

Challenges of Sub-County Life Expectancy in Maine

Jessica Bonthius, MPH
and Chris Paulu, ScD

Maine CDC's Environmental and Occupational Health Programs
and
University of Southern Maine's Muskie School for Public Service

September 2016



Paul R. LePage, Governor

Mary C. Mayhew, Commissioner

Overview

Maine population and geographies

Data and Method

Results

— Case study

Lessons learned/next steps

Image: South Moat Mtn, October 10, 2016

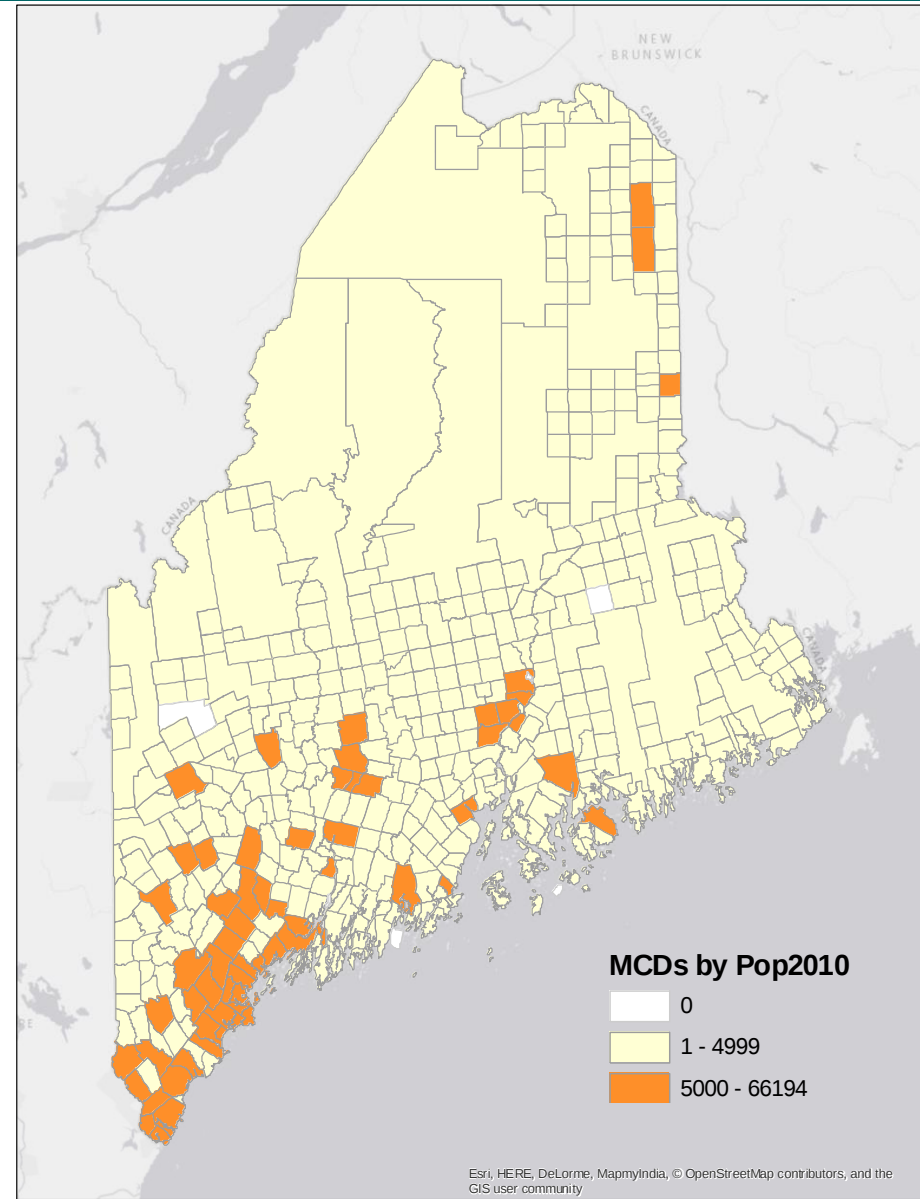
Population and Geographies

Population

- 1.3 million
- 94.4% non-Hispanic White

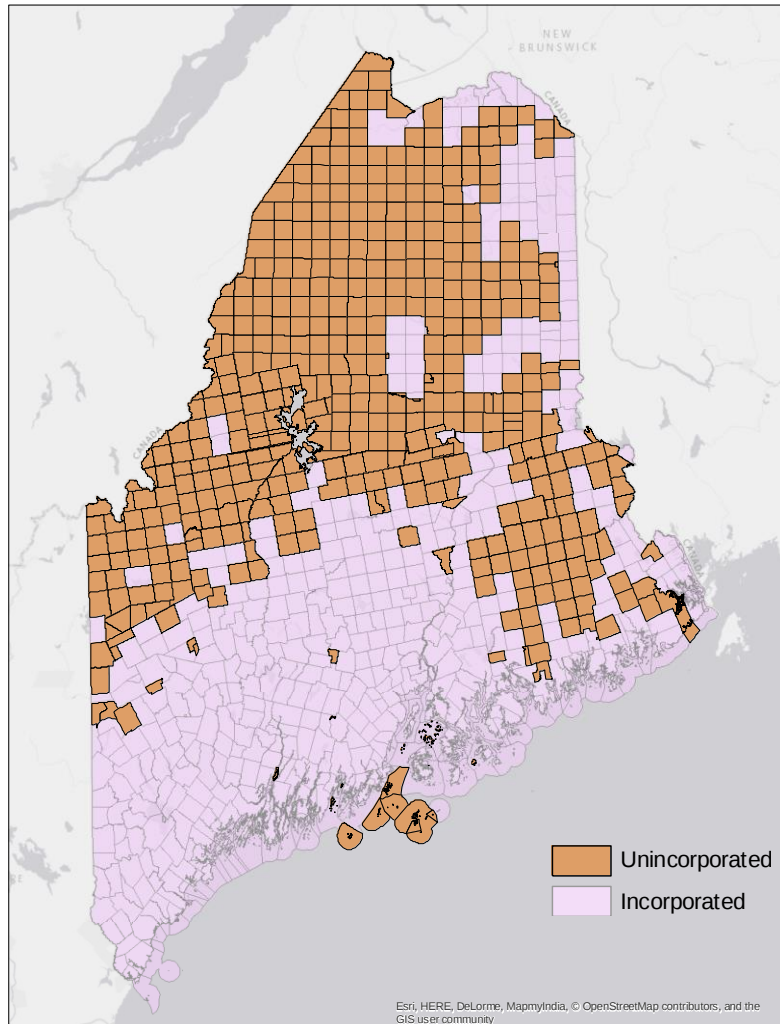
Geographies

- Counties (16)
 - Smallest = 17,000
- MCDs (533)
 - Largest = Portland, 67,000
 - 2nd largest = Lewiston, 36,000
 - 11th largest = Augusta (capital), 18,000

