

# Breaking the Cycle: Applying a Partnership-based, Three-client, Early Intervention Model within a Child Welfare Framework to Care for Children Exposed Prenatally to Substances

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Mothercraft's Breaking the Cycle (BTC) is a community-based prevention and early intervention program for young children who have been exposed to substances and their mothers. BTC programming involves a cross-sectoral

partnership model that takes a three-client approach, directing services toward the mother, child, and the mother-child relationship. Early intervention maximizes maternal motivation for change and neuroplasticity to mitigate the harms of substance exposure. This article outlines how BTC's model of care can be adapted within a child welfare framework.

**P**renatal substance exposure remains a major public health concern in North America and globally, with increasing trends noted across epidemiological studies and with women found to be the most vulnerable to problematic substance use during their reproductive years (Cook et al., 2017; Rodriguez & Smith, 2019; Wendell, 2013). Substance use during and after pregnancy often has an intergenerational impact through direct teratogenic and indirect environmental and relational pathways, respectively. Specifically, in addition to neurological effects, the impact of prenatal substance exposure often continues into the postnatal environment when parents are unable to make changes with their addictions, which may affect their caregiving practices and capacity to support positive attachment and promote healthy relationships with their children (Hyysalo et al., 2022). Parents who struggle with substance misuse may require myriad services to support their own well-being and parenting (Prindle et al., 2018). Children with parents who use substances may require monitoring and support from child protective services due to exposure to risk factors such as relational trauma, abuse, and/or neglect, as well as a paucity of protective factors in the home environment (Cohodes et al., 2019).

## **Prenatal Substance Exposure and Neurodevelopmental Risk**

Existing literature has demonstrated a consistent association between prenatal substance exposure and a number of poor neurodevelopmental outcomes given the underlying exposure of the developing brain to toxins in utero. The adverse impact of prenatal tobacco and alcohol exposure has been well-established. Prenatal tobacco exposure has been consistently associated with childhood behavioral challenges and potential impairments in academic performance (Guille & Aujla, 2019). Prenatal alcohol exposure is associated with attentional, academic, and executive functioning deficits, suggesting global and significant functional impairments (Cook et al., 2023). Prenatal alcohol exposure is also the etiology of fetal alcohol spectrum disorder (FASD), characterized by

congenital abnormalities and neurobehavioral sequelae that manifest during childhood and span cognitive, behavioral, emotional, and adaptive functioning capacities (Cook et al., 2023; Guille & Aujla, 2019). Prenatal marijuana use has been associated with significant negative effects on executive and intellectual functioning among school-age children and adolescents (Guille & Aujla, 2019).

Preliminary research on prenatal opiate exposure and child neurodevelopment has been conflicting to date. A recent review by Maguire and colleagues (2016) suggested that prenatal exposure to opioids is potentially associated with deficits in cognition, psychomotor processes, and behavioral processes in infants and young children, while a review by Behnke and Smith (2013) suggested that prenatal opioid exposure results in long-term effects on child behavior but not cognition. Nonetheless, treatment with opioid agonist therapy for opioid use disorder (e.g., methadone or buprenorphine) has not been found to have a negative impact on child growth, cognition, language abilities, sensory processing, or temperament (Guille & Aujla, 2019). Prenatal amphetamine or cocaine use may have a negative impact on child neurodevelopment, but effects have been shown to be largely mediated by childhood environmental and adversity-related factors (Guille & Aujla, 2019). Prenatal polysubstance exposure, although having been minimally studied to date, is highly prevalent (Tran et al., 2023) and is thought to negatively impact neurodevelopment more extensively given the concurrent impact of exposure to numerous toxins during a sensitive period of development.

## **Prenatal Substance Exposure and Concurrent Relational Risk**

In addition to robust risk for various developmental deficits, children exposed prenatally to substances often endure concurrent relational risks, including childhood trauma exposure, as well as instability in the family unit (e.g., living in high-risk environments, poor nutrition, family instability and homelessness, limited social supports) and

parent-child relationships (Cohodes et al., 2019). Compounding upon the risks of prenatal substance exposure, these early experiences of relational trauma can negatively impact neurological development, namely physiological mechanisms, brain structure and functioning, and neuropsychological functioning (e.g., executive functioning and emotion regulation; Andrews et al., 2019; Lowell et al., 2022). Early relational trauma can also negatively impact the development of relational capacities, including attachment and internal working models (Andrews et al., 2019; Özcan et al., 2016).

