Achievement Gap Vulnerability In Massachusetts
The Intersection of School Quality, Income, and Housing Costs Risks in Massachusetts Public School Districts

OVERVIEW

There is growing gap between the rich and the poor, and this gap has serious public health implications. Lower-income individuals are at a significantly higher risk for poorer economic, achievement, and health outcomes.Additionally, inadequate education and living conditions have serious implications for health disparities.[1] Inflated housing costs near high-scoring schools can drive economic segregation[2] and act as a barrier for low-income students who are forced to attend lower-scoring schools.

The purpose of this map is to provide a visual examination of school quality and socioeconomic disparities in Massachusetts public school districts to assess the areas left most vulnerable in the face of alarming increases in education and income gaps in the state. The analysis scored socioeconomic and school quality risk factors to determine which school districts were exposed to the greatest amount of risk.

The analysis identified the highest risk school districts as: Adams-Cheshire, Athol-Royalston, Boston, Brockton, Chelsea, Chicopee, East Hampton, Everett, Fall River, Fitchburg, Gardner, Gill-Montague, Greenfield, Holyoke, Lawrence, Lowell, Lynn, Malden, New Bedford, North Adams, Provincetown, Revere, Salem, Southbridge, Springfield,

METHODS

SCHOOL QUALIITY SCORE
English and Math Massachusetts Comprehensive Assessment System (MCAS) scores from 2011 were collected and used to construct a school quality score. The Composite Performance Index (CPI) for each subject, a figure calculated and released by the state, was used as the basis for scoring. The CPI is a 100-point index created by assigning 100, 75, 25, 50, or 0 points each participating student based on test performance, summing the results for individual students, and dividing that sum by the total number of students assessed. To create risk the scores for this analysis, the CPIs were first divided into quintiles for each subject. Each district was then assigned a score of one through five based on these quintiles, with five representing the lowest quintile. The risk score for the two subjects were summed by school district to form the school quality aspect of the vulnerability score.

