

The Influence of Community Factors on Childhood Asthma Prevalence

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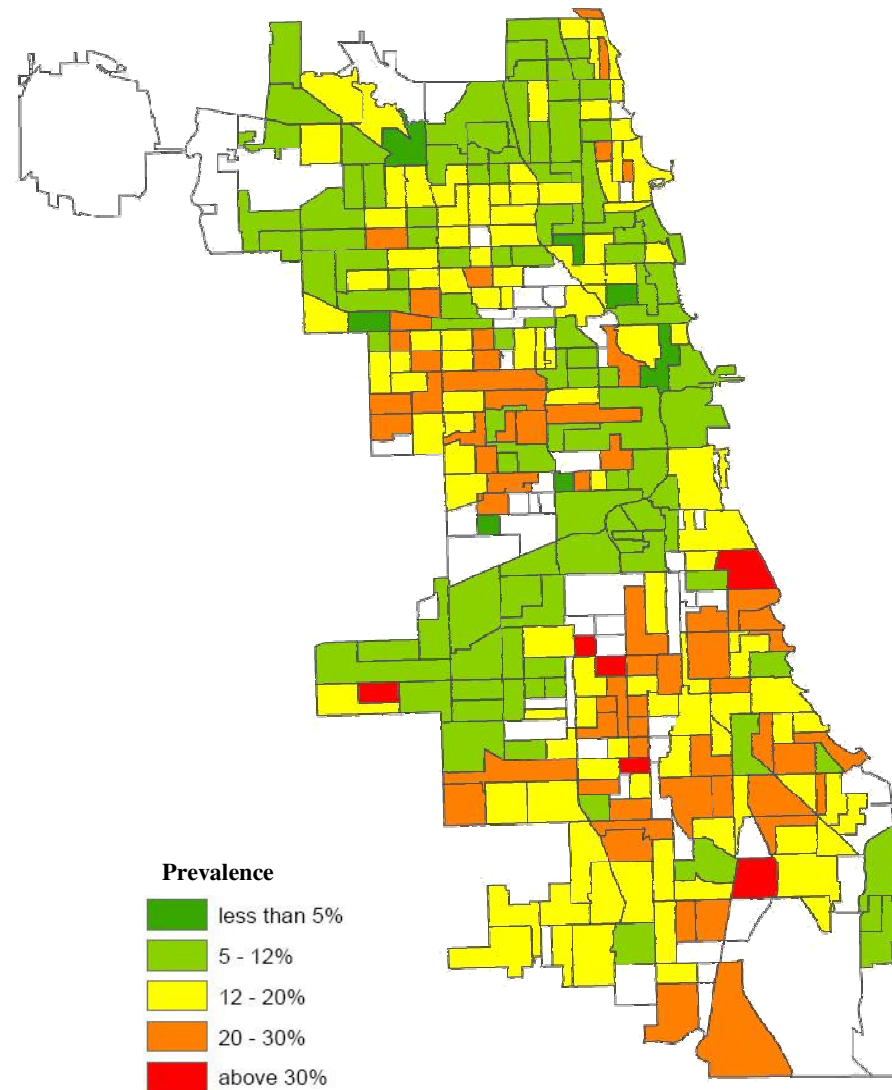
Background: United States

- Over 9 million children in the U.S. have asthma
- Disparities are on the rise
 - Asthma rates among Black children are disproportionately higher than those for White/Hispanic children

Background: Chicago

- Average childhood asthma rate is 13%
 - 12% for White children
 - 20% for Black children
- Asthma rates vary widely among neighborhoods from 0% to 44%
 - Black neighborhoods range from 4%-44%
 - White neighborhoods range from 2%-30%

Childhood asthma variability in Chicago:



Source: Gupta RS, Zhang X, Sharp LK, Shannon JJ, Weiss KB. Geographic variability in childhood asthma prevalence in Chicago. *The Journal of allergy and clinical immunology*. 2008 Mar;121(3):639-45 e1