The adverse effects of prenatal substance and relational trauma exposure can be exacerbated by risk factors across various domains in the perinatal environment (Carta et al., 2001; Conners et al., 2004; Lebel et al., 2019). The accumulation of protective factors also occurs across these perinatal domains and attenuates the negative effects of cumulative risk, promoting positive development (Ridings et al., 2017). Taken together, children with prenatal substance and relational trauma exposure are at high risk of compounding developmental vulnerabilities. These children who are vulnerable live within perinatal systems that have the potential to exacerbate or attenuate risk. Therefore, it is essential to establish models of care that can minimize risk and maximize protection across perinatal systems in order to enhance the developmental trajectory and quality of life of these children and families (Lebel et al., 2019). The implementation of effective models of care is essential in order to halt the intergenerational transmission of relational trauma and substance use that underlie longstanding developmental impairments (Buss et al., 2017; Lowell et al., 2022).

## **Prenatal Substance Exposure and Child Welfare Involvement**

Prenatal substance use has been consistently found to be associated with increased risk of child maltreatment and involvement of child welfare services (Austin et al., 2022; Barth, 2001; Drescher Burke, 2007; Hafekost et al., 2017; O'Donnell et al., 2009; Olsen, 2015; Smith &

Testa, 2002; Walsh et al., 2003), largely due to co-occurring adversities related to substance use, including trauma, domestic violence, mental health conditions, limited parenting skills, inconsistency in caregiving, and socioeconomic limitations (e.g., unstable housing, economic hardship; Boden et al., 2013; Forrester & Harwin, 2008; Velleman & Templeton, 2007). North American and international studies have indicated that parental substance use is a concern in approximately 11 to 80% of child welfare cases (Anthony et al., 2010; Osterling & Austin, 2008; Prindle et al., 2018; Sun et al., 2001; Taplin & Mattick, 2015; Testa & Smith, 2009). Several recent studies have also noted an association between maternal substance use and poor child welfare outcomes (Forrester & Harwin, 2008; Laslett et al., 2013). There has been indication that substance exposure type can contribute to variation in the likelihood and level of child welfare involvement (Prindle et al., 2018). Moreover, maternal patterns of substance use have also been found to be associated with subsequent child removal from the home (Brook et al., 2010; Canfield et al., 2017).

## **Prenatal Substance Exposure and Mothercraft's Breaking the Cycle**

Mothercraft's Breaking the Cycle (BTC) was one of the first Canadian community-based prevention and early intervention programs for women who are pregnant, for mothers, and for their infants and young children up to age six with exposure to maternal substance use and trauma. As a prevention program, BTC was designed to reduce the incidence of child maltreatment and to enhance the development of children exposed prenatally to substances by addressing maternal addiction problems and the mother-child relationship through a comprehensive, integrated, cross-sectoral, community-based model. As an early intervention program, BTC uses infant mental health approaches to promote the wellness and mental health of infants and young children who are at risk for poor outcomes due to maternal substance use

and co-occurring risk factors. Infant and early childhood mental health are the developing capacities of the child from birth through the early years to experience, regulate, and express emotions; form close and secure interpersonal relationships; and explore the environment and learn (ZERO TO THREE, 2001). This paper has been divided into four sections, across which we will:

1. Describe BTC's partnership-based, three-client, early intervention model of care.
2. Describe findings related to neurodevelopmental outcomes in young children at BTC within the context of BTC's model of care.
3. Discuss how BTC's model of care can be adapted within a child welfare framework to care for children with prenatal substance and trauma exposure.
4. Outline challenges, limitations, and future directions with respect to BTC's program and the broader literature on interventions for families who use substances.

## **Breaking the Cycle Program Description**

BTC's program encompasses an (a) partnership-based; (b) three-client; and (c) early intervention model of care that is elaborated upon in the respective sections below.

### ***Partnership Model***

BTC was launched in 1995 with the goal of addressing service-system problems which had precipitated risk to infants and young children exposed to substances in the city of Toronto, Canada. In the early 1990s, the tragic death of a number of infants and young children who were known to child welfare agencies and other service providers led

to public inquests. Following the inquests, representatives of organizations who were parties to the public proceedings began to meet regularly to discuss the inquest recommendations and to consider next steps in system-level planning. The identified system-level problems included fragmented services, multiple intake experiences, lack of consistency, multiple service locations, and poor coordination of services, especially between the adult treatment and child service sectors. Representatives from organizations that included child welfare, public health, pediatrics, and infant development met on a regular basis for a period of two years to envision a community-based service model that would meet the needs of families, and to develop a funding proposal for what would eventually become the BTC program. Funded by the Public Health Agency of Canada's Community Action Program for Children (CAPC) and the Canada Prenatal Nutrition Program (CPNP), BTC currently operates through the efforts of ten partner agencies,<sup>1</sup> representing a nontraditional collaboration among the child welfare, substance-use treatment, probation/parole, health, midwifery, and children's service sectors to address the complex problems related to mothering and substance misuse.

