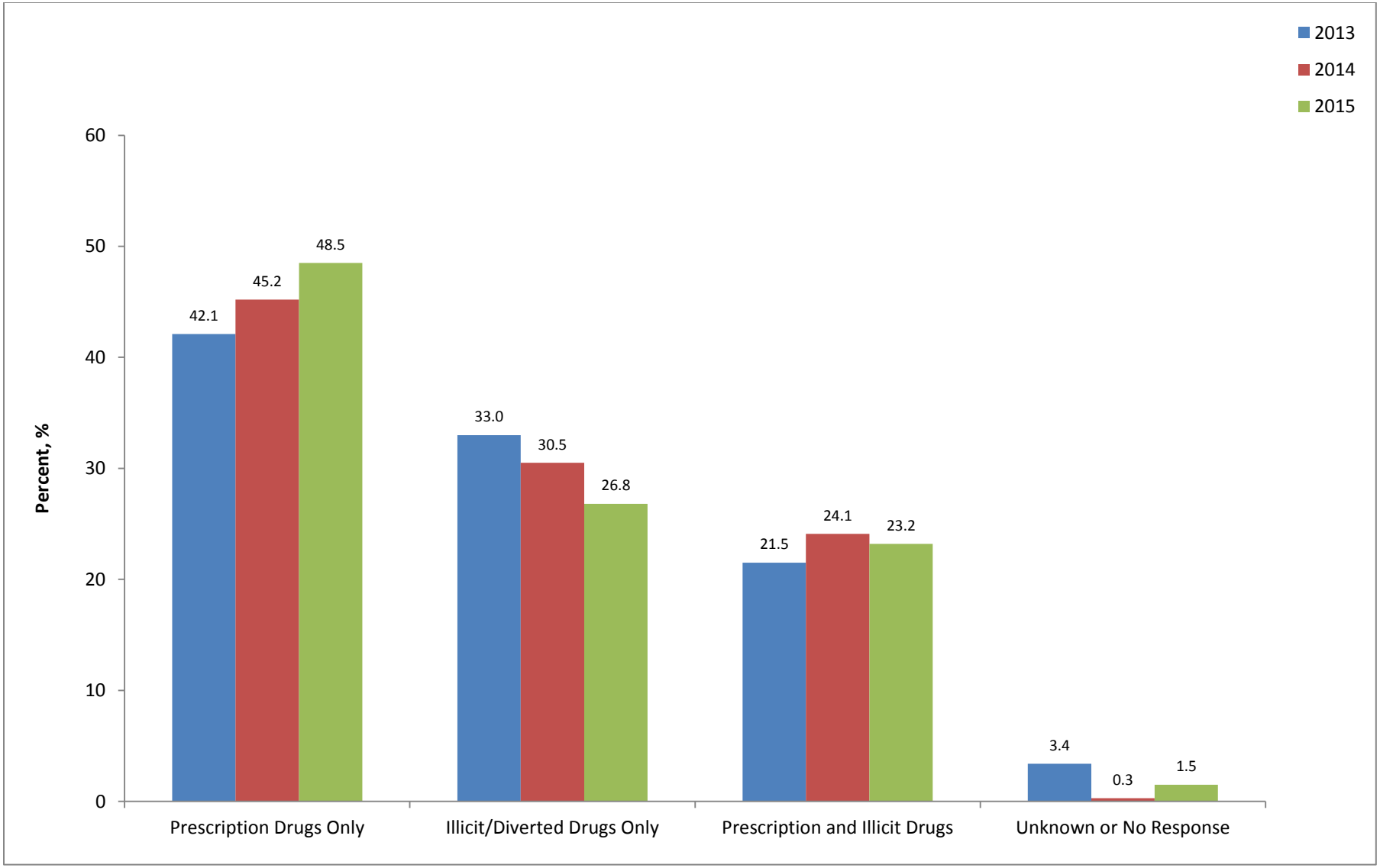

Figure 2: Mutually Exclusive Sources of Exposure for Neonatal Abstinence Syndrome Cases, Tennessee 2013-2015. The increase in exposure to prescription drugs only was statistically significant (p=0.01). Time trends did not reach statistical significance for exposure to illicit/diverted drugs only (p=0.07) or prescription and illicit drugs (p=0.55).

