

# A HOUSING AND NEIGHBORHOOD INDEX SCORES FOR PREDICTING DISPARITIES IN CHILDHOOD LEAD POISONING AND ASTHMA

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# Presenter Disclosures

**Pamela Pugh Smith**

**The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:**

**“No relationships to disclose”**

# Specific Study Objectives

- 1) Develop a household hazard index (HHI) and neighborhood hazard index (NHI) and combined household and neighborhood (HNI) rating scale.
- 2) Evaluate the associations of HHI and NHI with elevated blood lead (ebl) and asthma in children.

# Household Hazard SCALES

Structural	18 Items
Mold	8 Items
Pets	4 Items
Pests	6 Items
Ventilation	6 Items
Fire	6 Items
Electrical	7 Items
Lifestyle and Behavioral	12 Items

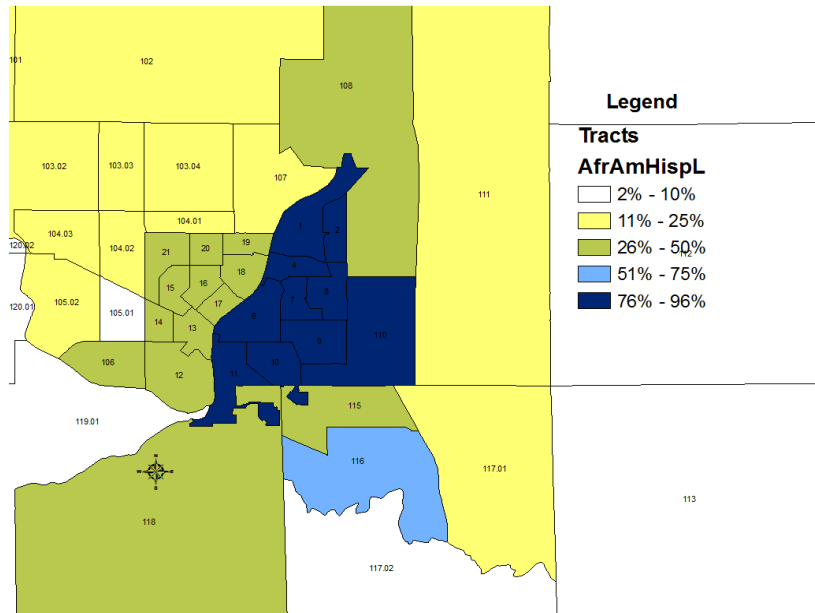
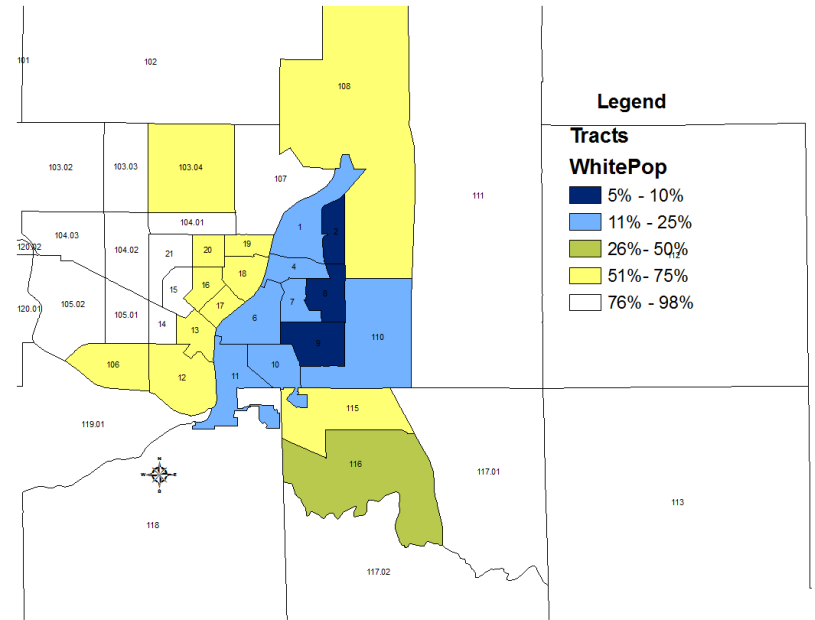
# NEIGHBORHOOD HAZARD SCALE

Neighborhood Satisfaction	(12 Items)
Perception of Neighborhood Condition	(6 Items)
Exterior Housing Observation	(13 Items)
Neighborhood Hazards (Observational)	(21 Items)

