

Sarah Dupuis

HN-300-F

Professor Plummer and Professor Gillespie

5 May 2021

Learning to View Nonpharmacological Care as Equivalent to Medications in the Treatment of
Babies Born with Neonatal Abstinence Syndrome

Introduction

With every day that goes by and every patient that comes through the hospital, treatments of conditions are constantly reevaluated. This process of reevaluating and determining better practices has become known as evidence-based practice. As health care workers in training, we learn to question everything. Just because something has been done one way in the past does not mean that there is not a better way to do it in the present. As times change and new research shows new information, medicine has to keep up with the changes. This paper will look at one specific change in treatment after significant national changes caused a great increase in incidence of babies born addicted to opioids. As opioid prescription increased, so did the incidence of opioid abuse and addiction. With a rise in overall opioid use, the number of pregnant women who use opioids during pregnancy rose and therefore the number of infants born with neonatal abstinence syndrome, NAS, also rose. With this increase in incidence, there was more research that went into the treatment of this syndrome, and new, more successful ways to treat NAS came to light. Overall, it is evident that the national opioid epidemic has changed the way babies born with neonatal abstinence syndrome are cared for, by shifting focus from treating neonatal abstinence syndrome with a medication regimen to taking more of nonpharmacological approach using no medications at all.

In broad terms, NAS is when a baby is born addicted to opioids. This happens when a mother is pregnant and using opioids, the drug is able to cross the placenta and enter into the baby. Throughout the pregnancy the baby develops a physical dependence on the opioid. In a sense, the babies' body is addicted to the drug before the baby is even born. As soon as the umbilical cord is cut at delivery, the source of the babies' opioid intake is cut off and within days, the baby enters full withdrawal from the opioid, a period of time that can be life threatening for a fragile baby. The withdrawal period comes with signs and symptoms affecting more than one body system including their neurological system, their metabolic system, their respiratory system and their gastrointestinal system.

According to the University of Iowa's Children's Hospital, some of the central nervous system clinical signs of withdrawal in infants includes irritability, increased wakefulness, high-pitched cry, tremors, frequent yawning, sneezing and seizures (Identifying Neonatal Abstinence Syndrome (NAS) and Treatment Guidelines). As for some of the common GI symptoms, they include diarrhea, vomiting, uncoordinated and frequent sucking, and uncoordinated swallowing (Gomez-Pomer and Finnegan 3). Lastly, in the respiratory and metabolic system, it is possible to see sweating, fever, temperature instability, and elevations in both respiratory rate and blood pressure (Identifying Neonatal Abstinence Syndrome (NAS) and Treatment Guidelines). All of these symptoms cause great discomfort in the infants, causing them to need high levels of care, including constant monitoring and the possible need for resuscitation, to keep them comforted and safe. There are two different approaches that can be used with the care of infants with NAS, pharmacological and nonpharmacological. With the first documented cases of NAS, the thought was that they could wean the babies off the opioid by giving them small amounts of the opioid in decreasing doses. Yet, that does not necessarily meet all of the emotional and attachment needs

of the infant, it simply addresses their physical problems. Looking forward in time, evidence now suggests that using drug therapy as a last line of treatment is successful in reducing hospital length of stay and reducing overall medical costs.

History

Throughout the research conducted, there is not clear causal relationship between the rise in opioid use with the rise in cases of NAS. Although no causal relationship could be concluded, many of the sources (Gomez-Pomer and Finnegan 3) (Achilles and Castaneda-Lovato 625) (Holmes et al. 1) (Grossman et al. 1) showed a strong correlation between the two. In order to further this connection, more research would need to be conducted on the specifics of pregnant women and opioid use prior to, and during, the opioid epidemic. The strong correlation between the national opioid epidemic and the rise in babies born with NAS can be used to describe how better treatment for NAS came as a reaction to an increasing number of babies born with NAS.