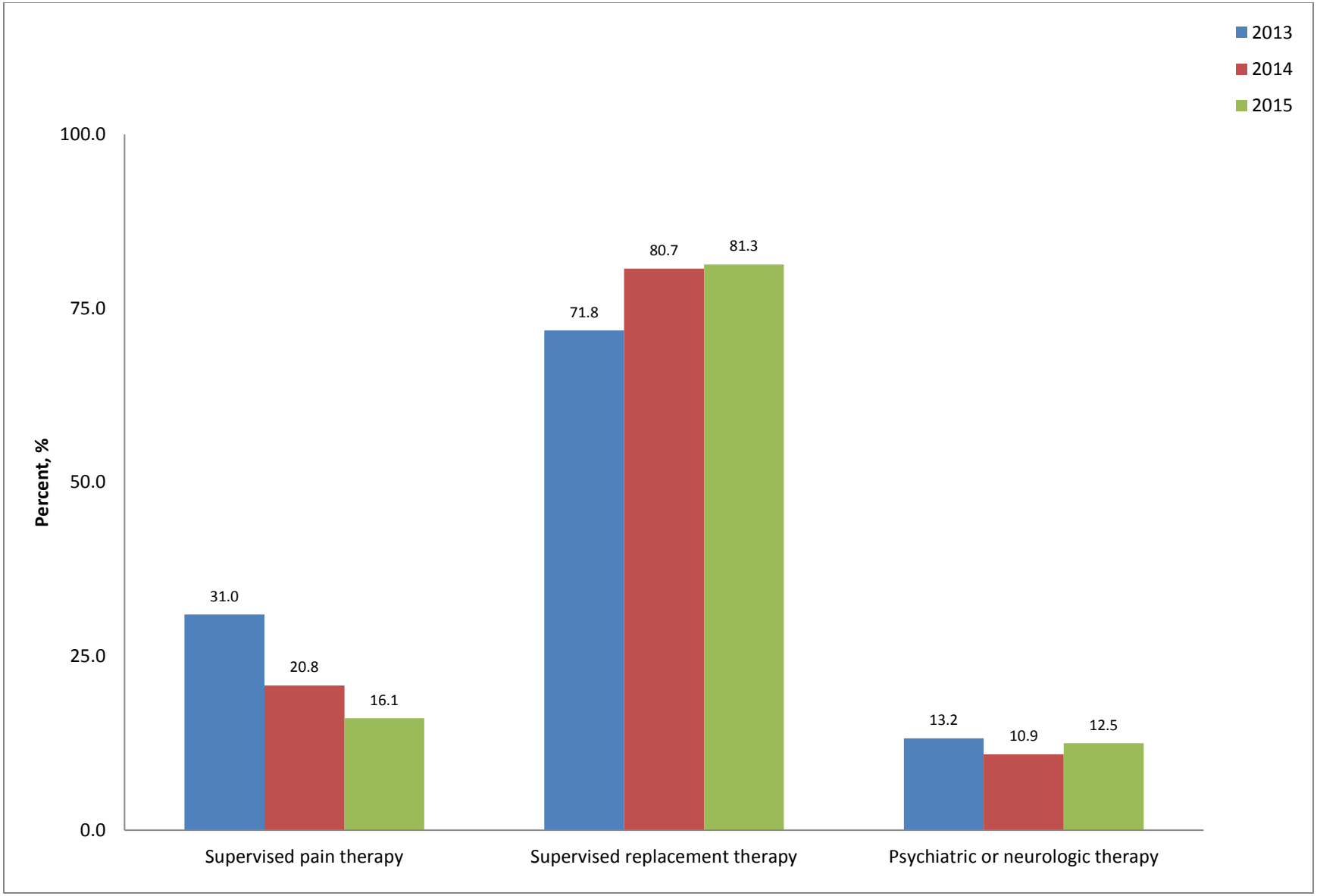

Figure 3: Class of Drug Exposure of Neonatal Abstinence Syndrome Cases with Prescription Drug Exposure Only, Tennessee 2013-2015. Trends were not statistically significant.

Regional Data

Highlights: Regional Trends for NAS

- Rates of NAS increase when moving from west to east across Tennessee.
- Exposure to prescription substances increases when moving from west to east across Tennessee.

