Childhood Cancer Tracking Initiative in Massachusetts:

Developing a New Electronic Tool

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Childhood Cancer Tracking Initiative

"Develop methods for linking environmental databases with childhood cancer incidence data to identify possible areas for further public health intervention"

Center for Environmental Health (CEH)

- Responds to environmental health concerns from different groups
- Provides communities with epidemiological and toxicological health assessments

Community Assessment Program (CAP)

- One of nine programs within the CEH
- Takes the lead in responding/triaging calls to the CEH regarding suspected disease clusters
- Evaluate frequency and patterns of disease in the population
- Investigate possible associations between environmental exposure and disease

Center for Environmental Health

Who do we respond to?

- Residents
- Legislators
- Local health officials
- Media

Why do they contact us?

- Suspected disease clusters
  - Majority are related to cancer
- Suspected environmental exposures
  - General and site-related

Responding to Community Concerns

- Peer Reviewed Protocol
- Step-wise Process
  - Phase I: Preliminary review
  - Phase II: Descriptive study
  - Phase III: Analytical study

Community-Specific Environmental Health Investigations

- Health component
  - Massachusetts Cancer Registry (MCR)
- Environmental component
  - Potential for exposures
  - Drinking water quality
  - Sampling data (e.g., soil, air)

Geographic Information Systems (GIS)

- Geocoding individual case addresses to evaluate spatial distribution
  - *“What does the pattern of cancer look like around a point exposure?”*
  - *“Does the spatial pattern of disease suggest a relationship to a common environmental exposure?“*
- Creating spatial layers of environmental data
  - *“How complex and severe is environmental contamination in the area of concern?”*

Limitations

- Neighborhood level cancer incidence data are not readily available
- Significant effort required to calculate rates

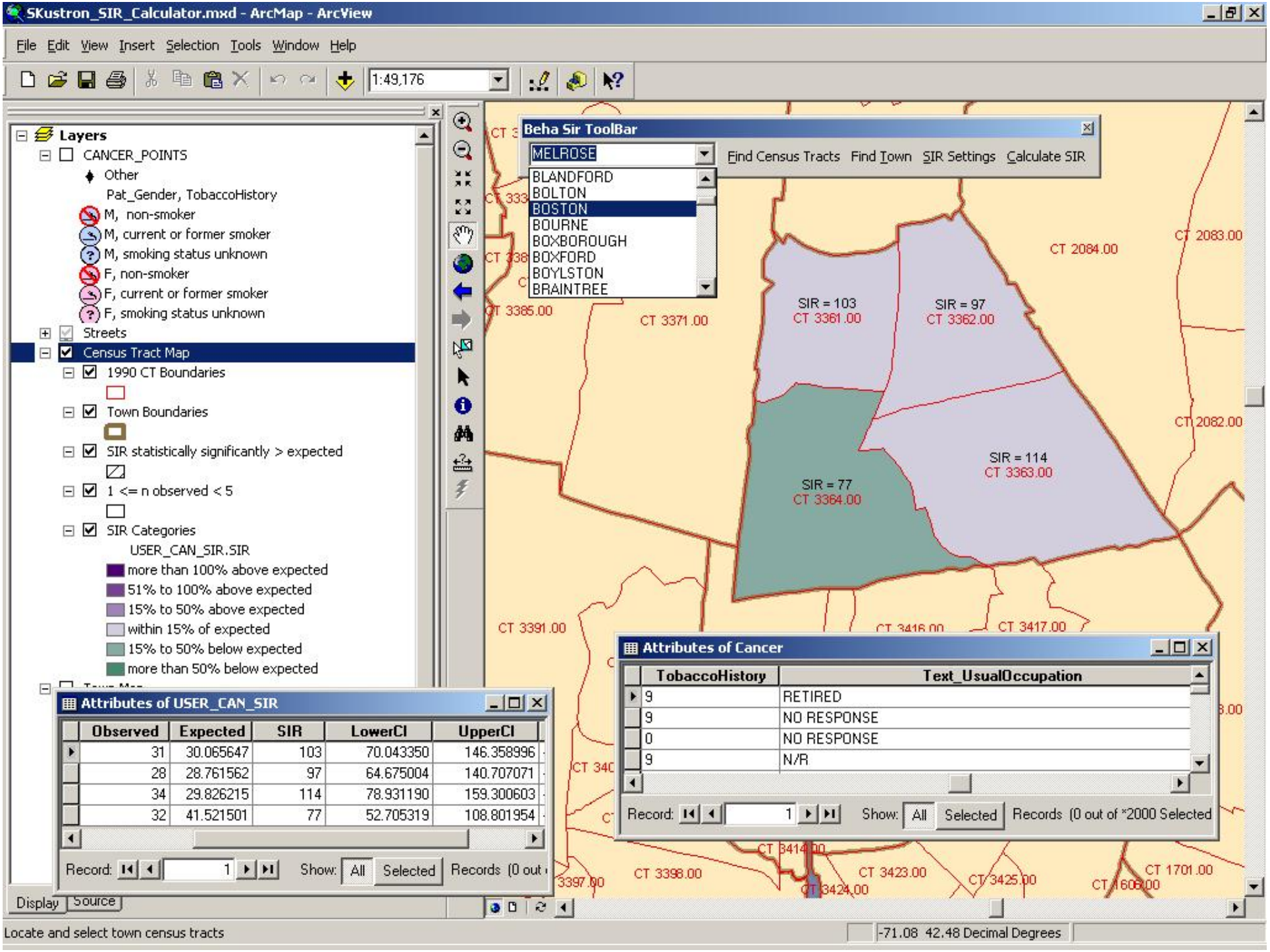
Standardized Incidence Ratio (SIR) Calculator