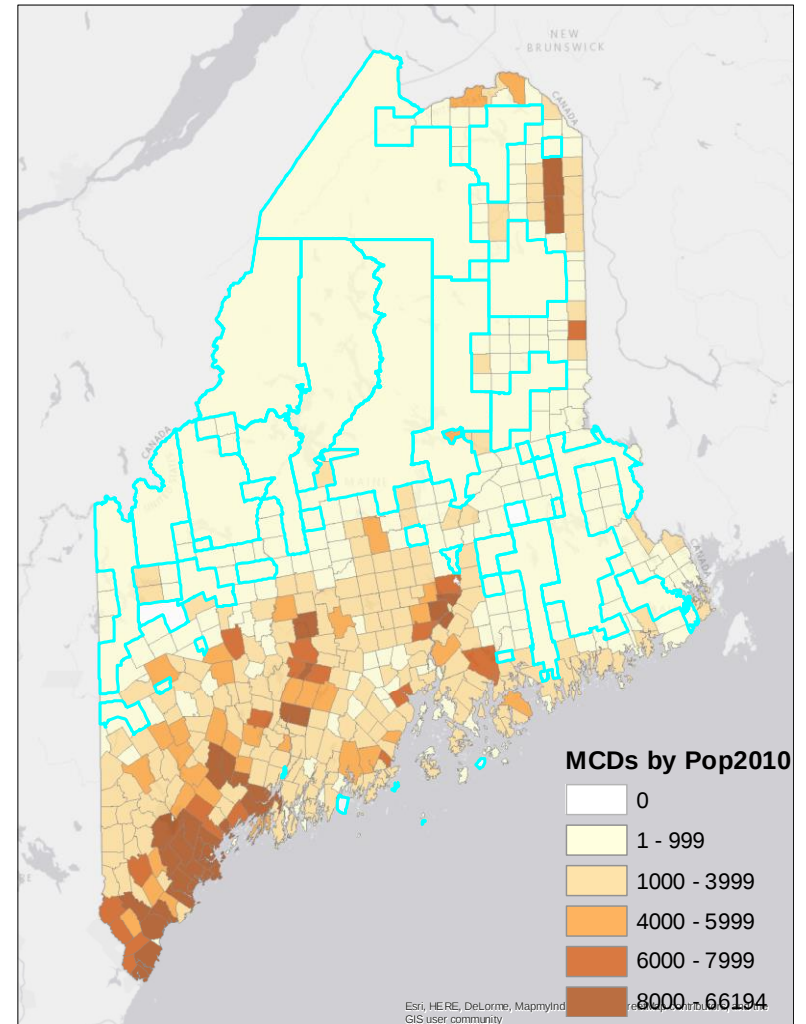


Geographies: MCDs

Unincorporated townships



Census-designated MCDs



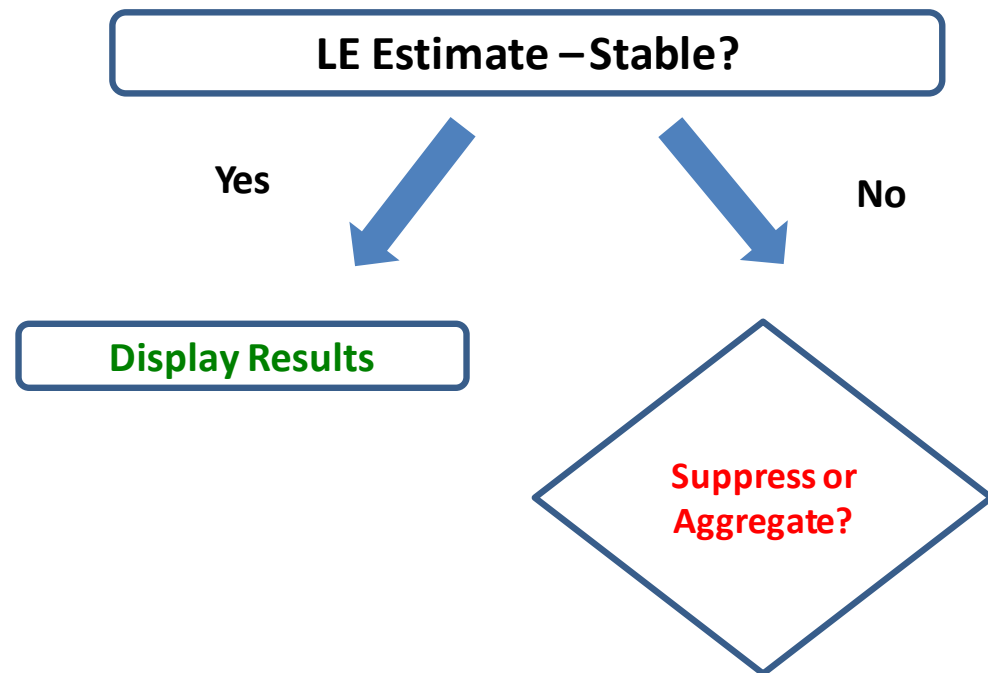
Data and Method

Vital Statistics Data - *Data provided by Maine's ODRVS*

- Death: MCD (town)-level
- Population: Annual intercensal, postcensal town-level estimates

Method

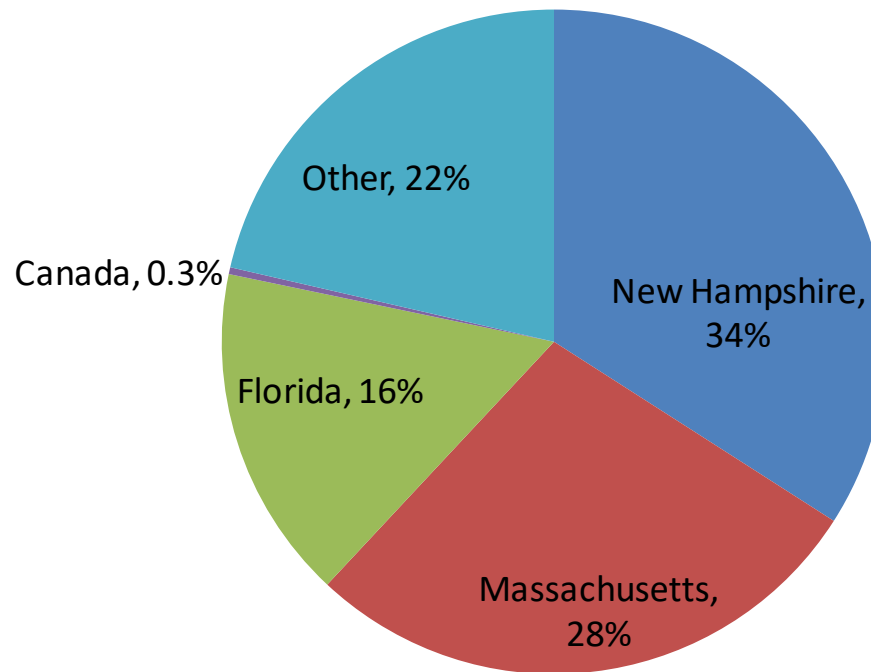
- SEPHO (Chiang II, Adjusted)
- County-level → town-level
 - Exploratory analyses