# Study Site

Demographics	City of Saginaw	Saginaw County	MI
Population <sup>1</sup>	51,508	200,169	9,883,640
% Hispanic/Latino Population <sup>2</sup>	12.1%	7.3%	4.0%
% African American Population <sup>2</sup>	42.8%	18.3%	14.0%
% White Population <sup>2</sup>	50.5%	76%	79.7%
Jobless Rate Calendar Year 2010 <sup>3</sup>	19.75%	11.8%	12.5%
% of individuals living below poverty <sup>2</sup>	36.5%	18.9%	14.5%
- with related children < 5 years <sup>2</sup>	48.6%	30.6%	22.7%
Median household income <sup>2</sup>	\$27,271	\$42,244	\$48,700
Population ≥ 25 years with a Bachelor's degree or higher <sup>2</sup>	10.4%	17.9%	24.5%
Housing Units <sup>1</sup>	23,574	79,011	4,532,233
Pre-1950 Housing <sup>2</sup>	57.3%	29.0%	25.3%

Source: <sup>1</sup>U.S. Census Bureau, 2010 Census. <sup>2</sup>U.S. Census Bureau, 2005-2009 American Community Survey. <sup>3</sup>Michigan Department of Labor & Economic Growth Bureau of Labor Market Information Unemployment Statistics, 2010 Jobless rates.



# Data Collection

15,351 Households Screened

642 Households  
Surveyed

Household HHI  
Score  $\geq 53$

Household Members:

- $\leq 12$  yrs; or
- Pregnant; and
- Resident  $> 3$  months

no

NO  
Intervention

no

Exclusion

Does Child Have  
Asthma or Blood  
Lead Level  $\geq 10\mu\text{g}/\text{dL}$

no

Basic Interventions  
200

yes

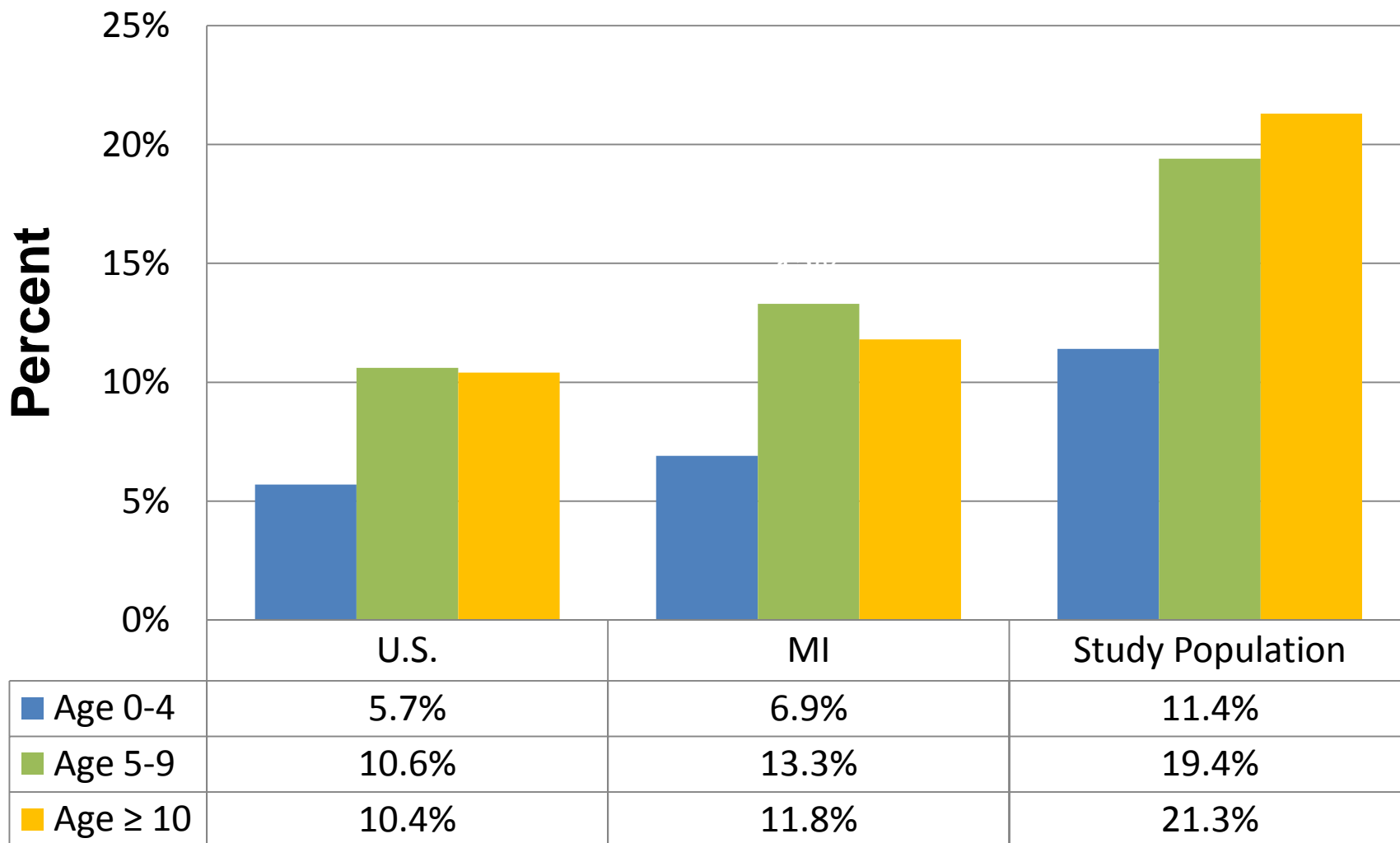
Basic + Extensive Interventions  $\sim 20$