With the rise of opioid use in the last two decades, it has been determined that our country is in a national opioid epidemic. From 1999 to 2019 there were nearly half a million deaths related to opioid use (“Understanding the Epidemic”). The first surge in opioid use in the United States of America was seen in the 1990’s (“Understanding the Epidemic”). This surge was directly related to the increase in opioid prescriptions that the doctors were prescribing (National Institute on Drug Abuse). Ironically, it was the fault of the pharmaceutical companies, as they were instructing healthcare workers that patients would not become addicted to the opioid being prescribed for pain relief (National Institute on Drug Abuse). With an increase in prescribing rates, it became quickly evident that these medications were, in fact, highly addictive and were being rapidly misused. Since the 1990s, the Center for Disease Control outlines two more surges in opioid use. One starting in 2010 and another one starting in 2013

(“Understanding the Epidemic”). These waves, according to the CDC were determined by looking specifically at opioid overdose deaths. The CDC determined that the surge in opioid use starting in 2010 was mainly an increase in heroin use (“Understanding the Epidemic”). Starting in 2010 heroin overdose deaths went from less than one per 100,000 to more than four per 100,000 by 2016 (“Understanding the Epidemic”). A similar event started in 2013 with synthetic opioid drugs including fentanyl (“Understanding the Epidemic”). In 2013 began a rise in synthetic opioid overdose deaths from less than one death per 100,000 to more than 11 deaths per 100,000 people by 2019 (“Understanding the Epidemic”). With this overall rise in opioid use disorder, there was a rise in pregnant women abusing opioids, and therefore a rise in babies born with NAS. “By 2012, the incidence of NAS increased to more than 30 per 1,000 hospital live births, along with an increase in the number of infants being treated pharmacologically for NAS, resulting in an increase in the length of stay and healthcare expenses” (Gomez-Pomer and Finnegan 1). With an increase in incidence, more questions were being asked by the medical professionals about the nature of NAS.

The opioid epidemic brought more attention to care of babies born with NAS, but NAS was a documented problem much before the epidemic. Cases of infant’s dependent on opioids, specifically morphine, were first reported in the United States in 1875 when they were reported under the diagnosis of congenital morphinism, which later was termed NAS (Gomez-Pomer and Finnegan 3). Signs and symptoms reported from these infants included inconsolability and a generalized development of seizures around the third day of life (Gomez-Pomer and Finnegan 3). It was not until 1901 that it was determined that the symptoms of congenital morphinism were in fact signs of drug withdrawal in the infant (Gomez-Pomer and Finnegan 3). At this point in history we start to see the implementation of treatment for infants withdrawing from opioids,

including morphine. The first line of treatment was giving the babies small amounts of the medications that they were addicted to, to attempt to wean the baby off of the medication. “Infants were given opium in small quantities to treat their symptoms with reports of success” (Gomez-Pomer and Finnegan 3). Looking at the timeline from the initial treatment until now, the idea of giving small amounts of drugs to alleviate symptoms and wean the baby off of the opioid addiction has not fully disappeared, but in 2016 with a study conducted in the neonatal intensive care unit, NICU, at Yale New Haven Hospital, research was published supporting the idea that nonpharmacological methods, or treatments that do not include drug therapy, should be the first line of treatment for infants diagnosed with NAS.

Progression to the Eat, Sleep, Console Method

The first study to be conducted that points to successes of treating NAS with nonpharmacological treatments is the study conducted in the NICU at Yale New Haven Hospital in Connecticut. Prior to this study, the most common scale that was used to measure the withdrawal in infants was The Finnegan Neonatal Abstinence Scoring System, FNASS. This system was first put in place in 1975 and was an objective way for providers to determine the diagnosis of NAS and to determine when interventions were necessary (Gomez-Pomer and Finnegan 4). This scale is consistently repeated to look at the progression of NAS and to continually make decisions regarding treatment. The overall basis of the FNASS scale is that the baby is looked at in a series of 21 items and are “scored anywhere from 1-5 depending upon the symptom type and the severity of that exhibited symptom. A score of eight or higher suggests that NAS is occurring with the infant” (Thompson 12). When looking at the score sheet, it is suggested that the baby is assessed every two hours and some of the categories that the assessor would be looking at would include high pitched crying, amount of sleep, tremors, body

temperature, sneezing, respirations, nasal flaring, excessive sucking, poor feeding, and stool appearance (Modified Finnegan Neonatal Abstinence Scoring System). The point of this scoring sheet was to rank the withdrawal symptoms that the infant was experiencing and use that information to guide the treatment for the infant. The shortcoming of this form of assessment tool is that it is used to direct pharmacological treatment, not nonpharmacological treatments. This is where the Yale New Haven NICU study paves the way for nonpharmacological treatment of NAS.

