Assessment of Lead Screening Care Gaps at a Patient-Centered Medical Home in Hartford

Margaret Mirabella, BA[1] & Julia Levin, BS[2]
Faculty Advisors: Elizabeth Lorick, MD,[2] Kiran Lorick, MD,[2] Barbara O'Neill, PhD, RN[3] & Cecil Tengatenga, MPH, STM[4]
UConn School of Dental Medicine,[1] UConn School of Medicine,[2] UConn School of Nursing,[3] Connecticut Area Health Education Center[4]

Introduction:

- Current research estimates that **535,000 U.S. children aged 1-5 years have elevated blood levels**. In addition, 24 million U.S homes contain deteriorated lead-based paint and elevated levels of lead-contaminated house dust[1]
- **Lead exposure can irreversibly harm a child's health** causing damage to their brain, heart, kidneys and possibly cause learning and developmental issues [2]
- In the state of CT, **17 per 1000 children** tested were found to have elevated blood lead levels during 2020 (≥5µg/dL, the recommended standard at the time) [3]
  - It can be assumed that the majority of homes in CT may contain lead paint, since about 71% of the housing stock in CT was built before 1980, 60% built before 1960 and 87% built before 1940. [4]
- **In October 2021, the CDC announced the reduction from the acceptable reference value of 5 µg/dl to 3.5 µg/dl** [5]
- CT is one of the first states to adopt this recommended change.
  - Within CT, Public Act 22-49 went into effect on January 1, 2023.[6] Notable changes highlighted within this policy can be found within Table 1.

Objective:

To gain a better understanding of pediatric lead screening guidelines as implemented in a patient-centered medical home, the Family Medicine Center at Asylum Hill (FMCAH), (Hartford, CT) and to determine the effect that the recent Connecticut legislative change (CT Public Act 22-49) on pediatric lead poisoning prevention standards will have on primary care screening practices in Connecticut.

Methods:

- **Retrospective chart review** of pediatric patients between the ages of 1 and 9 years old who were seen by primary care physicians at the Family Medicine Center at Asylum Hill, located in Hartford, CT, between April 15, 2020 and April 15, 2023.
  - The list of all variables that were abstracted from the medical records is as follows: medical record number, date of birth, age, sex, ethnicity, race, zip code, active problem list, refugee status, lead levels, types of blood draw (venous or capillary), date of lead levels obtained, the age that the patient was at the time of drawing the lead level, and whether is any documented education and guidance prior to testing or after documented elevated blood levels > 3.5 ug/dL.
  - **Inclusion Criteria:** Patients who are currently aged 1 to 9 years, who had an office visit (In person, virtual, or telehealth) between April 15th 2020 to April 15, 2023
  - **Exclusion Criteria:** Those who are no longer established patients with a FMCAH physician as their PCP

Results:

- 591 total patients
  - 98/591 patients with any elevated lead level (16.6% prevalence)
    - 46/591 with initially elevated lead level (7.8% prevalence)

Potential disparities and populations at-risk for elevated lead levels:

- Sex
  - 50.25% (297/591) female within total population
    - Of those with elevated lead levels, 52.04% (51/98) were female
- Race/Ethnicity
  - 61.93% (366/591) identify as not Hispanic or Latino within total population
    - Of those with elevated lead levels, 64.29% (63/98) were not Hispanic or Latino
  - 53.81% (318/591) of sample identify as Black or African American
    - Of those with elevated lead levels, 55.10% (54/98) were Black or African American
- Refugee
  - 4.5% (27/591) prevalence within total population
    - 8% prevalence (6/46) of elevated lead levels within refugee population with any elevated lead level
- Developmental delays
  - No apparent increase in developmental delays present with patients with elevated lead levels

Discussion:

- Further data analysis will be performed to assess whether lead screening practices met updated guidelines with appropriate education/guidance for the general population as well as at-risk populations (refugees, those with developmental delays, etc.). The eventual goal will be to analyze care gaps to develop interventions to optimize lead level screening practices and improve pediatric health outcomes.
- Additional analysis will be performed to see how many more children are being treated due to the Public Act 22-49 in CT.

Conclusions:

- Race, sex, ethnicity and refugee status may increase the relative risk of elevated blood lead level detection.
- The role of primary care providers is imperative to ensure all pediatric patients are properly screened for lead exposure and toxicity, to improve pediatric health outcomes.

Health disparities exist among pediatric patients with elevated blood lead levels.