## Findings – Child Health Outcome

<b>Children (n=1211)</b>	<b>number</b>	<b>%</b>
Children w/Asthma	212	17.8%
Initial BLL $\geq 10\mu\text{g}/\text{dL}$	18	1.5%
Households (n=642)	number	%
Households with One Asthmatic Child	144	23%
Households with Two Asthmatic Children	21	3.4%
Households with 3-4 Asthmatic Children	8	1.3%

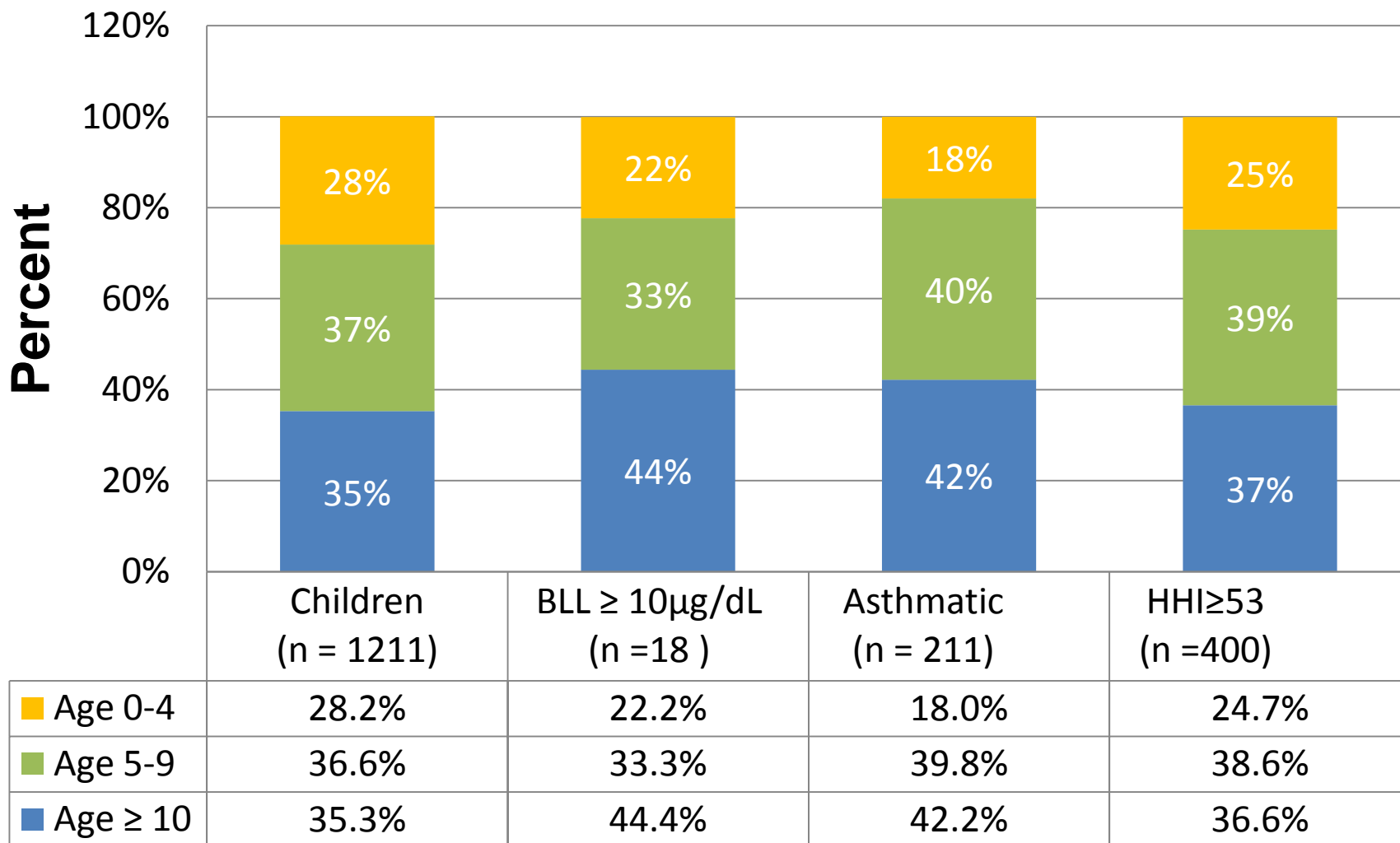