A memorandum of understanding outlines the roles and responsibilities of the BTC partners. Women who attend services at BTC are fully informed of the purpose and function of the partnership and sign a consent for communication between the BTC partners so that they can experience the full range of services provided through the program. BTC partners support the program at three different levels: (1) membership on the BTC Steering Committee, which provides general direction and guidance for the operation of the program from the perspective of each service sector; and (2) participation of a senior clinician from each organization on the clinical formulation team.

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1 BTC's partners include: Children's Aid Society of Toronto; Catholic Children's Aid Society of Toronto; Mothercraft Parent-Infant Program; Unity Health Toronto – St. Joseph's Health Centre and St. Michael's Hospital; the Hospital for Sick Children; University Health Network – Toronto Western Hospital, Mental Health and Addictions; Association of Ontario Midwives; Toronto Public Health; and the Ministry of the Solicitor General.

This team meets bimonthly and provides clinical recommendations to cases, presented by BTC staff, which become part of the programming plans for families; and (3) most organizations provide direct services onsite at BTC (e.g., public health nurse, female probation officer). Although child protection services are not provided onsite, child welfare workers have regular contact with case managers at BTC to support families to meet child welfare service goals; mothers may also choose to “host” their service planning conference meetings at BTC. This is often the location where they feel most supported, empowered, and comfortable in knowing their children are with familiar caregivers.

Through a single-access service model that is augmented with home visitation and street outreach components, the BTC partners combine forces to offer multiple services in a single location in a metropolitan center. Instead of mothers and children traveling to multiple locations, they travel to one location. Service providers from partner agencies travel to BTC to deliver a range of services that include: maternal addiction counseling; parenting interventions; a developmental pediatric/FASD assessment and diagnostic clinic; child development services; child care; and supports for basic needs including food, transportation, diapers, and clothing (see Figure 2). The program space is non-institutional, warm, welcoming, accessible, and safe for both mothers and children. The BTC partners created a program model guided by the following principles.

***A collaborative, community-based response.*** No single agency can respond to the multiple and complex needs of both children and their mothers affected by substance misuse and related issues (Anthony et al., 2010; Ondersma et al., 2000; Prindle et al., 2018; Traube, 2012). Substance misuse by mothers is only one factor that affects children’s development (Cohodes et al., 2019). Figure 1 summarizes the most common risk factors that co-occur for families participating in the BTC program, which place infants and young children at risk for poor mental health, developmental, and relationship outcomes, and highlights the need for an interdisciplinary approach to service delivery.

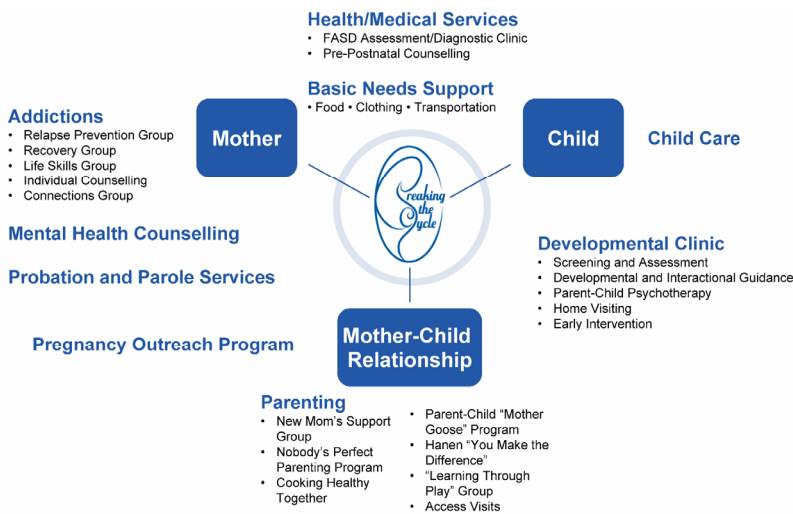
**Figure 1**

*Profile of Breaking the Cycle Risk Factors of Families*



**Figure 2**

*Breaking the Cycle Programs and Services*



***A comprehensive, integrated, cross-systemic response.*** A comprehensive approach to service delivery recognizes that the presenting problem of substance use is usually complicated by co-occurring adversities that contribute to concerns in other life domains, such as employment, housing, and family relationships (Kubiak et al., 2004; Lester & Twomey, 2008). Recognizing that the delivery of parenting, child welfare, addictions, developmental, correctional, and health/medical services must be provided in an integrated manner reflects the complex, interrelated experiences and needs of mothers and children that spans multiple systems (Coupland et al., 2021; MacAfee et al., 2020; Marcellus & Badry, 2021).