Yale conducted a multiyear study that focused on how newborns born with NAS can be treated in a nonpharmacological way. “Because the FNASS assessment is highly intricate, Grossman and his colleagues (2017) created a unique functional assessment that focused primarily on three measurements, which involved the infant’s ability to sleep, eat, and be consoled. This program was developed in 2017 and came to be known as the Eat, Sleep, Console, or ESC, approach” (Thompson 14). Similar to other studies, which will be addressed in greater detail below, there were certain criteria that the infants had to meet to be considered for this study. They had to have NAS as their only diagnosis. This was for the safety of the infants, ensuring that they received the proper treatment, and for the purpose of the study. With NAS as a single diagnosis, it was possible to focus on that one factor and not have other factors clouding the results of the study. In the Yale study, only infants who were born after 35 weeks’ gestation and had no other comorbidities were considered to be a part of the nonpharmacologic treatment study (Grossman et al. 2). In the study there were in fact four nonpharmacological interventions identified. The first intervention implemented was regarding the environment that the infants were placed in. In this study, infants were placed in an environment with low stimulation. This meant that the room the infant was placed in was kept dark and quiet. The second intervention

was in regard to parents. “Staff engaged parents continuously in the care of their infants (volunteers were used if the family member was not available)” (Grossman et al. 3). The third intervention in the Yale study focused on the nurses. As part of the treatment for NAS babies Yale New Haven Hospital made sure to train their staff to view nonpharmacological care as equivalent to medications This meant that “when increased intervention was warranted, the approach was to increase the involvement of the parents before using pharmacological treatment” (Grossman et al. 3). Lastly, the mother was encouraged mothers to breastfeed their infants if indicated (Grossman et al. 3). The main reason that breastfeeding would not be indicated is if the mom was still using opioids as these pass through breastmilk and can enter into the baby (Sachs). Not only did this study put emphasis these four nonpharmacological interventions, Grossman and his peers also developed guidelines for when it was appropriate or inappropriate to use morphine as a medication to decrease withdrawal symptoms. This is where we see the development of the eat, sleep, console method.

The eat, sleep, console method focuses on these three aspects, feeding, allowing rest, and comforting, of infant care as treatment for withdrawal from opioids. The goal is to make the infant comfortable. A large part of making the infant comfortable is having nurses, families, volunteers and other health care workers “decrease the environmental stimulus that the infant is exposed to (minimize environmental stimuli, swaddling, rocking) and minimize hunger (demand feedings)” (Gomez-Pomer and Finnegan 4). Demand feedings means feeding the baby whenever they are showing signs of hunger and not keeping to a strict schedule of feeds, while ensuring that the baby is hitting a calorie goal for the day. In the Yale study mentioned previously, it came to light that it was difficult to include parents in the care of newborns and to keep environmental stimuli down all while being in the NICU. To compensate they used the well-baby nursery and

rooming in, keeping the baby in the hospital room with the mother, to make both of these things possible. The only exception that required the admission of the infant into the NICU was if the infant had a FNASS score of eight or higher (Grossman et al. 3). When this switch was made, what Grossman and his colleagues found was that the average length of stay for babies born with NAS went down from a 17-day average, from 2009 to 2014, to an average of 5.9 days, in the years 2010 to 2016, with implementation of rooming-in, low stimulation, and the method that came to be known as the eat, sleep, console method (Grossman et al. 5). With more success in nonpharmacological treatments, there was a drastic reduction in the number of babies that needed pharmacological interventions.

When implementing the eat, sleep, console method, there became a new way to assess infants. A study conducted by the American Academy of Pediatrics developed a tool in the electronic medical record that could be used to document the eat, sleep, console method. For this tool, the infants did not need to be woken with the assessments performed every 3 to 4 hours (Achilles and Castaneda-Lovato 626). The documentation included three criteria that could be answered as simple yes or no answers. The three assessments were as follows “eat: goal feeds or 1oz per feed or breastfeeds well; sleep: 1 hours undisturbed; and consoled within 10 minutes” (Achilles and Castaneda-Lovato 626). Under this study protocol, if the infant is not consoled in 10 minutes, the next step would be to attempt swaddling and a low stimulation environment, and further, if the infant is not consoled within 30 minutes, the health care provider was called to assess the baby for the need of a one-time dose of morphine, if appropriate (Achilles and Castaneda-Lovato 626). Similar to Grossman, this study showed that by implementing the nonpharmacological methods surrounding the basis of eating, sleeping, and consoling, there was a decrease in the length of hospital stay, that in turn reduced hospital costs, and there was a

decrease in the number of opioid doses that were prescribed by the health care provider to NAS infants (Achilles and Castaneda-Lovato 624). These three above findings indicate success in the research and further support the use of nonpharmacological interventions as the first line of treatment for babies born with NAS.

