

Substance Use Disorder in Pregnancy & Neonatal Abstinence Syndrome

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Agenda Item V A (HEALTH CARE)
Meeting Date: 11-20-19

Opioid use disorder during pregnancy...

Sesame Street Introduces Karli, Whose Mother Has an Opioid Addiction



Lauren Evans

Yesterday 8:30AM • Filed to: SESAME STREET ▾



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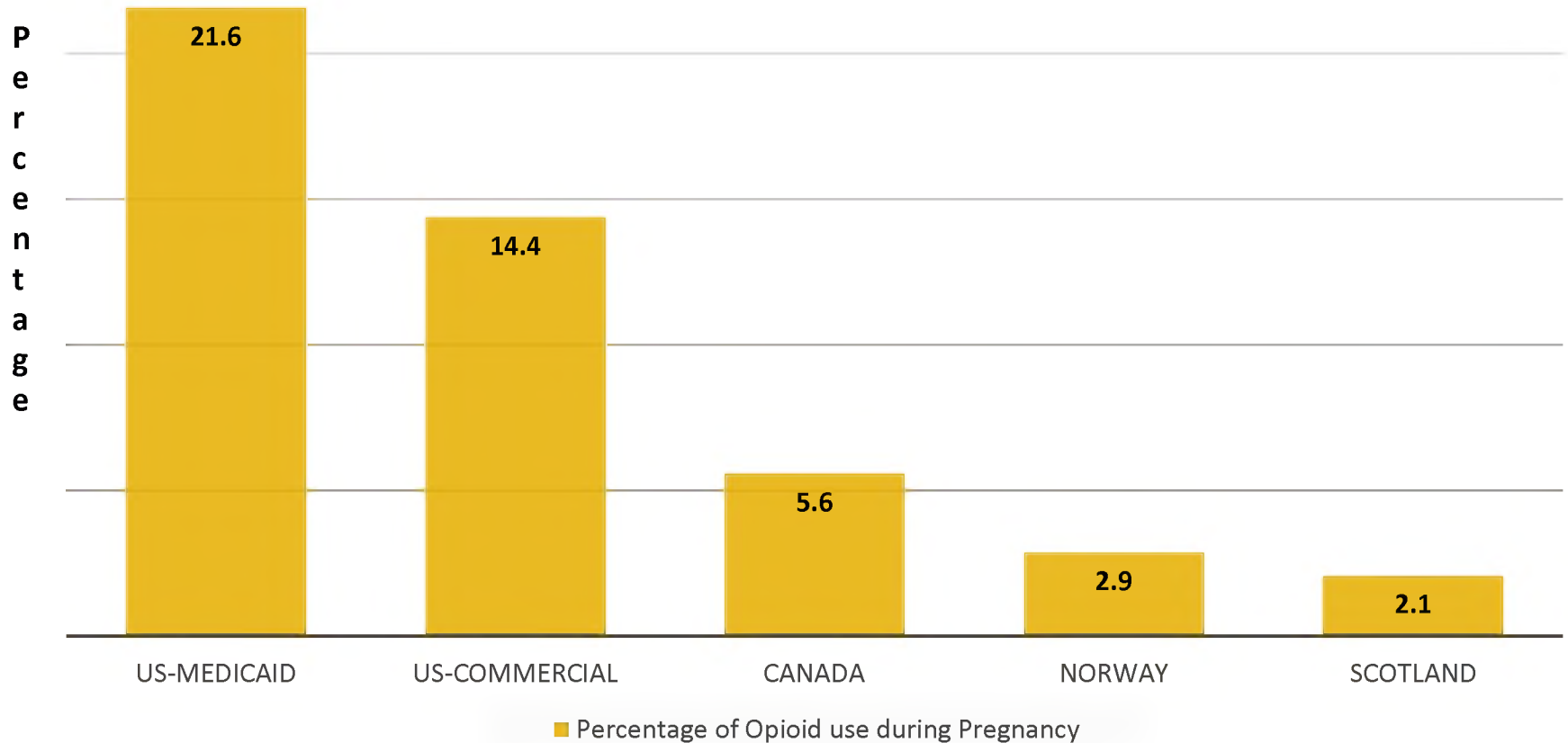
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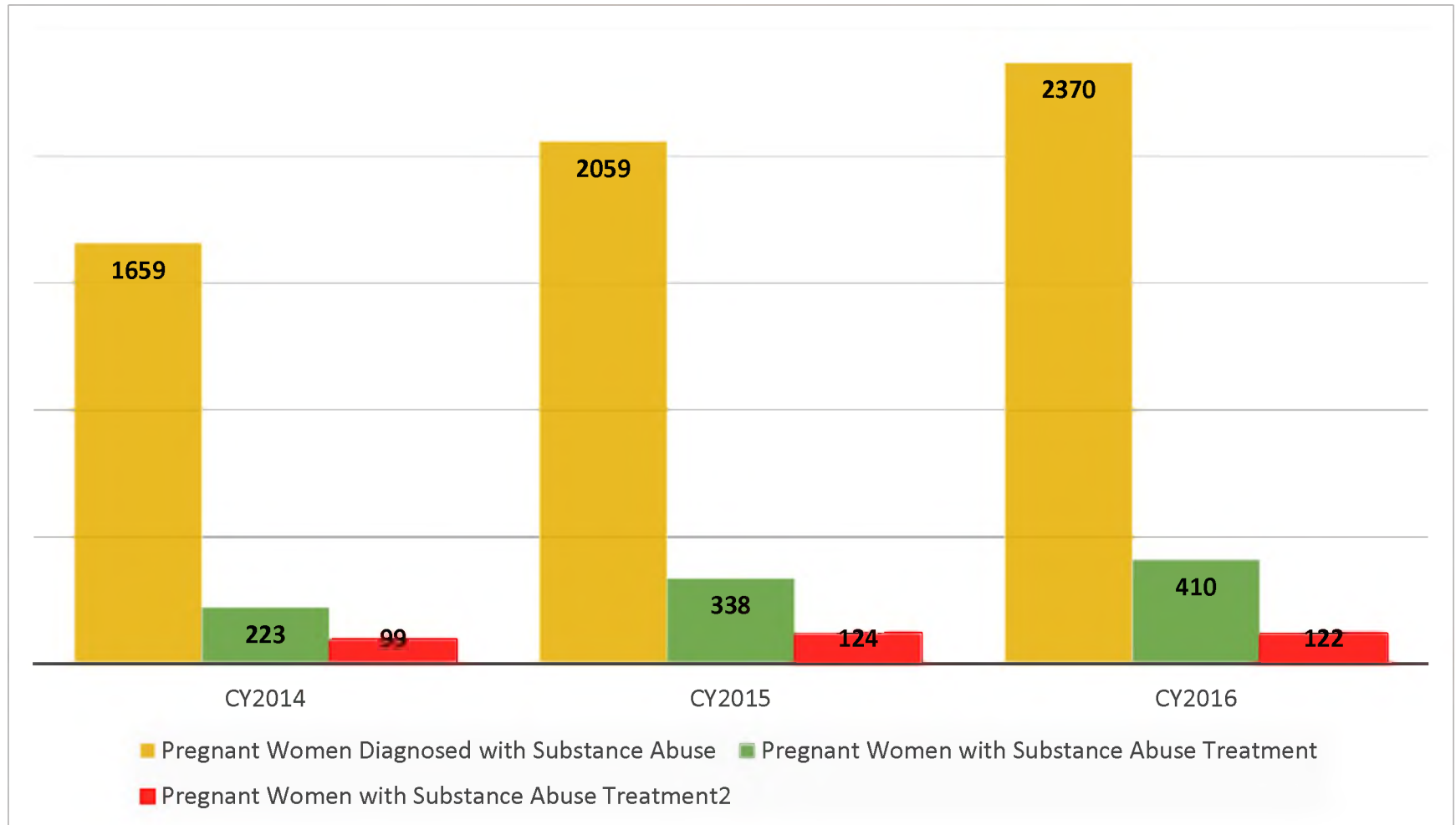
Image: AP