***Prevention through early identification.*** The aim of the program is to engage women in the earliest stages of pregnancy to reduce the biological, psychosocial, and cumulative risk of substance exposure to the fetus and to promote prenatal health care and birth planning support to prepare for parenting. BTC program evaluation findings have confirmed that the engagement of women who are pregnant through outreach services during the first two trimesters of pregnancy resulted in better prenatal and postnatal outcomes compared to mothers who were engaged during the third trimester (Pepler et al., 2002). Earlier engagement in BTC prenatal services also resulted in positive perinatal outcomes for infants, namely fewer prenatal risk factors including a reduction in alcohol and other substance exposure, higher birth weights, fewer birth complications and postnatal diagnoses, reduced length of hospital stay, and fewer mother-child separations at birth (Pepler et al., 2002). This is consistent with broader literature that has highlighted improved maternal and infant outcomes alongside substance use treatment commencing during pregnancy, including prenatal care (Flykt et al., 2021).

***Single-access model vs. multiple service locations.*** Removing barriers to care to promote engagement in services by mothers who misuse substances is necessary for the treatment of mothers and infants (Barnett et al., 2021). Women who are pregnant and mothers who misuse substances are understandably fearful and mistrustful of service

providers due to their previous interactions with professionals and systems, which have often included the loss of custody of other children due to substance use or related issues (Elms et al., 2018; Stone, 2015). Paradoxically, isolation from health and social services exacerbates risk for pregnant women who use substances and/or mothers with children (Urbanoski et al., 2017). Using a centralized single-access location, including outreach and home-visiting components, the aim of BTC is to engage women who are pregnant and mothering in a different kind of experience than they may have had previously, and to decrease isolation and facilitate access to early intervention services through a relational, attachment-promoting, trauma-informed approach.

### ***Three-client Model***

Maternal substance misuse has an impact on the mother, child, and the mother-child interactions (Flykt et al., 2021). Consistent with attachment theory (Ainsworth et al., 1978; Bowlby, 1969) and research on the intergenerational transmission of trauma (Yehuda & Lehrner, 2018) and parenting skills (Lomanowska et al., 2017), comprehensive interventions can help mothers reflect on what they learned in their own early relationships and how that knowledge influences their interactions with their children (Isobel et al., 2019). A “two-generation” response to relational problems involving substance use and trauma creates an opportunity to generate insight into, and progress toward, the development of both the mother and the child, as well as the development of the relationship between the two (Isobel et al., 2019). As a result, programming at BTC involves a three-client approach, with services specifically directed toward women, their children, and the mother-child relationship (see Figure 2). The mother-child relationship is recognized as the mechanism of change in early intervention services at BTC (Espinete et al., 2016).

Key components of the three-client model include:

***Increasing maternal reflective functioning.*** Reflective functioning refers to the ability to understand one’s own behavior and/or the

behavior of others in light of underlying mental states and intentions (Katznelson, 2014). For a mother, it represents her capacity to recognize, understand, and respond to her child's internal experience (Luyten et al., 2017). Maternal reflective functioning is integral to supporting the establishment of secure attachment relationships (Zeegers et al., 2017), and is thus a key mechanism of change in mother-child attachment interventions (Barlow et al., 2021).

***Increasing maternal sensitivity.*** Maternal sensitivity refers to a mother's ability to integrate her reflections into behaviors, to engage with her baby at an appropriate level, and to interact in a manner that supports development beyond their current abilities (Deans, 2020). This includes demonstrating appropriate and consistent responses to the infant's cues and signals (Deans, 2020). Maternal sensitive responding is also considered an underlying basis for attachment security (Zeegers et al., 2017), and is central in attachment interventions (Mountain et al., 2017).

***Creating and maintaining a solid therapeutic relationship.*** In order to keep mothers and their babies in treatment, the therapist needs to provide a secure, dependable relationship, which the mother can also use as a model for her own relationship with her infant (Berry & Danquah, 2016). In this way, treatment is grounded in attachment theory (Ainsworth et al., 1978; Bowlby, 1969) with a focus on a therapeutic relationship characterised by sensitive and attuned responses, allowing clients to foster affective regulation abilities and mentalization skills toward one's own and others' behaviors and inner states (Parolin & Simonelli, 2016). Stern (1995) suggested that the therapeutic relationship is a primary consideration and is actually more important than the therapeutic approach. Characteristics of the therapeutic alliance such as collaboration, mutuality, empathy, and therapist characteristics such as warmth and openness have been found to contribute to positive treatment outcomes (Baier et al., 2020) and this broader therapeutic style can support attachment security in the mother-child dyad (Wong, 2009).