## Asthma Rate in Comparison



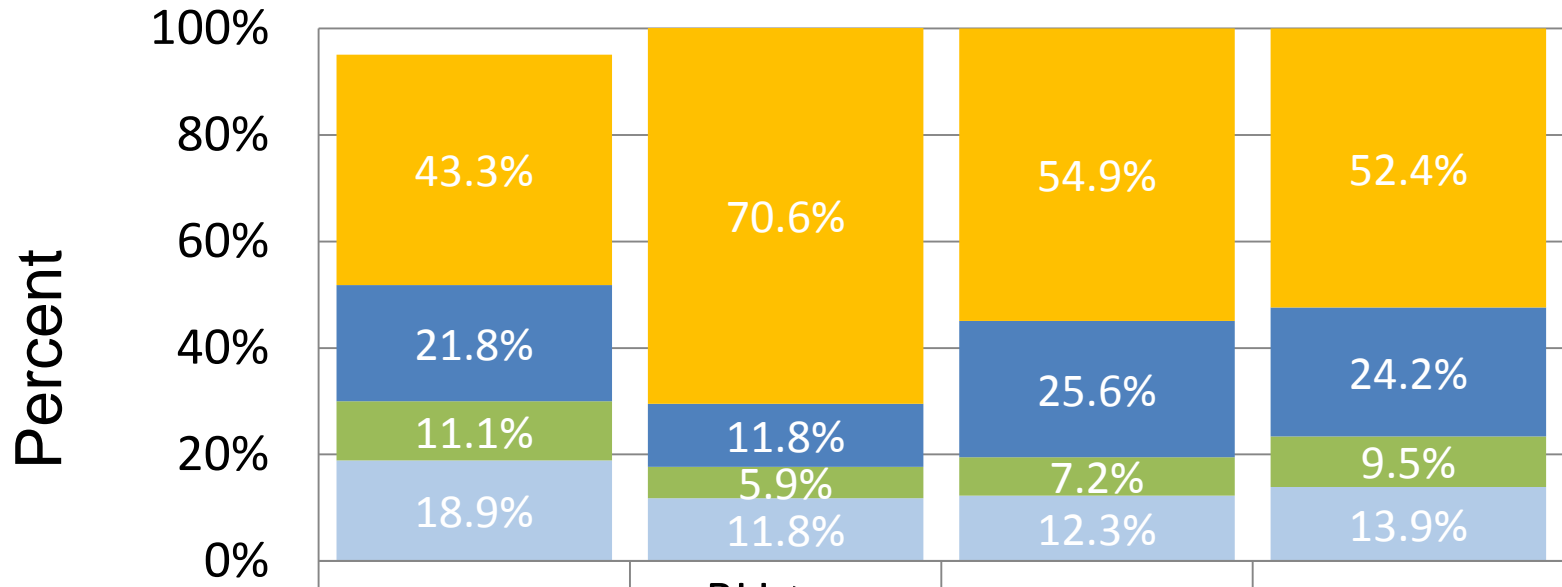
# Prevalence Rates

## Age



# Prevalence Rates

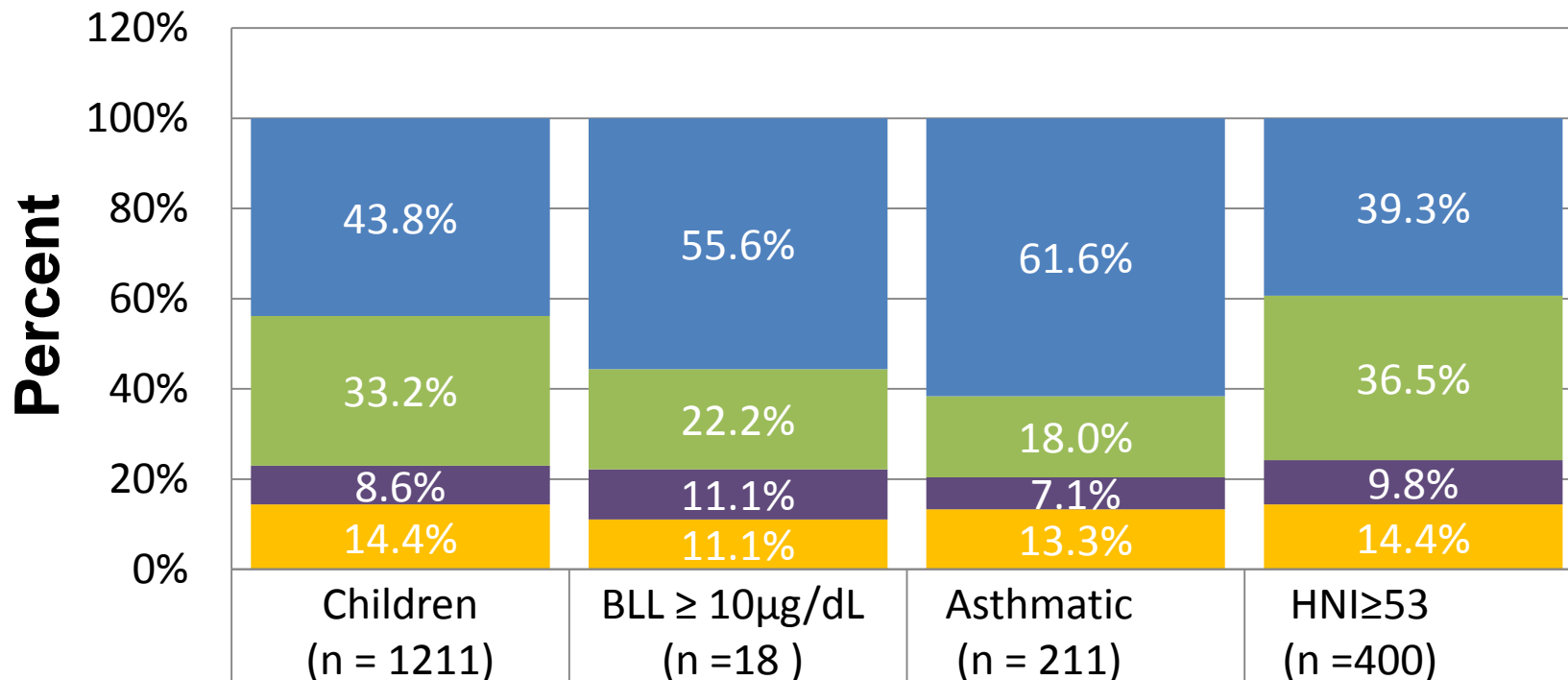
## Income



	Children	BLL $\geq$ 10 $\mu$ g/dL	Asthma	HHI $\geq$ 53
■ Less than \$19,999	0.433	0.706	0.549	0.524
■ \$20,000-\$34,999	0.218	0.118	0.256	0.242
■ \$35,000-\$49,999	0.111	0.059	0.072	0.095
■ \$50,000 or more	0.1888	0.118	0.123	0.139

