Structural Variables Leading to 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.

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.

Effects of Lead Exposure

- Decreased
  - intelligence levels
- Increased
  - neurological impairments
  - premature sexual maturation
  - impulsive or aggressive behavior
  - delinquency

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

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

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

Data Analysis

- Univariate and bivariate associations
- Multivariate logistic regression
  - Controlling for maternal race and Medicaid use

Sample: 536 pregnant teens

- 64.6% were African American
- 47.0 were between 18-19 years old
- 76.1% were on Medicaid
- 39.6% second or higher order pregnancy
- 37.5% were smokers

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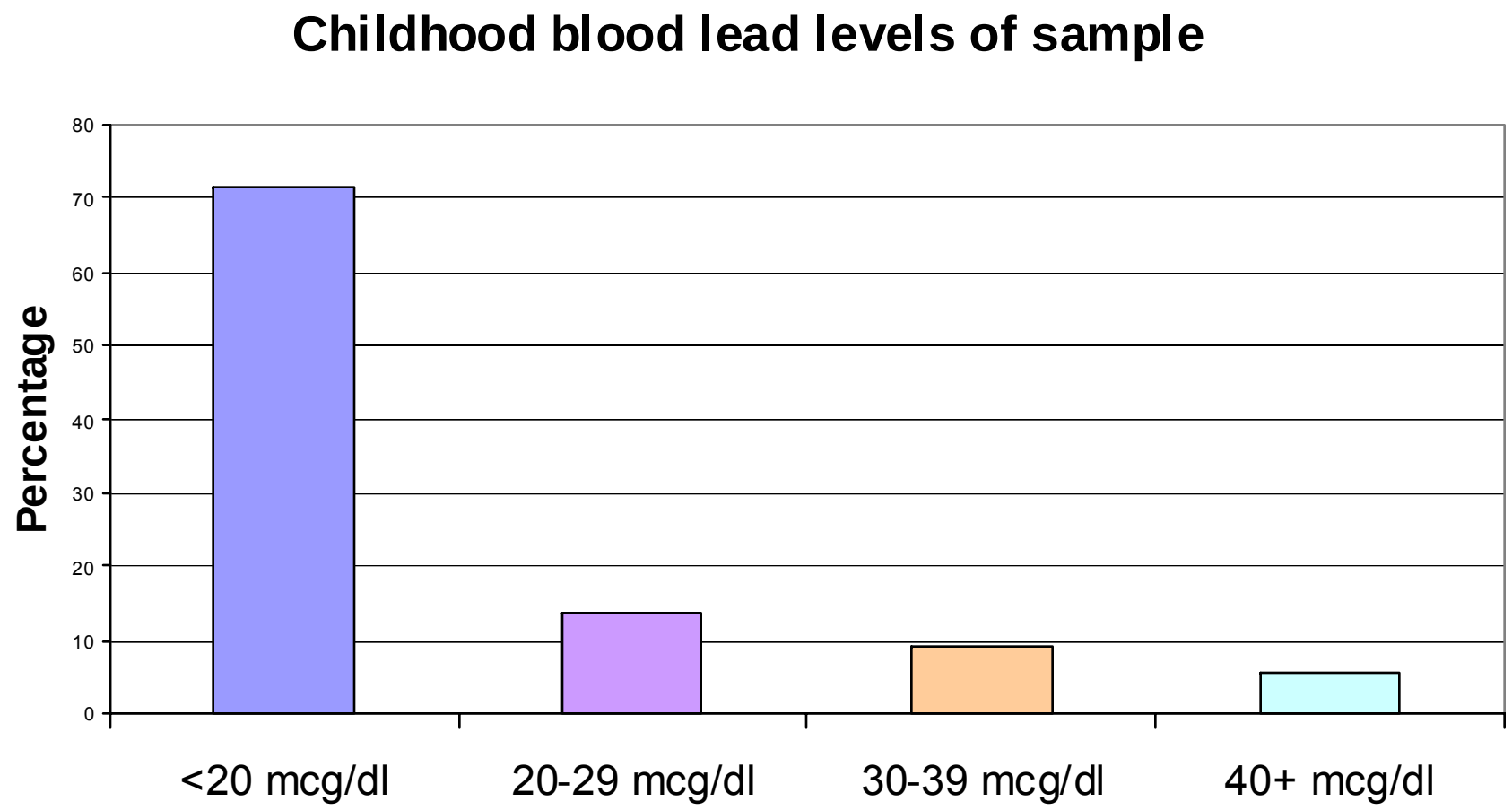

