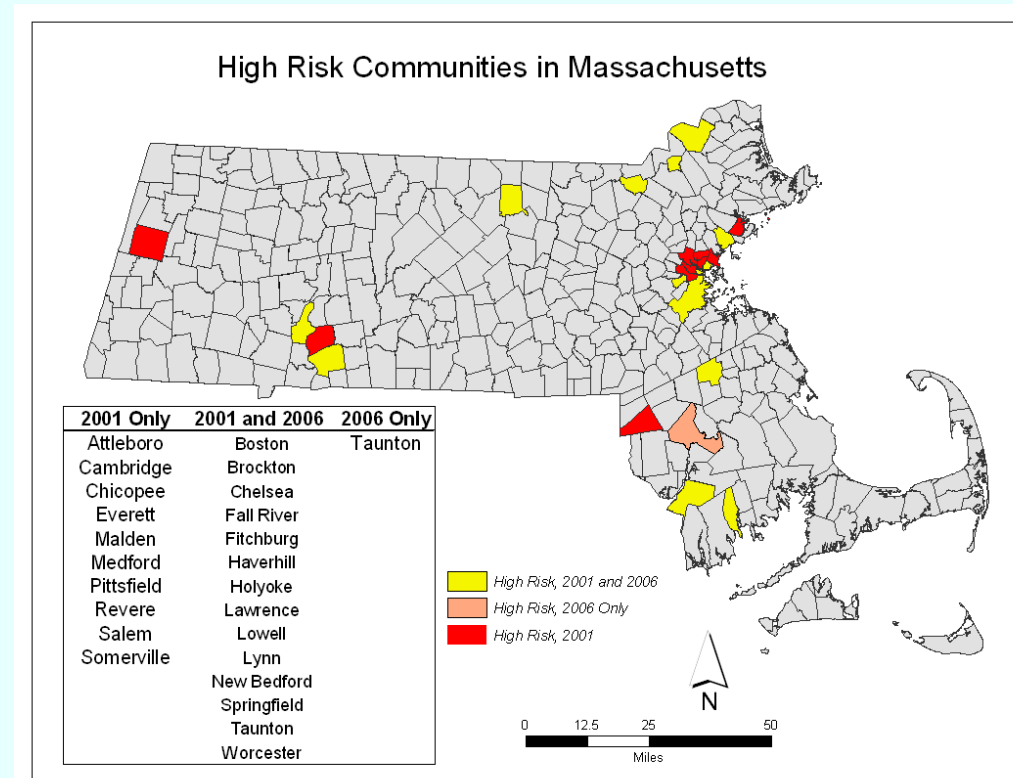


Evaluating Childhood Elevated Blood Lead Levels in Massachusetts

Statement of Problem

Lead poisoning is a condition caused by swallowing or inhaling lead particles. To test positive for lead poisoning, a person must have a blood lead level (BLL) of at least 10 µg/dL. In children, high BLLs can cause learning disabilities, behavioral problems, anemia, kidney problems, and seizures.



Objectives

- Examine the distribution of elevated blood lead levels (BLL) in children aged 6 – 72 months throughout Massachusetts
- Determine the relationship between the percentage of low income households, the percentage of homes built before 1950, and elevated BLLs

