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Unveiling the Impact: Structural Racism and Childhood Lead Exposure's Health Consequences in Philadelphia

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Unveiling the Impact: Structural Racism and Childhood Lead Exposure's Health Consequences in Philadelphia

Mahhum Naqvi, Mahrukh Naqvi, MPH, Justin Stout, MBA, Colton Spencer

Abstract

Childhood lead exposure poses a significant risk to health and well-being, adversely affecting brain function, nervous system development, and behavioral patterns. This study examines the health disparities and inequities associated with childhood lead exposure in Philadelphia, focusing on structural racism and residential segregation as crucial lenses for analysis. By delving into the sociocultural context of lead exposure, this study underscores the imperative of collaborative efforts among stakeholders to safeguard Philadelphia's most vulnerable populations. Healthcare professionals and policymakers play pivotal roles in enhancing funding and prevention strategies. Addressing this issue through the prism of structural racism allows for the identification and rectification of systemic and institutional factors contributing to health disparities. Through stakeholder collaboration and historical insights, this review aims to offer guidance for shielding the city's most at-risk children from lead exposure.

Methods

A review of current literature was conducted to understand the relationship between childhood lead exposure, structural racism in Philadelphia, and potential solutions to mitigate risk. To assess the literature, a database search was conducted through the Rowan School of Osteopathic Medicine Library. This study included papers written in English, including primary research, and meta-analyses which assessed childhood lead exposure, environmental racism, and historical consideration relating to these topics in Philadelphia. Some papers which assessed trends in the US were also used. This literature review qualitatively assessed historical and socio-cultural factors that influence childhood lead exposure in Philadelphia.

Childhood Lead Exposure in Philadelphia

Children can encounter lead through multiple sources, including chipping lead-based paints in older homes, soil near aging buildings and roads, drinking water, consumer products, cosmetics, and exposure via parental occupations or hobbies.[1] Predominantly, lead exposure in Philadelphia originates from homes constructed before 1978, where the use of lead-based paint was prevalent.[2]

Vulnerability and Health Impacts:

Lead exposure poses significant risks, especially for children under 6 years old. The CDC reports that there is no safe blood lead level in children, however, the CDC's "level for concern" is at 5 ug/dL. Low levels of lead in the blood have been shown to adversely affect a child's intelligence, academic potential, and ability to stay focused.[3] Studies also indicate a potential link between lead exposure and increased delinquent behavior, significantly limiting a child's potential and elevating health risks.[4]

Detection and Disparities:

Given its subtle symptoms, screening for lead exposure is crucial for early identification. The Centers for Medicare and Medicaid Services cover the cost of blood lead testing for Medicaid-enrolled children.[2] All children enrolled in Medicaid, regardless of whether coverage is funded through title XIX or XXI, are required to receive blood lead screening tests at ages 12 months and 24 months. In addition, any child between 24 and 72 months with no record of a previous blood lead screening test must receive one.

Health Disparities in Childhood Lead Exposure:

Studies demonstrate stark racial disparities in lead exposure, with non-Hispanic Black children exhibiting the highest rates of elevated blood lead levels (EBLL) compared to other racial groups.[5] Factors contributing to these disparities include socioeconomic status, the construction year of family homes, and race.[6] Gentrification processes, including demolitions of older buildings, elevate the risk of lead exposure, especially in older structures.[7] Historical discriminatory practices, such as redlining by The Home Owners' Loan Corporation in the 1920s and 1930s, have perpetuated a higher risk of lead exposure for Philadelphia's non-Hispanic Black population.[8]

Studies reveal strong correlations between EBLL and minority populations, children living in poverty, and non-Hispanic Black communities. Within five zip codes of low-income communities of color in North and West Philadelphia, studies demonstrate that as many as one in 15 children has EBLL.[9] Additionally, studies indicate that children of color in North Philadelphia are 2-2.5 times more likely to suffer lead poisoning compared to the entire city's children.[10] Race is a significant indicator of risk for lead exposure, as studies have shown that even at the national level, Black children experience 2.8 times higher odds of having blood lead levels higher than 5 ug/dL compared to low-income children who are white and Hispanic.[11] The same study indicated that being Black is the second strongest predictor of having elevated blood lead levels, second only to living in a residence built in 1950.[11] Housing code violations, inadequate funding, and loopholes allowing landlords to evade standards contribute to the persistence of lead in Philadelphia's poorest neighborhoods.[12,13] Many individuals who live in Philadelphia's poorest zip codes are not able to afford the upkeep and renovations in their old homes, which make risk factors for Lead exposure increase.

The Effect of Structural Racism on Childhood Lead Exposure:

Residential segregation has profoundly influenced childhood lead exposure in Philadelphia, perpetuating its enduring presence within communities of color. Historical redlining practices illustrate this impact, as evident in the city's neighborhood demarcations.

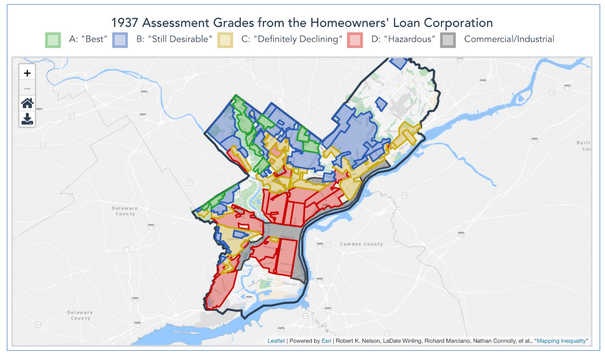

Figure 1. This graph shows the historical redlining practices in Philadelphia. Data sourced from The City of Philadelphia, Office of the Controller.