Objective

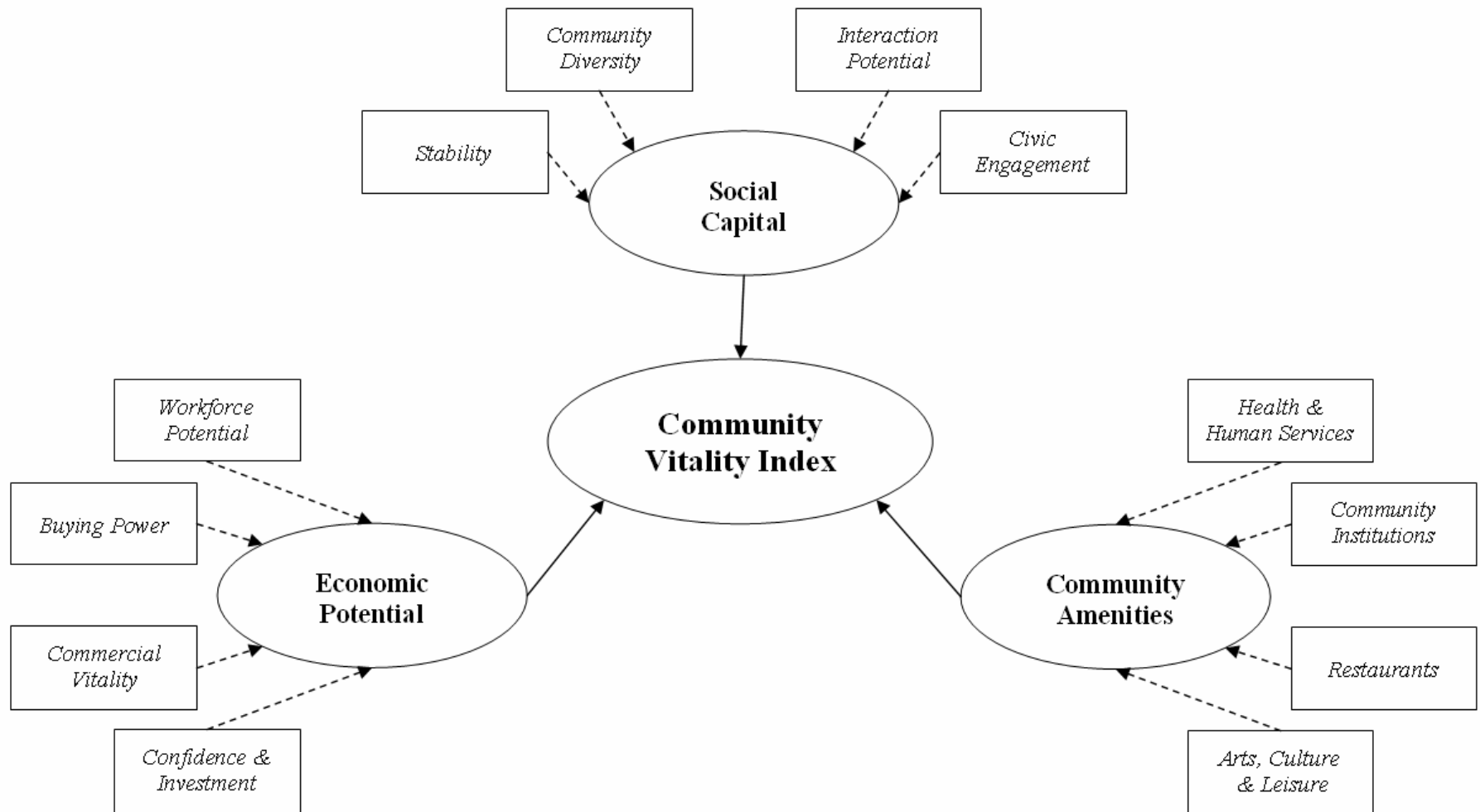
- **Determine the impact of positive community factors on childhood asthma and the variability in asthma rates by neighborhoods**

Methods

- Obtained data from the Chicago Initiative to Raise Asthma Health Equity (CHIRAH) asthma screening survey
 - 50,000 Chicago school children (2003-2005)
- Sample was geocoded into 287 Chicago neighborhoods
 - Followed Human Development in Chicago Neighborhoods (PHDCN) guidelines; selected neighborhoods to be:
 - Ecologically meaningful
 - Composed of geographically contiguous census tracts
 - Internally homogenous on key census indicators
- Bi-variant and multi-level logistic regression analyses were conducted

Methods: Positive Factors

Metro Chicago Information Center's Community Vitality Index (CVI)