Data: Out-of-State Deaths

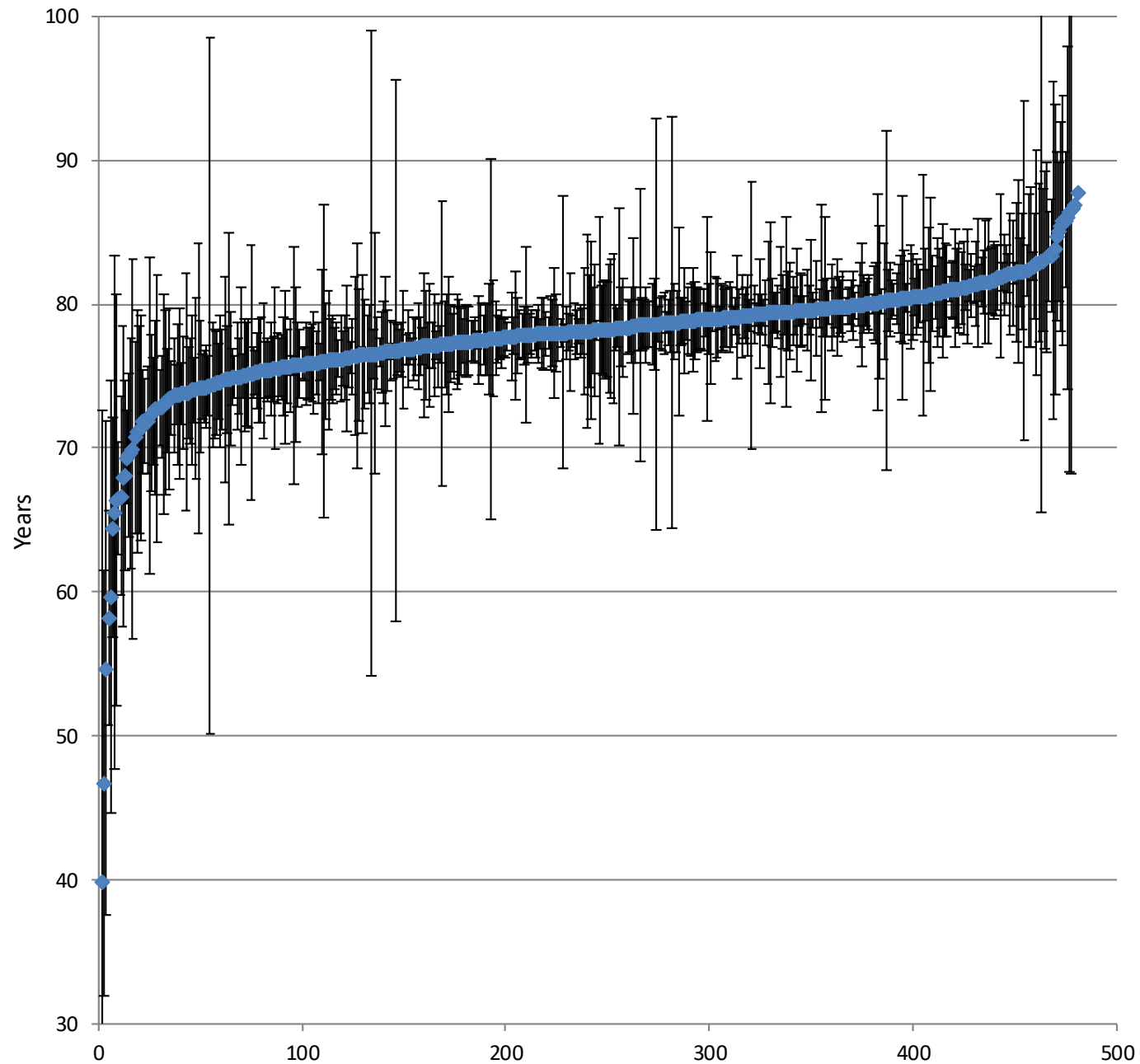
~ 3% (n~400) of Maine resident deaths (~16,000) each year occur out-of-state