***The mother and baby are both present for the intervention.*** Including the mother and baby in interventions at BTC supports a number of functions, including: ensuring that the therapist has access to accurate observations of the mother, the infant, and their relationship; circumventing the need to rely on the mother to recall behaviors and interactions that have occurred in the home; supporting the mother to better explain her reactions to and memories around her interactions with her baby; and allowing the therapist to intervene and provide support in the moment. This is particularly important given that, in light of each mother's own unique history in attachment relationships with frequent relational trauma exposure, their baby can often interact with and shape their perceptions, distortions, and projections in a manner that perpetuates maladaptive relationships and insecure attachment (Fraiberg et al., 1975). As such, when both the mother and baby are present, the therapist can use the "here and now" behaviors of the infant and focus the mother's attention on the infant's needs and experiences, which ultimately increases maternal reflectivity and sensitive responding and enhances the mother-child relationship (Lieberman, 1992; Lieberman et al., 2005).

### ***Early Intervention Model***

The prenatal period and the first three years of life are windows of opportunity for interventions to promote maternal and child health (Miguel et al., 2019). Mothers may experience increased motivation to change substance use behaviors due to their pregnancy and/or their infant (Forray, 2016; Higgins et al., 1995). For the child, the prenatal period and the first three years of life are critical periods of brain development (Gilmore et al., 2018). What happens in the early years either mitigates (e.g., early intervention) or exacerbates (e.g., co-occurring and interrelated adversities) the neurodevelopmental impacts of the child's exposure to substances prenatally (Solis et al., 2012). The basic principles of neuroscience indicate that early intervention produces

more favorable developmental outcomes than remediation later in life and contributes to positive societal and economic impact (Baker & Feinfeld, 2003).

Nonetheless, despite urgent and consistent calls to action to incorporate screening, prevention, and early intervention supports in the care of infants and young children exposed prenatally to substances (Anthony et al., 2010; Flykt et al., 2021; Matson et al., 2022), there has been very little literature to date outlining the impact of consistent early intervention implementation on maternal, child, and mother-child outcomes. There has been some preliminary research on the importance and impact of early intervention supports for children with prenatal alcohol exposure specifically resulting in FASD (Flannigan et al., 2020; Mukherjee et al., 2017; Olson et al., 2007; Peadon et al., 2009; Pei et al., 2017; Reid et al., 2015). Nonetheless, more extensive research is needed on the role of early intervention in prenatal substance exposure more broadly across various substances and polysubstance exposure.

BTC delivers early intervention by directly providing and promoting access to services that address areas of development that are most affected by the pre- and postnatal impacts of substance exposure. A developmental screen is conducted for each child in the intake phase of service by the family's home visitor; additionally, a complete developmental assessment is conducted annually through our developmental pediatric/FASD assessment and diagnostic clinic. These screens and assessments provide the basis for planning each child's programming needs through an individual program plan, which are reviewed every six months. Activities from the program plan are facilitated by parent-infant home visitors on a weekly basis to each family, as well as by child development workers through individual and group-based interventions at the BTC center. Program plans may also include referrals, service coordination, and integration of recommendations with other early intervention supports including occupational/physical therapy and speech/language services.

## **Breaking the Cycle's Model of Care and Neurodevelopmental Outcomes**

Previous research at BTC spanning four connected manuscripts has explored how contexts of risk and protection, including early intervention, impact early neurodevelopment in young children with substance and trauma exposure (Bondi et al., 2020a, 2020b, 2021a, 2021b). Early childhood neurodevelopment, encompassing both cognitive and socioemotional development, was found to be shaped by the balance of cumulative risk and protection across perinatal domains (i.e., influenced by the mother, secondary parent, family context, prenatal context, birth period, child health and well-being, parent-child interactions, social networks, and professional services). More specifically, it was found to be vital to consider the complex interplay between contexts of risk alongside contexts of protection such that heightened levels of risk, in the absence of heightened levels of protection, resulted in drastically different clinical outcomes. Within the present paper, our previously published findings of a subsample of children who accessed services at BTC will be interpreted in the context of BTC's: (a) partnership, (b) three-client, and (c) early intervention model of care.

### ***BTC Subsample***

Three pediatric (aged zero to six) sibling groups were included in the preliminary investigation into the impact of cumulative risk and protective factors, including early intervention, on neurodevelopmental outcomes. This included two sibling dyads and one sibling quadrad, for a total of eight children. All sibling groups had substance exposure histories and had received long-term treatment at BTC for a minimum of 2.5 years with developmental assessments at multiple time points. The three families were selected based on their clinical progress, which lead clinicians at BTC classified as good, fair, and poor, respectively, thus capturing the range of clients seen at BTC. Clinicians assessed overall clinical progress based on the families' participation in programming at

BTC, child apprehensions from parental care during their involvement, as well as their situation and progression toward individual therapeutic goal attainment at the time of ending services.