Sesame Street decided to add Karli's character on the basis that around 5.7 million children under the age of 11 live in a home with a parent with substance abuse issues.

Opioid use During Pregnancy



Nevada: Initiation & Engagement in Treatment for Pregnant Women



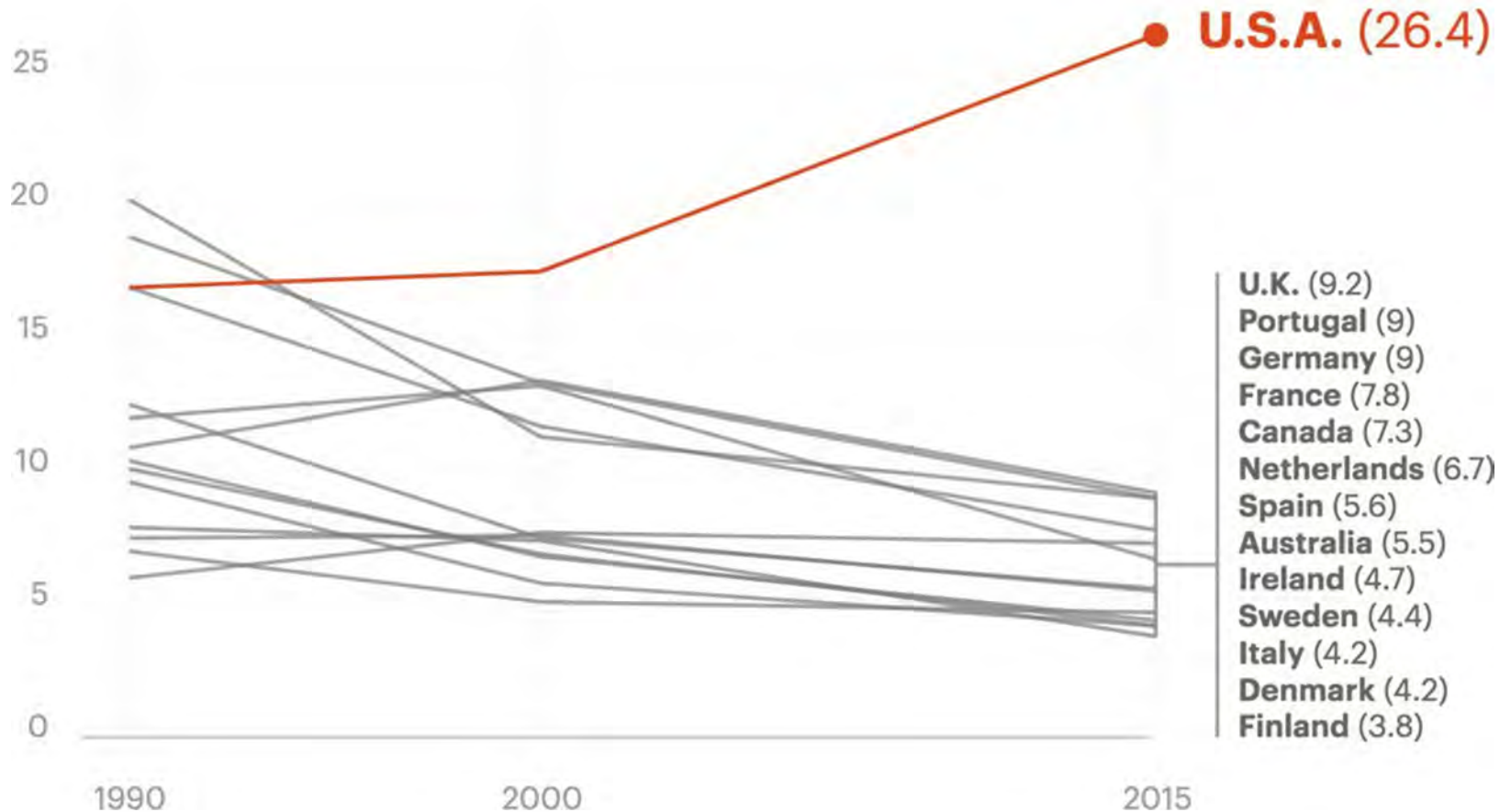
The effects of opioid use disorder on maternal mortality....

Nevada Pregnancy-Associated Deaths by Top Causes 2010-2017

Top Causes of Deaths	Year								Total
	2010	2011	2012	2013	2014	2015	2016	2017	
Pregnancy, childbirth and the puerperium	3	1	3	4	2	1	5	9	28
Diseases of the heart	3	0	1	1	4	5	2	3	19
Intentional self-harm (suicide)	1	1	1	1	1	4	1	5	15
Assault (homicide)	2	1	2	1	0	2	4	2	14
Transport accidents	1	2	1	1	3	3	3	0	14
Nontransport accidents	2	2	3	0	2	2	0	2	13
Malignant neoplasms	0	3	0	2	1	3	1	1	11
Cerebrovascular diseases (stroke)	1	0	0	0	0	4	0	0	5
Septicemia	0	0	1	1	1	0	1	0	4
Complications of medical/surgical care	0	1	0	0	0	1	0	0	2
Congenital malformations abnormalities	0	0	1	0	0	0	1	0	2
Events of undetermined intent	0	0	0	1	0	0	1	0	2
Influenza and pneumonia	0	0	0	0	1	0	1	0	2
Other diseases of circulatory system	0	1	0	0	0	0	0	0	1
Chronic lower respiratory diseases	0	0	0	0	1	0	0	0	1
Other disorders of circulatory system	0	0	0	0	0	0	1	0	1
Anemias	0	0	0	0	0	0	0	1	1
All other diseases (residual)	1	0	0	0	0	0	0	0	1
Symptoms, signs, not elsewhere classified	0	0	0	0	0	1	1	1	3
System Missing or Undefined	0	0	0	0	0	2	0	3	5
Total	14	12	13	12	16	28	22	27	144

* Pregnancy-Associated Deaths are deaths during pregnancy or within one year of the end of pregnancy, irrespective of cause.