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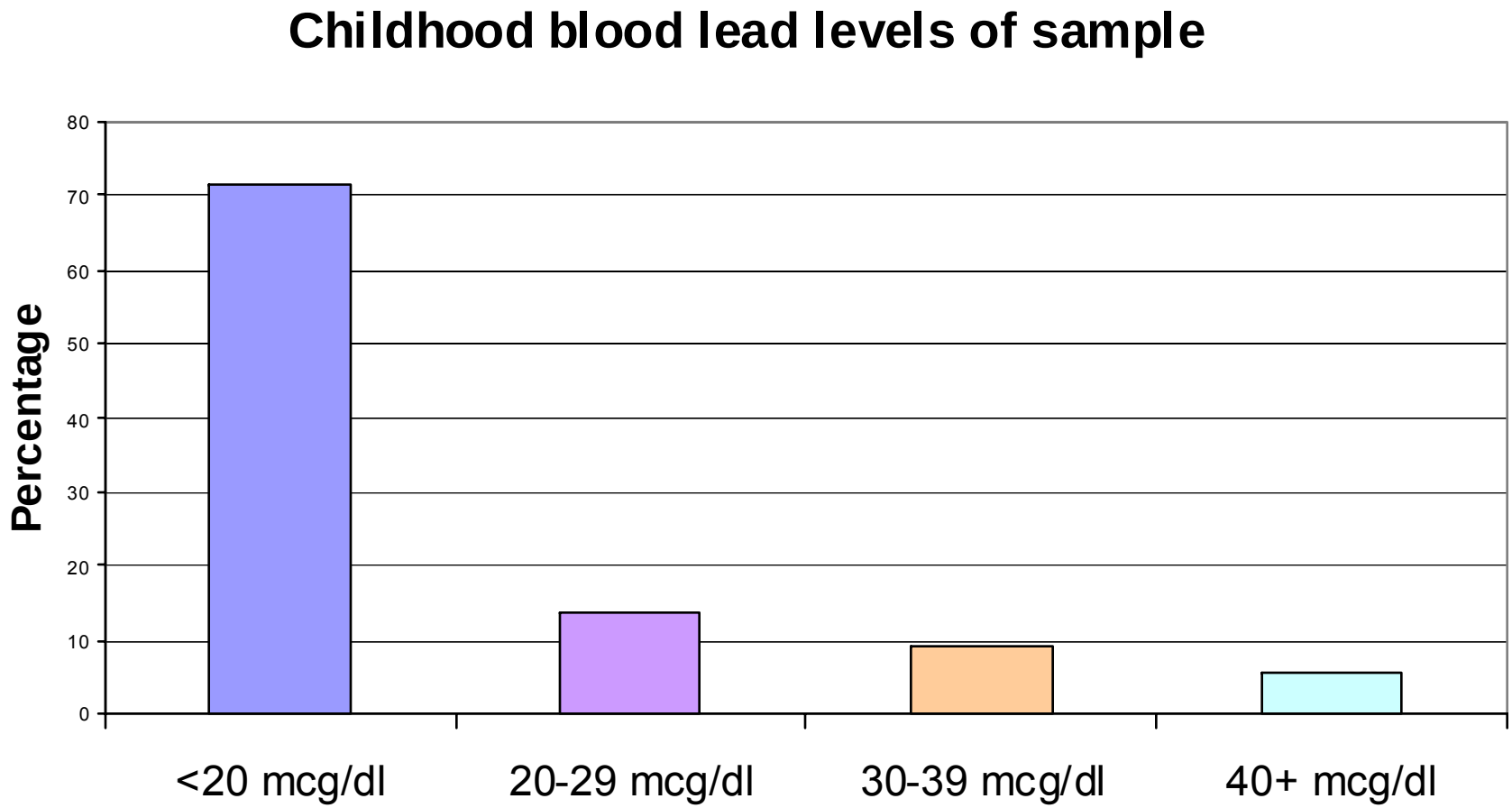
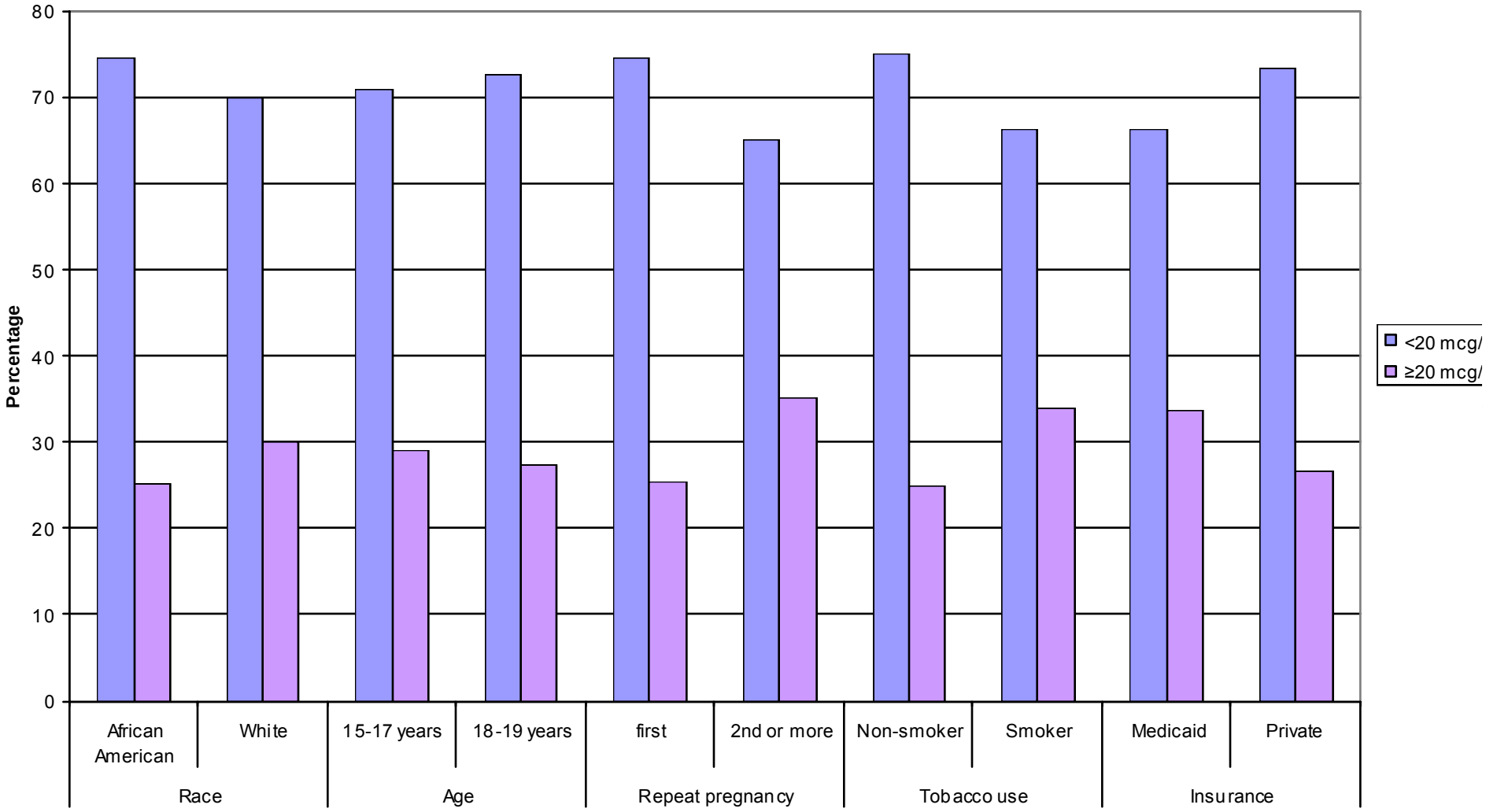


