

Assessing Stroke Disparities Using a Spatial Epidemiologic Investigation, 1992-2012

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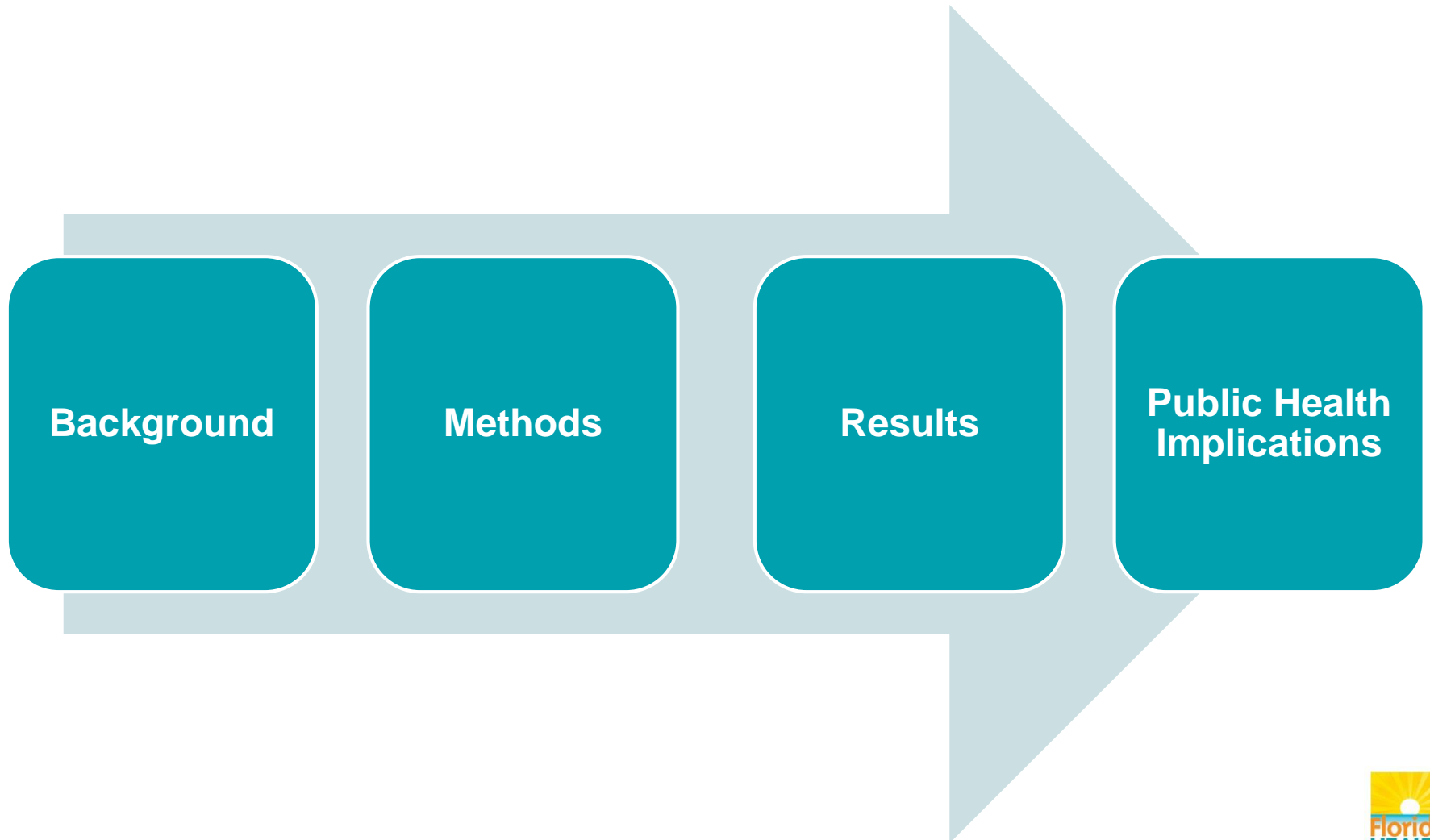
Florida Department of Health



2015-2016 Academy of Research Excellence

Overview

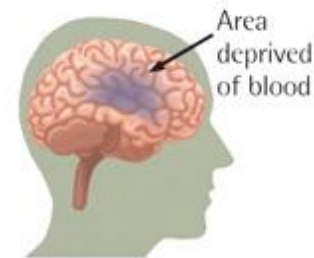
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What is a stroke?