Maternal Mortality Rates- USA vs Developed Nations



Maternal Mortality & Overdose Rates

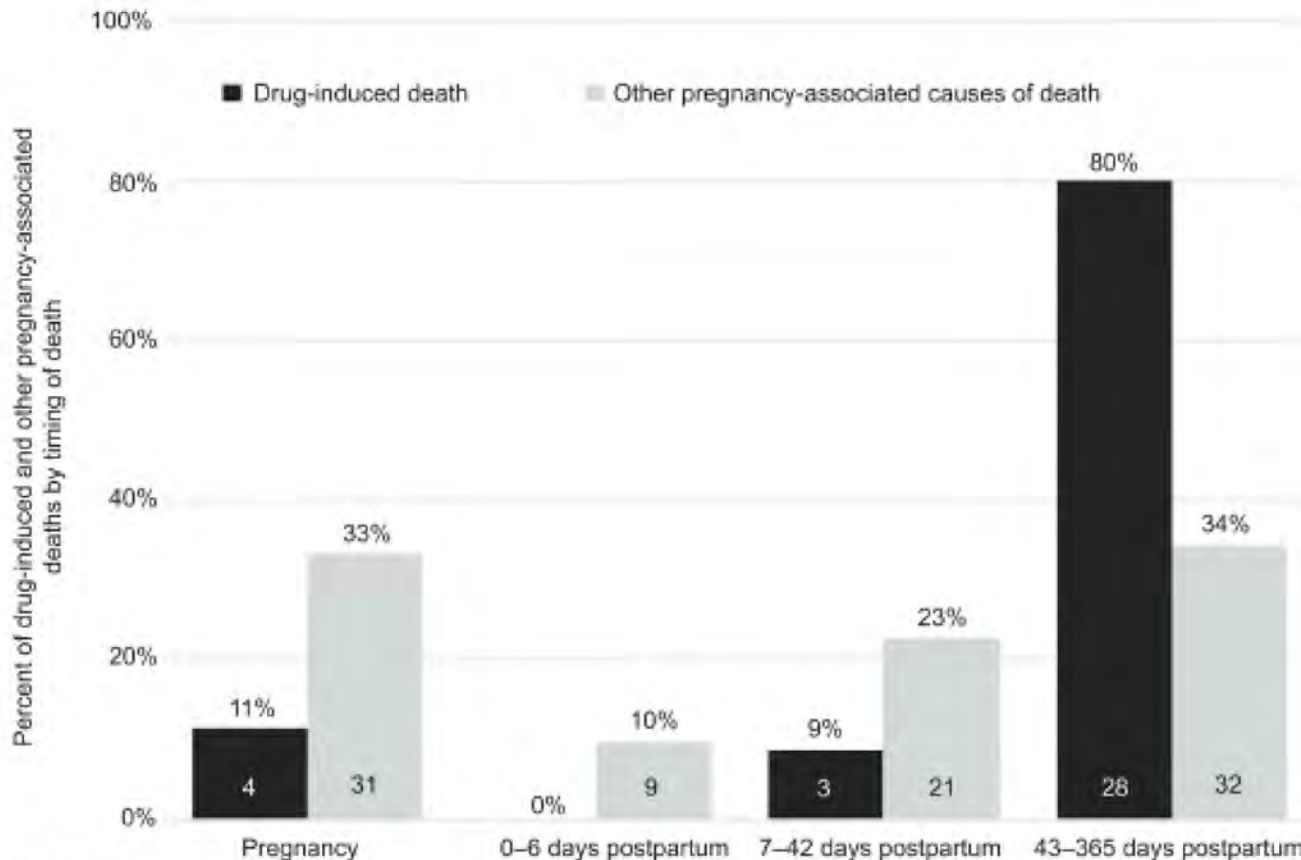


Fig. 1. Proportion of pregnancy-associated, drug-induced deaths vs all pregnancy-associated deaths, 2005–2014 (N=136).
Smid. Pregnancy-Associated Drug-Induced Deaths in Utah. Obstet Gynecol 2019.

Treatment options for maternal opioid use disorder....

Maternal Treatment Options

Methadone	Buprenorphine
<ul style="list-style-type: none">-Full opioid agonist-Requires daily visits to a federally certified opioid treatment program-Greater risk of overdose than Buprenorphine-Higher incidence, more severe symptoms & longer duration of NAS/NOWS	<ul style="list-style-type: none">-Partial opioid agonist/antagonist-May be prescribed in office setting-Less risk of overdose than Buprenorphine-Generally less incidence, milder symptoms & shorter duration of NAS/NOWS

Buprenorphine vs Methadone

- 3 different prospective studies have shown lower NAS rates for infants delivered to mothers receiving Buprenorphine

Study	Outcome
Methadone versus buprenorphine in pregnant addicts	Mean duration of treatment for NAS was longer for methadone vs. buprenorphine (5.3 vs 4.8 days p = 0.766)
PROMISE Trial	Length of hospitalization was longer for neonates exposed to methadone vs. buprenorphine (8.1 vs 6.8 days, P=0.021)
MOTHER Trial	Neonates exposed to buprenorphine required significantly less morphine. (1.1 vs 10.4mg, p<0.0091) Neonates exposed to buprenorphine had a significantly shorter duration of NAS treatment. (4.1 vs 9.9 days, p<0.003) Neonates exposed to buprenorphine had a significantly shorter hospital stay. (10.0 vs 17.5days, p<0.009)

Buprenorphine vs Methadone Cost Effectiveness

Theoretical Cohort of 20,000 opioid maintained pregnant women based on amount of pregnant women exposed to opioids in pregnancy.		
	Methadone	Buprenorphine
Neonatal Abstinence Syndrome (NAS)	9,080	5,263
Preterm Birth (< 37 weeks)	3,490	1,917
IUGR	927	564
CP	167	100
IUFD	5	5
Discontinued Treatment	3,600	5,625
Mother-Baby Dyad QALYs	1,109,800	1,120,600
Cost (in millions)	\$1,207	\$924

Per 20,000 patients treated buprenorphine results in

- 3187 less cases of NAS
- 1573 less cases of Preterm Births
- 362 less cases of growth restriction

Cost Savings of \$283 million dollars

Saves \$23,000 per pt for 7 months of treatment

In-utero effects on the fetus....

