

The original slide presentation
for Dr. Robert Keefe's
presentation has been edited
for content.

**The Role of Structural Variables Leading to Disparities
in Childhood Lead Poisoning, Teen Pregnancy, and
Tobacco Use**

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Purpose of the Study

- To investigate the persistent relationships between childhood lead exposure and:
 - Repeat teen pregnancy
 - Tobacco use

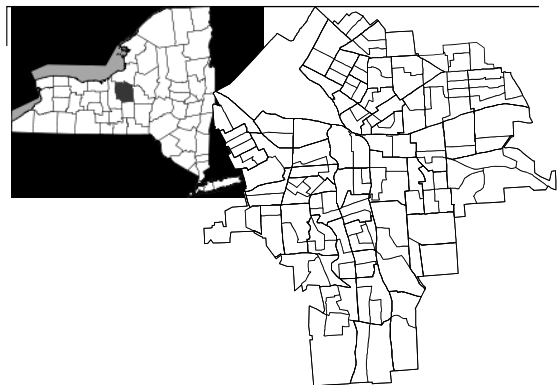
Hypotheses

1. Among females, childhood lead poisoning is associated with repeat teen pregnancy.
2. Among females, childhood lead poisoning is associated with cigarette smoking.

In our prior research we found that teens who give birth are likely to:

- Suffer from additional health problems
- Have repeat pregnancies
- Live in impoverished neighborhoods
- Live in poorly maintained housing, increasing the risk of lead exposure
- Have limited access to health care

Lane et al. 2004. Lane et al. in press *Journal of Urban Health*. Lane et al. in press. *Health and Place*.



Lead Poisoning in Syracuse

- 2nd highest prevalence of elevated blood level (EBL) in NY in 2001-2002.
- 5 zip codes in Syracuse had
 - 76% of the total number of lead poisoning cases
 - 7.7% of the *entire incidence* of EBL in NY.
 - These zip codes are reflective of national trends for areas that have high incidence of EBL.

NYSDOH, 2003.

Highest Risk Exposures

- Old lead-based paint in dilapidated buildings
 - Around windowsills
 - In the soil around buildings
 - In lead-tainted water

NYSDOH, 2004. Schilling & Bain, 1988.

Neurotoxicity from lead poisoning affects the ability to:

- Plan
- Learn from prior experience
- Control impulsive behavior
- Use executive functioning skills

Canfield et al. 2003a, 2003b, Espy, 2004, Needleman et al, 2002, Bellinger, 2001, 2003, 2004

Lead Levels and Birth rates by Race/Ethnicity in Syracuse 15-19 year olds

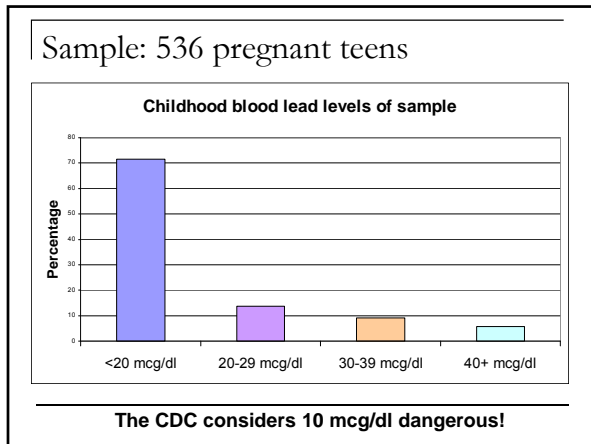
	Lead levels (per mcg/dl)	Birth rates (per 100,000)
White	7.38	32.9
African American	11.35	91.7
Hispanic	9.83	N/A

Acceptable blood lead levels

- 1960s 60 mcg/dl
- 1975 30 mcg/dl
- 1985 25 mcg/dl
- 1991 10 mcg/dl

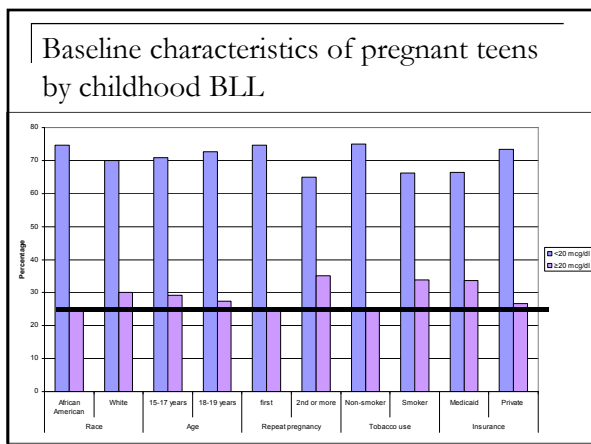
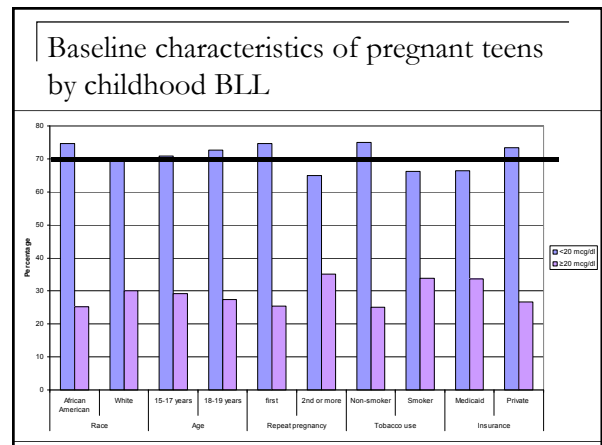
Syracuse Healthy Start Database