The CDC considers 10 mcg/dl dangerous!

Baseline characteristics of pregnant teens by childhood BLL



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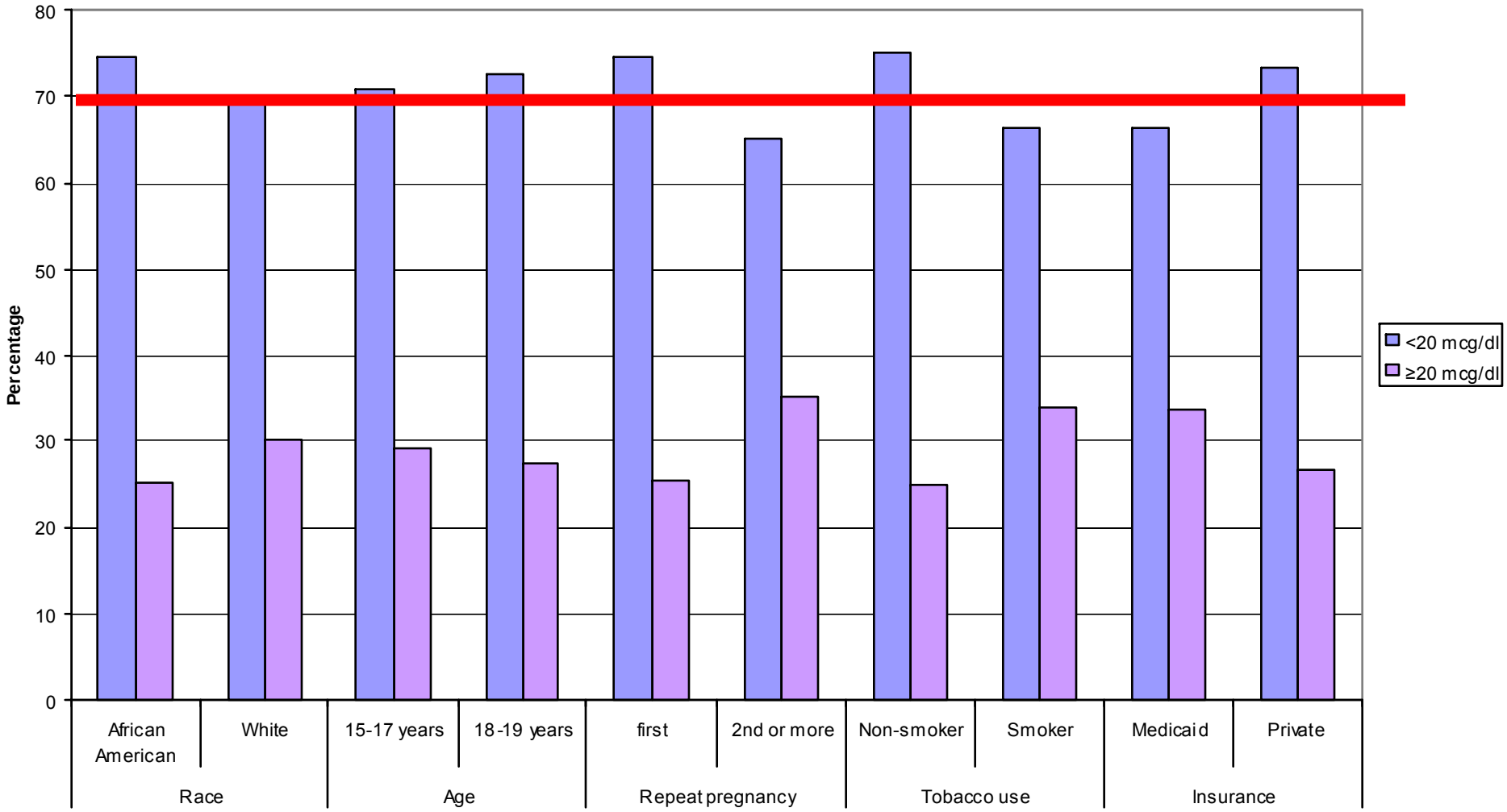