Methods: Positive Factors

Community Vitality Index

Sub-Index: Economic Potential

Descriptor of features considered important in community development and assets with potential leverage for community change

Item: Workforce Potential

Variable:

Educational Attainment

% population > 25 yrs old with at least some college education

Variable:

Wage Earners

wage earners age 16-64 per square mile

Variable:

Employment Rate

³
% labor force employed

Explanation of Community Vitality Index descriptors:

Social Capital Sub-Index (33%)		
<i>Descriptor of connections between people that allow communities to work together</i>		
Item	Variable	Definition
Interaction Potential (25%)	Neighborhood Interaction ¹	% households not linguistically isolated
	Social Support ¹	% households not comprised of a single person living alone
	Availability ¹	% households with at least 1 adult not in the labor force
Stability (25%)	Mobility ¹	% households that resided in same home 5 yrs earlier
	Immigration ¹	Inversely ranked % foreign born residents who entered given tract within 5 yrs
Community Diversity (25%)	Ethnic Diversity ¹	Inversely ranked % tract population of largest single racial/ethnic group
	Age Distribution ¹	Inversely ranked % tract population in any single age group (0-24; 25-44; 45+)
	Income Mix ¹	% households in any single income group (\$0-34,999; \$35,000-74,999; \$75,000+)
Civic Engagement (25%)	Voting Rate ²	% registered voters who voted in Nov 2002 election
Economic Potential Sub-Index (33%)		
<i>Descriptor of features considered important in community development and assets with potential leverage for community change</i>		
Item	Variable	Definition
Commercial Vitality (25%)	Business Density ³	# businesses per square mile
	Small Business Loans ⁴	Aggregate amount of small business loans (<1 million)
Buying Power (25%)	Aggregate Income ¹	Total income for all people in given census tract
	Shelter Cost Burden ¹	Inversely ranked % households spending ≥ 30% monthly income on housing
Neighborhood Confidence & Investment (25%)	Home Investment ⁵	# mortgages originated per dwelling unit
	Home Improvement ⁵	# home improvement loans originated per occupied dwelling unit
	Owner Occupancy ¹	% occupied dwelling units
Workforce Potential (25%)	Educational Attainment ¹	% population > 25 yrs old with at least some college education
	Wage Earners ¹	# wage earners age 16-64 per square mile
	Employment Rate ¹	% labor force employed
Community Amenities Sub-Index (33%)		
<i>Descriptor of the impact of cultural and social amenities on the growth of social capital and community development</i>		
Item	Definition	
Arts, Culture, and Leisure (25%) ^{6,7}	# of 3-mile buffers around each artistic, cultural and entertainment facility that include the center of each tract divided by the population density	
Restaurants (25%) ⁶	# of 1-mile buffers around each restaurant that include the center of each tract divided by the population density	
Health and Human Services (25%) ⁸	# of 3-mile buffers around each agency that include the center of each tract divided by the population density	
Community Institutions (25%) ⁹	# of 2-mile buffers around each institution that include the center of each tract divided by the population density	