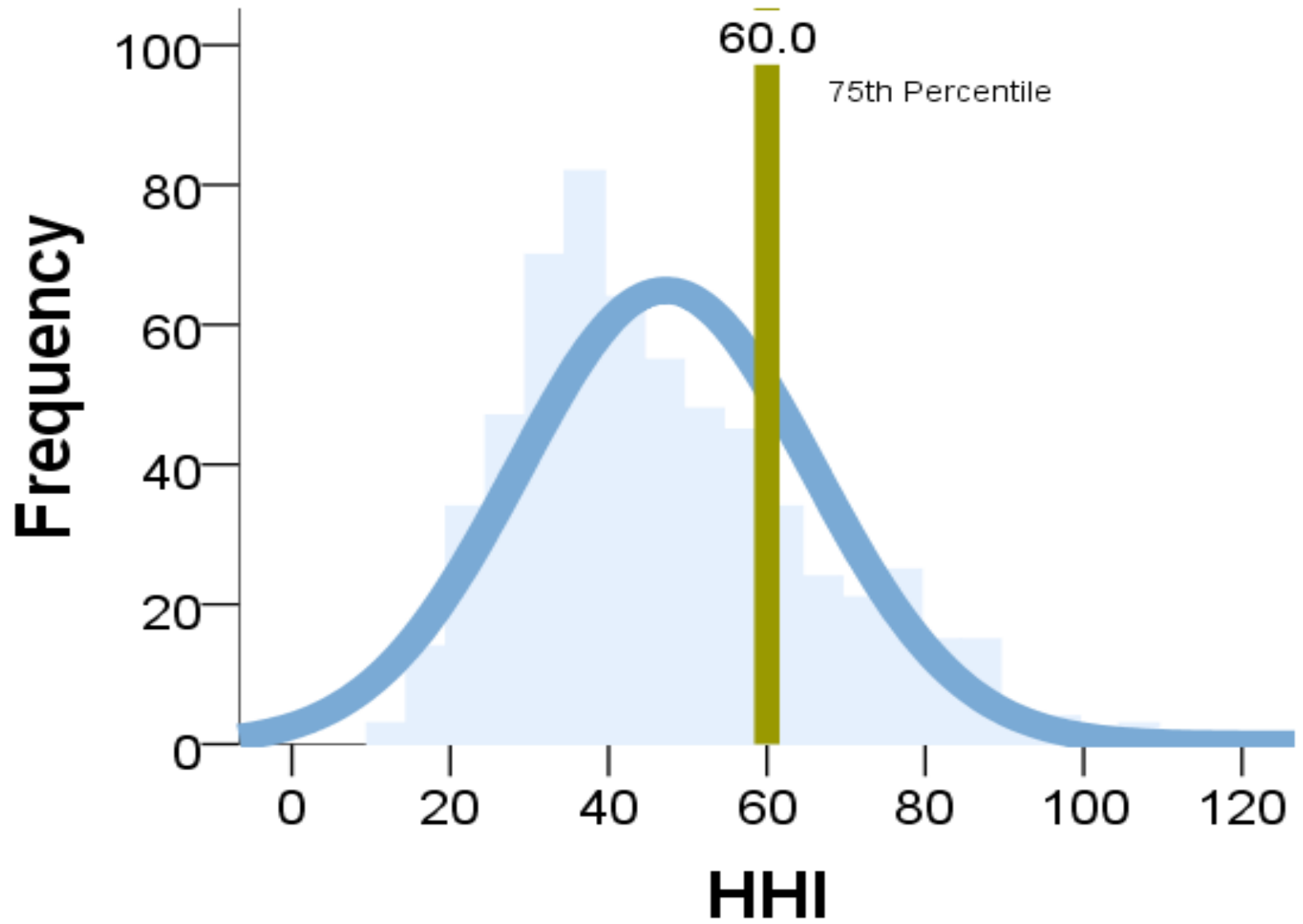
# Prevalence Rates

## Race & Ethnicity



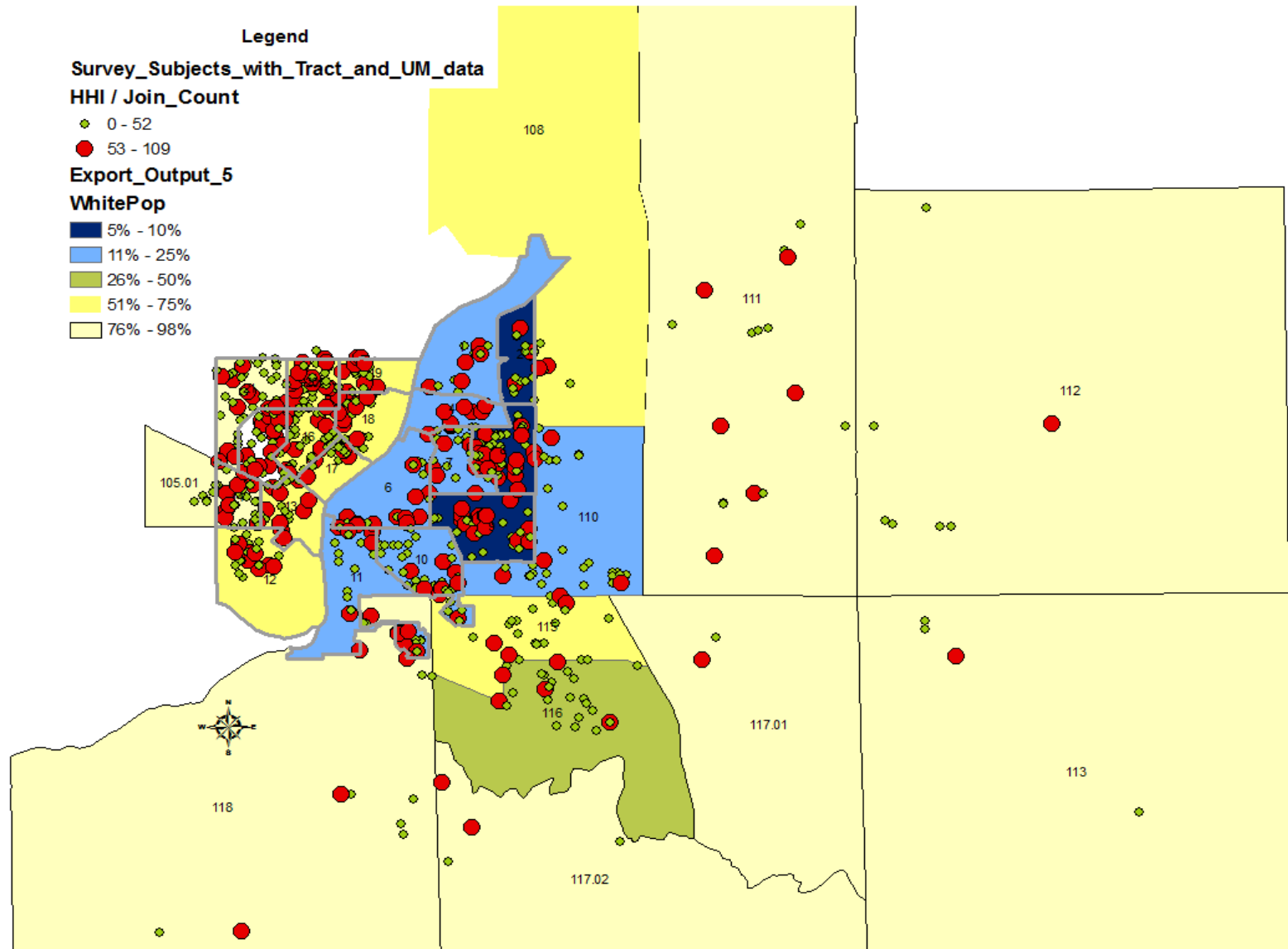
■ African Amer.	0.438	0.556	0.616	0.393
■ White	0.332	0.222	0.18	0.365
■ Hispanic/Latino	0.086	0.111	0.071	0.098
■ Other	0.144	0.111	0.133	0.144