Percent of Out-of-State Deaths by Place of Occurrence



Other = 46 states, international, unknown

Town-level LE, 2001-2010



Life Expectancy by Town, 2001-2010

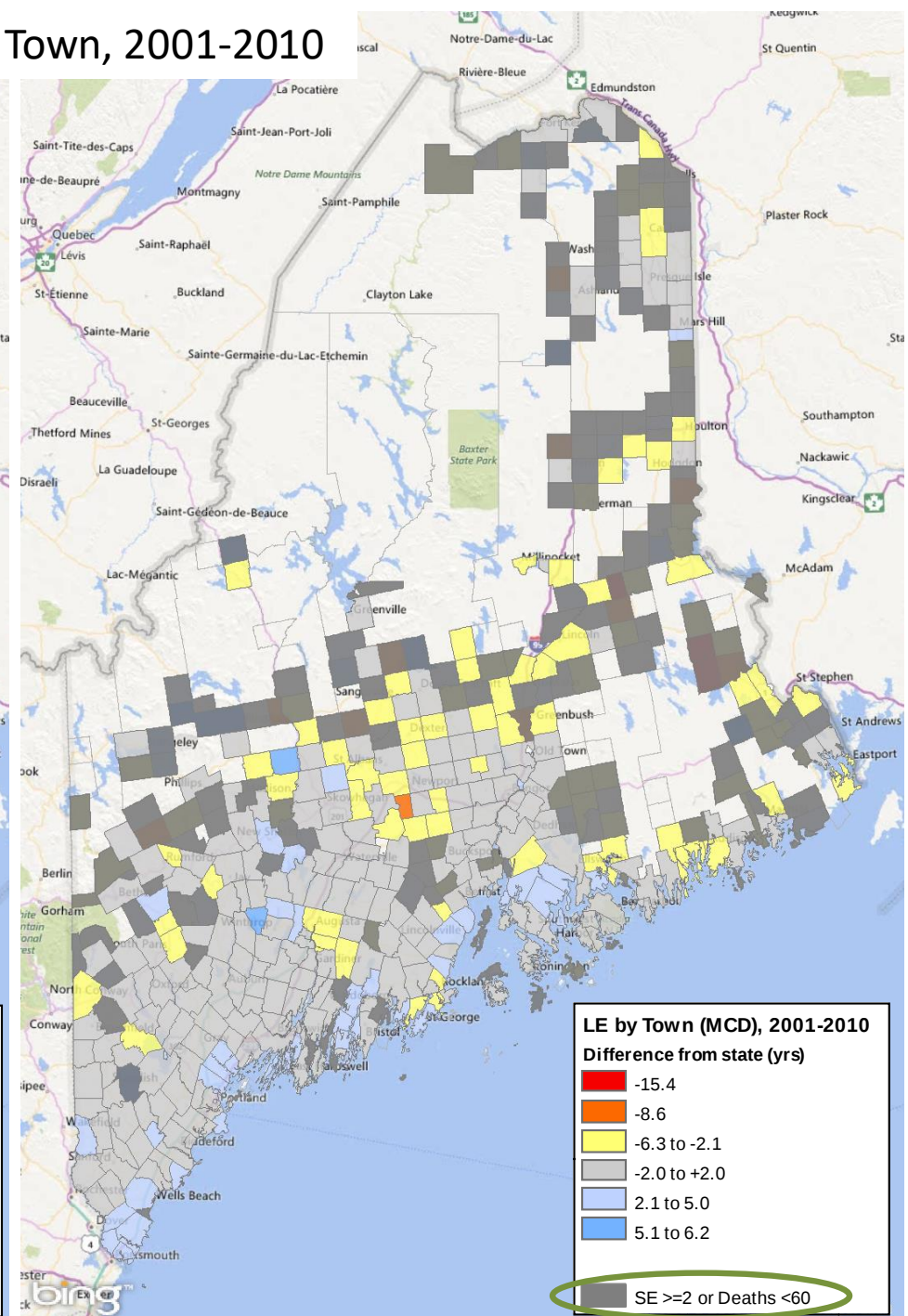
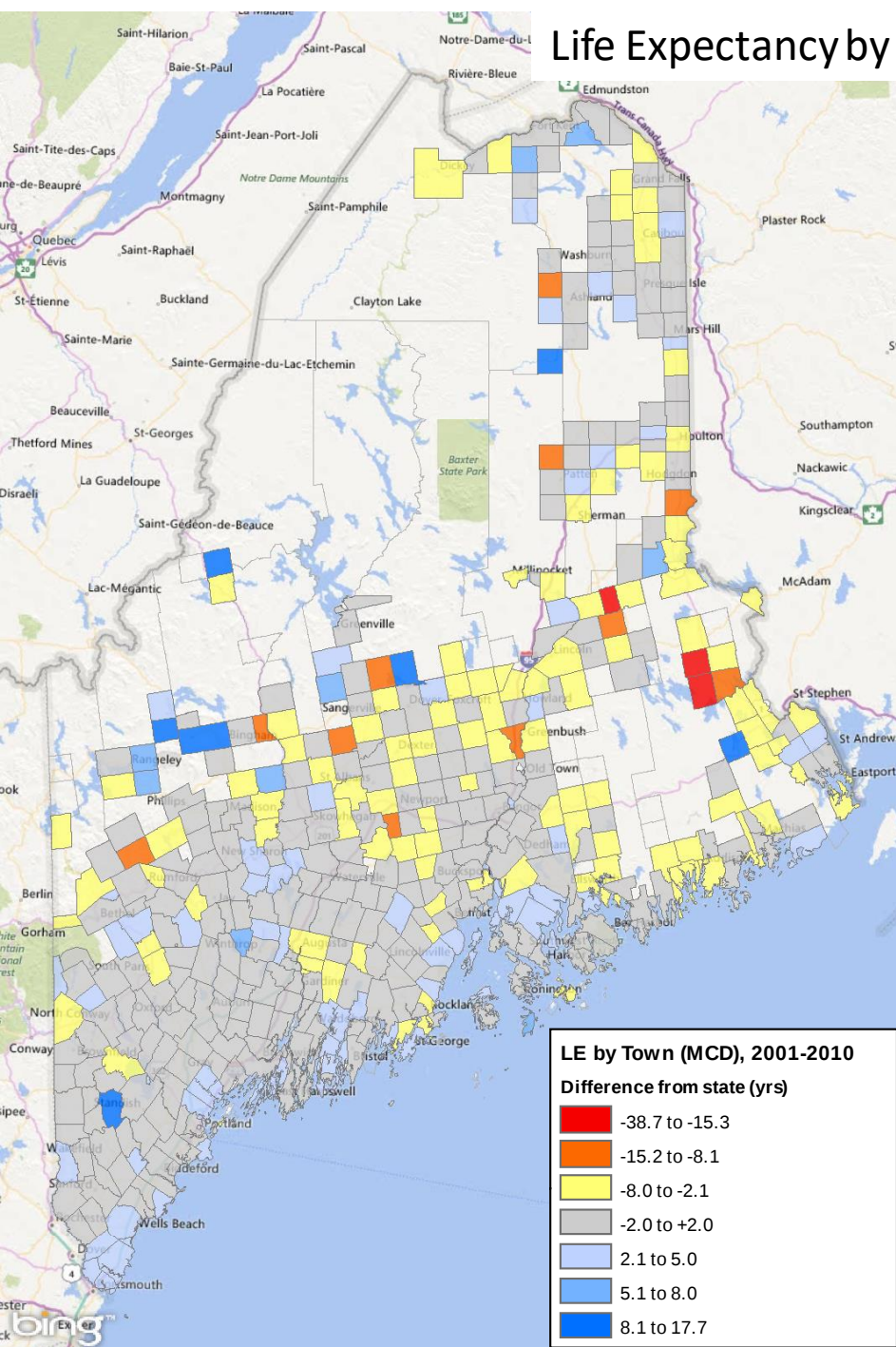


Table of Contents

Contact Information.....	
Introduction.....	
Requirements to run the tool.....	
Files needed for need to run tool.....	
Program files.....	
The sample data.....	
Your data.....	
Setting up the R Program and batch file.....	
Installing the GAT Tool.....	
Downloading R.....	
To run the tool.....	
Selecting the Data file.....	
Selecting the Identification Variable.....	
Selecting the Boundary Variable.....	
Selecting the Aggregation Variable.....	
Selecting an Additional Aggregation Variable.....	
Selecting the minimum Value(s) to aggregate to.....	
Selecting the merge type.....	
Calculate a Rate.....	
Confirm your selections.....	
Wait while the program runs.....	
Save your output files.....	
Performance measures: the compactness ratio.....	
Troubleshooting.....	
Technical Notes.....	
How the program merges.....	
Citation for the Geographic Aggregation Tool.....	
Description of the simulated low birth weight data set for N.....	
Birth outcome fields.....	
Socio-demographic fields.....	

Contact Information:

Please send comments and suggestions to:
Thomas Talbot, Chief
Environmental Health Surveillance Section
New York State Department of Health
547 River Street, Rm 200, Troy, NY 12180
Email: tot01@health.state.ny.us

Introduction

Health outcome maps with fine geographic resolution can be misleading due to rates caused by small numbers. In some cases these maps can overcome these limitations the New York State Department of Health Section developed the Geographic Aggregation Tool to join defined population and/or number of cases is reached. The finest geographic resolution practicable.

The tool allows for restrictions so that areas are not too small. It may want to merge census tracts into larger areas. It could also restrict the merging so that areas are not too large water bodies.

The tool has been tested in R 2.9.2 and 2.10.0. It has programming experience to run the tool. It can handle the geographic boundaries of the areas. It can handle these areas, and a numeric variable.

The program outputs a shapefile. It can handle GIS programs such as ArcGIS. It can handle produced KML files can be used.

In addition to the tool, it can handle simulated total number of cases. It can handle code area in New York. It can handle poverty and education.

If the software is improved, it can handle more data.

Disclaimer: This tool is provided as is. It is not intended to be used for legal or medical purposes.

Geographic Aggregation Tool
R Version 1.2
February 25, 2013

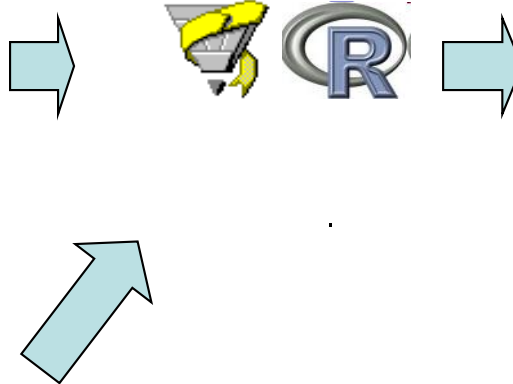
Environmental Health Surveillance Section
New York State Department of Health
Troy, NY

Geographic Aggregation Tool

Original Block Data †

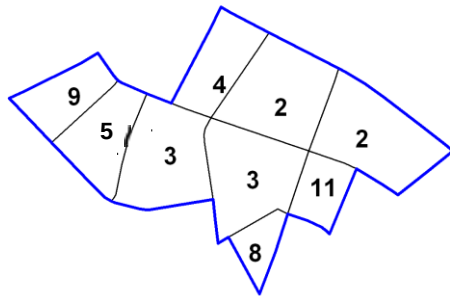
Block	Cases
122300/2004	2
122300/2005	11
014500/3005	2
014500/3007	3
014500/3008	8
014500/3009	3
014500/3010	4
103202/2001	9
103202/2002	5

SAS or R Tool

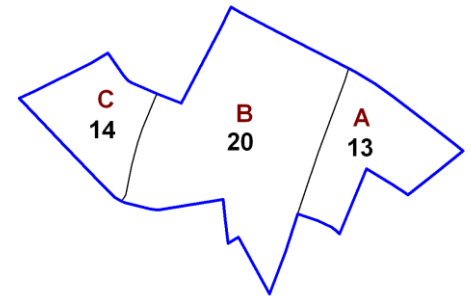


Regions

Block	Cases	Region
122300/2004	2	A
122300/2005	11	A
014500/3005	2	B
014500/3007	3	B
014500/3008	8	B
014500/3009	3	B
014500/3010	4	B
103202/2001	9	C
103202/2002	5	C

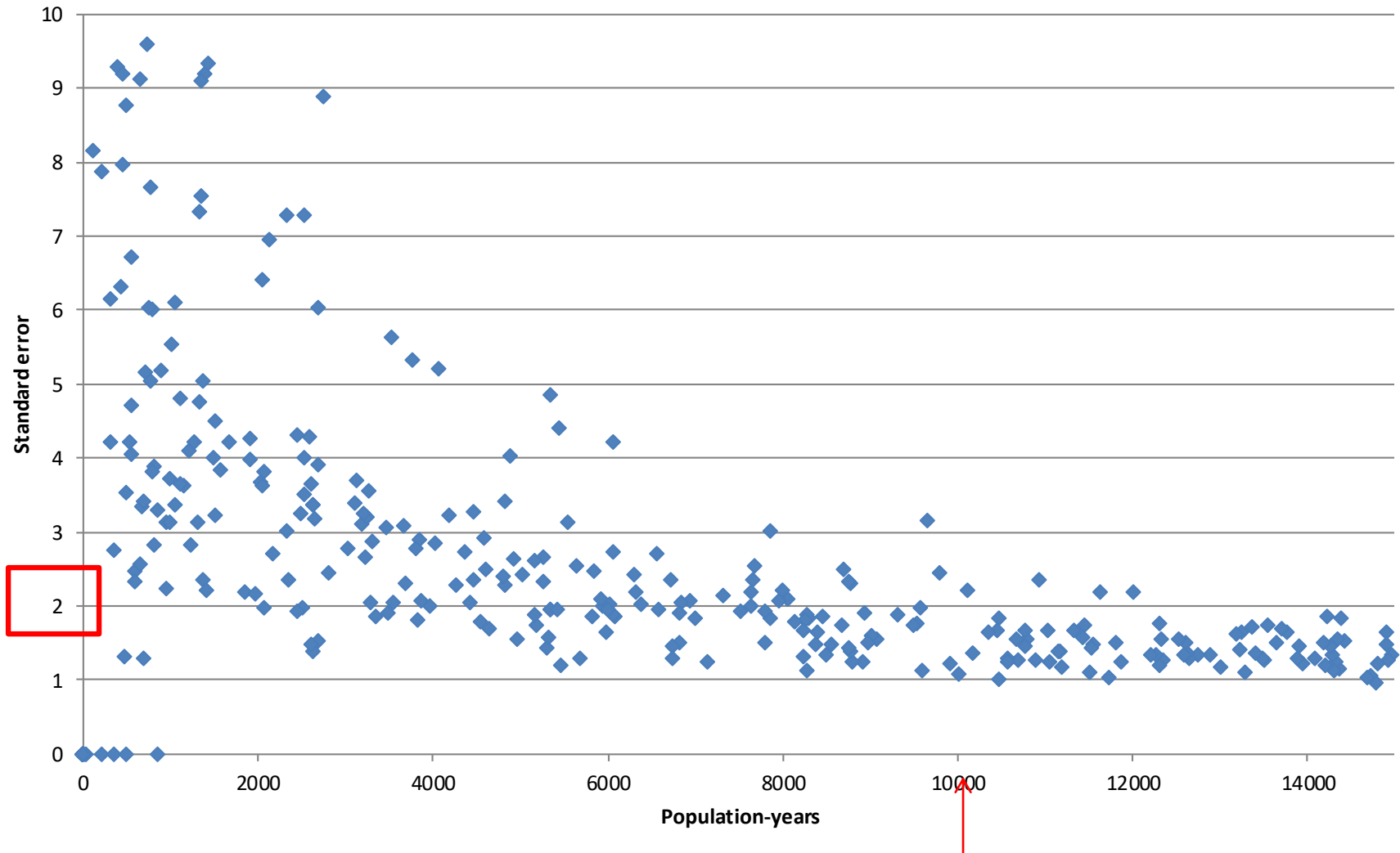


Cases	Region
13	A
20	B
14	C



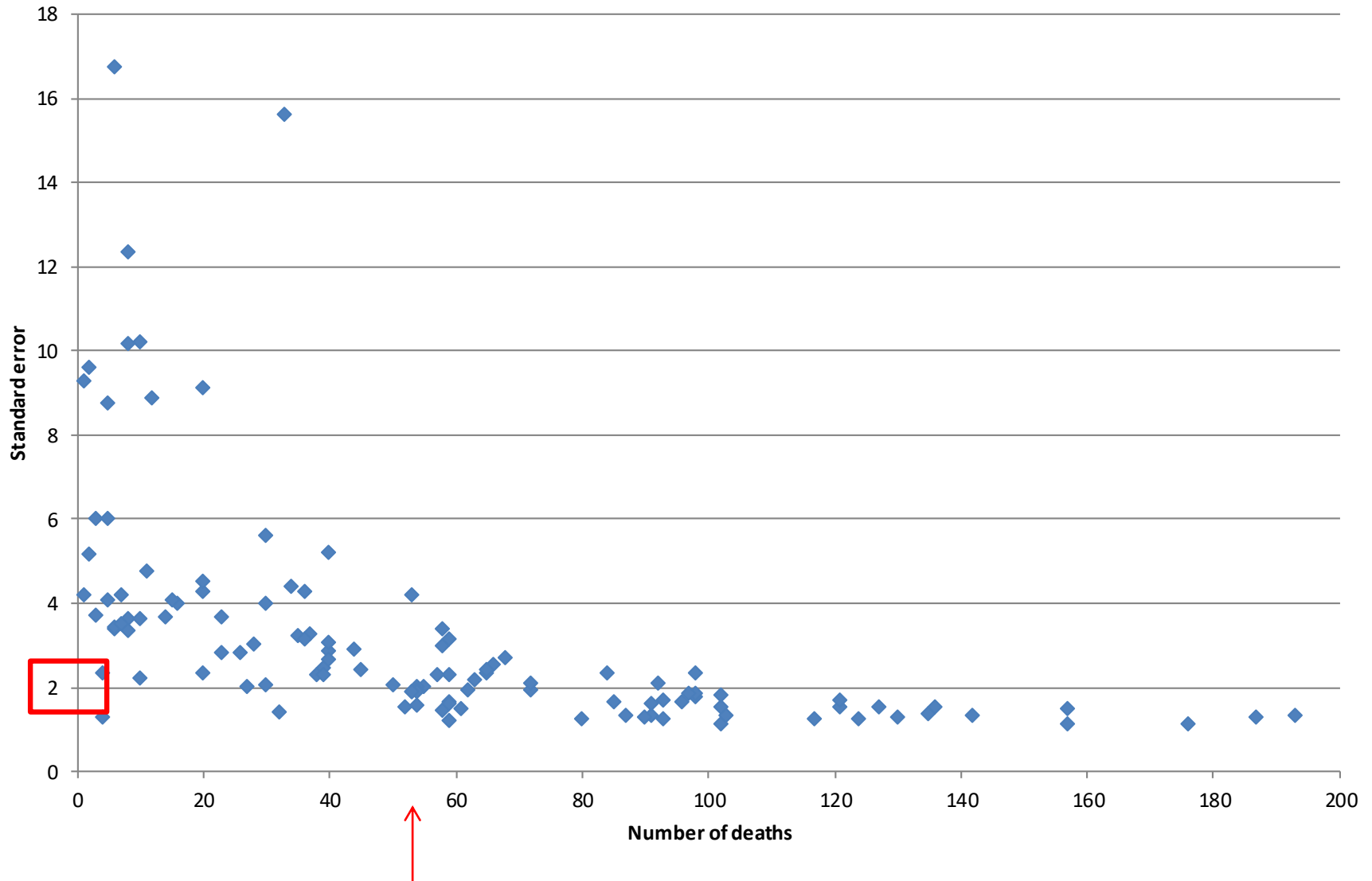
Aggregation: population

MCD standard errors by population-years,



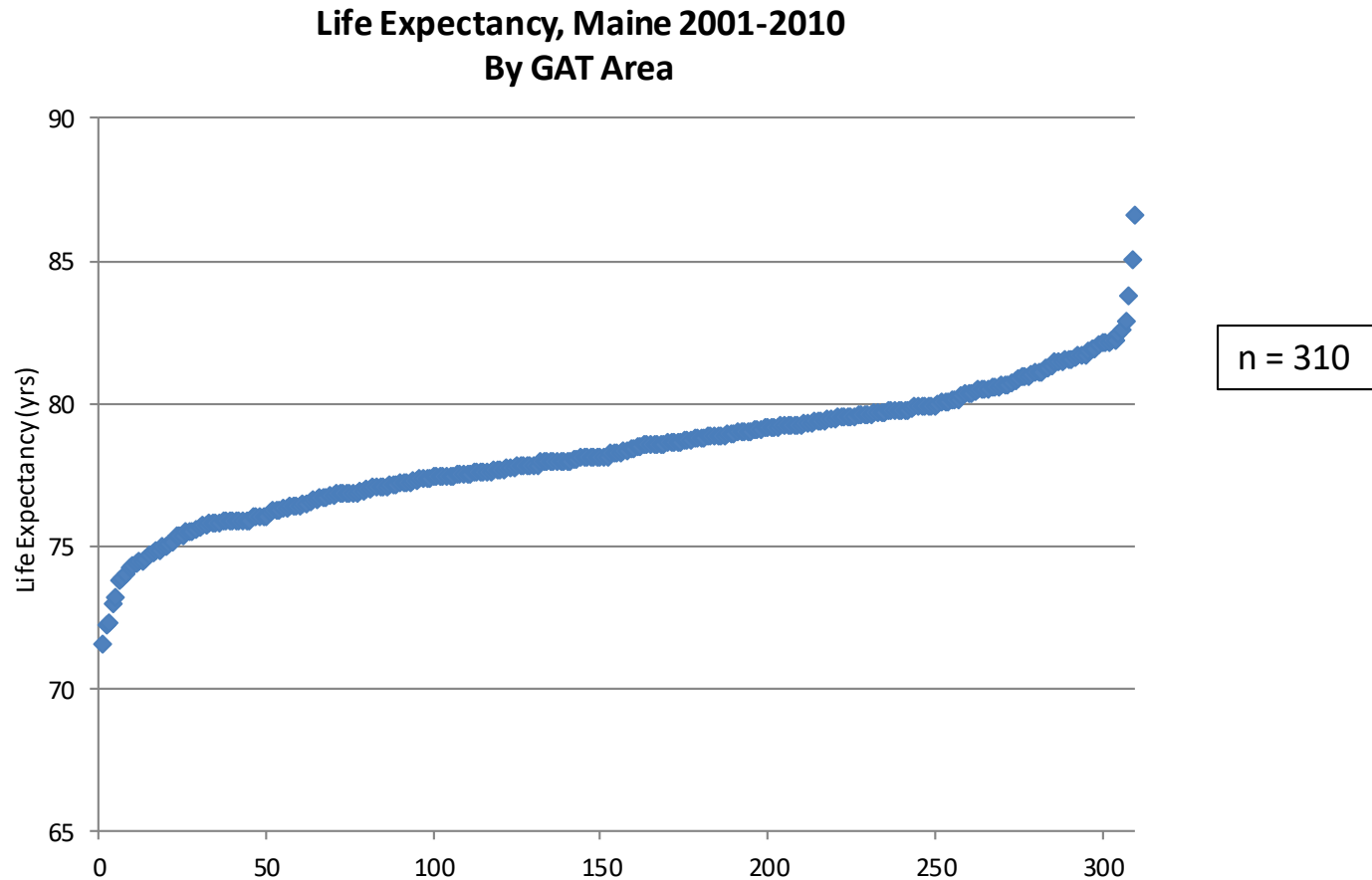
Aggregation: deaths

Standard error by number of deaths



GAT Results

- LE range ~ 15 years (Low = 71.6, High = 86.6)
- Assessing Stability
 - SE range: Min = 0.2, Max = 2.4



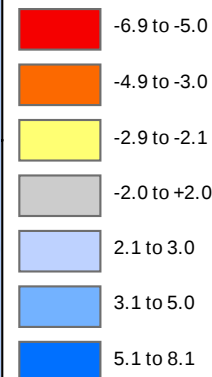
Aggregated to 10,000 population-years

- LE range ~ 15 years
(Low = 71.6, High = 86.6)