Opioid Exposure & the Brain

- Clinical studies in children & newborns
 - In utero exposure to opioids shows white matter microstructure changes on MRI
 - Decreased brain volumes (areas of effect are similar to animal studies)
 - Methadone exposure shows similar changes in neonatal brains
 - Correlates with studies showing decreased HC in infants with NAS

Effects on the newborn.....

NAS and Newborn Head Circumference

	Subjects	Controls	Signif.
Number	332	332	
HC $\leq 10^{\text{th}}\%$	98(29.5%)	41(12.3%)	$p < .001$
HC $\leq 3^{\text{rd}}\%$	25(7.5%)	5(1.5%)	$p < .001$
HC $\leq 10\% > 3\%$	73(22%)	36(10.8%)	$p < .001$
SGA/IUGR	54(16.3%)	37(11.1%)	$p = 0.07$
HTN etc.	65(19.6%)	69(20.8%)	$p = 0.8$
Diabetes	26(7.8%)	36(10.8%)	$p = 0.2$

Study shows fetuses exposed to Methadone during pregnancy had significantly smaller head size compared to fetuses not exposed to opioids.

Visconti, Towers 2015 AJP

Neonatal Abstinence Syndrome (NAS)...

What is NAS/NOWS?

- Prescription misuse & illicit drug use during pregnancy
- NAS = Neonatal Abstinence Syndrome
 - Withdrawal symptoms in Infants born to mothers who used drugs during pregnancy
- NOWS = Neonatal Opioid Withdrawal Syndrome
 - Specific form of NAS
 - 50-80% of opioid exposed infants develop NOWS

Symptoms of NAS

- Effects of withdrawal manifest in the following ways in infants:

Neurologic Symptoms	Gastrointestinal Symptoms	Autonomic Symptoms
<ul style="list-style-type: none">-Irritability-Increased wakefulness-High-pitched cry-Tremors-Increased muscle tone (stiffness)-Yawning/sneezing-Seizures	<ul style="list-style-type: none">-Vomiting/diarrhea-Dehydration-Poor weight gain-Poor feeding-Uncoordinated & constant sucking	<ul style="list-style-type: none">-Sweating-Nasal stuffiness-Fever-Temperature instability-Elevations in respiratory rate & blood pressure

How do we treat Neonatal Abstinence Syndrome (NAS)?

Treatment of NAS

Non- Pharmacologic

- Breastfeeding
- Skin-to-skin Contact
- Rooming-in
- Swaddling
- Pacifier use
- Quiet/dark environment

Pharmacologic

- Morphine
- Buprenorphine
- Clonidine
- Phenobarbital
- Clonidine

**Start these conversations
prior to delivery!!**

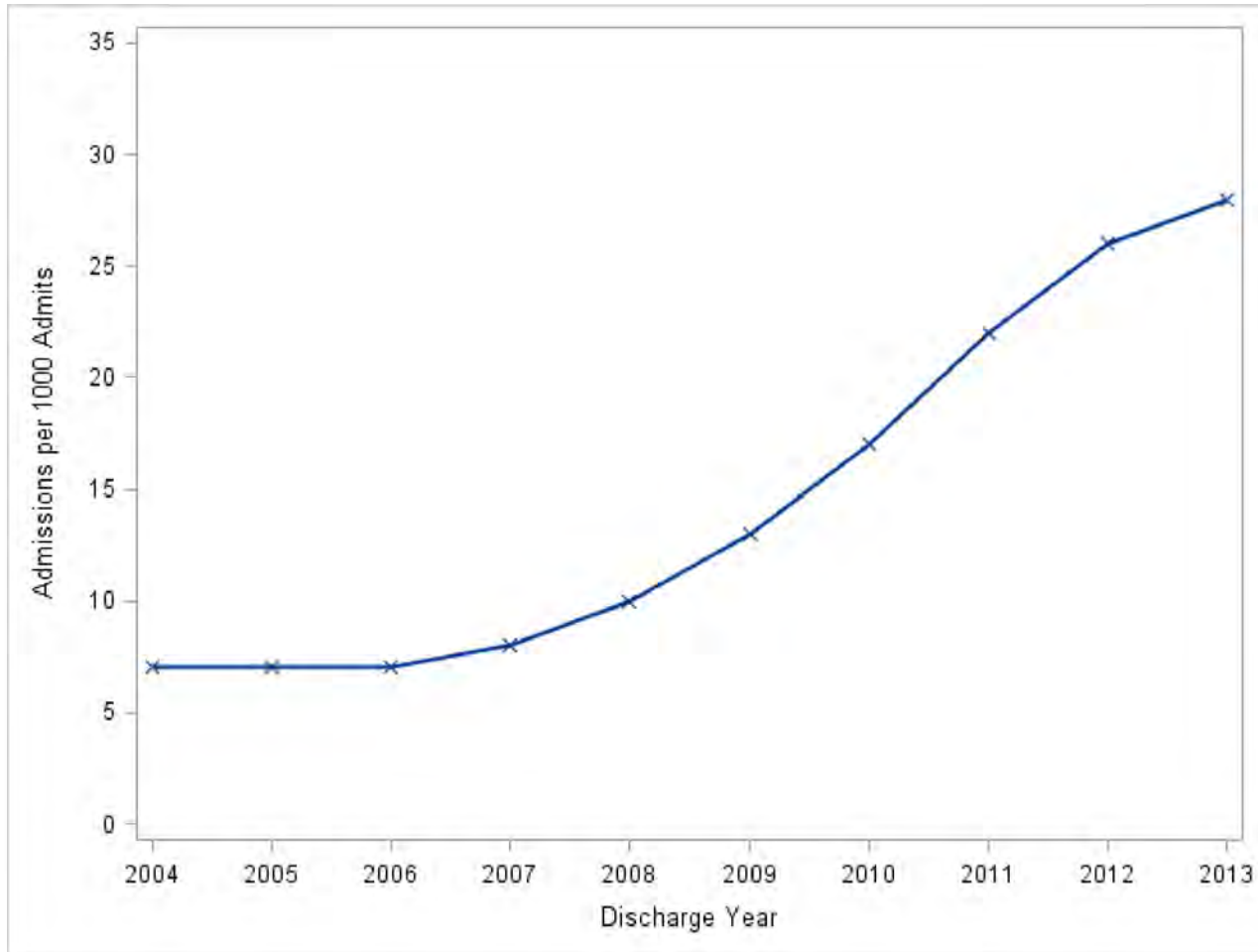
What is the scope of NAS in the United States?