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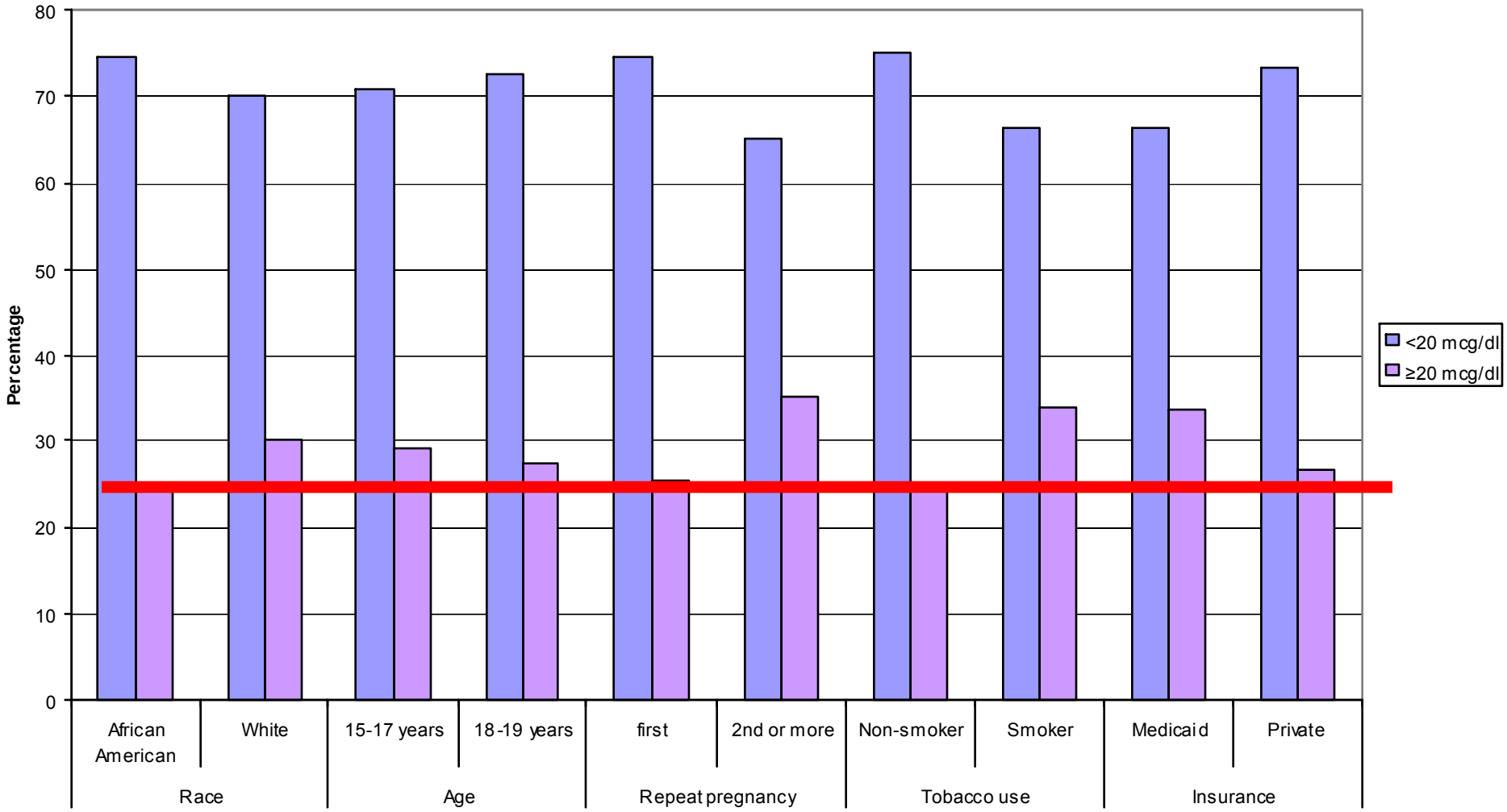

Baseline characteristics of pregnant teens by childhood BLL

- 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)

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Outcome: tobacco use

Predictor variables	Medicaid non-users	Medicaid users
Childhood lead level (20+ mcg/dl vs. 0-19mcg/dl)	4.25 (95% CI 1.89, 9.57)	1.25 (95% CI 0.78,2.00)
Mother's Race (African American vs. white)	0.32 (95% CI 0.15, 0.72)	0.29 (95% CI 0.19, 0.45)
Mother's Age (18-19 vs. 15-17 years)	0.93 (95% CI 0.42, 2.05)	1.35 (95% CI 0.88, 2.05)

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Discussion: Repeat Pregnancy

- Community factors
- Family factors
- Individual factors
- Developmental delays

All may lead to residence in older housing with peeling paint

Discussion: Addiction

- Smoking and race are determinants of EBL among women of reproductive age
- Early lead exposure associated with decreased ability to delay gratification and alterations in dopamine system and other neurochemicals

Limitations

- Small sample size
- Other community factors as potential confounders
  - Poverty
  - Community stress
  - Residence location
  - Family level factors

Further research

- Inclusion of community-level factors
- Individual vs. community level responsibility