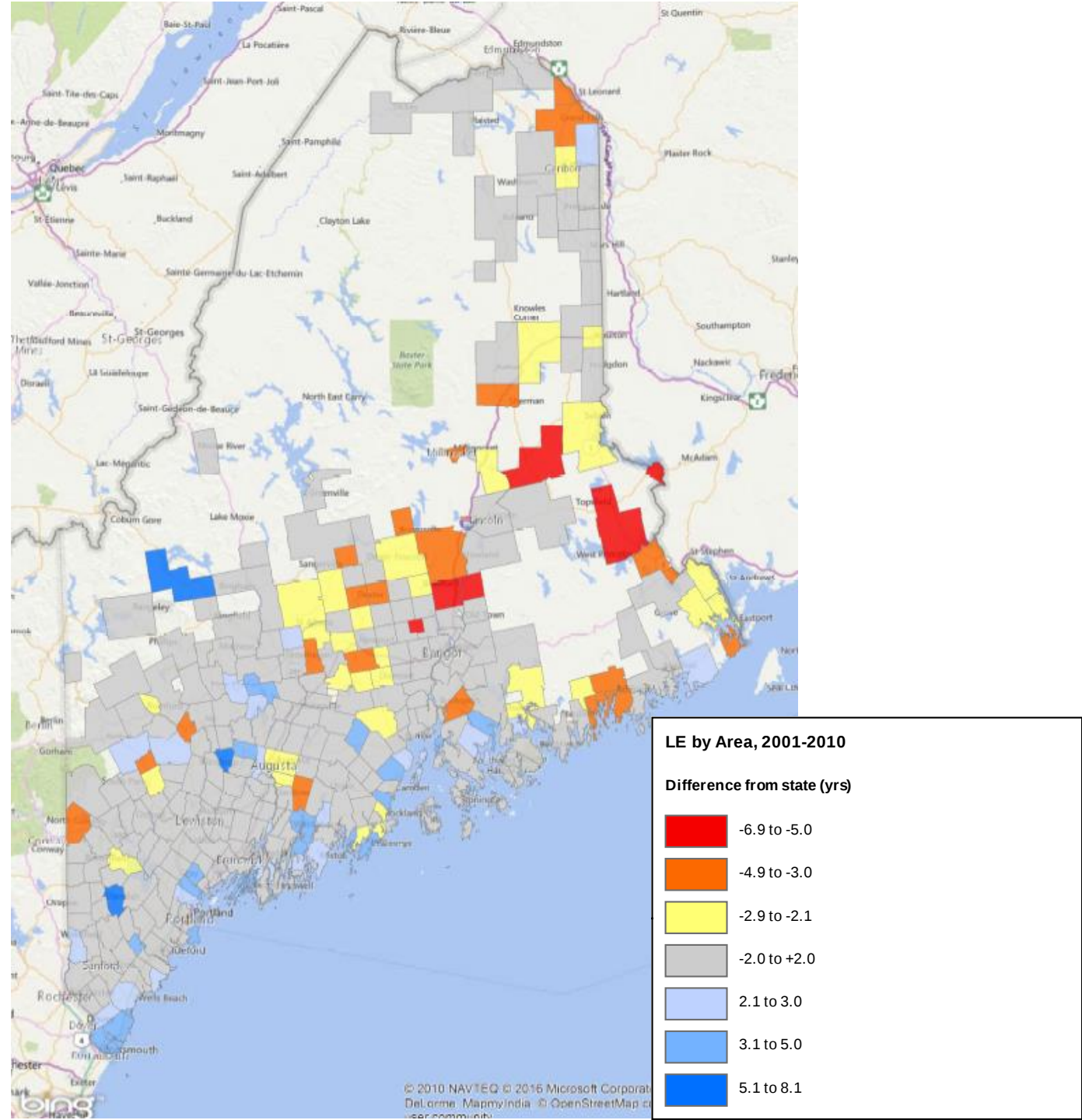
n = 310

LE by Area, 2001-2010

Difference from state (yrs)



Aggregated to
10,000
Population-years



Results

• • •

The curious kind

Assessing Stability

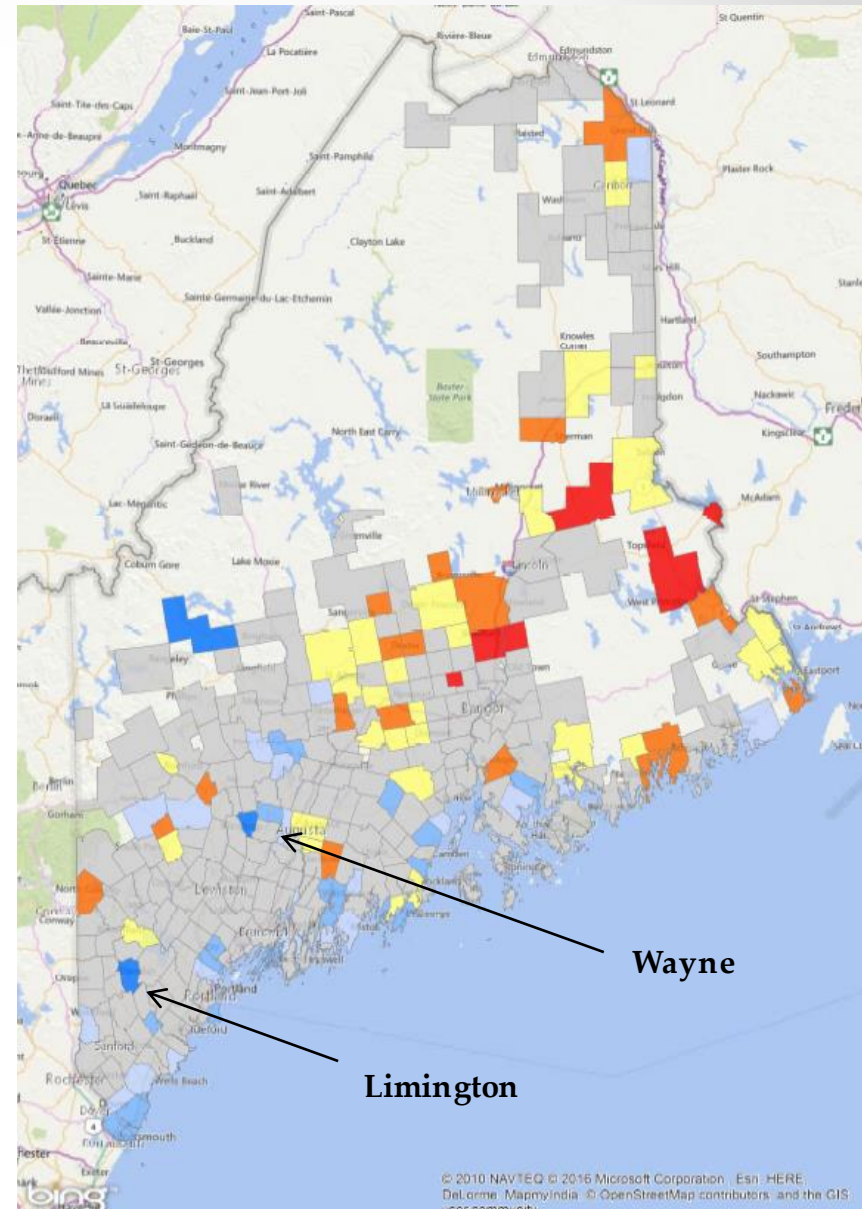
Limington

- Highest LE in Maine: **86.6**
- 218 deaths
- 37,326 population-years
- SE = **2.4**