Meeting the Infant's Needs

With a shift in the care to eat, sleep, console, one problem that arises is an increasing demand on the nursing staff when the family is not present to care for the infant. The addicted baby needs full attention when going through withdrawal. When the family is not around, this responsibility falls solely on the nurses. Although nurses enter the field of neonatology to care for infants in critical care and in desperate need, there is evidence of burnout with NAS babies as their care is not intense medical care; it is instead great emotional care that can drain a nurse's energy. NICU nurses are trained to take care of infants in critical condition. Although infants with NAS need medical attention, they are not in a critical care situation where they need constant monitoring, alternate forms of feeding, and/or respiratory support, all examples of treatments that NICU nurses are trained for. In interviews conducted with neonatal nurses on the topic of NAS baby care, one nurse stated "I pictured myself caring for acutely ill babies and parents who were going through every emotion in the book. But I find myself caring for demanding babies who NEVER stop crying, walking around and around the nurse's station with a baby in my arms or in a stroller, spending up to one hour trying to get a baby to eat a small amount of formula, but the poor thing was too disorganized to figure out how to suck" (Murphy-Oikonen et al. 309). This shows that the care is intense in a way that neonatal nurses are not trained. It is emotionally intense to have a baby be inconsolable and not having a solution to help the infant. The withdrawing infant requires so much from their caregivers, and it is not possible for the nurse to

continuously hold the infant and be giving full attention to just the NAS newborn for the entirety of their shift.

In order to find successful interventions that benefit the baby and the nurse, it is important to look at what hospitals are beginning to implement and what success they have had with the interventions. One thing that hospitals have implemented to better care for infants withdrawing from opioids, while still allowing the nurses to care for the other infants as well, are programs typically referred to as volunteer cuddlers. In not all cases are parents able to be with their infants in the newborn intensive care unit 24 hours a day, and some parents are not around at all. As for the nursing staff, shifting treatment from medication use to a care approach demands a lot for all the staff in the neonatal intensive care unit. Infants who are going through a withdrawal period benefit from supportive care including “swaddling, quiet environment, non-nutritive sucking, [and] vestibular stimulation (rocking)” (Hignell et al. 415). Therefore, volunteer cuddler programs allow volunteers to come into the hospital and support the infants. These programs are helpful in many ways, as withdrawing babies receive the full attention that they need and the strain on the nursing staff is reduced, allowing them to focus on the many other sick infants in the NICU. One hospital, St. Michael’s Hospital in Toronto, Canada, found that by having volunteers come into the NICU to provide supportive care to infants not only reduced the average length of hospital stay by approximately 6 days, but it also helped to take some the pressure on the nursing staff and even the families (Hignell et al. 414). Another benefit of volunteers included their ability to interact with the family members and distract siblings present so that the parents could turn their full attention to the infant in the NICU.

Shifting focus to a hospital in the United States, a Pennsylvania hospital also conducted a study that showed the benefit of using volunteer cuddlers to reduce the length of hospital stay of

babies born with NAS. This study lasted for 12 months. In just the first 6 months, the average length of stay for infants with NAS in the NICU was 26.2 days (Thompson 22). With this study, the cuddlers were trained to “provide an important component of the developmental care for the hospitalized infant. The importance of human contact and touch in the well-being of all hospitalized infants has been well documented” (Kraynek et al. 45). By having someone there to console the infants, to hold them, rock them, and give them their full attention, it has been shown that their recovery process has been sped up, and the infants do not require as long of a length of stay in the hospital.

NAS Infant Attachment Process

One other important aspect of care of babies born with NAS is their attachment process. “Attachment is an emotional connection that forms between the infant and his or her parents” (Durham and Chapman 404). The quality of this attachment between the parent and the infant goes on throughout a child’s life and can impact the persons physical development, emotional development, and even the formation of future relationships (Durham and Chapman 404). When a baby is born with NAS, they have an added barrier to developing a secure attachment with their parents. This is because “Parents with opioid use disorders are less likely to be emotionally available or responsive to their children’s needs” (Mirick and Steenrod 548). This seems to be a grave downfall, as the attention that needs to be directed toward a withdrawing infant is greater than one born at full term. The withdrawing neonates “are more difficult to sooth and less responsive than other infants” (Mirick and Steenrod 551). They need the same attachment to their mother that other babies need, but they are at a higher chance of having an insecure attachment to their mothers because of the characteristics of their diagnosis and certain traits seen in mother’s who abuse substances.

