

## Intervening with Opioid-Exposed Newborns:

### Modifying an Evidence-Based Parenting Intervention

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#### Abstract

**Background:** Prenatal opioid exposure predisposes infants to adverse development of regulatory systems and jeopardizes their long-term health outcomes. While sensitive caregiving promotes healthy development of emotional and physiological regulation and may remediate risks associated with prenatal opioid exposure, mothers with opioid use disorder often experience unique challenges that make providing sensitive care difficult. **Rationale:** Empirically tested early interventions, such as the Attachment and Biobehavioral Catch-up (ABC) intervention, can positively impact children's development following adversity through promoting sensitive caregiving. ABC intervention targets correspond to those parenting behaviors that may be challenging for mothers with opioid use disorder (i.e., nurturing infants who may be difficult to soothe, responding sensitively to infants by following the child's lead with delight, and avoiding intrusive/frightening behavior), and have positive impacts on child development and regulation. However, given the unique challenges for infants and mothers impacted by opioid use, some adaptations may strategically address those vulnerabilities and thereby maximize the potential benefits for this population. **Methods:** The present paper describes modifications made to the ABC intervention for use with pregnant mothers in treatment for opioid use disorder. This modified intervention is currently being examined via a large scale randomized clinical trial (RCT) at the University of Delaware, and a case study is presented here to highlight considerations for working with mothers and infants impacted by opioid use and to exemplify ways that modified ABC addresses the needs of this population.

#### The Need for Sensitive Parenting

From an evolutionary standpoint, humans are similar to other precocious animals, which are dependent on the parent's help to regulate physiology, emotion, and behavior.<sup>1</sup> However, humans have an elevated level and length of dependency on the caregiver's input due to a protracted period of brain development,<sup>2</sup> with evidence showing the most rapid growth occurring within the first few years of life.<sup>3</sup> These earliest years, when infants and young children rely most heavily on the support and protection of their parents, are thereby foundational for their subsequent developmental trajectory.<sup>1</sup> Parents are essential sources of children's regulation for a myriad of processes, and the quality of caregiving experiences inform development of these systems. Sensitive and responsive caregiving, involving accurate interpretation of and prompt responsiveness to distress and non-distress, confers numerous advantages, including fostering development of later regulatory capacities.<sup>4</sup> However, when parents fail to meet the needs of an infant (e.g., deprivation) or become a source of dysregulation (e.g., abuse), children are tasked with developing regulatory capacities on their own, with many children who experience early

caregiving adversity showing negative impacts even as they mature into late adolescence and adulthood.<sup>5</sup> Fortunately, children who experience these and other forms of early trauma demonstrate plasticity and have the capacity for resilience and recovery.<sup>6</sup> Children who receive early interventions that increase caregiving quality, or those who have exposure to positive life experiences, can develop efficient regulatory capacities despite early adversity.<sup>7</sup> Indeed, decades of research in caring for vulnerable infants sheds light on the power of sensitive parenting to buffer the effects of adversity.

## **Challenges to Sensitive Parenting**

Parents who experience significant hardships (e.g., economic disadvantage, traumatic stressors, untreated mental health problems, lack of social support) and prior adverse caregiving experiences are especially at risk for providing non-optimal caregiving experiences to their children,<sup>8</sup> even though their children are especially in need of sensitive caregiving. They may display more frequent intrusive caregiving, with behaviors that are adult-centered and ignore child cues, behaviors that are overstimulating (e.g., vigorous tickling, jarringly rough handling of the child) or behaviors that are frightening to the child, all of which are inherently dysregulating to children.<sup>9</sup> The exposure to non-optimal caregiving experiences hinders children's development of regulatory capacities and often leads children to behave in avoidant (i.e., rejecting) or resistant (i.e., fussy and irritable) ways with their parents, resulting in parents' beliefs that the child does not need them for support under either distressing or non-distressing circumstances.<sup>10</sup> This further contributes to insensitive and unresponsive caregiving experiences.

