


Responding to Ohio's Childhood Lead Poisoning Crisis

Lead Poisoning & Behavioral Health Increased Referrals for Treatment Can Mitigate Long-term Consequences of Childhood Lead Poisoning

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SUMMARY

For decades, childhood lead poisoning has been a persistent problem in certain neighborhoods in Ohio, particularly putting at risk African-American children, children from impoverished families, and/or children living in older homes. The effects of lead poisoning in children can be wide-ranging and long-lasting, leading to a variety of health issues—including behavioral. In this paper, we assert that it is necessary to mitigate the long-lasting consequences of lead poisoning by examining lead poisoning through a psychosocial lens, and include in its treatment the expansion of behavioral health treatments. We call for required referrals to behavioral health services for any children identified to have elevated blood lead levels.

WHO SHOULD USE THIS PAPER

- Local and state government officials
- Health officials and policymakers
- Managed care organizations
- Primary-care physicians and other healthcare providers

TAKEAWAYS & ACTION ITEMS

- Inclusion of behavioral health as an evidence-based treatment to support the psychosocial needs of children with lead poisoning.
- Inclusion of behavioral health as ancillary treatment during the IDEA Part B Child Find stage.
- Managed care organizations and primary-care physicians begin directly referring children with elevated blood lead levels for services with behavioral healthcare providers.
- Capitalize on opportunities to better evaluate effective psychosocial treatment of children with lead poisoning.
- Include behavioral health representation on Ohio's Child Lead Poisoning Advisory Council.

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WHERE NEW PATHS BEGIN

Lead Poisoning & Behavioral Health: Increased Referrals for Treatment Can Mitigate Long-term Consequences of Childhood Lead Poisoning

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Brief Background on Lead Poisoning

Lead poisoning is not a new phenomenon, as it has been known as an occupational hazard for adults for centuries (Wani et al., 2015), but incidences in young children increased in the 19th century with the use of leaded paint in homes. The most common way lead poisoning occurs today is from lead-based paint that remains in homes built before the late 1970s, when the manufacturing of lead paint was banned by the government. In fact, children who live in homes built before 1950 are six times more likely to have elevated blood lead levels (BLLs) above $5\mu\text{g}/\text{dl}$ (Schnur & John, 2014). Children also are susceptible to lead poisoning through contact with contaminated soil, water running through leaded pipes, food that comes in lead-sealed packaging, and even polluted air. Although adults in the same environment are potentially exposed to lead, children's gastro-

intestinal system absorbs lead fastest in infants and young children. Lead also has a longer half-life in children's bloodstreams, leading to the higher impact of lead exposure in young children compared to adults (Bellinger, 2004).



Lead poisoning impacts multiple body systems head-to-toe, such as interrupted production of blood cells (anemia), absorption of macronutrients like calcium and iron, kidney functioning, the entire nervous system, and

even apoptosis and necrosis (scheduled and unscheduled cell death) (KidsHealth, 2019; Burke & Miller, 2011). Possibly most upsetting is the discovery that lead poisoning even shrinks and kills cells in the brain (Cecil et al., 2008). In children, even a low BLL can cause delayed growth, poor hearing, ADHD, and lower IQ. High lead levels can lead to anemia, vomiting, convulsions, coma, and

death (Flora et al., 2012).

Each incidence of lead poisoning can look different across children as more studies demonstrate that setting, duration, nutritional profile, and other environmental variables can possibly account for differences in impact and susceptibility to lead poison-

ing. As symptoms and effects of lead poisoning can cause severe and lasting damage in children, intervention efforts are crucial to preventing lead poisoning and long-lasting impacts on families and communities. Intervention is especially imperative for populations who are at higher risk for lead poisoning.

Lead Poisoning's Connection to Behavioral Health

Studies have demonstrated region-specific decreases in gray matter in adults who had been exposed to lead as children (Cecil et al., 2008). The prefrontal cortex and an area called the anterior cingulate gyrus both have prominent roles for executive functioning and mood regulation. Common presenting mental health symptoms in children with lead poisoning include depression, anxiety, somatic issues, attention deficit/hyperactivity, oppositional defiance, and conduct disorder—all connected to the areas

most impacted by lead poisoning. No incidence of lead poisoning looks the same, and, similar to other childhood disorders like autism spectrum disorder (ASD), each child's deficits should be carefully screened, monitored, and responded to individually.