Of the children included in this sample, 5/8 had prenatal poly-substance exposure across all three trimesters, 1/8 had prenatal poly-substance exposure within the first trimester only, 1/8 had exclusive nicotine exposure within the first trimester, and 1/8 did not have any prenatal substance exposure. A total of 7/8 of the children were apprehended from the home by child welfare services into kinship or foster care, with subsequent returns to the home. Only 1/8 of the children was never apprehended and 2/8 of the children had a secondary permanent removal from the home with placement for adoption. A total of 2/8 of the children were diagnosed with FASD and 1/8 with attention-deficit/hyperactivity disorder (ADHD). Qualitatively, 7/8 showed social-emotional difficulties, 2/8 were considered at high risk for mental health concerns, 3/8 showed behavioral difficulties, 3/8 had language deficits, 2/8 had fine-motor deficits, and 2/8 had cognitive deficits. Of the three mothers included in this sample, 3/3 had engaged in prenatal substance use, 3/3 had child welfare involvement, 2/3 had a diagnosed mental health illness, 3/3 had a history of child abuse/neglect, 2/3 had a history of interpersonal violence/complex trauma, 3/3 had a primary relationship with a substance user, 3/3 had a dysfunctional or abusive relationship with the other parental figure, 2/3 underwent a separation/divorce from the other parental figure while at BTC, and 1/3 were teenage parents while at BTC. For comprehensive case studies of the sample outlining contexts of risk and protection, neurodevelopment, and clinical progress, including all services accessed, see Bondi et al., 2021a.

### *Partnership Model*

Given the potential for cumulative protective processes to attenuate the negative effects of cumulative risk (Ackerman et al., 1999; Ostaszewski & Zimmerman, 2006; Spencer, 2005), our work highlighted the

importance of considering cumulative protective contexts in addition to cumulative risks (Bondi et al., 2020b). This is in keeping with strengths-based practices employed within child welfare systems, ensuring that the strengths the child and family possess are harnessed and fostered throughout service delivery (Toros & Falch-Eriksen, 2021). Our prior work highlighted the importance of tailoring models of cumulative risk and protection to the clinical and community settings that serve the focal population in order to better capture relevant contextual factors. As such, to understand the risk and protective contexts that influence neurodevelopment for children at BTC, the partnership model, integral to service delivery, must be considered. When conceptualizing cumulative protection within the perinatal period, we included protective factors that occurred within the social networks and professional services domains (Bondi et al., 2020a). These included protective factors like non-family support networks, such as those facilitated through services at BTC. Additionally, these protective factors included access to public health services, high-risk nursing services, as well as other medical services and financial allowances that programming at BTC helps facilitate for clients through case management and the broader partnership model of care. Notably, all the families included in our previous work were found to have substantial protection within the social network and professional services domains (Bondi et al., 2021a, 2021b). The optimistic clinical and neurodevelopmental outcomes that were found for this sample must be considered alongside the substantial protection received via social networks and professional services, to which other families struggling with prenatal substance exposure and concurrent contexts of risk may not have access.

Additionally, all the families within our previous work were found to have comparable levels of risk across the maternal, other parental figure, and family domains, suggesting a potential baseline level of prenatal risk in this sample (Bondi et al., 2021a, 2021b). However, children who had clinically concerning neurodevelopmental deficits at one point during their follow-up at BTC were the only children who

had clinically notable levels of risk in the birth/postnatal context, child health and well-being, and parent-child interaction domains. These results indicated that ongoing risk in the postnatal environment may be more indicative of neurodevelopmental deficits and poor clinical progress compared to maternal or family history risks, namely risks within the prenatal period (i.e., baseline period of risk in this sample). It is thus essential that models of care during the postnatal period, including child welfare services, incorporate partnership services to address the variety of risks to which these children are exposed, since postnatal risks may exacerbate negative outcomes above and beyond prenatal substance and trauma exposure alone.

### ***Three-client Model***

As previously noted, children who had clinically concerning neurodevelopmental deficits at one point during follow-up were the only children who also had clinically notable levels of risk in the birth/postnatal context, child health and well-being, and parent-child interaction domains (Bondi et al., 2021b). Therefore, the salient impact of postnatal risks spanned across BTC's three-client model, impacting the mother, child, as well as the mother-child relationship, with subsequent effect on neurodevelopment. Conversely, the children who demonstrated optimal neurodevelopment and clinical progress were the only children who had clinically notable levels of protection within the family and parent-child interaction domains. These findings point to the importance of incorporating relational protection into clinical services to address the mother-child relationship in addition to maternal and child-specific services alone. Because prenatal substance exposure is often related to maternal addiction problems and related issues, the provision of concurrent services to the mother and the dyad promotes maternal health and parenting and enhances the postnatal relationship environment. Taken together, this highlights the importance for intervention and child welfare services to surround the mother, child,

and their relationship across various service partnerships involved in their care.

