

Nassau County Department of Health Childhood Lead Poisoning Prevention Program

Case Analysis of Children with Blood Lead Levels 5-9.9 mcg/dL

10/1/2019 – 3/31/2021

Introduction:

Childhood lead poisoning is still of great concern and the Nassau County Department of Health continues to play an active role in identifying those at risk and targeting prevention activities.

In 2012, the CDC lowered the threshold “level of concern” for blood lead from 10 micrograms/deciliter (mcg/dL) to 5 mcg/dL based on data from the National Health and Nutrition Examination Survey (NHANES).¹ Subsequently, NY State amended section 67-1.2 of the public health law (Title 10 of NY Codes, Rules and Regulations) in April 2019 to reflect the new blood lead level (BLL) threshold based on the new CDC guidelines, which then went into effect on 10/01/2019 (NYCRR, 2019).² The amendment requires local health departments to implement the new BLL standard and to provide reporting and follow-up services for children with this blood lead level.

Despite the COVID19 pandemic, which started a few months after the new blood lead level limit went into effect, Nassau County has remained vigilant in assessing and monitoring children’s blood lead levels in the county, while taking steps to mitigate its effects to protect the health and development of children living in the county.

The Childhood Lead Poisoning Prevention Program (CLPPP) reviewed the records of all new cases in Nassau County identified from 10/1/2019 – 3/31/2021 with lead levels between 5 to 9.9 mcg/dL. This effort will help identify trends that can be used to identify targeted prevention activities.

Background:

Lead is a heavy metal, which owing to its physical and chemical properties, has great versatility in industrial and commercial utilization, including batteries, paint, pipes, and other products. This usage leads to environmental contamination, in different forms in different countries.³ Lead exposure affects every organ system within the body, and often does not show any obvious

¹ Centers for Disease Control and Prevention. (2019, December 20). *National Health and Nutrition Examination Survey*. Childhood Lead Poisoning Prevention. Retrieved October 15, 2021, from <https://www.cdc.gov/nceh/lead/data/nhanes.htm>

² *New York Codes, rules and regulations*. Title: Section 67-1.2 - Lead screening and follow-up of children by health care providers | New York Codes, Rules and Regulations. (2019, October 1). Retrieved October 15, 2021, from <https://regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers>.

³ Obeng-Gyasi, E. (2019). Sources of lead exposure in various countries. *Reviews on Environmental Health*, 34(1), 25–34. <https://doi.org/10.1515/reveh-2018-0037>

symptoms until later stages of exposure.⁴ For children's developing brains, the consequences of this toxicity include lower IQ scores, poor attention, impulsivity and impairments in verbal processing, non-verbal reasoning, reading and arithmetic.⁵

Approximately 4 million households in the United States have children living in them with elevated blood lead levels.⁶ Blood lead concentrations have decreased dramatically in U.S. children over the past 4 decades since the elimination of lead from gasoline, but too many children still live in housing with deteriorated lead-based paint and are at risk for lead exposure according to the American Academy of Pediatrics.⁷ There are many ways in which a child can be exposed to lead hazards, many of which includes interior hazards such as lead-based paint in older homes as well as exterior hazards which includes lead contaminated dust and soil. As a result of the ban of lead-based paint in the United States in 1978, there has been a significant reduction in the prevalence of lead poisoning in children from 78% in 1977-1980 to 1.6% in 1996-2002.⁸

Additionally, children may encounter other preventable sources of lead exposure through family members by occupational hazards bringing lead into the home, use of imported home remedies, and certain consumer products such as candies, cosmetics and jewelry.⁹ Lead poisoning is still a concern within the United States and an increasing component of the hazardous exposure is coming from immigrant families' use of lead-contaminated consumer products. Children of immigrant families have higher average blood lead levels than U.S.-born children, but this difference declines gradually as the length of stay in the U.S. increases.¹⁰

The key to preventing lead toxicity in children is identification and elimination of the source of lead exposure as there is no safe lead level.¹¹ Recognizing this growing concern, the Nassau County Department of Health Childhood Lead Poisoning Prevention Program (CLPPP) has

⁴World Health Organization. (n.d.). *Lead poisoning*. World Health Organization. Retrieved October 15, 2021, from <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health>.