SOCIOECONOMIC RISK SCORE
Data on income and housing costs were collected from the United States Census Bureau's 2010 5-Year American Community Survey using school districts as a geographic basis and used to construct a socioeconomic risk score. Median annual household income and median monthly housing costs were selected and used as indicators of socioeconomic risk. Each set of data for income and housing costs was divided into quintiles. From there, the quintiles were used to assign a score of one through five to each risk factor for each school district, with five representing the quintile with the lowest housing costs or the lowest household income. The scores for each risk factor were summed by school district to create the socioeconomic component of the vulnerability score.
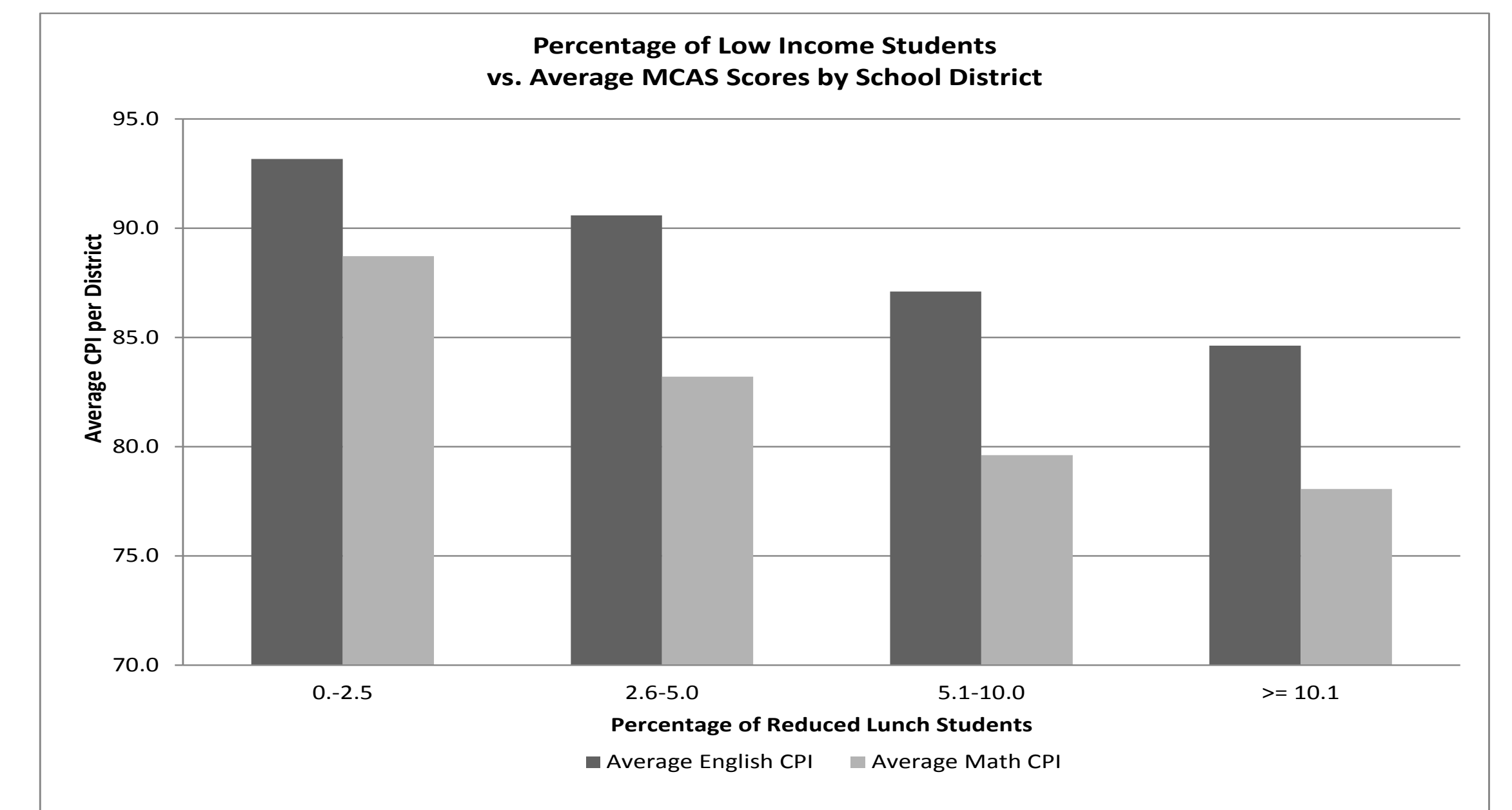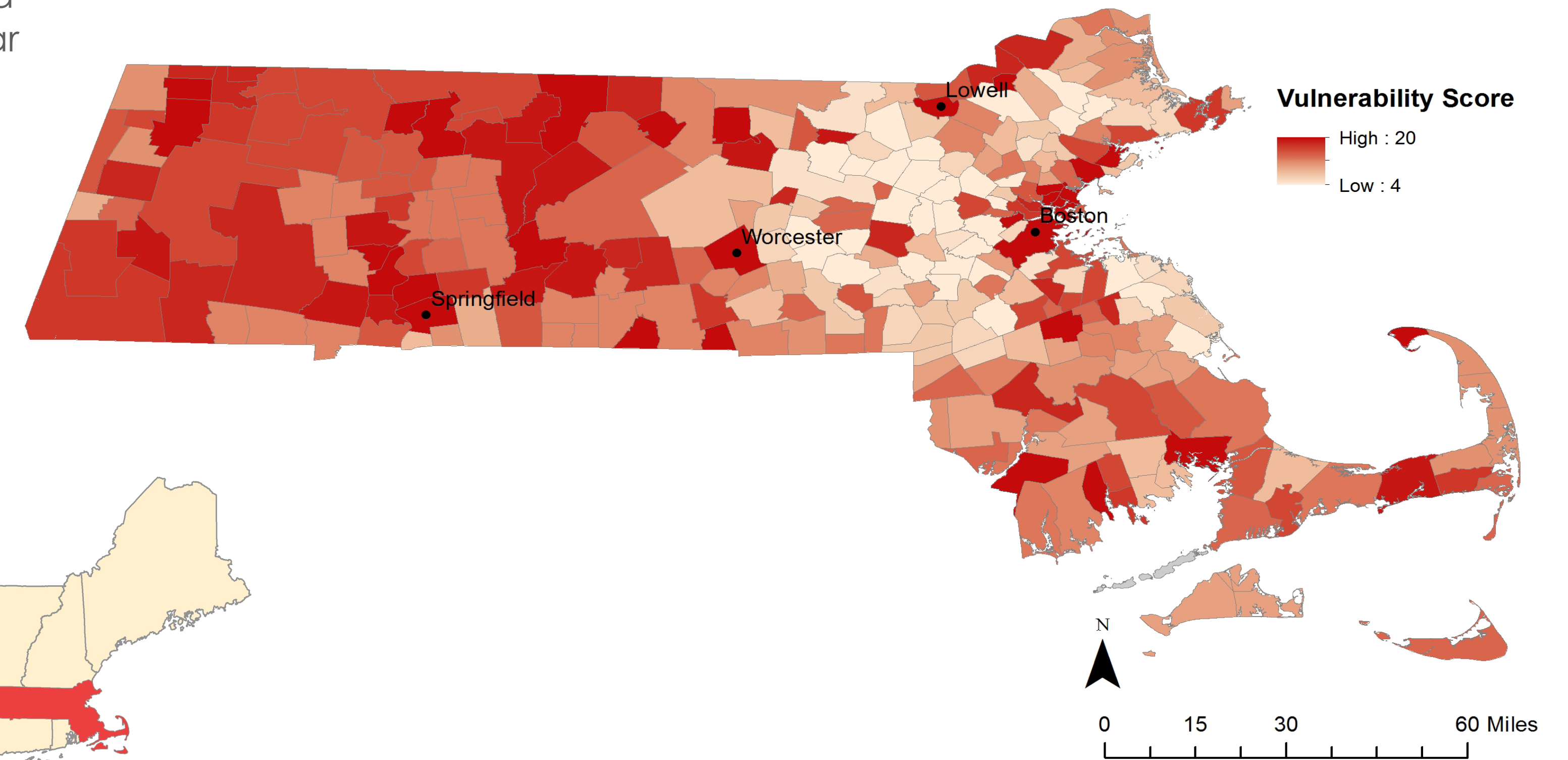
VULNERABILITY SCORE
To create the total vulnerability score, the school quality score and the socioeconomic score, the data were aggregated. The respective school quality and socioeconomic scores for each school district were summed. The final map displays the total vulnerability score, with a score of four representing a district with the lowest risk across all four categories and a score of twenty representing a district with the highest possible risk score across all four categories.