- 15 - 19 year olds
- 1998 - 2002
 - > 75% of all mothers < 20 years old
- Routine screening included:
 - Childhood lead levels
 - Tobacco use
- EBL reported to woman's obstetrician



- Dichotomous measures
1. Maternal race: White, African American
 2. Childhood BLL: <20, ≥20mcg/dl
 3. Tobacco use: none, any
 4. Previous pregnancy: first, repeat pregnancy
 5. Maternal age: 15-17, 18-19 years

- Baseline characteristics of pregnant teens by childhood BLL
- Repeat pregnancy was associated with elevated childhood lead and mother's age ($p < .05$)
 - Tobacco use was significantly associated with maternal race ($p < .05$)



- Logistic regression results
- One exposure: childhood BLL
 - Two outcomes:
 - repeat teen pregnancy
 - Controlled for race, age and insurance type
 - Tobacco use
 - Stratified by insurance type
 - Controlled for race & age

Outcome: repeat pregnancy

Predictor variables	
Childhood lead level (20+ mcg/dl vs. 0-19mcg/dl.)	1.59 (95% CI 1.04, 2.43)
Mother's Race (African American vs. white)	1.46 (95% CI 1.25, 1.71)
Mother's Age (18-19 vs. 15-17 years)	1.45 (95% CI 0.95, 2.21)
Medicaid (Medicaid vs. Private insurance)	1.70 (95% CI 1.06, 2.73)

So, what guidelines should we introduce?

1. All pregnancy women should be informed about the major sources of lead in the environment and the means of preventing exposure.
2. At the initial prenatal visit, health providers should assess a woman's risk for current high dose lead exposure. Women found to be at high risk for current high dose exposure should be tested for blood lead levels and counseled on how to reduce or eliminate current exposure.
3. Women found to have a blood lead level of 10 mcg/dl or greater should receive additional risk reduction counseling.
4. At the post-partum visit, providers should advise all women about the major causes of lead poisoning in infants and the means of preventing exposure.

Risk Assessment Questions

Answering "yes" to any question is rationale for testing

1. Do you or others in your home have an occupation that involves lead exposure?
2. Sometimes pregnant women have the urge to eat things which are not food, such as clay, soil, plaster, or paint chips. Do you ever eat paint chips?
3. Do you live in an old house with ongoing renovations that generate a lot of dust (e.g., sanding and scraping)?
4. Has your home been tested for lead in the water, and if so, were you told that the level was high? (Note: a level over 15 parts per billion [ppb] or mcg/dl is considered high.)
5. Do you use any traditional folk remedies or cosmetics that are not sold in a regular drug store, which may contain lead?
6. Do you or others in your household have any hobbies or activities likely to cause lead exposure?
7. Do you use non-commercially prepared pottery or leaded crystal?

Prevention strategy options

- Primary Prevention
 - Prevent lead from affecting children
- Secondary Prevention
 - Identify and treat children already poisoned

Parental education

- If you have a child under the age of six:
 - Ask the pediatrician to test your child at one and two years of age (some states vary on this requirement)
 - Test paint and dust in the home
 - Wash children's hands and toys often
 - Wipe floor and windowsill surfaces with damp cloths
 - Remove lead paint safely

Remediation

- Identify homes with lead paint
 - Use GIS to map homes built *before* 1978
- Remove lead paint before children move into the home
 - If children are already occupants, remove lead safely
 - \$313 million in HUD money for remediation

Targeted outreach

- Map homes built before 1978
- Map homes where children have tested with elevated blood lead levels
- Map areas reached by intervention
- Identify “hot spots” and target outreach

Enforce federal housing standard regulations

- Residential Lead-Based Paint Hazard Reduction Act of 1992
 - “Disclosure of known information on lead-based paint in homes built before 1978” (EPA, 1996)
- Lead abatement of rental property by landlord when the child has EBL
- Strict enforcement saved \$45,360 in one project

Screening debate

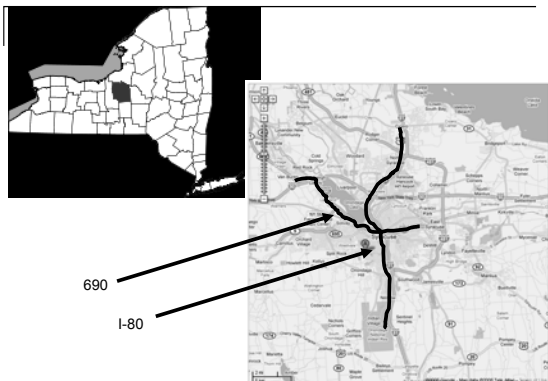
- Universal screening is not cost effective
 - $\geq 27\%$ housing built before 1950
 - $\geq 12\%$ of population with EBL
- Targeted screening
 - Risk assessment questions
 - Immigrants
 - Medicaid-eligible families
 - Public assistance-eligible families
 - Parent exposed to lead at employment site

Why does policy focus on secondary prevention?

- Cost
- Lack of consensus about how best to approach a health problem
- Impact of the lead industry
- Lack of studies showing efficacy of primary prevention methods

Onondaga County, NY

- 697 children with EBL 2002
- 2 clusters in the City of Syracuse
 - North side
 - South and southwest sides
- Correlated with property values and population density



Onondaga County Prevention Efforts

- **Primary**
 - Lead Hazard Control Program for lead-free housing
 - Syracuse Regional Lead Task Force to promote collaboration
- **Secondary**
 - Home Headquarters Home Improvement Loan Program
 - SHARP program for minor repairs

Recommendations

- Incorporate primary prevention strategies wherever possible
- Insure that risk assessment screening is sensitive to identified risk factors
- Combine geographical data with incidence to create hot spots to target with information
- Hold landlords accountable for abatement.