The overlap of mental health symptoms associated with lead poisoning demonstrates that behavioral healthcare is critical to children with lead poisoning.

Research Shows the Need for Behavioral Healthcare

To date, there is no cure for lead poisoning, only intensive treatment with chelation therapy. However, more research is demonstrating the impact of psychosocial intervention to mitigate the consequences of lead poisoning in children. An Institute of Medicine report highlighted the effectiveness of interventions in early childhood that shifts “the odds in favor of more adaptive outcomes” for children (Shonkoff & Phillips, 2000, p. 32). Therefore, we propose the expansion of

treatment options to include behavioral healthcare for children with lead poisoning.

Multiple studies have demonstrated differences in levels of psychosocial support on BLL. Studies have shown that children with lower psychosocial protective factors often have the highest representation of elevated BLLs, take longer for their BLLs to decrease after treatment, and experience higher rates of cognitive deficits. Additionally, animal

studies offer glimmers of hope for environments that are enriched with opportunities for “self-directed learning and physical exercise” (Burke & Miller, 2011, p. 164). Most significant are the findings from studies that point to higher levels of parental nurturing mitigating lead poisoning’s impact on the stress response system. Neuroanatomical studies have demonstrated the lasting impact of lead poisoning on the hypothalamic-pituitary-adrenal (HPA) axis and the hippocampus—key elements of the stress response system (Rossi-George et al., 2009; Toscano & Guilarte, 2005).

Although these studies do not offer a definitive cure for lead poisoning, and true prevention can only be attained through complete lead abatement, these studies offer an opportunity to expand interventions for families of

children with lead poisoning. These studies suggest that interventions rooted in psychosocial protective factors and that build resiliency through relational processes should be implemented as early and often as possible for children with elevated BLLs. Behavioral health interventions that intimately include parents and caregivers, focus on supporting caregiver nurturing skills, and provide psychoeducation on the power of healthy relationships (attachment), child directed learning, and play may prove to be a critical treatment pathway to mitigate further deficits from lead poisoning.

However, this requires that behavioral health providers become key stakeholders and integrated into the treatment pathway when elevated BLLs are identified in children.



Making Space for Behavioral Health Intervention: Utilizing the IDEA Part B “Child Find” Process

Part B of the Individuals with Disabilities Education Act of 1990 presents opportunities to expand intervention in school-aged children. It authorizes the identification and evaluation of individuals suspected of disabilities, including the designator “other health impairment” that captures lead poisoning, under a process named “Child Find.” Child Find pushes for greater cooperation between educational agencies and connected/related agencies and systems including mental health (Educational Services for Children Affected by Lead Expert Panel, 2015).

Behavioral healthcare is a very appropriate response to the American Academy of Pediatrics' (AAP) recommendations for children with lead poisoning. AAP recommends that Early and Periodic Screening, Diagnostic and Treatment (EPSDT) "continue annually (no age limit) to identify emerging or un-addressed behavioral/developmental/cognitive concerns" (AAP, 2006, as cited in Educational Services for Children Affected by Lead Expert Panel, 2015, p.30). With that said, behavioral health referral and treatment should be appreciated as an ancillary course of treatment and integrated as a critical part of the Child Find stage of response to children with elevated BLLs covered by Medicaid.

We therefore call for increased collaboration to implement evidence and guidelines, including from AAP (Lipkin, 2020; Educational Services for Children Affected by Lead Expert Panel, 2015), that indicate the need for evi-

dence-based interventions to treat childhood lead poisoning. We assert that behavioral health should be a part of the evidence-based interventions to address associated behavioral issues, as this is well within the scope of mental health services—especially those delivered in school settings.

We believe that services such as ECMH (Early Childhood Mental Health) and school-based mental health (e.g. OhioGuidestone’s School Services) are key parts of both the healthcare and educational communities that are a part of the CDC’s recommended flow of response (Council on Children with Disabilities Section on Developmental Behavioral Pediatrics et al., 2006; Educational Services for Children, 2015). Mental health providers should be a part of the referral pathway as early as possible, as an ancillary treatment in addition to medical treatment recommendations at the Child Find stage.

“We assert that behavioral health should be a part of the evidence-based interventions to address associated behavioral issues...”