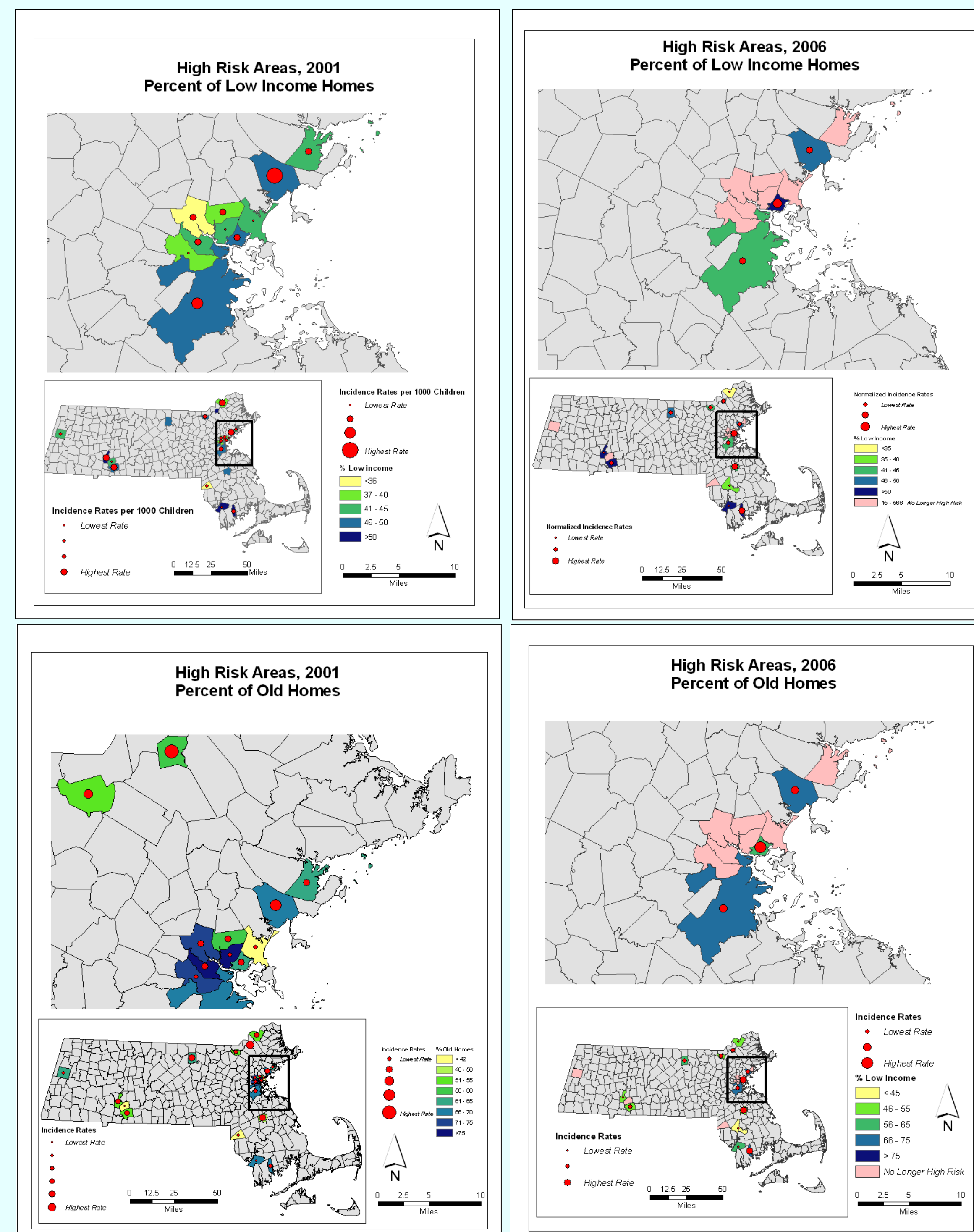
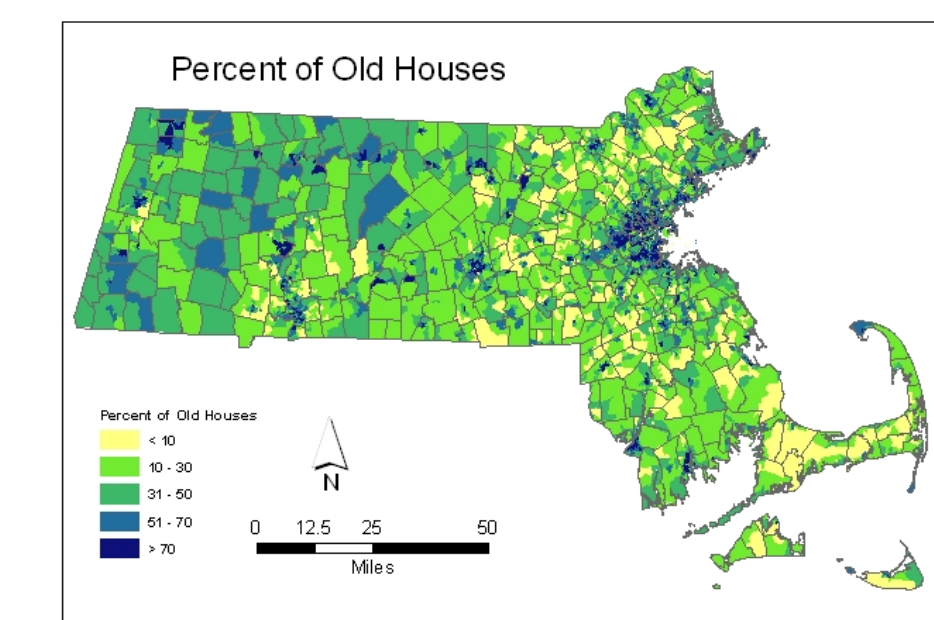
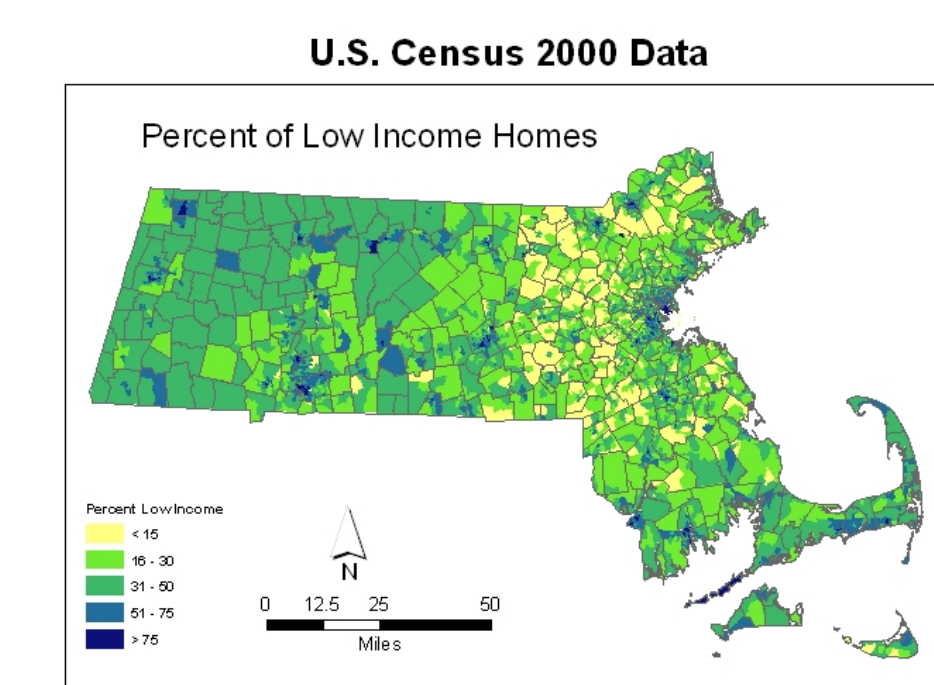
Definitions

- Blood Lead Level (BLL):** Concentration of lead found in a blood sample, measured in µg/dL; a BLL of 10 µg/dL or greater indicates lead poisoning
- High Risk Community:** A town in which at least 15 new cases of elevated BLLs have been reported within a five year period
- Incidence Rate:** Number of children per one thousand screened who have been tested to have a BLL greater than 20 µg/dL within five years

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Low Income Community: A community in which the median household income is less than the national low income level of \$37,700

Old Homes: Houses in Massachusetts that were built before 1950, when lead paint was still used in the interior and exterior of homes



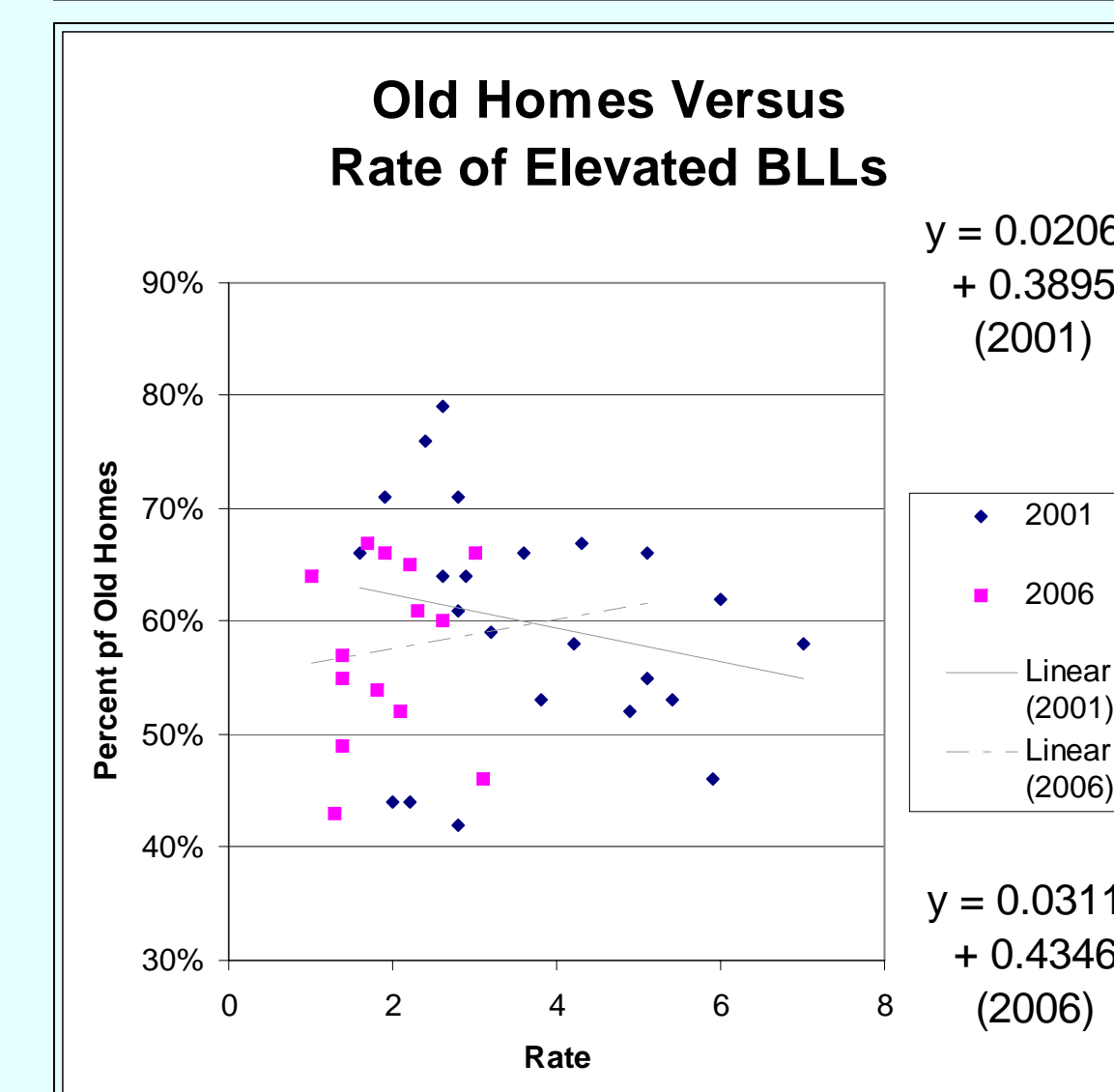
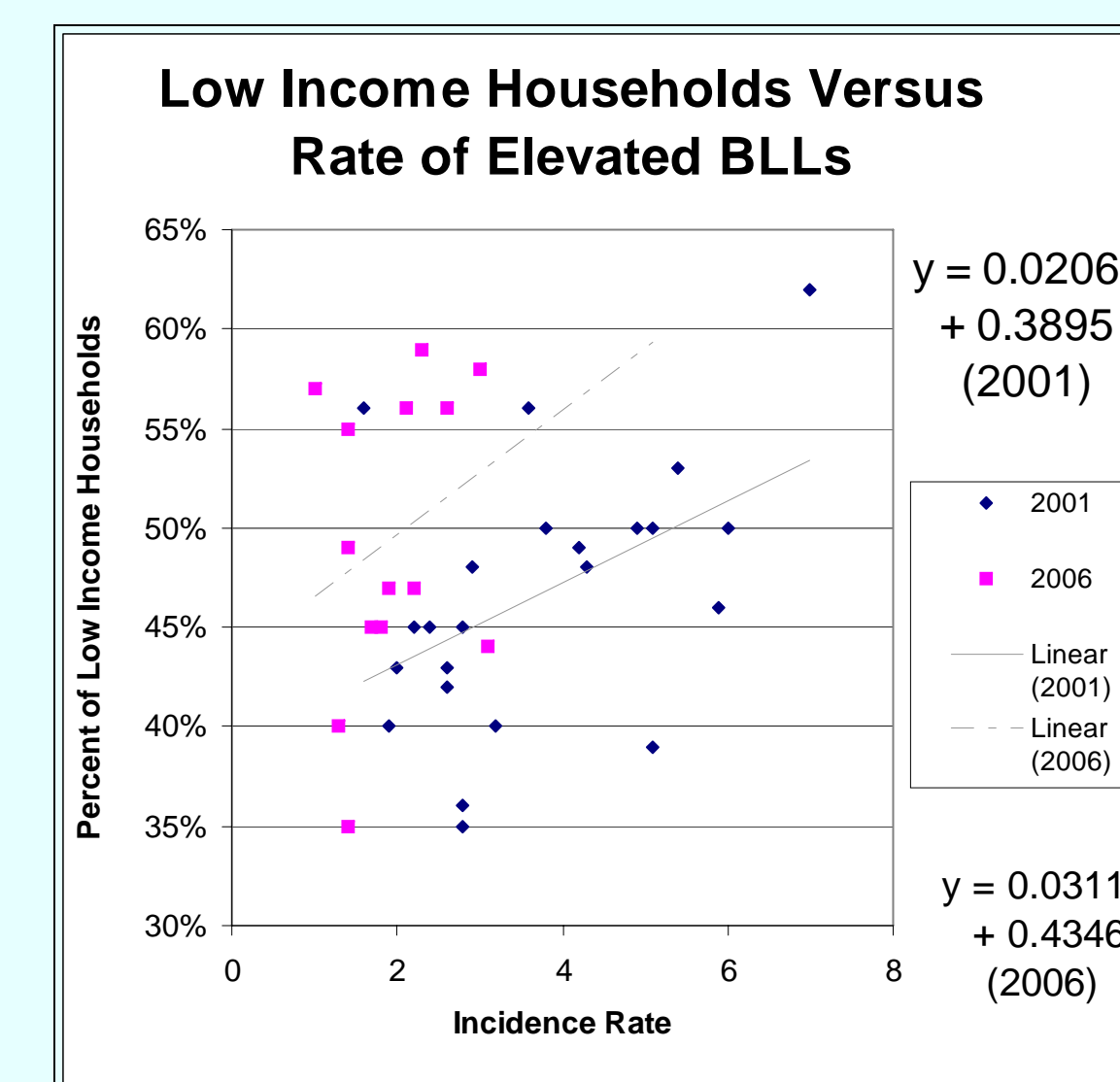
Methods

- Data was obtained from the following sources:
 - MassGIS website
 - Massachusetts Department of Public Health (MDPH)
 - U.S. Census Bureau
- MDPH data was converted from Excel format to dbf format, and joined to the state and town outlines in ArcMap. Census data was also joined to state and town outline maps.
- Tracts were dissolved for clearer display of Census data.
- The field calculator was used to convert data from the U.S. Census into percentages.
- Incidence rates for high risk towns were overlaid on the distribution of low income households and old houses.

Results

The number of high risk communities decreased from 23 in 2001 to 14 in 2006. This could be because high risk areas are designated as such only if 15 or more new cases of elevated BLLs have been reported within five years.

There is a stronger correlation between elevated incidence rates and low income households than there is between elevated incidence rates and older homes. Residents with lower incomes may not have the sources to de-lead their homes. The correlation between low income households and elevated BLLs is about 1.5 times stronger in 2006 than in 2001, possibly because of the smaller sample size in 2006.



Conclusions

Massachusetts should provide additional funding for low income communities to de-lead their homes. The state should continue screening children between aged 6 – 72 months to ensure that incidence rates continue to decline.

References

- MassGIS website
- Massachusetts Department of Public Health
- U.S. Census 2000