One way to facilitate better attachments between mothers and their infants is through rooming-in with their mothers. With rooming-in, the baby never leaves the mother. All of the baby care takes place in the mother's room and therefore the baby is not taken to the nursery. This may be difficult for infants with NAS because they may need monitoring in the NICU, but the connection with the caregiver and the emotional support of the baby would benefit from staying in the room with their mothers. By having the babies stay in the room with the mothers it also allows an opportunity for mothers to give the baby a chance to have a positive attachment to the mother, further helping to decrease symptoms of NAS. The benefit to rooming-in for babies born with NAS was studied at Dartmouth Hitchcock Medical Center. With the exclusion of infants born premature, earlier than 35 weeks' gestation, it was found that there was a significant decrease in length of stay, from about 2-12 weeks down to 12 days, and significant reduction in hospital costs by almost half, when rooming-in was implemented for infants born with NAS (Holmes et al. 7). One of the reasons that hospitals can see success with rooming in for babies born with NAS is because with rooming-in the mechanism of treatment is human contact with the infants' family. "Gentle handling, swaddling, cuddling, and generalized holding are much more likely to be practiced in rooming-in scenarios ... and can greatly improve the quality of life for an infant experiencing Neonatal Abstinence Syndrome" (Thompson 19). When the infant does not leave the room of the mother, there is less care being performed by nurses and more care being performed by the parents. This in turn allows for the baby to receive treatment for their NAS at the same time as developing a secure attachment to their parents. The nonpharmacological treatment is facilitated by the parents instead of the health care workers alone.

As for how health care workers fit into the picture with rooming in, they are able to turn their focus to helping the infant develop a positive attachment to the mother, which promotes wellbeing of the babies' emotional health and relieves the pressure put on nurses. In order for this attachment to be successful, there must be no judgment directed toward the mothers. By staying judgement free, health care workers are able to better provide positive care to withdrawing infants. Sadly, many expecting mothers who use opioids are afraid of getting care because they fear judgment from the health care community, making it so many of them do not seek the much-needed treatment for themselves and for their babies. In the article "Opioid Use Disorder, Attachment, and Parenting: Key Concerns for Practitioners", it is supported that "In the hospital, mothers often experience blame around opioid use, and unsupportive nurses who advocate for babies' to be placed in foster care instead of supporting mother/baby attachment" (Mirick and Steenrod 549). One example of working to change this view can be seen in a Boston Medical Center program titled Project RESPECT. The letters in the acronym stand for Recovery, Empowerment, Social Services, Prenatal care, Education, Community and Treatment (Story 5: Cuddling as the First Line of Treatment for Neonatal Abstinence Syndrome). Overall, what this program attempts to do is to support pregnant women and their newborns, following delivery. Instead of feeling like there is no support in health care for women who are addicted to substances, this project has put together a team of healthcare workers to solely support pregnant women with addiction. The team "includes obstetricians qualified to administer buprenorphine, which reduces symptoms of withdrawal, a psychiatrist specializing in mood disorders in pregnancy, an addiction psychiatry nurse practitioner and a licensed independent clinical social worker" (Story 5: Cuddling as the First Line of Treatment for Neonatal Abstinence Syndrome). Overall, the team is able to work together to provide a safe environment and proper care to

mothers with opioid addiction who are going through pregnancy, delivery and or the postpartum period, and includes their infants in the care as well.

Conclusion

The new changes that have come in reaction to an increase in maternal opioid use have positively changed the care of infants going through withdrawal. The positive change is for both the benefit of the infant and the benefit of the hospital. By training health care workers to view nonpharmacological treatment as equivalent to medication in the treatment of the infants born with NAS, these newborns will have a speedier recovery that decreases the length that they stay in the hospital. Therefore, by decreasing the infant's hospital length of stay, hospital costs also decrease. The medical treatments that the infants should be receiving for the treatment of NAS are no longer based on medications themselves. Instead, they are based on a holistic approach allowing the physical and emotional needs of the infant to be met through approaches involving the environment, the quality of sleep and feedings and human contact. In the case of NAS, evidence has guided treatments to a more successful approach and supported the use of nonpharmacological treatment as a replacement for medication.