### ***Early Intervention Model***

Most notably, our previous work highlighted the importance of early intervention for the population of children served at BTC who have both substance and trauma exposure. Early intervention is essential as it capitalizes on brain plasticity and is thus capable of altering a child's brain architecture. Our results supported the notion that early intervention within the first three years of life is crucial to have the most notable impact on neurodevelopmental trajectories (Bondi et al., 2021b). More broadly, there appeared to be additional benefits to the neurodevelopment of children alongside earlier timing and/or a longer duration of time receiving early intervention. Neurodevelopmental differences were found between children with comparable risk contexts who entered BTC programming with as little as a one-year age difference at entry (e.g., age one vs. age two). Therefore, the results highlight the importance of early intervention, which includes child welfare services, commencing as early as possible postnatally, indicating a need for the typical conceptualization of the sensitive period of early intervention (i.e., ~age zero to six) to be adjusted to better reflect the *very early* intervention provided at BTC. The results are specific to programming at BTC; therefore, intervention must not just be delivered early, but also within BTC's partnership and three-client model of care.

### **Adaptation within a Child Welfare Framework**

Given the complex contexts of risk associated with pre- and postnatal caregiving environments (Cohodes et al., 2019), it is not surprising that children who have prenatal substance and trauma exposure are at high risk for child welfare involvement and for removal from the home (Austin et al., 2022; Canfield et al., 2017; Prindle et al., 2018).

The complex problems faced by children with prenatal substance and trauma exposure, and their families, require an innovative and collaborative systemic response to provide continuity of care and to promote positive outcomes. The relevance of BTC's partnership, three-client, early intervention model of care will be discussed within a child welfare framework. Practical strategies for the implementation of this model in differing communities will also be discussed.

### ***Partnership Model***

There is not one agency or sector that can deliver all the services required to address the cumulative and co-occurring risks faced by mothers and young children with substance and trauma exposure (Coupland et al., 2021; MacAfee et al., 2020). Collaboration between various disciplines, agencies, and sectors, including child welfare, has been noted to be invaluable when planning early detection and prevention services for children exposed prenatally to substances (e.g., child welfare and other service providers, medical professionals, drug treatment providers, developmental specialists; Anthony et al., 2010; Marcellus & Badry, 2021; Prindle et al., 2018; Traube, 2012). As such, cross-sectoral, community partnerships involving collaborations with child welfare services are essential to address the multiple and complex needs of children and mothers during the critical perinatal period. Through formal partnerships, coordinated case management can decrease obstacles to accessing services for families. Additionally, increased communication between the agencies and sectors that are providing care is critical to reduce risk and to increase supports to optimize safe outcomes for families. This partnership model, with heightened case management and communication across services and sectors, also provides an opportunity to harness strengths-based approaches with families to recognize contexts of risk and protection. The importance of taking a strengths-based approach when working with children with prenatal substance exposure, especially within a child welfare

framework, has been consistently indicated in the literature (Marcellus & Badry, 2021). Overall, a partnership model of care is also consistent with child welfare mandates (Wegner-Lohin et al., 2014) to carefully balance risk and protective factors in the delivery of care, including placement decisions and the provision of concurrent services to support the child within their dynamic systems of care.

### ***Three-client Model***

Because prenatal substance exposure is often related to maternal addiction problems and related issues that place the parenting relationship and children's neurodevelopment at risk (Carta et al., 2001; Conners et al., 2004; Lebel et al., 2019), it is important to address the needs of the mother, the child, and their relationship (Flykt et al., 2021; Hyysalo et al., 2022). Preliminary investigation into integrated intervention programs that strive to address the needs of mothers and children within families impacted by substance use have found improved outcomes for the mother, child, and the mother-child relationship (Calhoun et al., 2015; Niccols et al., 2012). More specifically, the provision of services to the mother and the dyad, concurrent to child-specific services, promotes maternal health and parenting, enhances the postnatal relationship environment, and ultimately improves neurodevelopmental outcomes for children above and beyond child-specific programming alone. In addressing the mother's own history of relational trauma, these services also provide an opportunity to interrupt the intergenerational transmission of trauma, which are known to perpetuate intergenerational substance misuse as a means of coping (Yehuda & Lehrner, 2018).

### ***Early Intervention Model***

Early detection and prevention services through child welfare have been found to substantially minimize the negative impacts of substance

exposure on infant and child development (Anthony et al., 2010). As such, there has been a call for the early detection of prenatal substance exposure through child welfare to shift away from policing efforts and toward early detection as an opportunity for prevention of future consequences from long-term parental substance use and related risk factors (Anthony et al., 2010), with a focus on supporting postnatal effects of prenatal substance exposure including abuse/neglect, attachment, and developmental needs (Ondersma et al., 2000). In addition to early detection services, the prevention of ongoing perinatal trauma and child maltreatment through child welfare services, alongside early interventions that harness protective factors, are essential (Anthony et al., 2010; Flykt et al., 2021; Matson et al., 2022). More specifically, prevention and early intervention services must be provided as soon as possible in the perinatal period, and more broadly in the first three years, in order to capitalize on the rapid rate of development and neuroplasticity (Gilmore et al., 2018), as well as the heightened maternal motivation to enhance parenting and mitigate harms to child neurodevelopment (Luyten et al., 2017). Intervening early and comprehensively in the short term can ameliorate the long-term impacts of substance and trauma exposure at an individual, familial, societal, and intergenerational level (Baker & Feinfeld, 2003).

