National Center for
HEALTHY HOUSING

Technical Assistance Brief:
Projecting the Burden of Childhood Lead Poisoning in Communities with Low Screening Rates

Purpose
Even in states with laws requiring screening of all children for lead exposure, lead screening rates often vary widely. Given this variation, programs often wish to project prevalence rates and numbers of children with lead poisoning more accurately. The following process outlines the steps that programs can take to improve estimates of the prevalence or number of children with elevated blood lead levels.

Step 1
Determine whether the children currently being screened in the geographic area of interest (county, city, and/or target area) are representative* of the children in the area as a whole. Determine this by comparing demographic information on children screened with all children in the geographic area of interest, based the following variables that are readily available through the U.S. Census Bureau at https://data.census.gov/cedsci/:

- Age
- Race/ethnicity
- Foreign-born versus U.S.-born
- Poverty-to-income ratio (see attached appendix) or another socioeconomic measure, such as family or household income

Step 2
Once you have determined if the children being screened are demographically similar to or different from all children in the geographic area of interest,

* *Without using statistical analysis, there are no rigid rules as to what constitutes "similar" or "different." This method represents a basic example of things to consider, not* ***everything*** *one could or should consider. Even without statistical analysis, this comparison will allow you to identify potential differences or similarities and be transparent about your methods.*

you will conduct your calculations following Step 2a (similar to) or 2b (different from) below as appropriate.

Step 2a

If the children being screened are demographically similar to all children in the area of interest:
First, calculate the prevalence rate for the area. Next, multiply this prevalence rate by the number of children under age six in the area of interest to project the number of children with elevated blood lead levels that would be identified in this area if universal screening were conducted. Finally, use this information to determine how many children are currently not being detected or served due to the lack of blood lead screening (Example 1).

Step 2b

If the children being screened are demographically different from all children in the area of interest:
Adjustments to the numbers and prevalence rates by demographic group will be required to compensate for discrepancies in screened children before calculating how many children are currently not being detected or served due to the lack of blood lead screening. For example, if screening data demonstrate that black children are more than three times as likely than white children to have an elevated blood lead level, but black children are overrepresented among the children screened (e.g., they are 40% of the screened population but only 20% of the county population), then the data would need to be adjusted to correct for the overscreening of black children and the higher rates of lead poisoning identified.

EXAMPLE 1

In 2010, 6,000 children under age six were screened for lead poisoning in *County X*. Seventy-eight of these children had confirmed blood lead levels (BLLs) ≥ 10 µg/dL, resulting in a countywide prevalence rate of 0.013, or 13.0 per 1,000 children.* The 6,000 children screened are representative of children under age six across the county. Therefore, if *County X* has a total of 25,000 children under age six, then the true number of children with blood lead levels ≥ 10 µg/dL in the county is estimated to be 325. This is calculated as shown:

1. ***Calculate the countywide prevalence rate.***
   Number of children with confirmed BLLs ≥ 10 µg/dL divided by the number of children screened:

   78 / 6,000 = 0.013

2. ***Calculate the projected number of children in County X with BLLs ≥ 10 µg/dL.***
   Prevalence rate multiplied by the total number of children in *County X:*

   0.013 x 25,000 = 325 children

3. ***Calculate the number of children in County X with BLLs ≥ 10 µg/dL not being detected.***
   Total number of projected children with BLLs ≥ 10 µg/dL minus the actual number of confirmed children with BLLs ≥ 10 µg/dL:

   325 - 78 = 247 children

Finding: If all children under the age of six had been tested in *County X* in 2010, an estimated total of 325 children under age six would have been identified with blood lead levels ≥ 10 µg/dL. This means that potentially 247 children are currently not being detected or served to reduce their exposures due to the lack of blood lead testing.

First, calculate the prevalence rate for each racial or ethnic group in the area of interest. Next, multiply the group-specific prevalence rates by the number of children under age six in each racial or ethnic group to project the number of children with elevated blood lead levels that would be identified by racial or ethnic group in the area of interest if universal screening were conducted. Finally, use this information to determine how many children are currently not being detected or served due to the lack of blood lead screening (Example 2).*

* *When describing prevalence rate in writing, it is typically presented in an "xx per 1,000 children" format. However, when conducting calculations involving prevalence rate, the numeric representation 0.xxx is used.*

EXAMPLE 2*

In 2010, 78 of 6,000 children in *County X* under age six screened for lead poisoning had confirmed blood lead levels greater than or equal to 10 µg/dL, yielding a countywide prevalence rate of 0.013 or 13.0 per 1,000 children.** However, the 6,000 children screened were not representative of the county's population of 25,000 children under age six. Black children represented 40% of those screened (2,400 children) but represent only 20% of the county's population of children under age six (5,000 children).