NAS Incidence by Region

In 2015, rates of NAS varied by health department region. Rates of NAS are lowest in West Tennessee and increase in an easterly fashion. There has been some annual variation in the case rate by region, but time trends were statistically significant only for the South Central and South East Health Regions (Figure 4).

While there has not been much change in rates of NAS when aggregated at the regional level, 43 counties had no change or a decrease in the absolute case rate comparing 2013 and 2015 (Figure 5).

Exposure Source by Region

There also appears to be geographic variation in the substance causing NAS (Figure 6). Exposure to only prescription drugs is more common in the eastern most regions, though more than half of NAS cases in West Health Region were exposed only to prescription drugs. Conversely, exposure to only illicit or diverted drugs is more common in West and Middle Tennessee, with 30% or more of NAS infants in Shelby, West, Mid-Cumberland, Davidson, South Central and Upper Cumberland Health Regions exposed only to illicit or diverted drugs.

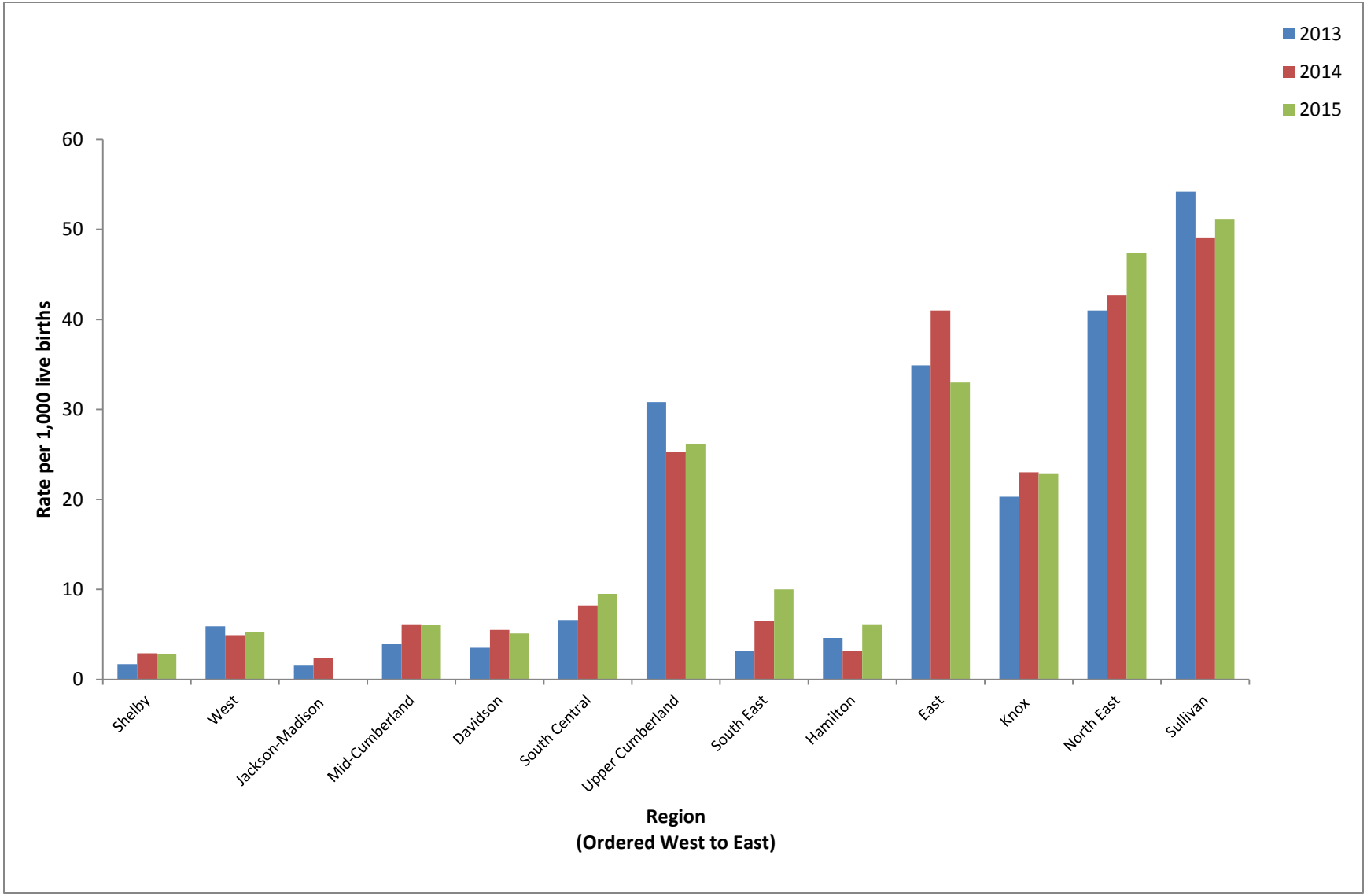

Figure 4: Annual Neonatal Abstinence Syndrome Case Rate by Tennessee Health Region, 2013-2015 Trends were statistically significant only for South Central and South East Health Regions.