National Scope of NAS

- CDC:
 - Rate of hospital births for NAS increased from 1.5 to 6 per 1,000 hospital births from 1999 to 2013
 - 300% increase
- Patrick, et al:
 - Rate of NICU admissions for NAS increased from 1.2 cases to 5.8 per 1,000 hospital births from 2000 to 2012
 - ~400% increase

NAS NICU admissions 2004-2013

Total N = 674,845 NICU infants



Rate of NICU admissions for NAS increased from 7 to 27 cases per 1,000 admissions from 2004 to 2013

What is the cost of NAS?

Cost of NAS



2009

- \$732 Million hosp cost
- 3.4 per 1000 hosp births

2012

- \$1.5 Billion
- 5.8 per 1000births
- 81% of costs- Medicaid

2014

- 6.7% of all neonatal costs by Medicaid

Patrick Am J Perinatol 2015
Tyler Pediatrics 2018

What is the scope of NAS in Nevada?

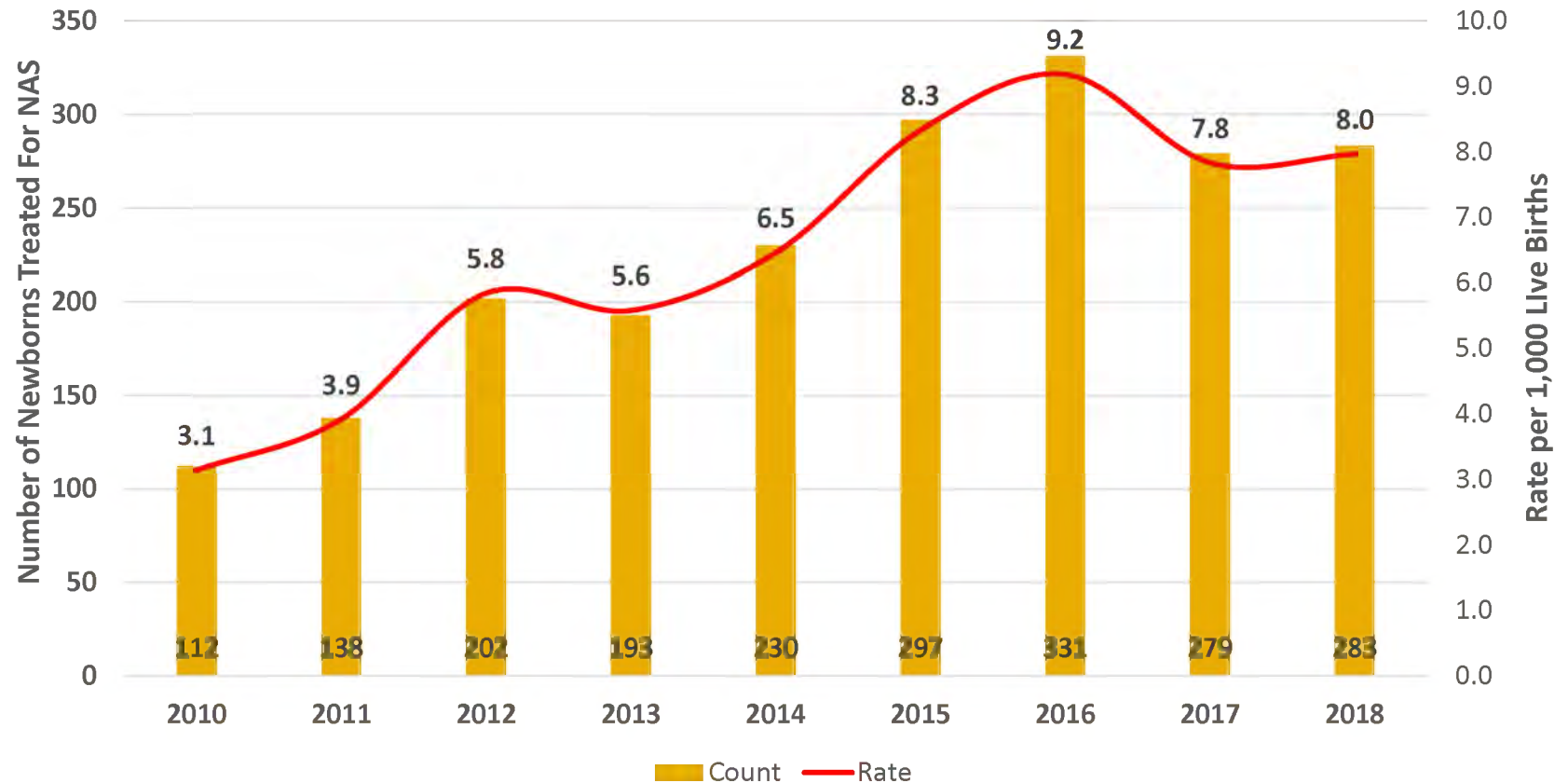
Prevalence of NAS in Nevada

Mednax Data							
Year	Patients	NAS Patients	Nevada NAS Rate	Mednax NAS Rate	Nevada LOS	Mednax LOS	P Value
2014	3739	145	3.9%*	2.7%	24.2	22.1	< 0.001*
2015	3940	215	5.5%*	3.2%	20.8	20.9	< 0.001*
2016	3959	209	5.3%*	3%	20	22.5	< 0.001*

**Only includes infants treated with medication

***Does **NOT** include infants who were not started on medications or not admitted to the NICU
(amphetamines, cocaine, marijuana, Peds/PICU admissions)

Neonatal Abstinence Syndrome, Nevada Residents, 2010-2018



What is the scope of NAS in our community?

Prevalence of NAS in Southern Nevada

Methadone Clinic: Maternal Toxicology Data

	2015	2016	P Value	Overall (2015-2016)
# of mothers in a methadone clinic	13/42 (31%)	30/59 (51%)	$P < 0.001$	43/101 (43%)
Non-Compliance Rate	6/13 (46%)	16/30 (53%)	$P = 0.221$	22/43 (51%)

Prevalence of NAS in Southern Nevada

Methadone Clinic: Infant Toxicology Data

	2015	2016	P Value	Overall (2015-2016)
# of infants with mothers in a methadone clinic	13/42 (31%)	30/59 (51%)	$P < 0.001$	43/101 (43%)
Non-Compliance Rate	11/13 (85%)	22/30 (73%)	$P = 0.394$	33/43 (77%)

Prevalence of NAS in Southern Nevada

Infant Toxicology Data of Mothers in a Methadone Clinic: Illicit vs Controlled vs Polysubstance Use

	2015	2016	P Value	Overall (2015-2016)
Infants of mothers in a methadone clinic positive for > 1 substance (polysubstance use)	11/13 (85%)	22/30 (73%)	P = 0.938	33/43 (77%)

