

Geospatial analysis of hepatitis C in Connecticut: a novel application of a public health tool

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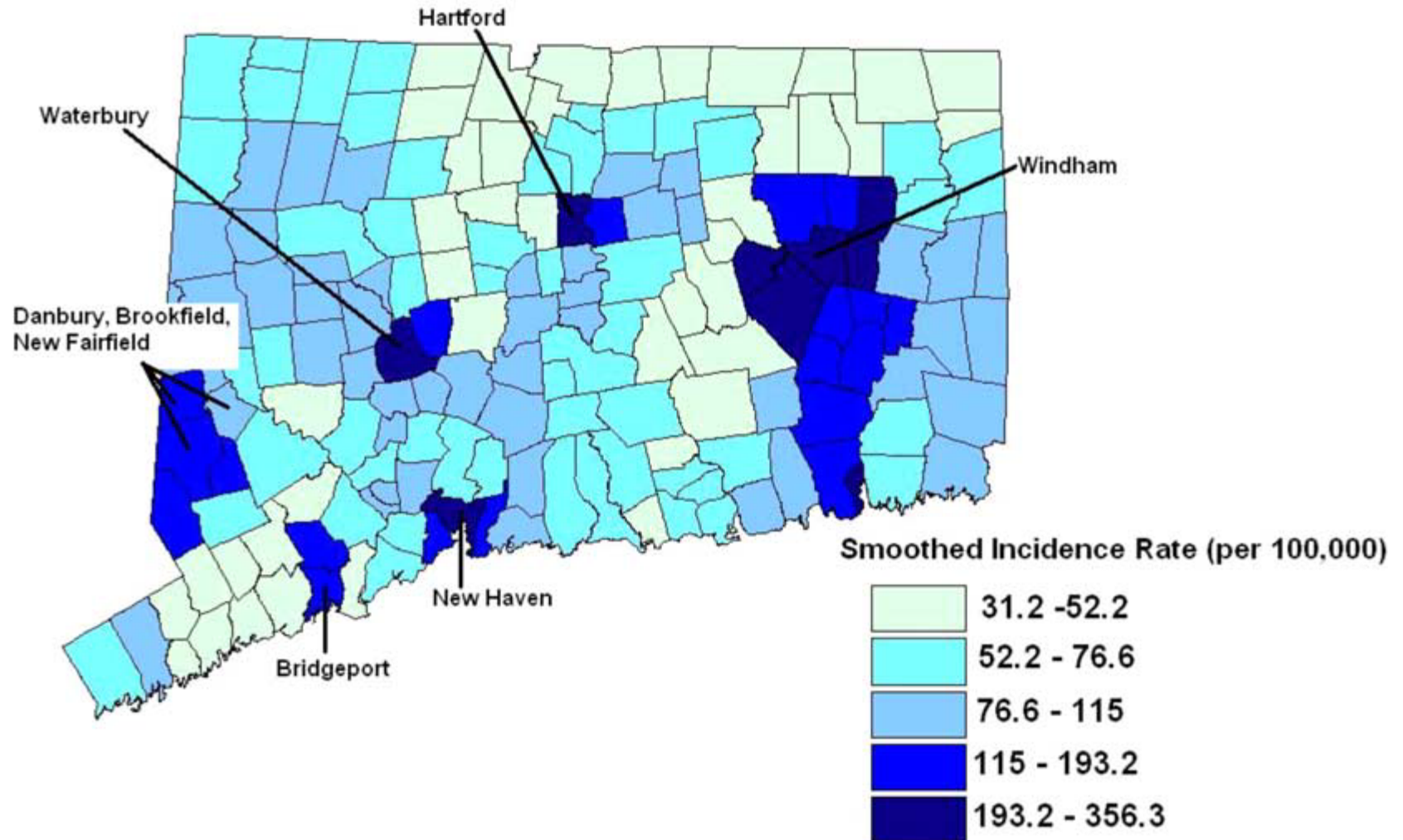
Study Objective

This study aimed to use geographic information systems (GIS) that facilitate analysis of associations between location, environment and disease to document the non-random distribution of hepatitis C, identify infection cluster areas, and describe the demographic characteristics of those areas.

Methods

- Spatial analysis was conducted of newly reported positive hepatitis C test results using the Connecticut Hepatitis C Reporting Database
- A complete database of unduplicated hepatitis C laboratory reports sent to the CT DPH during 1999 was created
- Spatial filtering was used to eliminate random noise generated by sparsely populated towns or small number of cases per town
- Cluster analysis was used to determine whether cases of hepatitis C virus (HCV) infection tend to occur closer in space to other cases than would be expected by chance alone
- The demographic attributes of identified clusters of HCV-positive reports were examined