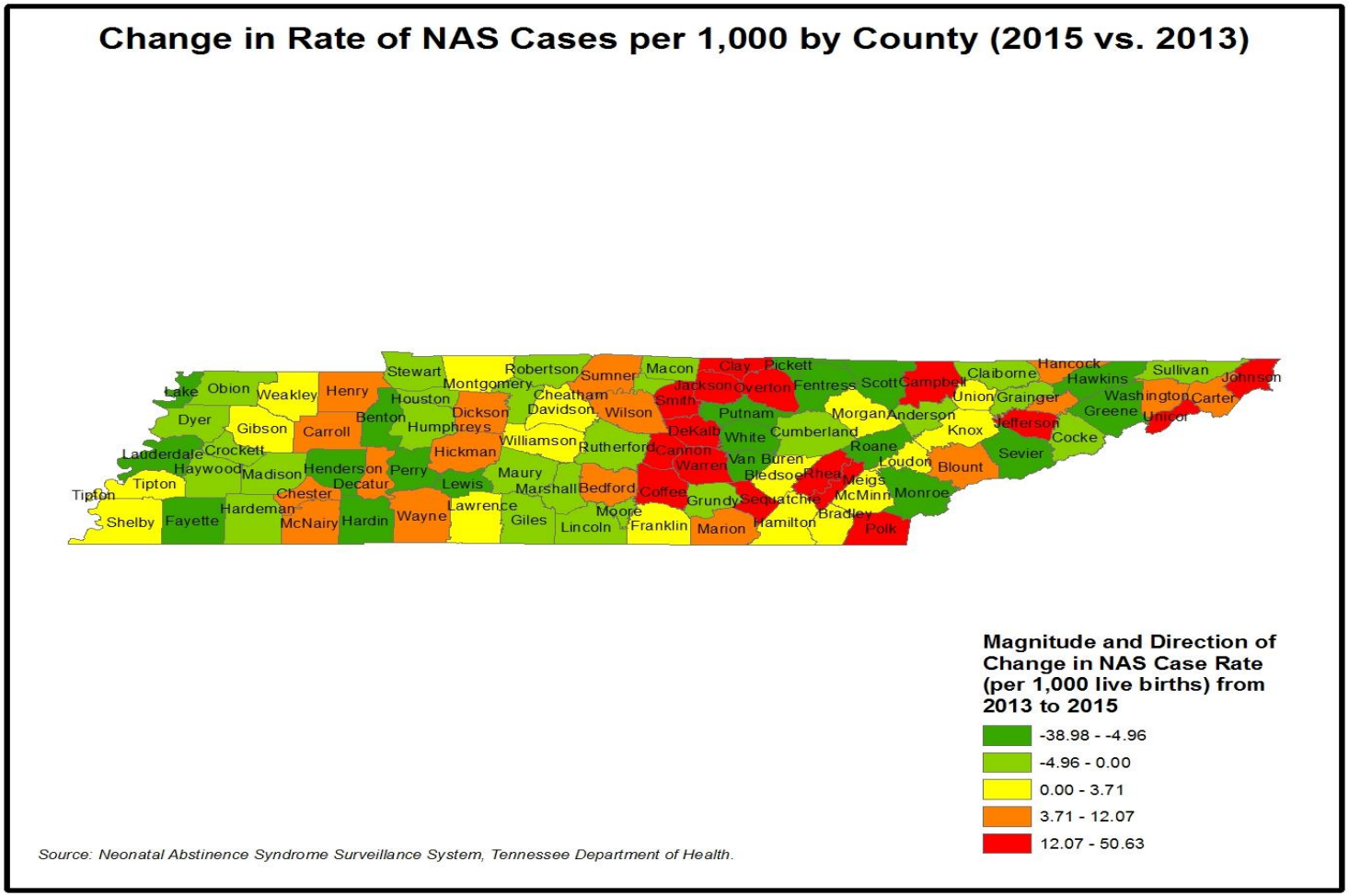

Figure 5: Magnitude and Direction of Change of Neonatal Abstinence Syndrome Case Rate (per 1,000 Live Births) from 2013 to 2015 by Tennessee County. Counties with green shading showed an improvement in the NAS case rate, with darker green showing greater improvement. Counties shaded red or orange showed a worsening case rate, with red shading indicated a greater worsening than orange.