Prevalence of NAS in Southern Nevada

Infant Toxicology Data: Illicit vs Controlled vs Polysubstance Use

	2015	2016	P Value	Overall (2015-2016)
Infants positive for an illicit substance	20/42 (48%)	43/59 (73%)	P = 0.01	63/101 (62%)
Infants positive for a controlled substance	22/42 (52%)	39/59 (66%)	P = 0.165	61/101 (60%)
Infants positive for > 1 substance (polysubstance use)	23/42 (55%)	48/59 (81%)	P = 0.015	71/101 (70%)

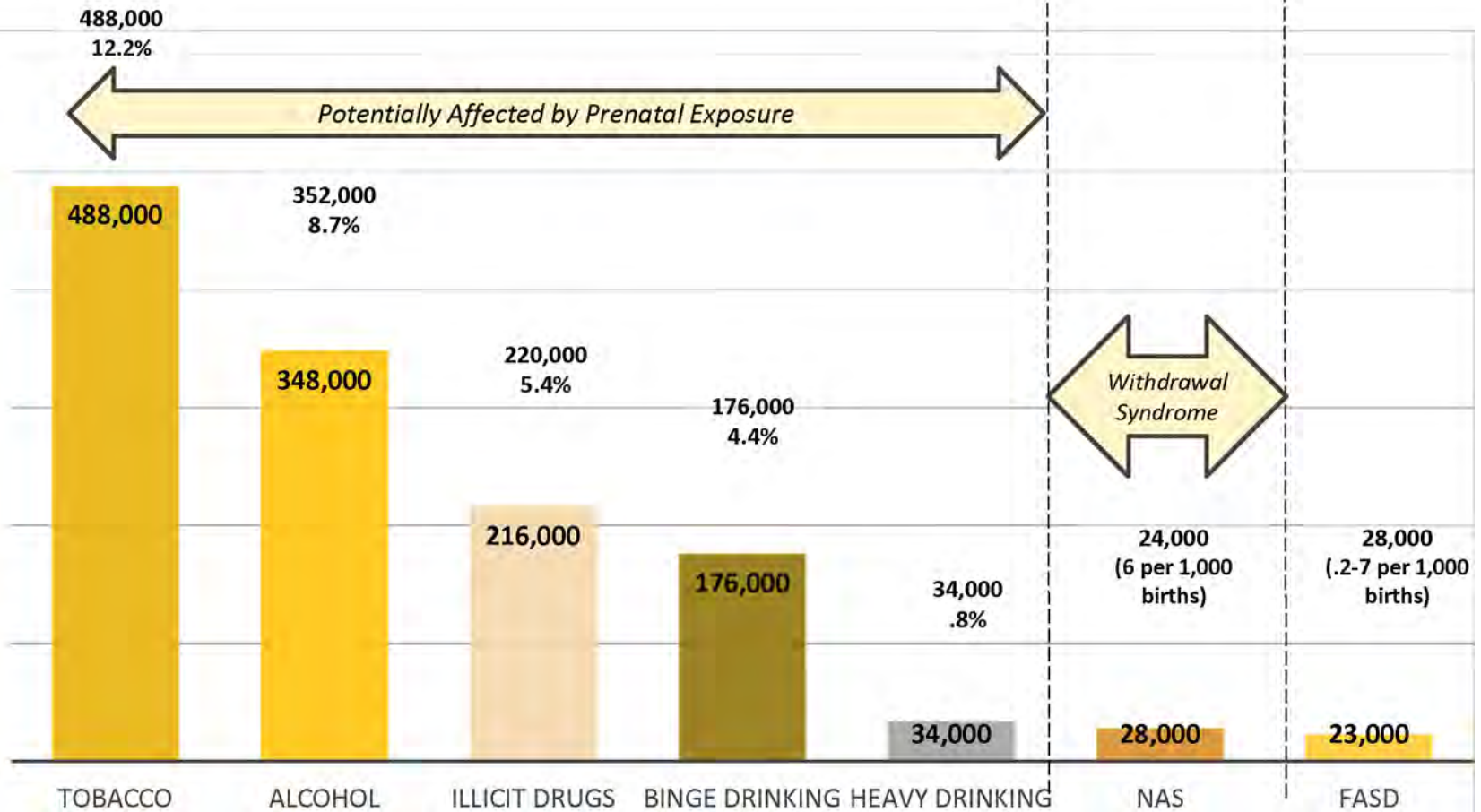
Prevalence of NAS in Southern Nevada

Infant Toxicology Results: Specific Substances

	2015	2016	P Value	Overall (2015-2016)
Opiates	20/42 (48%)	34/59 (58%)	P = 0.320	54/101 (54%)
Benzodiazepines	3/42 (7%)	13/59 (22%)	P = 0.043	16/101 (16%)
Methamphetamine	14/42 (33%)	31/59 (53%)	P = 0.056	45/101 (45%)
Marijuana	11/42 (26%)	18/59 (31%)	P = 0.636	29/101 (29%)
Cocaine	0/42 (0%)	2/59 (3%)	P = 0.228	2/101 (2%)

Estimated Number of Infants Affected by Prenatal Exposure Annually by Type of Substance and Diagnosis