CONCLUSION

With a variety of factors playing a role in the achievement gap, this analysis was limited to examining only four of these factors. MCAS scores, household income, and median housing costs may not provide a complete picture of what is contributing to the growing gap in education and income in Massachusetts. A relationship may exist between these four factors and growing inequality, but but they do not represent the sole components that should be assessed as contributing to these disparities.

Income and Education Gap Vulnerability

Vulnerability Score
High : 20
Low : 4

0 15 30 60 Miles

Percentage of Low Income Students
vs. Average MCAS Scores by School District

Average CPI per District

Percentage of Reduced Lunch Students
■ Average English CPI ■ Average Math CPI

Cartographer: Danielle Goryl | May 2014

Coordinate System: GCS_North_American_1983 | **Data Sources:** Public School Districts (MassGIS Data, August 2006), Education Data (Massachusetts Department of Elementary and Secondary Education, Year 2010-2011), 5-Year American Community Survey by School District (U.S. Census Bureau, 2010)
Notes: Charter schools are excluded from this anlaysis

1 Woolf, S. H., and P. Braveman. "Where Health Disparities Begin: The Role Of Social And Economic Determinants—And Why Current Policies May Make Matters Worse." Health Affairs 30.10 (2011): 1852-1859.
2 The Brookings Institute, Rothwell, Jonathan. "Housing Costs, Zoning, and Access to High-Scoring Schools - Boston-Cambridge-Quincy, MA-NH Metro Area ." Brookings Institute.
N.p., n.d. Web. 11 Mar. 2014. <http://www.brookings.edu/~/media/research/files/papers/2012/4/19%20school%20inequality%20rothwell/profiles/Boston.pdf>.

MCAS Scores: Math
Composite Performance Index
0 - 71
72 - 78
79 - 84
85 - 89
90 - 97

Annual Household Income
Median Annual Household Income ($)
30,833 - 56,347
56,348 - 73,004
73,005 - 90,763
90,764 - 115,172
115,173 - 164,583

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