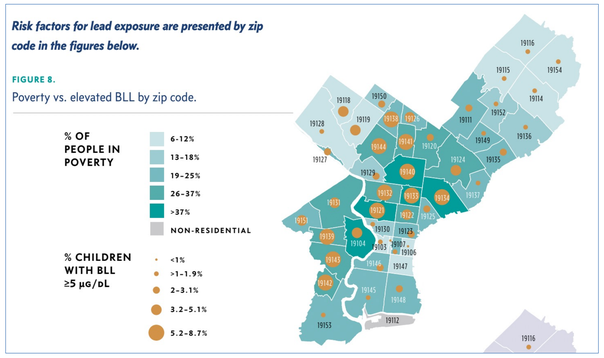

Figure 2. This map demonstrates the various zip codes within Philadelphia where lead levels are highest and the correlation between EBLL and socioeconomic status. Data Sources from Philadelphia Department of Health, Childhood Lead Poisoning Surveillance Report, 2017.

Structural Racism

Structural racism embodies societal mechanisms fostering racial discrimination across essential systems, encompassing housing, education, employment, healthcare, and justice.[14,15] Particularly for Black Americans, historical residential segregation, notably through practices like redlining, has generated enduring adverse health consequences.[9] Redlining, initiated by the Federal Housing Administration in 1934, deliberately denied mortgages to marginalized groups, perpetuating neighborhood segregation.[16] These discriminatory practices persist, with studies revealing their compounding effects on health outcomes and ongoing segregation. The historical implications of structural racism, especially residential segregation, have curtailed access to healthcare, community resources, education, and social mobility within communities of color.[17]

Existing Policies

Lead Paint Disclosure and Certification Law- Bill No. 100011-A

The Philadelphia Lead Paint Disclosure and Certification Law, passed in December of 2011, requires landlords to provide certification that their housing units are "lead-safe" or "lead-free." This ordinance applies specifically to residential properties built before March of 1978

Rental Property Lead Certification Law- Bill No. 180936-A

The Rental Property Lead Certification Law was an ordinance in full effect October of 2020. This is the newer version of Philadelphia's Lead Paint Disclosure Law. Like the Lead Paint Disclosure Law, this ordinance focuses on rental properties but includes all rental properties, regardless of the year built.[18] In addition, specific zip codes are targeted to assess areas with a high prevalence of children with elevated blood lead levels (EBLLs).

Testing Lead Levels in Children- Bill No. 180937-A

Testing Lead Levels in Children was an ordinance passed on June 05th, 2019. This ordinance established requirements for the testing of blood lead levels in children under specific terms and conditions. First, a physician treating a child between 9 to 21 months of age whose blood lead level has not been tested, shall test the lead levels at the first practical opportunity. Second, a physician treating a child between 21 to 72 months of age that has not been tested shall be tested at the first practical opportunity.[18]

Compliance

One issue with the implementation of the three above ordinances is compliance. The Lead Paint Disclosure and Certification Law was a significant step in the right direction. However, a lack of compliance made the ordinance largely ineffective at reducing lead exposure in the housing units. This is apparent due to collected data that showed only a small percentage of lead-free and safe certifications were provided. The Rental Property Lead Certification Law was passed as an update to improve compliance, but there is no data available because it was recently implemented. A significant reason for the lack of compliance in landlords is the high costs of remediation. Average lead abatement, specifically the mitigation of lead, costs more than $1,000 per housing unit, including sealing old paint with new paint and covering affected areas with new siding or drywall. This does not eliminate the source of the exposure, and therefore would be done frequently. To create a lead-free environment, elimination would cost approximately $10,000 or more per unit.[19] Federal and state funding received for lead poisoning prevention programs in Philadelphia from 2007-2016 significantly fell, and as a result, landlords would most likely be paying out of pocket for lead remediation services in their housing units. The new Rental Property Lead Certification Law has received tremendous pushback from landlords due to the increased penalties from lack of compliance. Also, landlords are expected to comply and remediate their units, but many cannot afford to pay out of pocket for these services, considering they own more than one housing unit.[20]

Conclusion

Structural racism, operating through various channels, significantly impacts community health. Factors such as deteriorating housing conditions in neighborhoods inhabited by people of color, deficient built environment standards, exposure to environmental pollutants, limited educational and employment opportunities, and constrained healthcare access all contribute to this issue. In Philadelphia, historical practices that fostered residential segregation have notably increased the risk of lead exposure among non-Hispanic Black children. The detrimental repercussions of lead exposure pose an imminent threat of irreversible harm to children, necessitating urgent intervention. The compounded effects of residential segregation on healthcare access further exacerbate these challenges. The City of Philadelphia's reports unequivocally highlight the undeniable disparities in lead exposure. In Philadelphia specifically, recommendations to address childhood lead exposure must be developed on the institutional level. The entities which contributed to these issues historically, should lead the way in addressing and funding the solutions. Namely, the Federal Housing Commission, as well as local stakeholders within Philadelphia should work to increase funding for the enactment and enforcement of laws and regulations in Philadelphia's most vulnerable neighborhoods to prevent childhood lead exposure. Additionally, state and federal funding for lead-based prevention programs should increase, as this will encourage compliance with ordinances passed within Philadelphia to mitigate risk of childhood lead exposure and increase health equity.

References: