

Preliminary Investigation of TRI Facilities and Cancer Outcomes in Middlesex County (Massachusetts)

BACKGROUND

Nearly 350 TRI facilities operate within Middlesex County Massachusetts according to the United States Environmental Protection Agency (EPA) Envirofacts Database. The availability of annual data collected by the Massachusetts Cancer Registry over five-year time windows show town-specific cancer rates from within the county. An interesting question that comes to mind is how (and to what extent) Middlesex County cancer occurrence varies on a town-by-town basis when investigating 1) the number of facilities per town, and 2) the spatial influence of groups of facilities in areas proximal to county towns.

PROJECT SUMMARY

The goal of this project aims to visually depict the number and density of TRI facilities for towns located within Middlesex County, and compare them against the total number of observed cancer cases identified in these same Middlesex county towns registered between 2000-2004. The project activities will rely on ArcGIS-based mapping tools and methods to achieve the aims of this exercise.

Health Data

Cancer data from the Massachusetts Cancer Registry for 55 towns in Middlesex county was entered into an excel spreadsheet. "Total Observed" cases (2000-04) that includes male and female cases for each town were Table Joined to the Census 2000 Towns PolyM data layer within Middlesex County. By this action we were able to spatially identify and compare the number of cancer cases in Middlesex County by town.

Facility Data

Two GIS-based analytical methods were utilized to visually gauge the number of TRI facilities, as well locations and spatial density. One approach involves a vector analysis where the Spatial Join function was used to combine TRI facility "points" to Census 2000 town-boundary polygons within Middlesex County. A second approach utilized a raster analysis method estimating the mean density of TRI facilities throughout the county followed by a Zonal Statistics analysis that calculated the mean facility density per "zone layer" which in this case was designated as any individual town within Middlesex County.

RESULTS

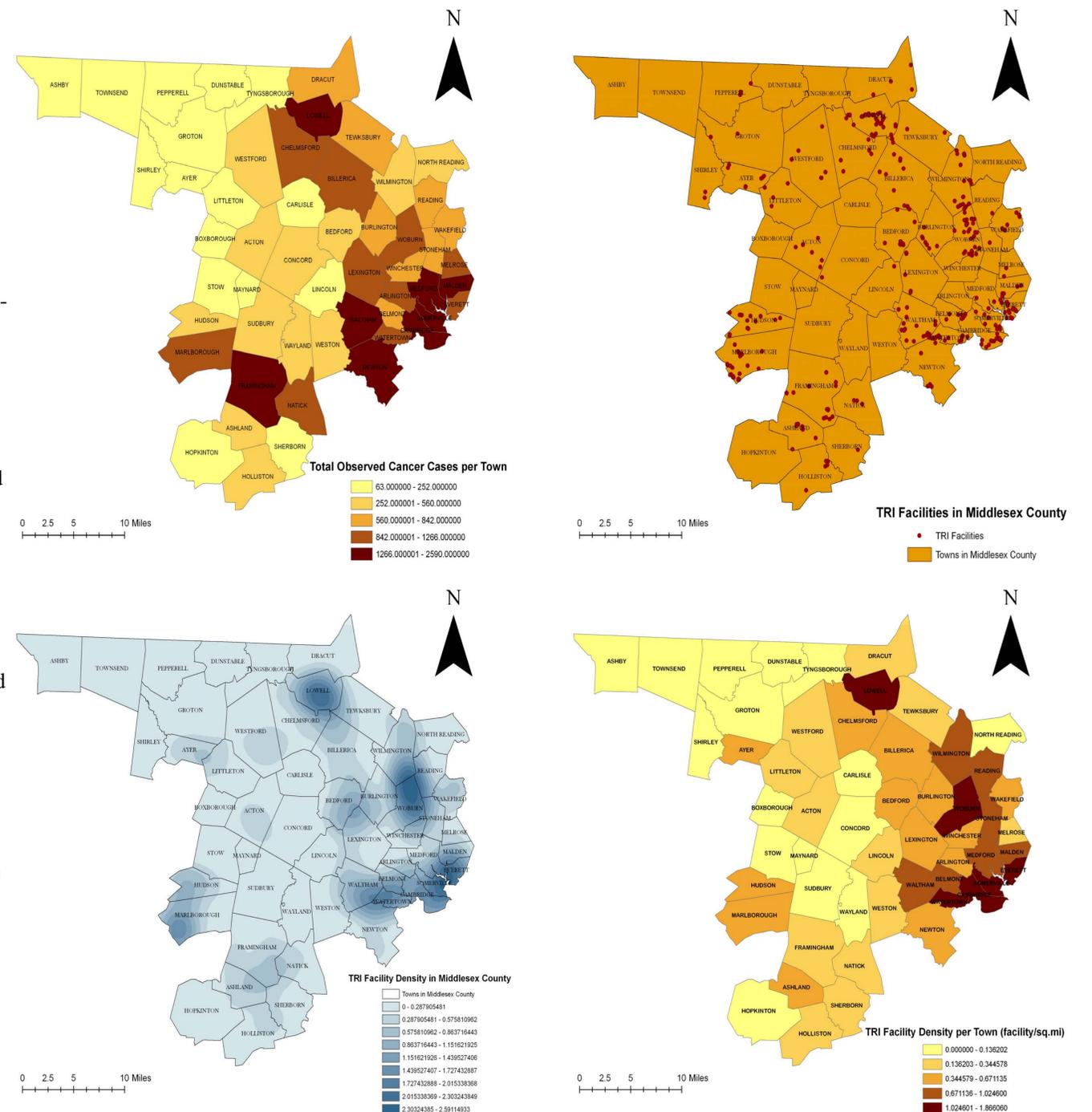
The resulting map analysis demonstrates that coupling health data, i.e. total town-specific observed cancer cases with TRI facility data attributes possibly uncovers some basic qualitative effects that chemical releases may have on proximal communities. In addition, these mapping results provide a framework for more in-depth public health investigations examining the possible health and environmental impact(s) of TRI facilities.

Map 1 shows varying ranges of total observed cancer cases by town in Middlesex County

Map 2 vector analysis shows the TRI facility point locations throughout Middlesex County

Map 3 shows the mean TRI facility density across Middlesex County

Map 4 shows the mean TRI facility density range per town (facility/square mile) within Middlesex County



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 May 2008
 Data Sources:
 Census 2000
 Massachusetts Cancer Registry
 U.S. EPA Envirofacts Database, www.epa.gov/enviro/