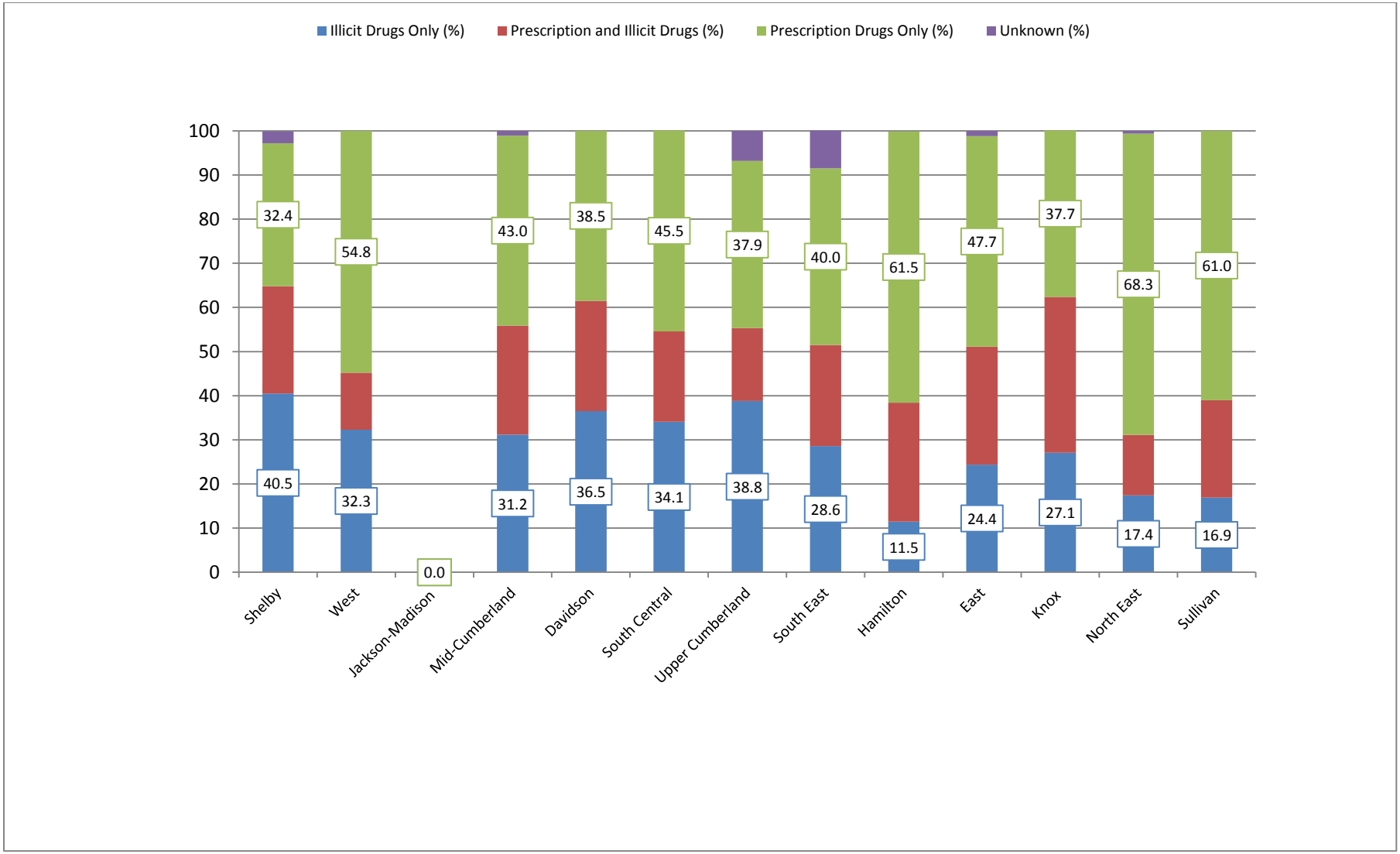

Figure 6: Distribution of Mutually Exclusive Sources of Exposure by Health Region for Neonatal Abstinence Syndrome Cases, Tennessee 2015. No cases were reported with maternal residence in Madison County. Cases born in Madison County were reported for their maternal county/region of residence (e.g., West Health Region).

Non-Residential NAS Cases

Highlights: Non-Residential NAS Cases

- In CY2015, Tennessee hospitals reported 92 NAS cases in which the infant was from another state.
- The majority of non-residential NAS cases were from Virginia.

Effective July 1, 2014, reporting hospitals were asked to report cases of NAS treated at Tennessee hospitals that were residents of states that border Tennessee. These states include Alabama, Arkansas, Georgia, Kentucky, Mississippi, Missouri, North Carolina and Virginia.

In 2015, 92 cases of NAS from other states were treated in Tennessee. The distribution of out of state cases, by maternal state of residence, is shown in Table 2.

Just over half (54.3%, n=50) of out of state NAS cases were born in Tennessee (for example, the baby's mother was from North Carolina but delivered in Tennessee). The others were born in out of state hospitals and transferred to a Tennessee hospital for care (for example, the baby was born in Virginia but transferred to Tennessee for care).

Table 2: State of Residence for Non-Resident Cases of Neonatal Abstinence Syndrome Reported in Tennessee, 2015

State	No. of Cases	% of Cases
Alabama	1	1.1
Arkansas	1	1.1
Georgia	15	16.3
Kentucky	13	14.1
Mississippi	0	0
Missouri	0	0
North Carolina	2	2.2
Virginia	60	65.2
Total	92	100.0

Conclusion

Since becoming a reportable condition in 2013, the proportion of births affected by Neonatal Abstinence Syndrome each year seems to slowing. From 2000 to 2012, the rate of NAS increased 15 fold, as measured by Hospital Discharge Data. The rate measured by surveillance data has not shown a statistically significant increase over the past three years.