⁵ Rocha, A., & Trujillo, K. A. (2019). Neurotoxicity of low-level lead exposure: History, mechanisms of action, and behavioral effects in humans and preclinical models. *NeuroToxicology*, *73*, 58–80. <https://doi.org/10.1016/j.neuro.2019.02.021>

⁶ Raymond, J., & Brown, M. J. (2016). Blood lead levels in children aged <5 years — United States, 2007–2013. *MMWR. Morbidity and Mortality Weekly Report*, *63*(55), 66–72. <https://doi.org/10.15585/mmwr.mm6355a6>

⁷ AAP Council on Environmental Health. Prevention of childhood lead toxicity. (2016). *PEDIATRICS*, *138*(1). <https://doi.org/10.1542/peds.2016-1493>

⁸ Jones, R. L., Homa, D. M., Meyer, P. A., Brody, D. J., Caldwell, K. L., Pirkle, J. L., & Brown, M. J. (2009). Trends in blood lead levels and blood lead testing among US children aged 1 to 5 years, 1988-2004. *PEDIATRICS*, *123*(3). <https://doi.org/10.1542/peds.2007-3608>

⁹ Centers for Disease Control and Prevention. (2020, October 26). *Prevent children's exposure to lead*. Centers for Disease Control and Prevention. Retrieved October 15, 2021, from <https://www.cdc.gov/nceh/features/leadpoisoning/index.html>.

¹⁰ Horton, C. J., Acharya, L., & Wells, E. M. (2019). Association between self-reported length of time in the USA and blood lead levels: National Health and Nutrition Examination Survey 2013–2016. *BMJ Open*, *9*(7). <https://doi.org/10.1136/bmjopen-2018-027628>

¹¹ Hauptman, M., Bruccoleri, R., & Woolf, A. D. (2017). An Update on Childhood Lead Poisoning. *Clinical pediatric emergency medicine*, *18*(3), 181–192. <https://doi.org/10.1016/j.cpem.2017.07.010>

conducted chart reviews and environmental investigations on children with blood lead levels of 5-9.9 µg/dL, the new threshold of concern identified by the CDC. This chart review encompasses the cases identified between October 1st, 2019 through March 31, 2021. For the purpose of this report, lead hazards will be identified as ‘traditional;’ which includes lead from paint and dust and ‘nontraditional’ which includes, but is not limited to, foreign cosmetics (kohl, kajal, surma), imported medicine (ayurvedic, homeopathic/alternative and imported products), foreign household items (imported pottery), and cookware. Some nontraditional products may contain as much as 80% lead and can enter the body via hand-to-mouth activity and/or absorption through the eyes. Some of these products may be banned for sale in the U.S. but can still make their way into the home via ethnic retail stores, visiting family and family trips overseas.

Findings:

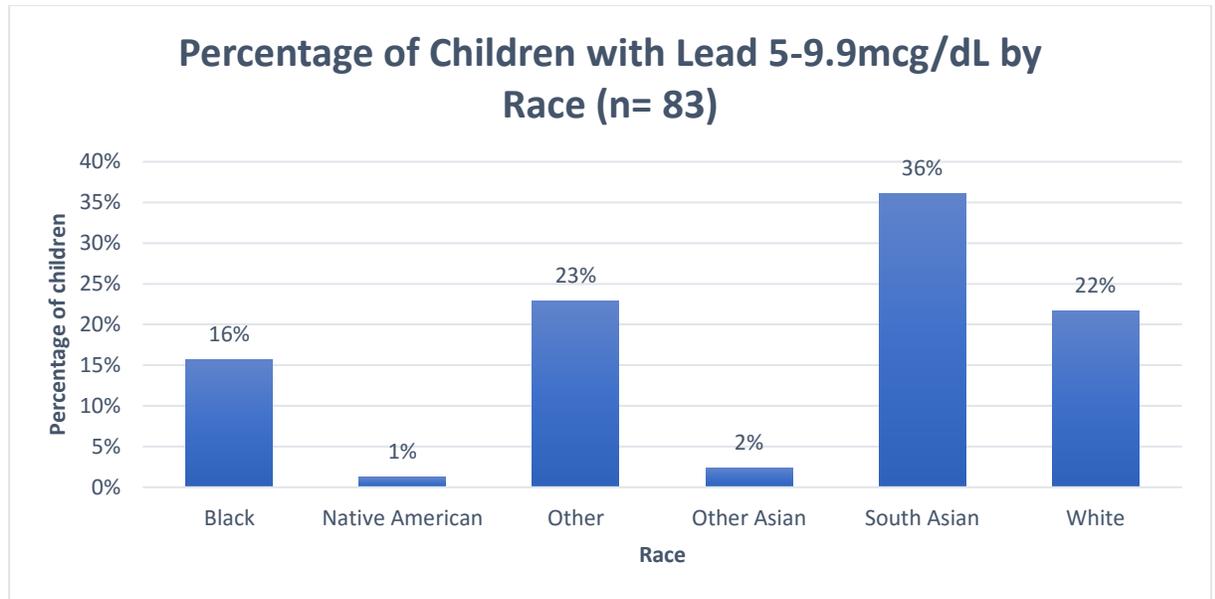
New York State Public Health Law and Regulations require health care providers to: Obtain a blood lead test for all children at age 1 and again at age 2; Assess all children ages 6 months to 6 years for risk of lead exposure at least annually as part of routine care, and obtain a blood lead test on all children found to be at risk.¹² Between October 1, 2019 through March 31, 2021 there were 158 children newly identified as having a blood lead level between 5- 9.9 mcg/dL. The overall average blood lead level in these children was 6.2 mcg/dL.