OhioGuidestone adopts a stance of prevention and mitigation of the long-term impact of childhood lead poisoning

We call for primary prevention through lead abatement efforts by local, state, and federal stakeholders and present an opportunity to mitigate lead poisoning effects through increased behavioral health referrals for children with elevated blood lead levels.

We present community mental healthcare as a solution to help mitigate lead poisoning by providing evidence-based interventions to improve psychosocial protective factors that can improve outcomes and prognosis of children with elevated blood lead levels (BLLs). Furthermore, OhioGuidestone recognizes the importance of early intervention when curative treatment is not available, adopting a stance similar to the one we hold on conditions such as autism spectrum disorders (ASD). We hold the perspective that childhood conditions that have a continuum of symptoms also have a continuum of intervention available. We propose that children with BLLs up to 10µg/dl be referred for behavioral health services to mitigate further outcomes, as suggested by the CDC.

Intervention should target both children and caregivers through treatment modalities such as early childhood mental health treatment, family psychotherapy, school-based individual psychotherapy, and even prevention programs that seek to build parent skills and attachment capacities like Nurturing Parenting, Bright Beginnings, Parents as Teachers, and Joyful Together®.

OhioGuidestone has expertise in condition-specific treatment, such as with ASD, and is focused on innovations around increasing resiliency through psychosocial intervention and skill-building models and programs. We accept the growing evidence that children with mild-to-moderate psychological symptoms due to lead poisoning can benefit from mental health interventions that focus on attachment, play, and executive function skill building. We propose that behavioral health providers such as OhioGuidestone become an integral component of the treatment response for children identified with elevated BLLs up to 10µg/dl and that managed care organizations and primary care physicians begin to directly refer children for services.

Evaluation of the impact of psychosocial support through mental healthcare for children with elevated blood levels and their families can prove to be a hopeful option to mitigate the long-term effects of childhood lead poisoning—and even result in an evidence-based approach to treat lead poisoning with early intervention.

To learn more about OhioGuidestone's early intervention and early childhood mental health community-based services, visit www.OhioGuidestone.org.

Making Space for Behavioral Health Providers as Stakeholders: Child Lead Poisoning Advisory Council

In addition to their necessary role in treatment, behavioral health providers should be included as childhood lead poisoning stakeholders to assist with informed decision-making for children. Behavioral health providers already are solidified as stakeholders in many communities impacted by lead poisoning and potentially already treat significant counts of youth with a history of lead poisoning (e.g., through school-based mental health). Ohio Gov. Mike DeWine recently created a Child Lead Poisoning Advisory

Council (Ohio Governor's Office, 2019) with representation from multiple disciplines but lacks behavioral health representation—and could even afford to expand educational stakeholder representation as only one educational professional is on the council as of the publication of this paper (Mr. John McBride of The Prep Schools in Cleveland). This Ohio council, and similar councils moving forward, must include behavioral health representatives as childhood lead poisoning is clearly a behavioral health issue.

Conclusion

Prevention through full abatement is still needed to end childhood lead poisoning. There is no way around this fact. Lead poisoning is something that should be of the past, but it's not, as thousands of children are screened with elevated BLLs every year. Unfortunately, children in older homes, who are African American, and/or who live in economically depressed or abandoned areas are at the greatest and most disproportionate risk of childhood lead poisoning. The lifelong impacts of lead poisoning have generational implications, as lead never leaves the body and even leeches out of bones in pregnant and breastfeeding women to infiltrate their children (Yeter et al., 2020). Children's brains are forever changed as lead causes brain cell death and changes structures such as the HPA axis, hippocampus, anterior cingulate gyrus, and prefrontal cortex, implicat-

ing a child's stress response system, learning and memory abilities, mood regulation, and higher-level executive functioning.

Although preventable, childhood lead poisoning remains; and there still is no cure. Treatment options are limited to chelation therapy, and early intervention services are offered to some children and families. Increasingly, data indicate that children with higher psychosocial protective factors have better outcomes, which demands the inclusion of behavioral health providers as key players in lead poisoning conversations, prevention, and treatment options. Behavioral health must be appreciated as critical treatment for children with lead poisoning, and providers must be included as crucial stakeholders to provide intervention as early and often as possible for children and families.