- A stroke occurs when blood supply to the brain is blocked or when a blood vessel in the brain ruptures, causing brain tissue to die

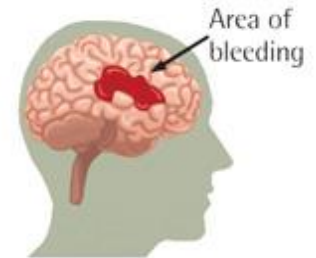
Ischemic Stroke



Obstruction blocks blood flow to part of the brain



Hemorrhagic Stroke



Weakened vessel wall ruptures, causing bleeding in the brain



Background: Conditions that increase risk for stroke

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- Previous Stroke or Transient Ischemic Attack
- High Blood Pressure
- High Cholesterol
- Heart Disease
- Diabetes

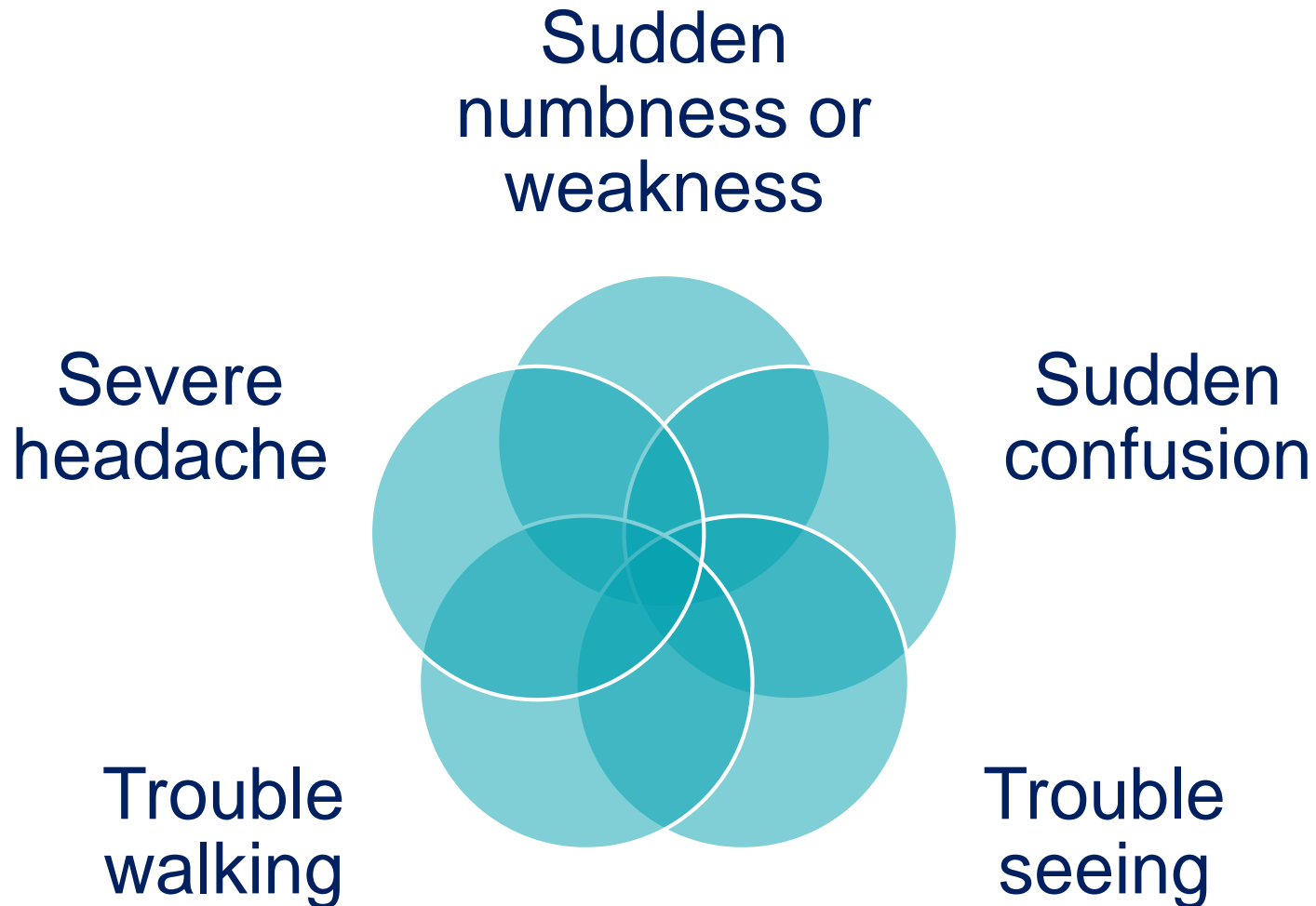
Background: Behaviors that increase risk for stroke