1. Demographic Findings:

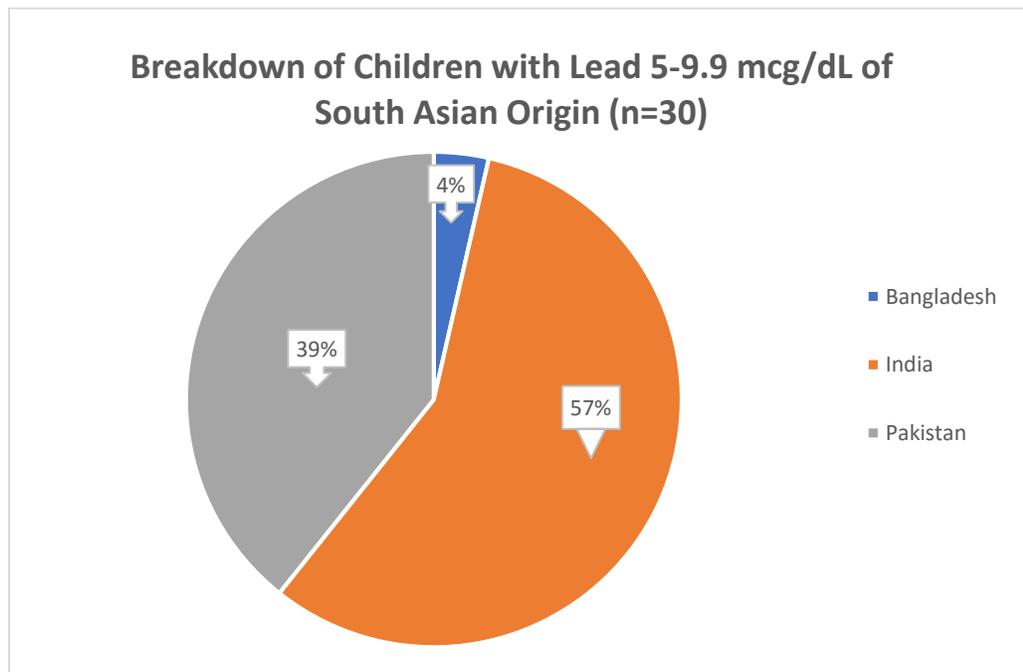
- The ages of the children identified as having elevated blood lead levels varied widely, from 8 months of age to 17 years of age, with more than half tested before 2 years of age.
- Males (54%) were slightly more affected than females (46%).
- 47% (n=75) of children had no identified race in their chart. Of the 83 children with identified race, 22% identified as White, 16% identified as Black, 36% identified as South Asian, 2% Other Asian, 23% Other, 1% Native American (see Graph 1). Of note, according to 2019 census data for Nassau County, 73.4% identified as White, 13.1% Black, 0.5% Native American and Alaska Native and 10.9% identified as Asian. (Note: Asian race in census data for Nassau includes Far East, South East Asia or the Indian Subcontinent.)
- As seen in Graph 2, of the 30 cases identifying as South Asian, 57% identified as Indian, 39% as Pakistani, and 4% as Bangladeshi.

¹² *New York Codes, rules and regulations*. Title: Section 67-1.2 - Lead screening and follow-up of children by health care providers | New York Codes, Rules and Regulations. (2019, October 1). Retrieved October 15, 2021, from <https://regs.health.ny.gov/content/section-67-12-lead-screening-and-follow-children-health-care-providers>.

Graph 1:



Graph 2:



- Of the 158 children:
 - 53% (n=85) had no identified ethnicity
 - Of the 74 children with identified ethnicity:
 - 27% (n=43) identified as Non-Hispanic and 20% (n=30) identified as Hispanic. Of note, according to 2019 census data for Nassau County, 58.5% identified as Non- Hispanic and 17.5% identified as Hispanic.