### ***The Implementation of BTC's Model in Different Communities***

The implementation of BTC's model of care within different communities, and from a child welfare lens, will necessitate taking a community-specific approach. This includes consideration of the unique needs of the population being served, including concurrent and cumulative risks and diversity-related factors, as well as partnerships and resources available in the community, which, at times, may be limited in nature. It is important to understand the landscape of services accessed by the families being served, which span various disciplines, agencies, and sectors including maternal, child, and mother-child relational supports.

It is helpful to ask women and mothers what services they need and value most so that plans can be developed to best allocate limited resources. Time can then be invested in building relationships with relevant providers as a preliminary step to establishing formal partnerships. It will be essential to prioritize building relationships with child welfare and other mandated services that the families require but have difficulties engaging and intersecting with on their own. It is necessary to be transparent with women and mothers about the nature of the partnerships with child welfare and other mandated services, highlighting the benefits, limitations, and purposes of the partnerships within their care. In relationship building across services, a shared mission can be discussed to support families struggling with substance use, and through this alliance service providers from multiple sectors will have the opportunity to engage families with whom they have had difficult relationships historically. In the process of building partnerships between providers in varying sectors, it is important to incorporate each perspective into the establishment of the model of care and service delivery. Additionally, it is critical to invest time into maintaining relationships with service partners, especially if there is extensive staff turnover or program changes over time.

Notably, partnership building can be a slow and resource-intensive process. Through the establishment of partnerships over time, prioritization of a single-access model as much as possible is essential in providing the structural supports offered by a partnership-based model of care. Early in the partnership building process, or in communities where partnership building is challenged by geographic, sociopolitical, or economic factors, providing single-access care can include additional consultation and case management supports to bridge the gap between clients and the various services they are accessing. Virtual platforms can be helpful in building partnerships and in supporting single-access care; however, finding opportunities to meet in person, when/if possible, can be beneficial in relationship building and in supporting collaboration and cohesiveness across an integrated service delivery. Additionally, a central tenet of programing that should be promoted early in program

establishment, or in less resourced contexts, is the early intervention approach wherein services are offered as soon as possible, including during the prenatal period and early across child development.

## **Challenges, Limitations, and Future Directions**

Despite the many benefits of BTC's partnership-based, three-client, early intervention model of care, it is resource-intensive, and it was established in a metropolitan city with various funding sources, social services, and partnerships available. Although we have striven to outline methods in which BTC's model can be implemented in different contexts, the perspectives highlighted may not generalize as robustly to communities that are remote or underserved. More broadly, the COVID-19 pandemic has exacerbated the need for mental health, developmental, parenting, and addictions supports, especially for families already struggling with substance use and co-occurring risks and adversities (Araújo et al., 2021; Avena et al., 2021; Garner et al., 2023). Public health restrictions throughout the COVID-19 pandemic have shifted the landscape of service delivery, resulting in service shutdowns, disruptions, and transitions toward virtual or hybrid models of care. Despite the benefits of virtual and hybrid models, in many ways, this has made partnership-based and relational service delivery more challenging and has decreased the accessibility of services for the most vulnerable (Lau et al., 2022). This has resulted in further isolation and compounding risks for families who are vulnerable. As such, the implementation of BTC's model will have to be considered within the ever-evolving landscape of service delivery in different contexts amidst the COVID-19 pandemic.

As previously noted, there has been a paucity of literature to date exploring the impact of early intervention services on maternal, child, and mother-child outcomes in families struggling with substance use. More notably, there has been minimal overview of early intervention services that take a relational, attachment-promoting, trauma-informed approach similar to BTC wherein services are comprehensive

and integrated and span the mother, child, and the mother-child relationship. As such, further work in this area is necessary, especially as BTC's model is implemented into different contexts and communities with prenatal substance exposure (including various substances and polysubstance exposure) and co-occurring risks. More broadly, it will be important to gain insight into how these effective models of intervention can be translated in means of capacity building within existing community-based programs to better support the needs of infants and young children who are prenatally exposed to substances and their mothers. In identifying core program components and strategies vital in implementation in different contexts, programs that already operate within communities and in formal partnerships can be augmented to address the extensive public health needs surrounding substance use.

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