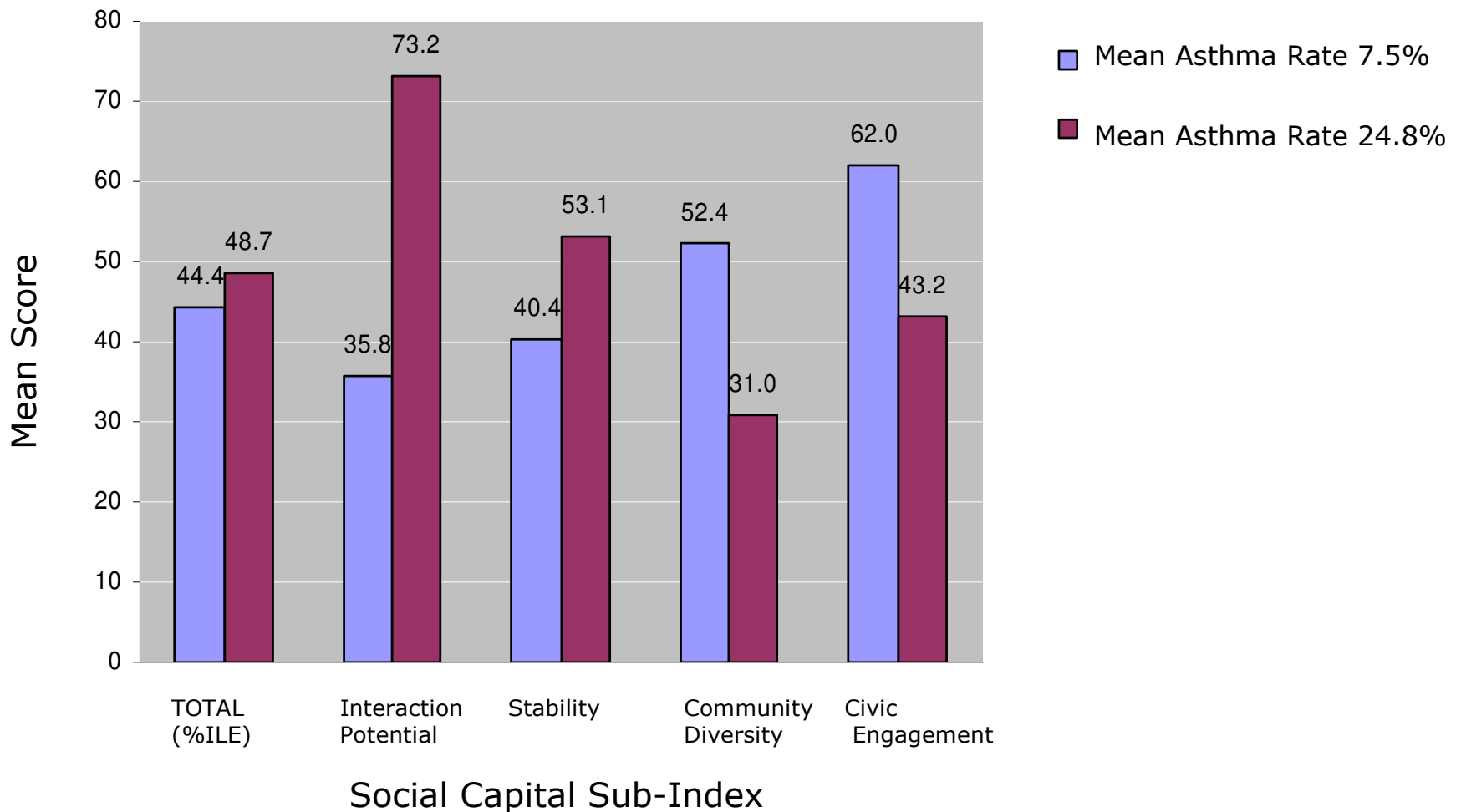
¹Data Source: 2000 US Census; ²Data Source: County Board of Elections, Chicago Board of Elections by precinct; ³Data Source: 2002 commercial listing of all businesses with telephones; ⁴Data Source: 1999 Community Reinvestment Act data; ⁵Data Source: 1999 Home Mortgage Disclosure Act; ⁶Data Source: Commercial database of businesses with telephones; ⁷Data Source: Database of non-profit arts/culture organizations; ⁸Data Source: 2001 United Way Blue Book; ⁹Data Source: InfoUSA commercial business database

Questions

- How does social capital impact childhood asthma?
- How does economic potential impact childhood asthma?
- How do community amenities impact childhood asthma?
- Are positive community factors significant after controlling for individual characteristics?

Results: Social Capital

Social capital in neighborhoods with low and high asthma prevalence:

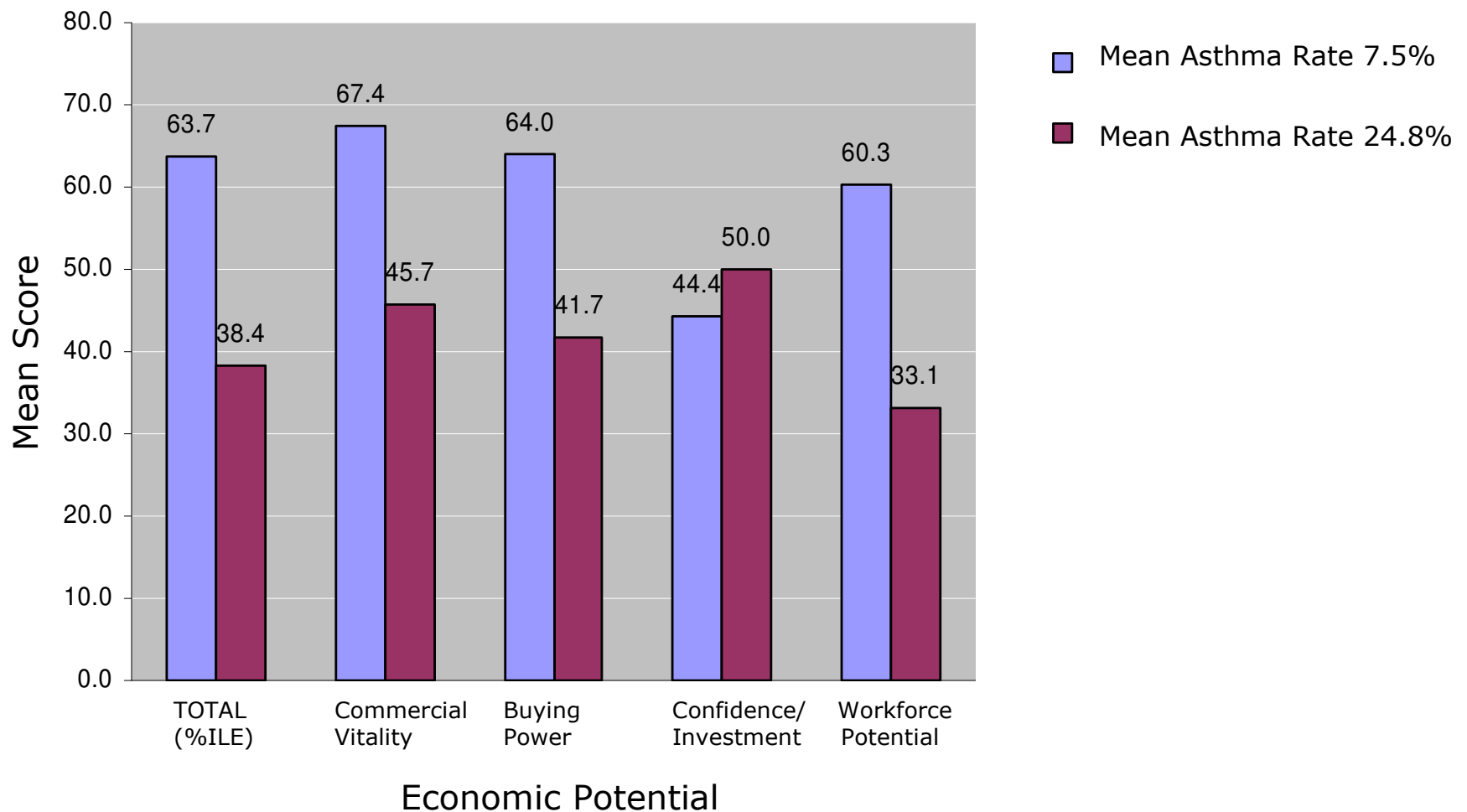


Results: Social Capital

- Associated with low asthma prevalence:
 - More civic engagement, i.e. higher percentage of registered voters
 - Increased diversity, e.g. ethnicity, income, age etc.
- Associated with high asthma prevalence:
 - Higher interaction potential, e.g. social support in neighborhood households
 - More stability, i.e. more residents in the same home for the last 5 years

Results: Economic Potential

Economic potential in neighborhoods with low and high asthma prevalence:

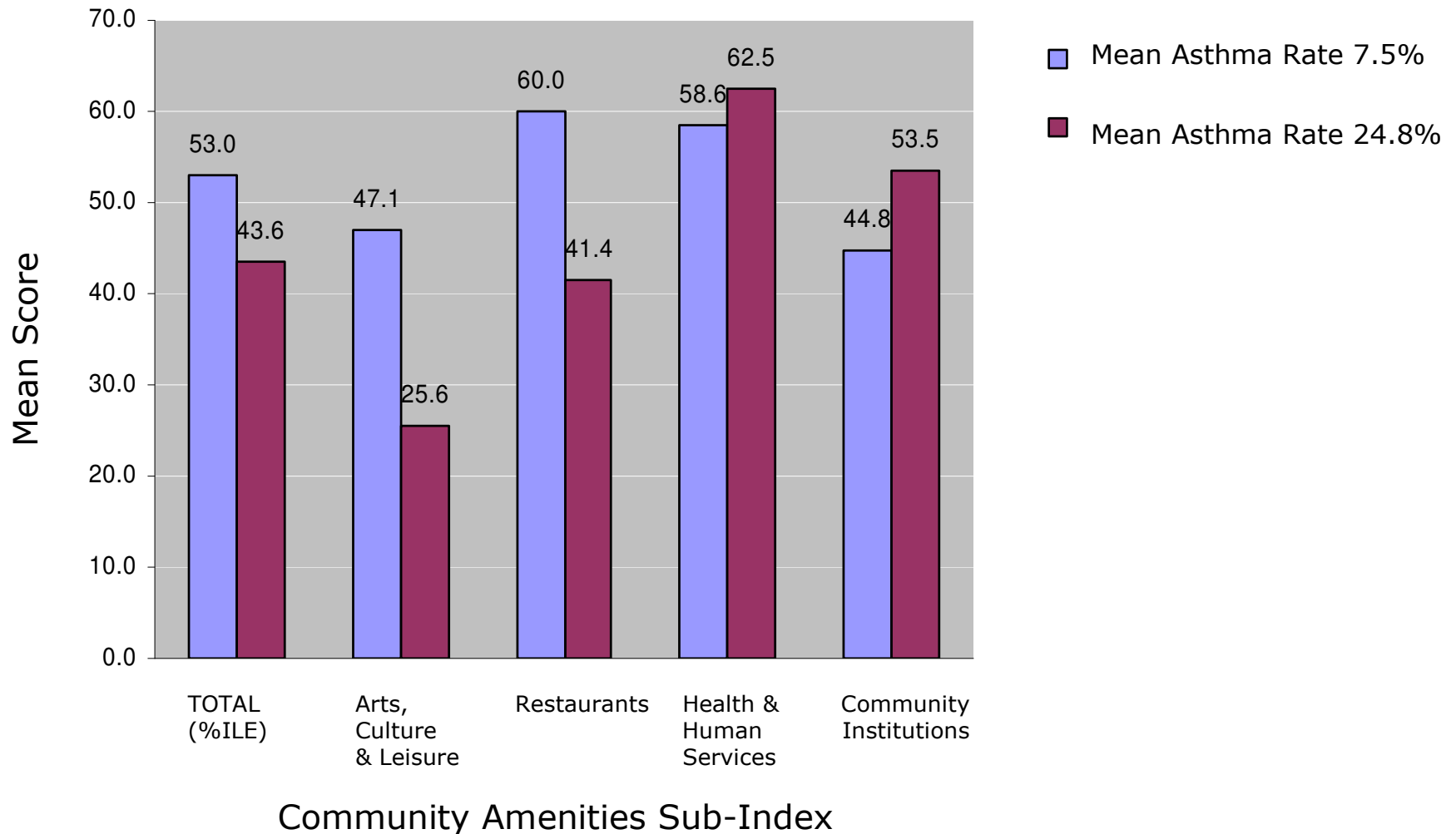


Results: Economic Potential

- Associated with low asthma prevalence:
 - More businesses
 - More business loans
 - Larger aggregate income
 - Higher educational attainment
 - More wage earners/household
 - Higher employment rates

Results: Community Amenities

Community amenities in neighborhoods with low and high asthma prevalence:



Results: Community Amenities

- Associated with low asthma prevalence:
 - More restaurants
 - More artistic, cultural & entertainment facilities
- Associated with high asthma prevalence:
 - More libraries
 - More places of worship
 - More institutions of higher education
- The number of health and human services agencies was not related to asthma prevalence

Results: Individual Characteristics

- Positive factors explained 21% of asthma variation
- As the Black population increased in a community, so did childhood asthma
- After controlling for socio-demographic and individual characteristics:
 - In Black neighborhoods positive community factors remained significantly higher in areas with low asthma prevalence
 - Social capital continued to contribute significantly to asthma variation

Conclusion

- Positive community factors have a strong impact on childhood asthma prevalence in Chicago
- A deeper understanding of this impact may lend insight into potential interventions to reduce childhood asthma
- Next steps:
 - Determine the impact of community violence and air pollution on childhood asthma prevalence
 - Assess community factors within a specific community



Thank You

Questions?