Note: these data are derived from varied methods and data sources

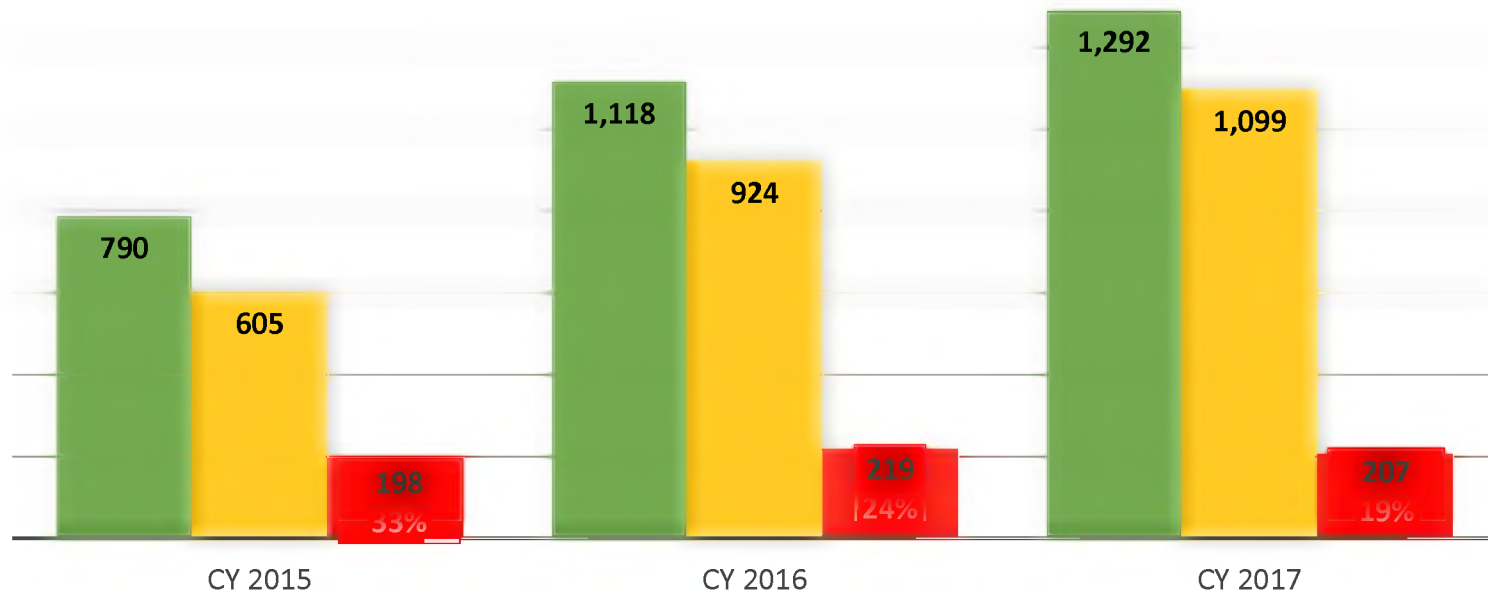


Prevalence of NAS in Southern Nevada

Prenatal Care/Discharge Information

	2015	2016	Overall (2015-2016)
Infants admitted for NAS with no prenatal care	11/42 (26%)	11/59 (19%)	22/101 (22%)
Infants discharged with someone other than parents	12/42 (29%)	22/59 (37%)	34/101 (34%)

Statewide Child Protective Services (CPS) Reports with an Allegation of Substance Exposed Infants Calendar Year 2015 - 2017



- Unique Count of Reports
- Count of Reports Investigated
- Count & Percent of Investigations Substantiated

Source: query as of 8/31/2018
Prepared by Office of Analytics-DCFS
Branch

Take-Home Points

- More pregnant women appear to be seeking treatment
 - Compliance is poor
- Polysubstance use is high
 - 77% (in patients seeking treatment) vs 70% (patients not seeking treatment)
 - Opioids & benzodiazepines are primary concerns
 - Marijuana use is increasing
- Nevada NAS rates are nearly double national rates
 - 3 consecutive years show this
- CPS & foster care burden is high

How does NAS impact our community?

Pregnancy/Delivery Costs

- High risk pregnancy
 - Poor fetal growth = Lower birth weight
- Postnatal effects:
 - Prolonged Hospitalization (including NICU admissions)
- Hospital cost contributed by NAS
 - Avg Mean Charge \$93,400 for NAS baby vs \$3500 for healthy newborn in 2012 dollars
- Estimated total hospital costs over a 10 year period
 - \$2.5 Billion from 2004-2014

Long-Term Effects of NAS

- Long-term developmental outcomes related to NAS are limited
- Lifelong Impact- social, emotional, physical and mental health challenges that last into adulthood
 - School failure, alcohol and drug use
 - Increased chance for health conditions: obesity, heart disease, etc
- Estimated Additional Liability:
 - >\$150,000/pt for ongoing medical care, education, social services

What did we do to reduce the impact of this epidemic?

EMPOWERED Pathway

Empowering Mothers for Positive Outcomes With
Education, Recovery, and Early Development

Resources

Community Support

- Support Groups
- Baby Cuddlers
- Baby's Bounty
- St. Rose WIC
- Lactation Support
- NV Health Link

Educational Classes

- Baby Basics
- Birth Center Tours
- Boot Camp for New Dads
- Breastfeeding Classes
- Infant CPR
- Prepared Childbirth

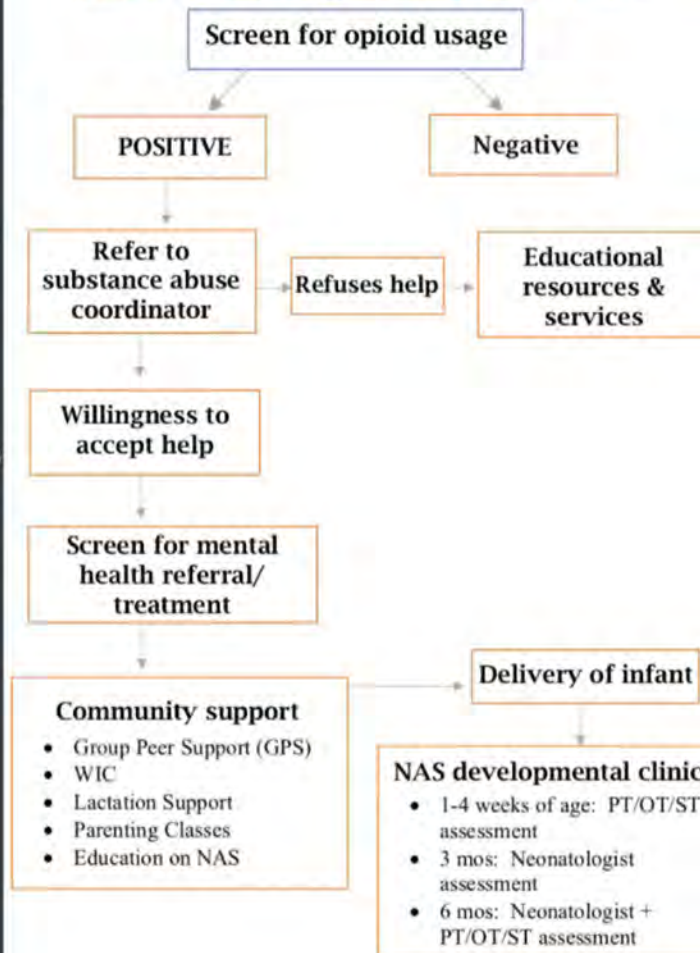
Developmental Clinic

- Assessment
- Evaluation

If you are looking
for additional
assistance or
information,
please call
702.616.4912.

Funding was provided through the Division
by Grant Number 1H70T1060205-01 from
the Substance Abuse and Mental Health
Services Administration (SAMHSA).

XRX-1208 (04/18)



Contributions to the Community from the EMPOWERED Program...

Dignity Health EMPOWERED Program Update (June 2018 – September 2019)

- 102 patient encounters

Resources Provided by EMPOWERED

- Referrals for MAT: 31%
- Referrals for prenatal care: 44%
- Referrals to a pediatrician: 4%
- Referrals for pain management: 7%
- WIC: 17%
- Assistance with employment: 5%
- Assistance with transportation: 63%
- Assistance with housing: 26%
- Infant/parenting classes offered at Dignity Health WomensCare Centers: 102

Barriers to Care Identified by the EMPOWERED Program

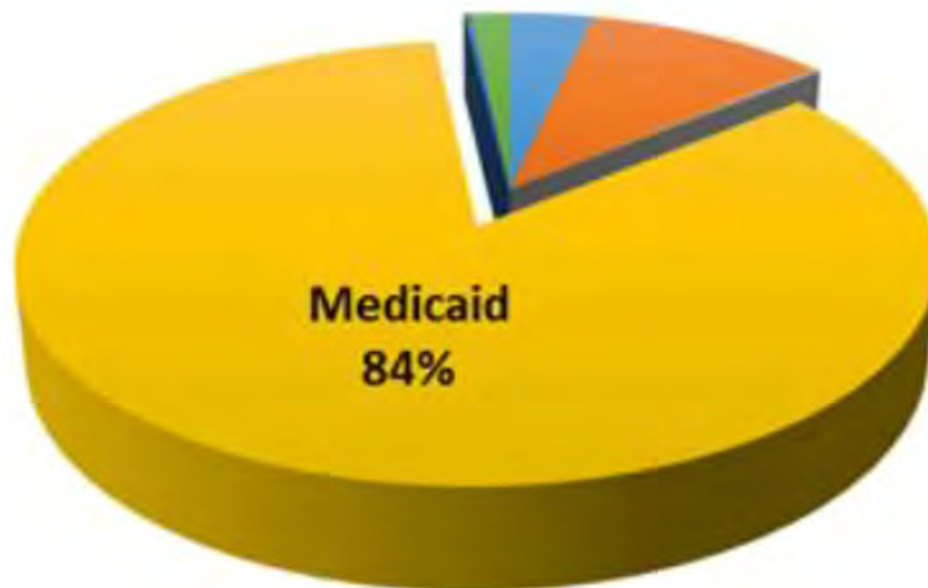
- Care coordination
- Loss of services with newly identified pregnancy
 - Pain management
 - Psychiatric care
- Mental health support
 - Inpatient admission process
 - Inadequate provider network
- Housing
- Transportation

Case Studies...

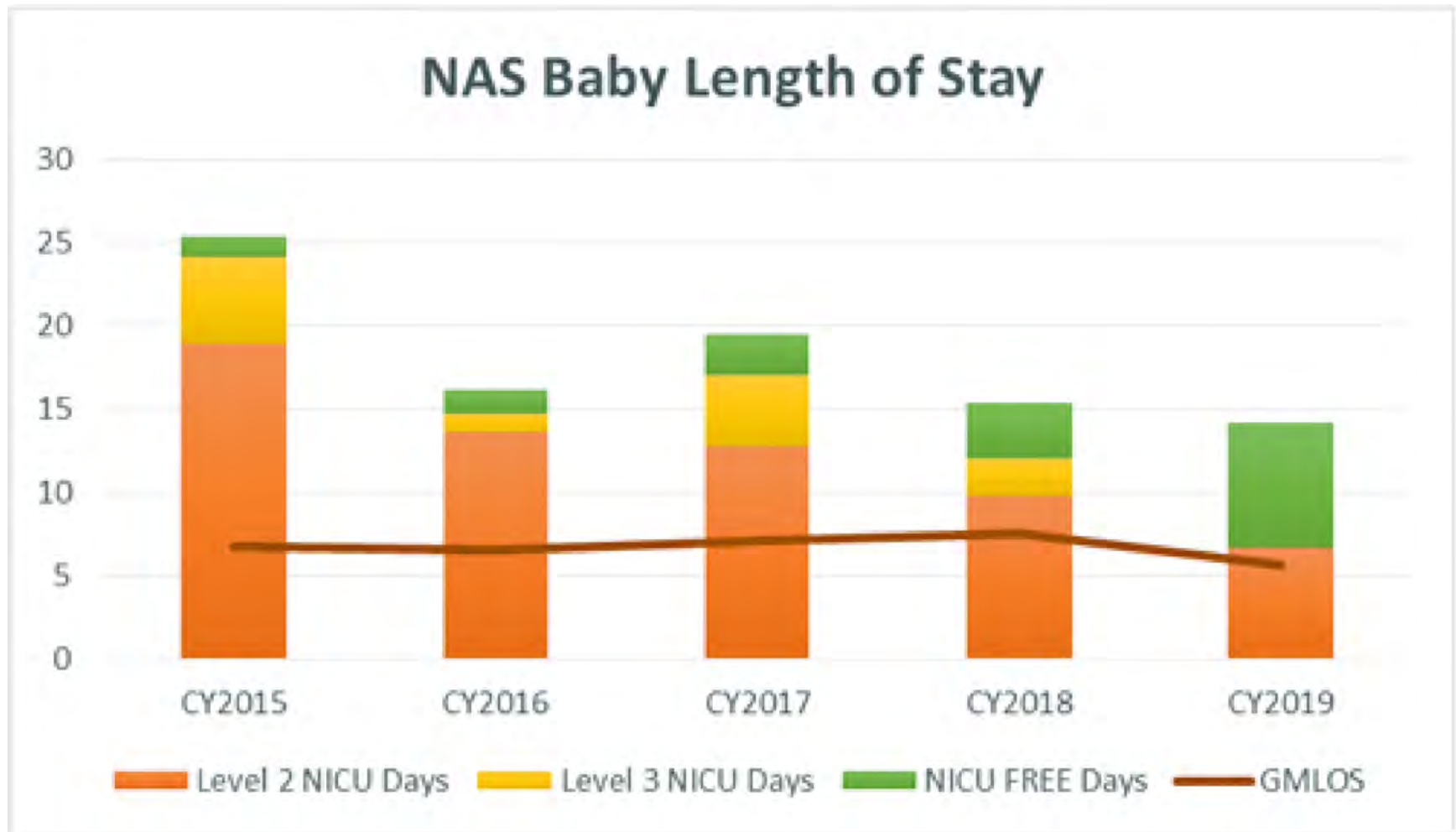
Financial impact of the EMPOWERED program.....

EMPOWERED: Financial Impact

NAS Baby Payor Mix



EMPOWERED: Financial Impact



What can I do help?

Action Items

Prevention	Support During Pregnancy	Postpartum Support
<ul style="list-style-type: none">-Early identification-Appropriate utilization of SBIRT-Education	<ul style="list-style-type: none">-Early identification-Appropriate utilization of SBIRT-Connection to community resources-Education/support	<ul style="list-style-type: none">-Continuity of care for mom-Baby safety & development

Legislative Asks

- Continued funding of the EMPOWERED program
- Home visiting programs to support postpartum period
- Support for barriers to care and/or social determinants of health (housing, transportation, etc)

Thank you!