Works Cited

- Achilles, Jennifer S., and Jennifer Castaneda-Lovato. "A Quality Improvement Initiative to Improve the Care of Infants Born Exposed to Opioids by Implementing the Eat, Sleep, Console Assessment Tool." *Hospital Pediatrics*, vol. 9, no. 8, 2019, pp. 624–631., doi:10.1542/hpeds.2019-0144.
- Durham, Roberta F., and Linda Chapman. *Maternal-Newborn Nursing: the Critical Components of Nursing Care*. F.A. Davis, 2019, pp. 404.
- Gomez-Pomar, Enrique, and Loretta P. Finnegan. "The Epidemic of Neonatal Abstinence Syndrome, Historical References of Its' Origins, Assessment, and Management." *Frontiers in Pediatrics*, vol. 6, 2018, doi:10.3389/fped.2018.00033.
- Grossman, Matthew R., et al. "An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome." *Pediatrics*, vol. 139, no. 6, 2017, doi:10.1542/peds.2016-3360.
- Hignell, Amanda, et al. "The Infant Cuddler Study: Evaluating the Effectiveness of Volunteer Cuddling in Infants with Neonatal Abstinence Syndrome." *Paediatrics & Child Health*, vol. 25, no. 7, 2019, pp. 414–418., doi:10.1093/pch/pxz127.
- Holmes, A. V., et al. "Rooming-In to Treat Neonatal Abstinence Syndrome: Improved Family-Centered Care at Lower Cost." *PEDIATRICS*, vol. 137, no. 6, 2016, doi:10.1542/peds.2015-2929.
- Identifying Neonatal Abstinence Syndrome (NAS) and Treatment Guidelines*, University of Iowa Children's Hospital, Nov. 2014, [uichildrens.org/sites/default/files/neonatal_abstinence_syndrome_treatment_guidelines_feb_2013_revision-1.pdf](https://www.uichildrens.org/sites/default/files/neonatal_abstinence_syndrome_treatment_guidelines_feb_2013_revision-1.pdf).

- Kraynek, Monica C., et al. "Baby Cuddlers Make a Difference." *Journal of Obstetric, Gynecologic & Neonatal Nursing*, vol. 41, 2012, doi:10.1111/j.1552-6909.2012.01360_25.x.
- Mirick, Rebecca G., and Shelley A. Steenrod. "Opioid Use Disorder, Attachment, and Parenting: Key Concerns for Practitioners." *Child and Adolescent Social Work Journal*, vol. 33, no. 6, 2016, pp. 547–557., doi:10.1007/s10560-016-0449-1.
- Modified Finnegan Neonatal Abstinence Scoring System*. Western Australian Centre for Evidence Based Nursing & Midwifery, 2007, lkpz.nl/docs/lkpz_pdf_1310485469.pdf.
- Murphy-Oikonen, Jodie, et al. "The Experiences of NICU Nurses in Caring for Infants with Neonatal Abstinence Syndrome." *Neonatal Network*, vol. 29, no. 5, 2010, pp. 307–313., doi:10.1891/0730-0832.29.5.307.
- National Institute on Drug Abuse. "Opioid Overdose Crisis." *National Institute on Drug Abuse*, U.S. Department of Health and Human Services, 11 Mar. 2021, www.drugabuse.gov/drug-topics/opioids/opioid-overdose-crisis.
- Sachs, H. C. "The Transfer of Drugs and Therapeutics Into Human Breast Milk: An Update on Selected Topics." *PEDIATRICS*, vol. 132, no. 3, 2013, doi:10.1542/peds.2013-1985.
- "Story 5: Cuddling as the First Line of Treatment for Neonatal Abstinence Syndrome." *Grayken Center for Addiction*, Boston Medical Center, 2021, www.bmc.org/addiction/grayken-news/cuddling-first-line-of-treatment-for-nas.
- Thompson, Alexis L. "Cuddling and the Born-Addicted Infant: Implementation of the Volunteer-Based Cuddling Programs for Babies Experiencing Neonatal Abstinence Syndrome in the Neonatal Intensive Care Unit." *Eastern Kentucky University*, 2020, https://encompass.eku.edu/cgi/viewcontent.cgi?article=1773&context=honors_theses

“Understanding the Epidemic.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 17 Mar. 2021,

www.cdc.gov/drugoverdose/epidemic/index.html#:~:text=The%20first%20wave%20began%20with,increasing%20since%20at%20least%201999.&text=The%20second%20wave%20began%20in,in%20overdose%20deaths%20involving%20heroin.