Additionally, in examining the prevalence rates by race in *County X*, local epidemiologists found that 18 of the 3,600 white children screened had confirmed blood lead levels greater than or equal to 10 µg/dL, yielding a prevalence rate of 5.0 per 1,000 children. Sixty of the 2,400 black children screened had confirmed blood lead levels greater than or equal to 10 µg/dL, yielding a prevalence rate of 25.0 per 1,000 children, a rate five times that of white children. To account for both the overrepresentation of black children in the screened population and the higher rate of lead poisoning identified, you would use the following calculations:

Racial or Ethnic Group	Total Population under Age Six in County X
White	20,000 children
Black	5,000 children

1. ***Calculate the prevalence rate among white children.***
   Number of white children with confirmed BLLs ≥10 µg/dL divided by the number of white children screened:
   18 / 3,600 = 0.005

2. ***Calculate the projected number of white children with BLLs ≥ 10 µg/dL.***
   Prevalence rate for white children multiplied by the total number of white children in *County X:*
   0.005 x 20,000 = 100 children

3. ***Calculate the prevalence rate among black children.***
   Number of black children with confirmed BLLs ≥ 10 µg/dL divided by the number of black children screened:
   60 / 2,400 = 0.025

4. ***Calculate the projected number of black children with BLLs ≥ 10 µg/dL.***
   Prevalence rate for black children multiplied by the total number of black children in *County X:*
   0.025 x 5,000 = 125 children

5. ***Calculate the total projected number of children in County X with BLLs ≥ 10 µg/dL.***
   Total projected number of white children with BLLs ≥ 10 µg/dL in *County X* plus the total projected number of black children with BLLs ≥ 10 µg/dL in *County X*:
   100 + 125 = 225 children

6. ***Calculate the number of children in County X with BLLs ≥ 10 µg/dL not being detected.***
   Total projected number of children with BLLs ≥ 10 µg/dL minus the confirmed number of children with BLLs ≥ 10 µg/dL:
   225 - 78 = 147 children

Finding: If all children under the age of six were tested, an estimated total of 225 children in *County X* under age six would be identified with blood lead levels ≥ 10 µg/dL in 2010. This means that potentially 147 (225-78) children are currently not being detected or served to reduce their exposures due to the lack of blood lead testing.

* *For simplicity, Example 2 calculations assume two racial or ethnic groups in the area of interest. In application, the process and calculations would be repeated for each racial or ethnic group over- or underrepresented in the screening data for the area of interest.*

** *When describing prevalence rate in writing, it is typically presented in an "xx per 1,000 children" format. However, when conducting calculations involving prevalence rate, a numeric representation such as 0.025 must be used.*

Appendix. Calculating Income-to-Poverty Ratio

(Note: The Google Chrome browser was used in the development of these instructions.)

Step 1

Collect and download data from the U.S. Census Bureau.

1. Visit the U.S. Census Bureau's data site at https://data.census.gov/cedsci/.
2. Select "Advanced Search" under the main search bar.
3. Click "Geography" on the left side of the page under "BROWSE FILTERS." When the "GEOGRAPHY" window appears, click "Show Summary Levels," then select "140 – Census Tract." When the "140 – CENSUS TRACT (STATE)" menu appears in the window, select the state of interest.
4. In the "[STATE] (COUNTY)" window that appears, select either "All Census Tracts within [State]" or the specific county of interest from the populated list. Within the "[County], (STATE)" window you may select one or multiple Census tracts within the county of interest. Once you have finished with your selections, click "SEARCH" at the bottom right of the page.
5. On the next page, at the top of the screen in the search bar, type "B17022" and click "SEARCH." Under "Tables," find the table with the title "RATIO OF INCOME TO POVERTY LEVEL IN THE PAST 12 MONTHS OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RELATED CHILDREN UNDER 18 YEARS BY AGE OF RELATED CHILDREN" and click on it. The table for the most recent ACS 5-Year estimate should populate (currently, 2019). At the top of the page under "Product," the dropdown menu will allow you to confirm the dataset shown and/or select a different year. If a different dataset/year is selected under "Product," your page should refresh automatically to that dataset.
6. On the left side of the page, click "DOWNLOAD." Check the box next to "RATIO OF INCOME TO POVERTY LEVEL IN THE PAST 12 MONTHS OF FAMILIES BY FAMILY TYPE BY PRESENCE OF RELATED CHILDREN UNDER 18 YEARS BY AGE OF RELATED CHILDREN" and then click on "DOWNLOAD SELECTED." In the "Download/Print/Share" window that appears, confirm that the year you previously selected under "Product" is checked and the radio button for "CSV" is selected. Then click "DOWNLOAD" to start the dowload file preparation and "DOWNLOAD NOW" when it shows that your files are 100% prepared.
7. Open the downloaded ZIP file to access the dataset. Delete unnecessary rows/columns as appropriate.

Step 2

Calculate the percentage of homes with an income-to-poverty ratio under 1.3.

1. Scroll across to identify the columns entitled "Estimate!!Total" and "Estimate!!Total!!Under 1.30."
2. For each Census tract, divide the number "Estimate!!Total!!Under 1.30" by the "Estimate!!Total" to find the percentage of homes with a poverty-to-income ratio less than 1.3.

For additional resources, please visit:

https://nchh.org/tools-and-data/technical-assistance/nys-clpppp/

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