- Automates calculation of census-tract (CT) level incidence rates for 23 different cancer types
- Provides a map with specific locations of individuals diagnosed with cancer to enable quicker analysis of spatial distribution

SIR Calculator

DATA LAYERS

- Massachusetts Cancer Registry
- U.S. Bureau of the Census
- GDT streets/political boundaries
- MassGIS


SKustron_SIR_Calculator.mxd - ArcMap - ArcView
File Edit View Insert Selection Tools Window Help
1:49,176
Layers
CANCER_POINTS
Other
Pat_Gender, TobaccoHistory
M, non-smoker
M, current or former smoker
M, smoking status unknown
F, non-smoker
F, current or former smoker
F, smoking status unknown
Streets
Census Tract Map
1990 CT Boundaries
Town Boundaries
SIR statistically significantly > expected
1 <= n observed < 5
SIR Categories
USER_CAN_SIR.SIR
more than 100% above expected
51% to 100% above expected
15% to 50% above expected
within 15% of expected
15% to 50% below expected
more than 50% below expected
Beha Sir ToolBar
MELROSE
Find Census Tracts
Find Town
SIR Settings
Calculate SIR
BLANDFORD
BOLTON
BOSTON
BOURNE
BOXBOROUGH
BOXFORD
BOYLSTON
BRAINTREE
SIR = 103
CT 3361.00
SIR = 97
CT 3362.00
SIR = 114
CT 3363.00
SIR = 77
CT 3364.00
CT 2084.00
CT 2083.00
CT 2082.00
CT 3371.00
CT 3385.00
CT 3391.00
CT 3416.00
CT 3417.00
CT 3398.00
CT 3423.00
CT 3425.00
CT 1701.00
Attributes of USER_CAN_SIR
Observed Expected SIR LowerCI UpperCI
31 30.065647 103 70.043350 146.358996
28 28.761562 97 64.675004 140.707071
34 29.826215 114 78.931190 159.300603
32 41.521501 77 52.705319 108.801954
Record: 1 Show: All Selected Records (0 out
Attributes of Cancer
TobaccoHistory Text_UsualOccupation
9 RETIRED
9 NO RESPONSE
0 NO RESPONSE
9 N/R
Record: 1 Show: All Selected Records (0 out of *2000 Selected
Display Source
Locate and select town census tracts
-71.08 42.48 Decimal Degrees

SIR Calculator
“Streamlining the Process”

- Automated mapping for analysis of individual cancer diagnoses to determine spatial patterns or “clustering.”
- Simultaneous evaluation of cancer risk factors (e.g., age, cancer cell type, smoking status, and occupation).
- More staff time available for interpretation and communication of results to the public
- Will significantly improve response time for incoming requests for cancer cluster investigations
- Potential for future EPHT linkage opportunities

Special Considerations

- Security/confidentiality
- MCR database conversion
- Community-specific geocoding issues
- Provisions for incorporating more recent MCR data

SIR Calculator: Next Steps

- Finalize updated version with previous years of MCR data (i.e., 1982-2000)

- Possible future enhancements
  - Data refresh program
  - Improve reporting capabilities (i.e., summary tables)
  - Incorporate tool to improve active surveillance

Environmental Data Linkage

Next Steps:

- Work with federal, state, and local agencies to obtain available data

- Databases being considered for linkage include:
  - Drinking water quality (e.g. public and private)
  - Pesticide use
  - Outdoor air

Environmental Data Linkage

Challenges:

- Evaluate feasibility for linking environmental data with cancer incidence data

- Develop protocol for merging data sources

Questions?