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- Unhealthy Diet
- Physical Inactivity
- Unhealthy Weight
- Too Much Alcohol
- Tobacco Use

Stroke Symptoms

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Stroke AHA/ASA Promotion

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SPOT A STROKE

FAST

FACE ARM SPEECH TIME
DROOPING WEAKNESS DIFFICULTY TO CALL 911

Learn more


American Heart Association | American Stroke Association
Together to End Stroke™





Face drooping.

Arm weakness.

Speech difficulty.

Time to call 911.

Spot a stroke **F.A.S.T.**


American Heart Association | American Stroke Association
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 StrokeAssociation.org

Background: Treatment

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- Ischemic (~85% of strokes)
 - Thrombolytic therapy provided within 3-4.5 hours from onset of symptoms
 - Limits long-term disability and prevents death

- Hemorrhagic (~15% of strokes)
 - Endovascular procedures
 - Depends on cause and severity of bleeding
 - Surgical treatment

Joint Commission Stroke Certification

Primary Stroke Center (96)

- Use a standardized method of delivering care
- Tailor treatment & intervention
- Administer IV-thrombolytic
- Designate a stroke unit for continuous patient monitoring
- Promote the flow of patient information across healthcare settings
- Support patient self-management activities
- Analyze & use standardized performance data to continually improve treatment plans, eight measures required
- Demonstrate application of and compliance with clinical practices guidelines published by the AHA/ASA

Comprehensive Stroke Center (3)

- Provide state-of-the-art care (staff, training, etc.)
- Have neuro-intensive care unit beds for complex stroke patients that provide care 24/7
- Use advanced imaging capabilities
- Provide care to patients with subarachnoid hemorrhage; performing endovascular coiling or surgical clipping procedures for aneurysm & IV-tPA
- Coordinate post hospital care for patients
- Use peer-review process to evaluate the care provided to ischemic & hemorrhagic stroke pts.
- Analyze and use standardized performance measure to continually improve treatment plans; 16 measures required
- Participate in stroke research

Background: Geographic Disparities

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- Highest burden of stroke found in southeastern US- “stroke belt”
- It is questionable if counties in north Florida are part of the national stroke belt
- Disparities in hospitalization and mortality rates
- Access to care

Background: Economic Burden

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Stroke Expenditures

- Stroke costs exceeds 73 billion annually in US
- Stroke costs exceed 5.5 billion annually in Florida

Applied Application of Spatial Epidemiology

Traditionally

- Age-adjusted stroke mortality/Hospitalization rates have been mapped in Florida

Spatial Epidemiology

- Rigorous statistical analyses to determine if there are significant differences in stroke burden is lacking in the literature

Research Objective

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The objectives of this study were to investigate geographic disparities of stroke deaths and hospitalizations in Florida 1992-2012