Hepatitis C in Connecticut, 1999: Standardized Disease Rates by Town



Hepatitis C in Connecticut, 1999: Clusters of Anti-HCV Positive Reports

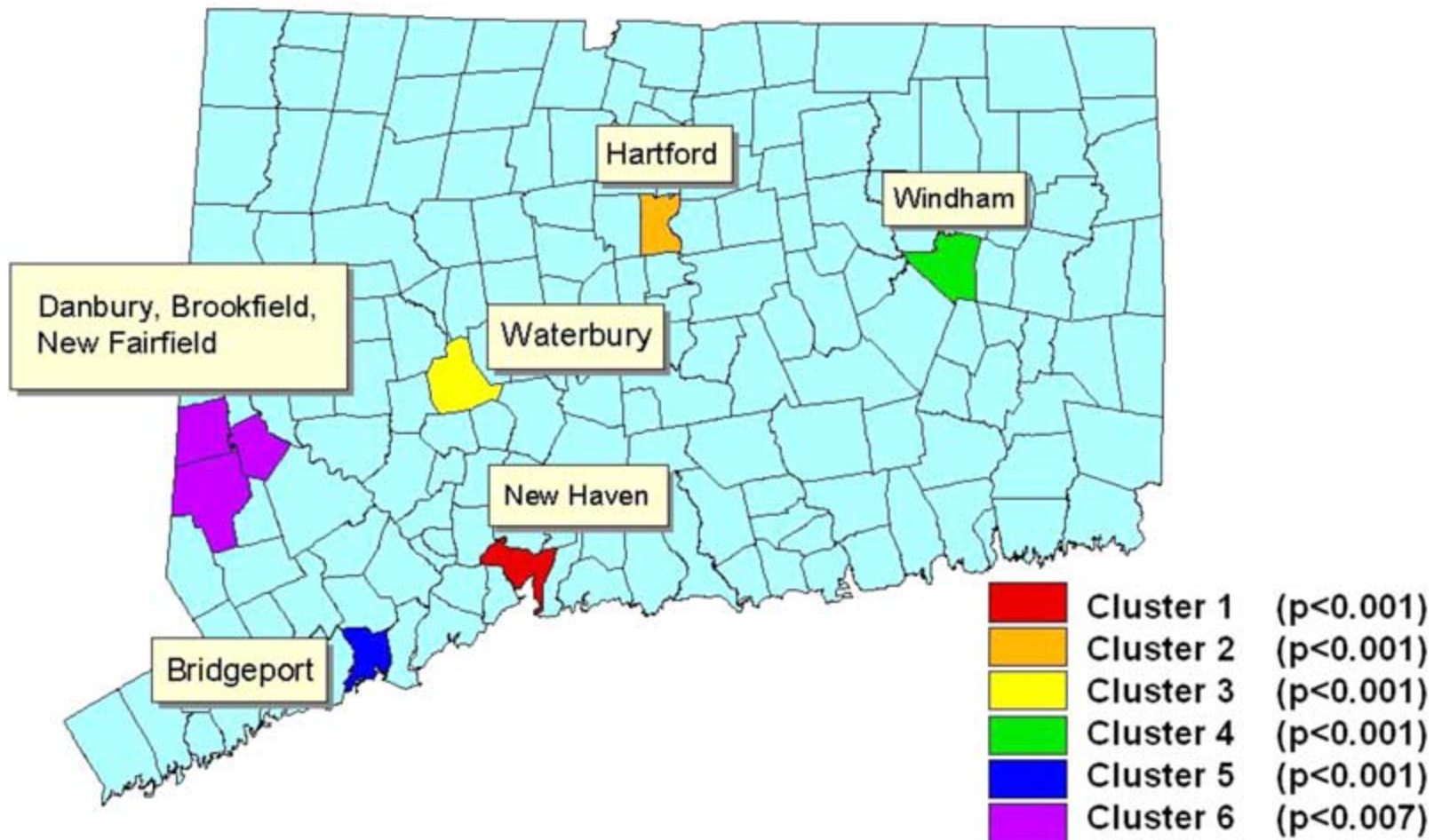


Table 1 Cluster analysis of positive reports of hepatitis C virus infection made to the Connecticut Department of Public Health, 1999.

Cluster	Towns included	Population	Number of cases	Incidence rate (per 100,000)	Overall relative risk	<i>P</i> value
1	New Haven	123,640	278	225	2.471	0.001
2	Hartford	131,640	266	202	2.220	0.001
3	Waterbury	109,700	220	201	2.204	0.001
4	Windham	21,350	78	366	4.014	0.001
5	Bridgeport	137,860	214	155	1.706	0.001
6	New Fairfield/Brookfield/ Danbury	92,830	128	138	1.515	0.007

Table 2 Population diversity and economic statistics for Connecticut and towns identified as clusters of hepatitis C virus reports, 1998-1999.

Cluster	Per capita income (\$)	White (%)	African American (%)	Hispanic (%)
Connecticut	28,225	86.7	6.7	7.5%
New Haven	16,777	42.2	37.1	16.8
Hartford	13,271	21.7	37.5	38.6
Waterbury	18,388	68.2	13.1	17.2
Windham	16,828	75.3	2.7	19.9
Bridgeport	17,698	37.6	26.3	32.5
Brookfield/Danbury/ New Fairfield	31,804	82.0	4.8	9.7

Discussion

- Five of the six clusters were limited to one town each, suggesting that those areas contain focused, high-risk populations
- Clusters of disease were found in large urban populations
- Areas identified as clusters of HCV reports are well-recognized areas of significant injection drug use.
 - In 1998 and 1999, the only six syringe exchange programmes that existed in the state were located in New Haven, Bridgeport, Windham, Hartford, Danbury and Stamford.

Limitations

- Due to the cross-sectional nature of the study, it is impossible to determine any causal relationship between HCV clusters and the presence of needle exchange programs.
- Cases reported to CT DPH were antibody only and require confirmatory testing.
- Data reported to CT DPH may not reflect true prevalence of infection, but rather those who have come into care

Conclusions

- Findings contribute to the understanding of the state-specific epidemiology of HCV infection.
- Methodology can be applied wherever a similar database exists
- Enables the implementation of targeted prevention and educational campaigns to raise awareness of HCV risk factors, the importance of being tested, and treatment options