2. Source of Lead Hazard Findings:

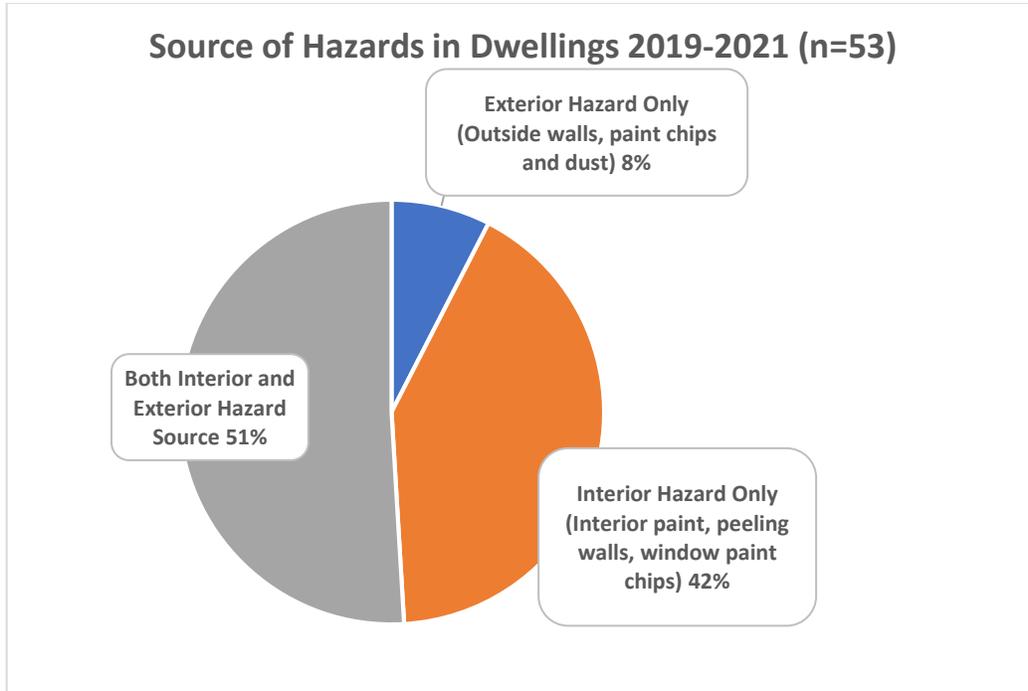
For children identified with lead levels 5 mcg/dL or more, health department care coordinators and environmental investigators will initiate a home investigation to identify possible sources of lead. Of the 158 cases identified with lead levels 5-9.9mcg/dL between October 1, 2019 through March 31, 2021:

- 77% (n=122) homes were investigated
- 9.5 % (n=15) were unable to be reached after multiple attempts by the health department.
- 9.5 % (n=15) family denied access to the home
- 3% (n=5) had no inspection due to relocation
- 0.6% (n=1) met the criteria to be discharged before environmental inspection could be performed (due to NYS COVID protocol)

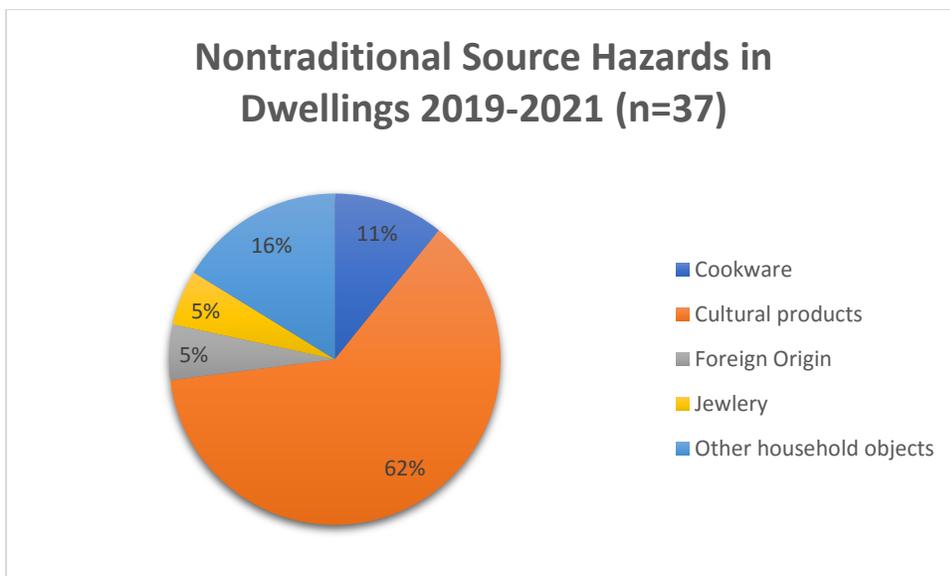
Of the 122 homes investigated:

- **43% (n=53) of homes had ‘traditional’ lead hazards identified (leaded paint & dust).** See Graph 3
 - 51% (n=27) had lead paint hazards found on both the exterior **and** the interior of the home
 - 42% (n=22) had lead paint hazards identified **only** on the interior of the home
 - 8% (n=4) had lead paint hazards identified **only** exterior to the home
- **30% (n=37) homes had ‘nontraditional’ lead hazards identified.** See Graph 4
 - 62% (n=23) had cultural products identified to be the source of lead poisoning, such as sindoor, surma and spices.
 - 11% of cases (n=4) had clay or ceramic cookware identified as the source of lead poisoning.
 - 16% of cases (n=6) were found to have other leaded household objects in the home such as keys and batteries identified to be the source of lead poisoning
 - 5% of cases (n=2) were exposed to leaded jewelry
 - 5% of cases (n=2) were due to a foreign origin/recent immigration
- **27% (n=33) homes that were investigated had no known source of lead identified.**

Graph 3:



Graph 4:



Summary:

In summary, this research confirms that the sources of lead hazards have diversified over time. Deteriorating lead paint and lead in house dust and soil are often emphasized when looking for sources of lead in the United States.¹³ However, lead paint contamination is not the only source of exposure for Nassau County children. Sources such as spices, foreign cosmetics (kohl, kajal and surma), imported medicine as well as imported household items (cookware, pottery) can also lead to elevated lead levels. Non-paint lead exposure sources might be insufficiently characterized, and their importance underestimated.

Years of federal, state, and local lead poisoning prevention measures have resulted in a decline in the number of children with elevated blood lead levels and an increase in public awareness for lead poisoning. The childhood lead poisoning prevention program routinely provides information on practices that minimize exposure to lead. Parents are advised to monitor children, so they do not bite on objects or surfaces, mop floors regularly and keep surfaces dust-free, paint over walls or other surfaces with lead paint, and work with landlords to take measures to remove the sources of lead paint. The CLPPP also recommends frequent hand washing and washing toys. Additional sources of lead and other risk reduction education are frequently given. Importantly, families are asked to purchase spices only from major food stores and not use any spices from ethnic stores which may have been imported from foreign countries, or any spices the families may have brought to the U.S. with them.

Childhood lead poisoning remains an on-going concern for children nationwide. Even levels of lead below 5 mcg/dL in blood are shown to irreversibly affect IQ, ability to pay attention, and academic achievement, a greater focus on primary prevention of lead exposure is essential.¹⁴ Recognizing the changes in the pattern of children's lead exposure, the Nassau County Department of Health is working to develop new strategic interventions in order to reduce dangerous lead sources in children's environments before they are exposed. Areas of interest include:

- Increasing awareness of pediatricians of current lead screening and testing laws, sources of lead and treatment recommendations.
- Increasing awareness of childhood lead poisoning in pregnant people by targeting obstetricians and gynecologists in local communities.

¹³ Centers for Disease Control and Prevention. (2012, August 10). *MMWR lead in drinking water and human blood level levels in the United States*. Centers for Disease Control and Prevention. Retrieved October 15, 2021, from <https://nassaucountyny.gov/DocumentCenter/View/8007/MMWR-Lead-in-Drinking-Water-and-Human-Blood-Level-Levels-in-the-United-States?bidId=>.

¹⁴ World Health Organization. (n.d.). *Lead poisoning*. World Health Organization. Retrieved October 15, 2021, from <https://www.who.int/news-room/fact-sheets/detail/lead-poisoning-and-health>.

- Rigorous medical and environmental screening and investigations to locate the source of exposure and educating families on foreign products which may lead to exposure as well as U.S. manufactured replacements for such items.
- Develop educational strategies for non-traditional lead sources especially in communities with newly immigrant families.
- Developing culturally competent partnerships to assist in providing education to at-risk populations. The population of Nassau County is diverse and strategies to reduce exposure from religious, cultural and manufacturing sources of lead would benefit this population.

The Nassau County Department of Health remains committed to reducing lead poisoning in children and will continue to look for innovative ways to meet these objectives. We hope that this report is an opportunity to improve awareness and reduce childhood lead poisoning.

Acknowledgements:

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