REFERENCES

- Bellinger D. C. (2004). Lead. *Pediatrics*, *113*(4), 1016–1022. https://pediatrics.aappublications.org/content/113/Supplement_3/1016.long
- Burke, M. G., & Miller, M. D. (2011). Practical guidelines for evaluating lead exposure in children with mental health conditions: Molecular effects and clinical implications. *Postgraduate Medicine*, *123*(1), 160–168. <https://doi.org/10.3810/pgm.2011.01.2256>
- Cecil, K. M., Brubaker, C. J., Adler, C. M., Dietrich, K. N., Altaye, M., Egelhoff, J. C., Wessel, S., Elangovan, I., Hornung, R., Jarvis, K., & Lanphear, B. P. (2008). Decreased brain volume in adults with childhood lead exposure. *PLOS Medicine*, *5*(5), e112. <https://doi.org/10.1371/journal.pmed.0050112>
- Council on Children With Disabilities Section on Developmental Behavioral Pediatrics, Bright Futures Steering Committee, & Medical Home Initiatives for Children With Special Needs Project Advisory Committee. (2006). Identifying infants and young children with developmental disorders in the medical home: An algorithm for developmental surveillance and screening. *Pediatrics*, *118*(1), 405–420. <https://doi.org/10.1542/peds.2006-1231>
- Educational Services for Children Affected by Lead Expert Panel. (2015, April). *Educational interventions for children affected by lead*. Centers for Disease Control and Prevention. https://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf
- Flora, G., Gupta, D., & Tiwari, A. (2012). Toxicity of lead: A review with recent updates. *Interdisciplinary Toxicology*, *5*(2), 47–58. <https://doi.org/10.2478/v10102-012-0009-2>
- Individuals with Disabilities Education Act of 1990, 20 U.S.C. § 1400 *et seq.* (1990). <https://sites.ed.gov/idea/statuteregulations/>
- KidsHealth. (2019, March). *Lead poisoning*. Retrieved from <https://kidshealth.org/en/parents/lead-poisoning.html>
- Lipkin, P. H., Macias, M. M., & the Council on Children with Disabilities Section on Developmental and Behavioral Pediatrics. (2020). Promoting optimal development: Identifying infants and young children with developmental disorders through developmental surveillance and screening. *Pediatrics*, *145*(1), e20193449. <https://doi.org/10.1542/peds.2019-3449>
- Rossi-George, A., Virgolini, M. B., Weston, D., & Cory-Slechta, D. A. (2009). Alterations in glucocorticoid negative feedback following maternal Pb, prenatal stress and the combination: A potential biological unifying mechanism for their corresponding disease profiles. *Toxicology and Applied Pharmacology*, *234*(1), 117–127. <https://doi.org/10.1016/j.taap.2008.10.003>
- Schnur, J., & John, R. M. (2014). Childhood lead poisoning and the new Centers for Disease Control and Prevention guidelines for lead exposure. *Journal of the American Association of Nurse Practitioners*, *26*(5), 238–247. <https://doi.org/10.1002/2327-6924.12112>
- Shonkoff, J. P., & Phillips, D. A. (Eds.) (2000). *From neurons to neighborhoods: The science of early childhood development*. National Research Council; Institute of Medicine; Board on Children, Youth, and Families; Committee on Integrating the Science of Early Childhood Development. <https://doi.org/10.17226/9824>
- Toscano, C. D., & Guilarte, T. R. (2005). Lead neurotoxicity: From exposure to molecular effects. *Brain Research Reviews*, *49*(3), 529–554. <https://doi.org/10.1016/j.brainresrev.2005.02.004>
- Wani, A. L., Ara, A., & Usmani, J. A. (2015). Lead toxicity: A review. *Interdisciplinary toxicology*, *8*(2), 55–64. <https://doi.org/10.1515/intox-2015-0009>
- Yeter, D. D., Banks, E. C., & Aschner, M. (2020). Disparity in risk factor severity for early childhood blood lead among predominantly African-American Black children: The 1999 to 2010 US NHANES. *International Journal of Environmental Research and Public Health*, *17*(5), 1552. <https://doi.org/10.3390/ijerph17051552>

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Expand Insurance Coverage of the PLAY Project to Support Developmental and Relationship-based Treatment of Young Ohioans with ASD

Kristen Mitzel, Ashley Cunningham, & Maic D'Agostino