While the count of NAS cases remains high, we are somewhat reassured that the rate is not increasing significantly. This may indicate that the NAS epidemic is reaching a plateau; additional time will be needed to determine this with certainty.

Since 2013, there has been a shift in the reported substances associated with Neonatal Abstinence Syndrome, with more mothers of NAS infants taking medications prescribed by a provider. The increase in women receiving supervised replacement therapies, and corresponding decrease in those receiving supervised pain therapies, may suggest a decrease in the use of pain management clinics.

The patterns of exposure highlight continued opportunity for changes in provider prescribing practices as well as for providers promoting effective contraceptive methods among women of childbearing age. Additionally, the findings underscore the continued need for substance abuse treatment resources in Tennessee.

Acknowledgements

The Tennessee Department of Health would like to acknowledge the reporting hospitals and providers across the State of Tennessee, the NAS Sub-Cabinet Working Group and TDH Staff.

Technical Notes

1. At publication of the 2014 Neonatal Abstinence Syndrome Surveillance Annual Report, 1018 cases with a birth year of 2014 had been reported. After publication of the 2014 report, an additional 13 cases were reported and are included here.

2. All rates for 2015 were calculated using the provisional 2015 Birth Statistical File, accessed March 17, 2016.

Suggested Citation

This report was prepared by Angela M. Miller, PhD, MSPH and Michael Warren, MD, MPH. Suggested citation: Miller AM and Warren MD (2015). Neonatal Abstinence Syndrome Surveillance Annual Report 2015. Tennessee Department of Health, Nashville, TN.