# Distribution - HHI

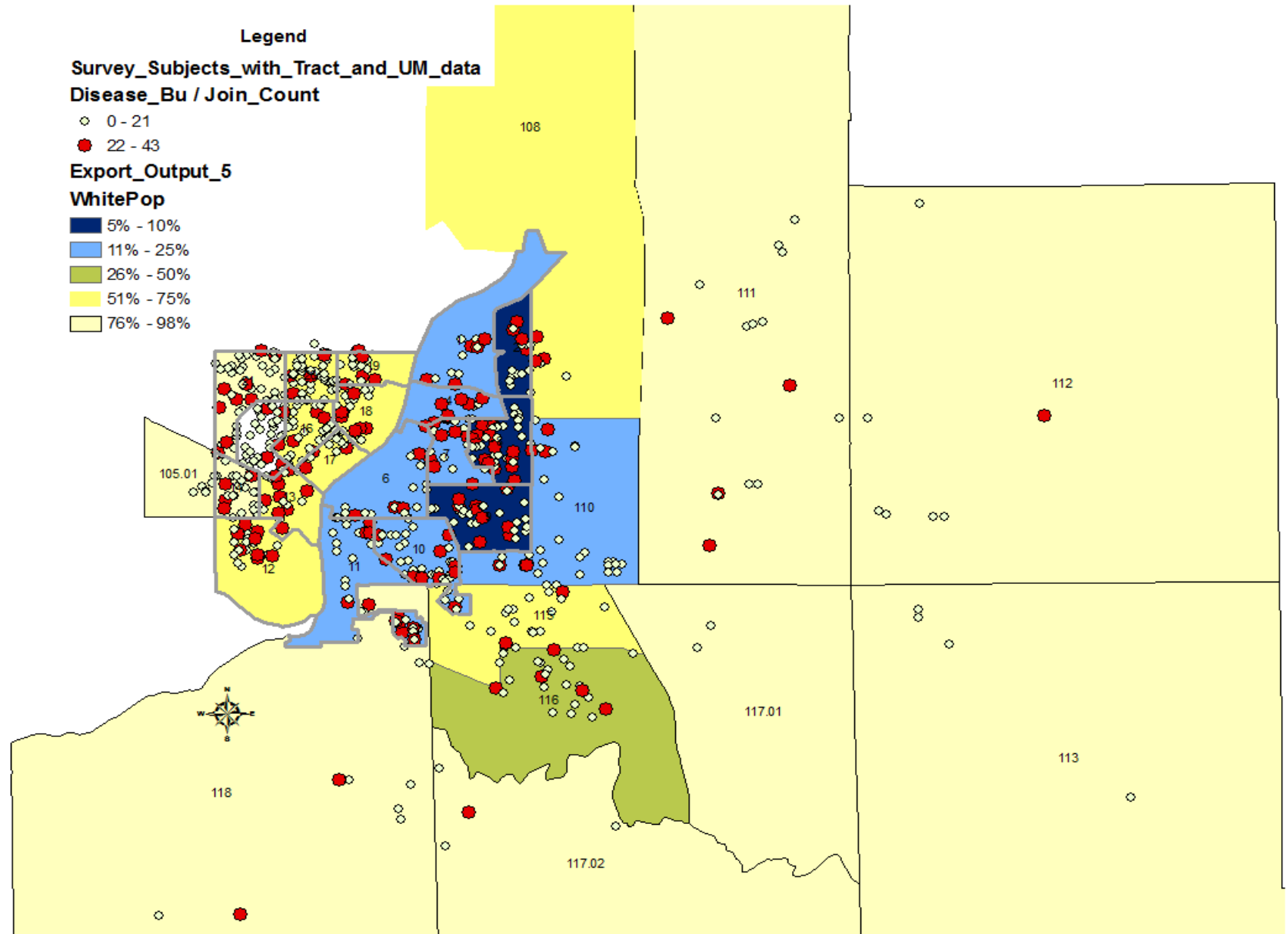




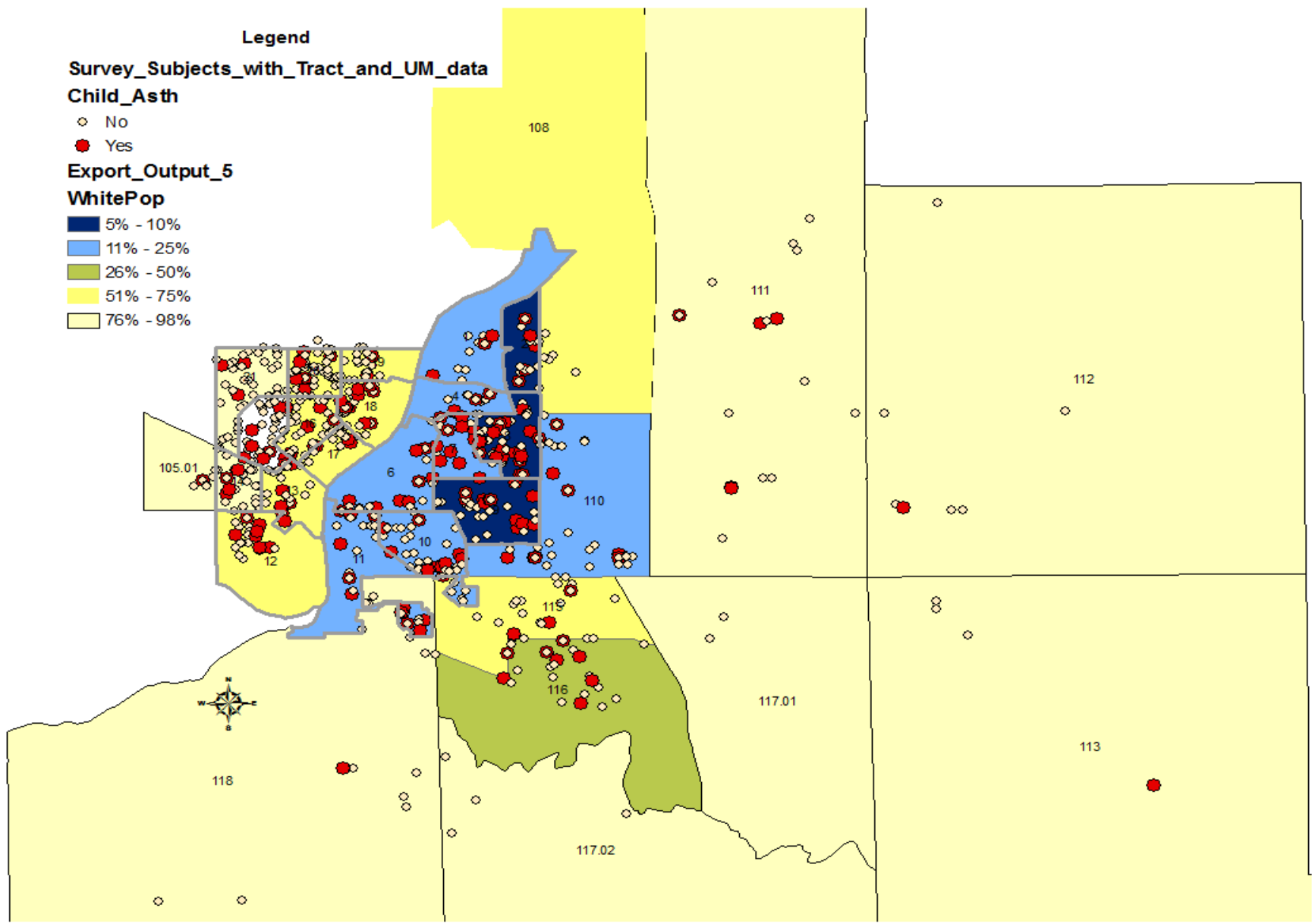
# Distribution - HHI



# Distribution – Disease Burden



# Distribution – Child Asthma





# Crude Odds Ratios - HHI $\geq$ 53

	(p-value)	Odds Ratio	95.0% CI for OR	
			Lower	Upper
Neighborhood Satisfaction	.000	1.054	1.024	1.084
Perception of Neighborhood Condition	.000	1.125	1.076	1.176
Respiratory/Lung/ Breathing Problems	.001	1.797	1.257	2.568
Asthma	.003	1.763	1.214	2.562
Household Disease Burden	.000	1.130	1.105	1.155

## Further Tool Validation.

- Query additional neighborhood risk factors.
- Further assessment of the relative impact of household, neighborhood, and behavioral hazards.

# Questions

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