Wayne

- 3rd highest LE in Maine: **83.8**
- 81 deaths
- 11,445 population-years
- SE = **1.6**

→ *Why is Limington's SE > 2?*

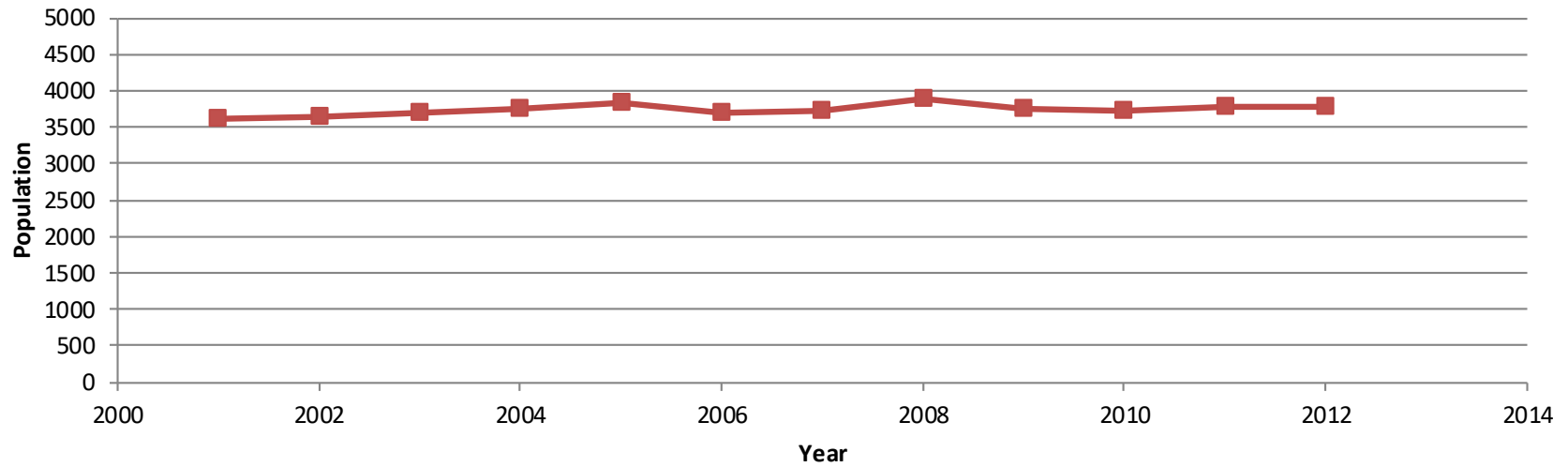


Case Study: Limington

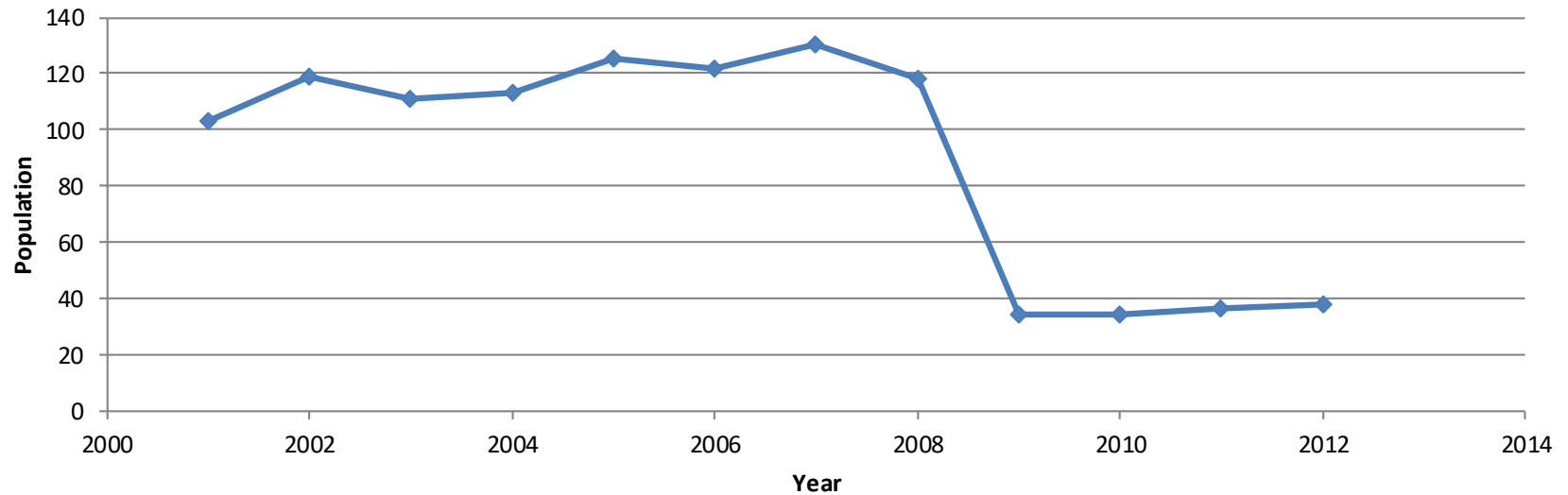
- 4.8% in group quarters (2000) → <1% (2010)
- Low death rate in last age group, high interval width

		LIFE EXPECTANCY TEMPLATE AGE INTERVAL WIDTH						
Interval Width								
n_i								
Instructions								
Technical Notes								
Area Name	Age Group							
	Under 1	1-4	5-9	10-14	15-19	...	85+	
31120	1	4	5	5	5		14.9	
31130	1	4	5	5	5		17.6	
31140	1	4	5	5	5		14.9	
31150	1	4	5	5	5		13.4	
Limington	1	4	5	5	5		56.1	
31170	1	4	5	5	5		7.7	
31180	1	4	5	5	5		16.8	
31190	1	4	5	5	5		11.4	
31197	1	4	5	5	5		16.6	
31200	1	4	5	5	5		13.9	

Population of Limington, ME



Population of Limington, ME Age Group: 85+



Discussion

- Next steps
 - LE & social determinants
 - Challenge: data availability
 - Update results
 - Challenge: geographic vs temporal aggregation
 - Environmental Public Health Tracking (EPHT) content workgroup for LE, development of best practices
 - Continue exploring challenges and solutions related to LE as a measure of health disparities

Thanks!

Jessica Bonthius, MPH
Epidemiologist, Maine CDC
jessica.bonthius@maine.gov
(207) 287-3364

Chris Paulu, ScD
Environmental Epidemiologist, Maine CDC
chris.paulu@maine.gov
(207) 287-9932