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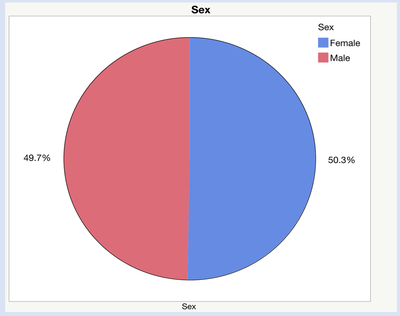
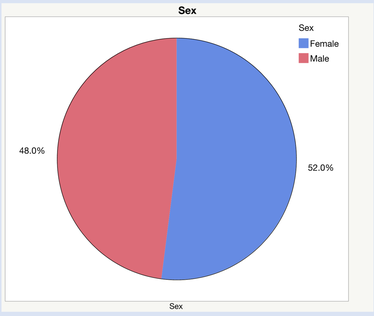
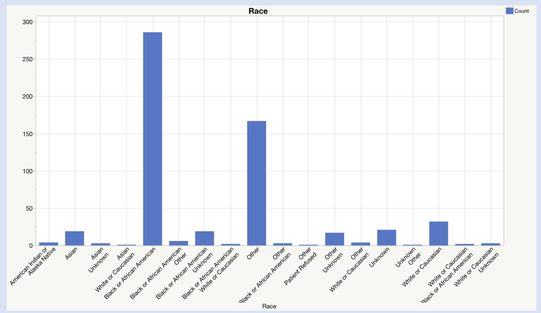
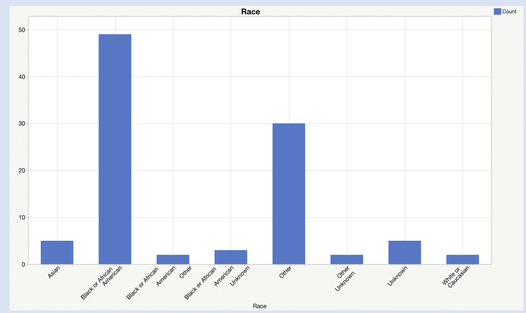
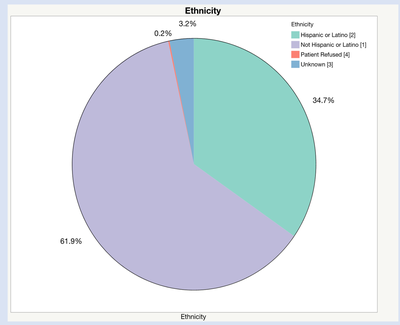
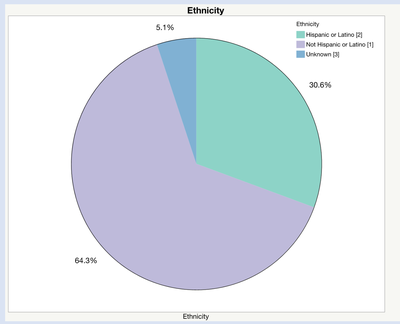
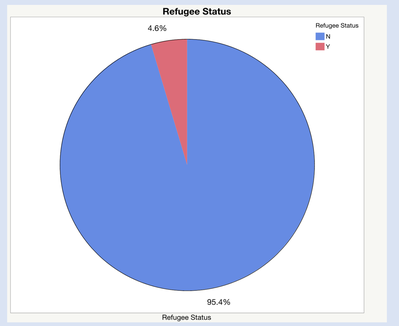
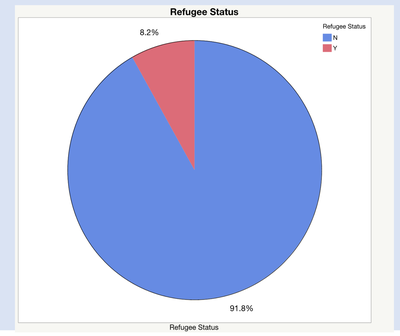
Table 1: Public Act 22-49 [10]

Decreased blood lead reference value from 5 µg/dl to 3.5 µg/dl
Annual risk assessments for children between the ages of 36 and 72 months to determine if lead screening must occur. Questions: • Does your child live in or regularly visit a home or facility built before 1978? • Does your child have a family member or friend being treated for lead poisoning? • Does your child encounter an adult whose hobby or job exposes them to lead? • Has your child been exposed to imported products such as spices, foods, vitamins, ethnic home remedies, etc.?
Lower triggers for both local health department and on-site home inspections
Requirement to notify parents of elevated lead levels at lower value than previously
Plan to decrease the reference value further over the next few years until 2025 and beyond.

Table 2: Prevalence of elevated lead levels within study population

	Total population	Any elevated lead level
Sex		
Race		
Ethnicity		
Refugee Status		

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