## **The Unique Challenge of Maternal Opioid Use**

Young children can face numerous forms of early adversity, but the recent rise in opioid use and dependence has resulted in an alarming increase in the number of children impacted by maternal opioid use. In Delaware, opioids were involved in 88% of overdose deaths in 2018,<sup>11</sup> above the national average of 69%, while the incidence of Neonatal Abstinence Syndrome (NAS) was 23.2 per 1,000 live births, above the national rate of 6.8 per 1,000 births.<sup>12</sup> Despite the well-established nature of the opioid epidemic, illicit opioids and controlled prescription drugs continue to be a serious concern, and provisional overdose data for 2020 suggests increases both in Delaware and nationally.<sup>13</sup>

The impacts of opioid use on children occur both through prenatal exposure of infants to opioids and through the effects of opioid use and addiction on the mother's ability to parent. Neonatal abstinence syndrome (NAS), which occurs when infants are exposed to opioids that cross the placental barrier during pregnancy, causes direct neurological impacts but also can disrupt caregiving through symptoms (e.g., high-pitched cry, irritability, difficulty sleeping and soothing)<sup>14</sup> which may make it more difficult for mothers to read their infants' cues and persist in providing nurturance when infants are distressed. Medication assisted treatment (MAT) is the gold-standard treatment option for pregnant women with opioid use disorder. This means that even infants whose mothers are stable and in treatment during their pregnancy are exposed to maintenance drugs such as methadone and buprenorphine, which can result in NAS. At the same time, mothers with opioid dependency have a number of contextual stressors and psychosocial factors in addition to physiological factors that can negatively impact their ability to provide high quality care to their infants.<sup>15</sup> In Delaware, approximately one third of serious or fatal child abuse and neglect cases between 2014-2018 involved infants who had prenatal substance

exposure, with 85% of cases occurring before the child was four months of age, indicating particularly high risk for very young children.<sup>16</sup> Additionally, trauma disproportionately affects mothers with opioid use disorder, with trauma exposure and particularly interpersonal trauma found at high rates among those with opioid use disorder.<sup>17</sup> These complex, bi-directional factors between mothers and their infants put infants at risk for a number of negative developmental outcomes.<sup>18</sup>

## Enhancing Sensitive Parenting

While there are several preventive programs available to enhance sensitive parenting among vulnerable infants, the Attachment and Biobehavioral Catch-up (ABC) intervention is unique in terms of its model parsimony and the large body of empirical research showing efficacy and effectiveness.<sup>19</sup> ABC is a brief (10-session, 1-hour per week), strength-based, home-visiting parenting intervention designed to promote sensitive caregiving in three main behavioral targets: (a) nurturing the child when he or she is distressed, (b) responding sensitively when the child is not distressed (i.e., following his or her lead with delight), and (c) avoiding intrusive or frightening behavior. These intervention targets were identified based on empirical findings on the needs of children experiencing adversity.<sup>20</sup> Parent coaches trained in ABC conduct the sessions at the target family's home, therefore increasing generalizability through practicing intervention targets in their natural environment.

ABC has been empirically tested in several randomized clinical trials (RCTs) across different vulnerable populations, including parent-child dyads with a history of child protective services (CPS) involvement,<sup>21</sup> children living in poverty,<sup>22</sup> children in Early Head Start,<sup>23</sup> foster children,<sup>24</sup> and internationally adopted children.<sup>25</sup> Parents who received ABC have demonstrated greater parental sensitivity than the control group in both high-risk (e.g., low resources, CPS-involved)<sup>7</sup> and low-risk (e.g., foster and adoptive parents with high resources)<sup>7,26</sup> populations. Importantly, the improvement in parental sensitivity has been pinpointed as the mechanism of the downstream positive effects for children who receive the intervention. Specifically, following the intervention, infants who received ABC showed more normative diurnal cortisol production than the control group, with effects sustained at three-years post-intervention and in middle childhood (ages 8 to 10).<sup>7</sup> Behaviorally, at both post-intervention and middle childhood follow-ups, children who received ABC were found to show better inhibitory control than children who received a control intervention.<sup>27</sup> In a functional magnetic resonance imaging (fMRI) task where children were presented pictures of their parent and a stranger, children who received ABC showed greater activations than the control group when viewing their parents vs. a stranger in brain regions implicated in socio-emotional functioning.<sup>28</sup> Furthermore, children who received ABC showed enhanced executive functioning,<sup>24</sup> better autonomic nervous system regulation,<sup>29</sup> improved emotion expression,<sup>30</sup> greater language development,<sup>31</sup> and altered DNA methylation<sup>32</sup> when compared to children who received a control intervention. These empirical data demonstrate that intervening to improve outcomes for vulnerable children is possible, and that working to increase sensitive and responsive caregiving through the ABC approach is an effective method of doing so.

Given the unique risk to infants with prenatal opioid exposure and the ways in which sensitive parenting and the infant-caregiver relationship may mediate that risk,<sup>33</sup> intervening early through targeting parenting behaviors appears to be both a crucial and viable approach for improving long terms child outcomes. The empirical support for the ABC intervention in other at-risk

populations, including parents with substance use concerns<sup>34</sup> provides strong theoretical backing for use of ABC with infants prenatally exposed to opioids. However, the unique needs of these infants and their mothers suggest adaptations to the ABC intervention that need to be validated by empirical research prior to wide dissemination to this population. In order to do so, we are now examining the efficacy of a modified form of ABC specifically adapted for pregnant women on MAT for opioid use disorder and their infants. This research on modified ABC (mABC) is being conducted at the University of Delaware through a RCT, and while robust conclusions will not be available until data collection concludes, current development and implementation of the intervention may shed light on treatment considerations for others currently working with this vulnerable population.

## **Modified Attachment and Biobehavioral Catch-Up**

A number of modifications have been made to the ABC intervention (for a detailed description of the original intervention, see *Coaching Parents of Vulnerable Infants: The Attachment and Biobehavioral Catch-Up Approach*)<sup>19</sup> while retaining the core targets and mechanisms of the intervention. Consistent with ABC, mABC targets aim to increase parenting sensitivity, and are addressed through flexibly manualized content, illustrations of parenting behaviors using video clips (including videos of the parent and child from previous sessions), and “in-the-moment” comments that highlight parent behavior in real time. These in-the-moment comments, where parent coaches provide positive feedback by describing and labeling target behaviors as they occur, have been identified as the primary mechanism of parent behavior change,<sup>35</sup> and occur across all sessions, taking priority over content delivery. With an average commenting rate of one comment per minute, parents are receiving concrete feedback on opportunities to engage in targeted behavior and praise for attempts to do so approximately 60 times per session. Only towards the end of the intervention are advanced comments utilized to gently reshape problematic behaviors through suggestions or questions to help parents reflect on their behavior. This positive, strengths-based approach is one way that parent coaches come alongside parents to support their parenting and counteract parenting-associated insecurity or resistance resulting from previous experiences with DFS or other professionals. Qualitatively, this is even more important for mothers in treatment for opioid use disorder, who report significant anxiety around their parenting and judgment from those in both healthcare and substance use treatment settings regarding the effects of their addiction on their child.

Beyond these foundational similarities, mABC seeks to address the unique needs of mothers in treatment for opioid use disorder. In ABC, the intervention may begin when the child is an infant (6-24 months) or a toddler (24-48 months), and continues for 10 consecutive weeks. In contrast, mABC begins earlier, starting with a prenatal session during the third trimester of pregnancy with a second session taking place as soon after delivery as possible. It then continues for 10 additional sessions spaced every 2-3 weeks and concludes when the infant is around seven months of age. This allows the parent coach to provide support during the particularly vulnerable peripartum period and address challenges specific to infants who may be experiencing NAS symptoms. Parent coaches can help prepare mothers in the prepartum and peripartum period to provide crucial nurturance to their very young infants who may be difficult to soothe or are easily overstimulated. As the intervention progresses, it addresses parenting behaviors that are developmentally appropriate and gives parents the opportunity to practice skills (like following the lead) that are relevant to the infant’s increasing abilities.

The structure of the prenatal session is the most unique compared to ABC, given that the infant is not yet born, and thus the only hands-on practice (and opportunity for in-the-moment commenting) is created using an infant simulator. The early postnatal session typically takes place at the hospital, rather than in the home as other sessions, and prioritizes relationship building and supporting the mother during this potentially challenging time. The parent coach primarily reinforces content from the previous session and builds engagement through in-the-moment commenting. The content in the following sessions proceeds similarly to ABC, moving from nurturance to following the lead with delight and then to reducing intrusive and frightening behavior. However, newborns are less likely to be awake and have a smaller repertoire of behaviors than older infants. Thus, in earlier sessions, activities to elicit target behaviors and in-the-moment commenting are adjusted to account for the infant's developmental abilities. In-the-moment comments are expanded to include comments on "pre-nurturance" (i.e. approximations of nurturance in the absence of infant distress, such as cuddling as the baby sleeps) and "pre-following" (i.e. approximations of following the lead in the absence of clear cues, such as making eye contact with the baby). The last four sessions include time for mothers to explore and override their automatic styles of responding that arise from previous experiences ("voices from the past" that interfere with their parenting) and consolidate gains made across the intervention. Given the high rates of trauma in this population and potential for difficult recollections of their own childhood experiences, parent coaches respond supportively to disclosures of mothers' histories while empowering them to make deliberate choices about how to parent their own children. This maintains the intervention's present-focused child emphasis while acknowledging the mother's context.

### **Case Study: Marissa & Trevor**

Marissa was a 33-year-old woman in her seventh month of pregnancy when she enrolled in mABC. She had two older children, both of whom lived with relatives through kinship care. At the time of enrollment, she was on MAT and living with her partner and his parents. However, she also used illicit and prescription opioids sporadically throughout her pregnancy, and after Trevor was born, she moved to a residential treatment facility. Her relapses and substance use led to her moving out or back into the home with her partner six times over the course of her participation in the study. After the second move, Trevor remained in the home with his father and paternal grandparents, while Marissa visited approximately twice weekly during periods when she was not living in the home.

At the start of the intervention, Marissa's efforts to nurture Trevor when he was fussy tended to rely on using a pacifier or distracting him by shaking a rattle in front of his face. Her behaviors were often intrusive and overwhelming; beyond regularly putting toys close to his face, she also played with him by moving his limbs or leaning close and loudly pretending to "gobble him up." Her parent coach made frequent in-the-moment comments whenever Marissa followed Trevor's lead or nurtured him, and Marissa made rapid gains in both domains. However, her behavior continued to be intrusive or frightening at times, such as getting frustrated when Trevor was crying and raising her voice. As the parent coach moved with her into the "voices from the past" sessions, Marissa had developed enough trust to disclose some of her own abuse history to her parent coach. She and Marissa discussed how frightening behaviors were the norm in Marissa's family growing up, and how it can be easy to do what you saw your own parent doing. Marissa recognized that even though she may be automatically ready to yell, she can take a step back and override that impulse in order to be the safe person she wants to be for her son. In the

consolidation sessions, the parent coach focused on intrusive/frightening behaviors, making comments such as, “Wow, look at how you paused and took a breath in that moment where it would be so easy to get frustrated, it’s so impressive that you can do that for Trevor!” Marissa also connected strongly with the idea “If there was someone ten times bigger than you, how would you feel?” in relation to her manipulation of her baby’s body during intrusive play. By the final session, Marissa was actively inhibiting intrusive and overwhelming play behaviors in response to Trevor’s cues, and had reduced the frequency of frightening behaviors. She was also more likely to nurture him by picking him up when he cried rather than seeking a means to distract him.

## Conclusion

The RCT is ongoing, limiting conclusions that can be drawn about the efficacy of mABC with mothers and infants affected by opioid use. However, previous research and preliminary findings suggest that modifying ABC to meet the needs of pregnant mothers with opioid use disorder may be a targeted method of addressing the vulnerabilities of mothers and their infants. By intervening to support sensitive parenting behavior through an individualized and trauma-informed approach in a real-world setting, mothers are better equipped, despite other ongoing challenges, to meet the socioemotional needs of their infants during this crucial period of development. The impacts of intervening early include not only buffering the developmental and regulatory susceptibilities of the infant, but also the lasting experience for the mother of positive parenting support and a strengthened parent-child relationship.

## Author Note

Names and some identifying details of the case study presented have been changed in order to protect the anonymity of our research participants.

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