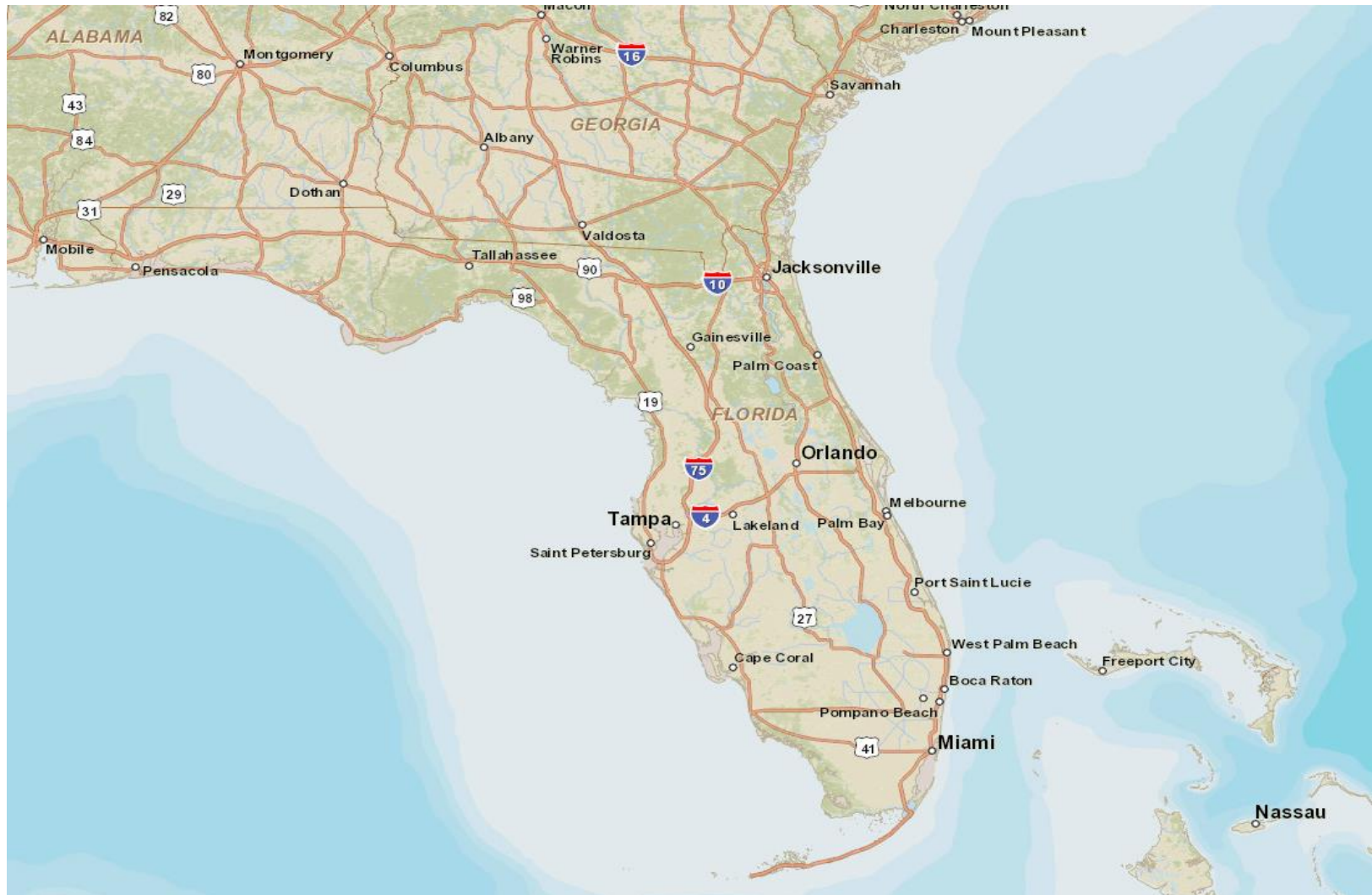
Research Goal

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- Investigate county-level geographical disparities associated with stroke in FL
 - Objective 1
 - Investigate the geographical distribution of age-adjusted hospitalization rates and determine clusters of disease
 - Objective 2
 - Investigate the geographical distribution of age-adjusted mortality rates and determine clusters of disease

Methods: Study Area

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Methods: Data Sources

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- Agency for Health Care Administration
 - ▣ Hospital discharge data (1992-2012)
 - ▣ ICD-9–CM codes 430-438

- Florida Department of Health (FDOH) Office of Vital Statistics
 - ▣ Mortality data (1992-2012)
 - ▣ ICD-10 codes I60-I69

Methods: Data Analysis

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- ArcGIS 10.3
- SAS 9.4
- GeoDa
 - Global Moran's I
 - Local Moran's I

Methods: Data Sources

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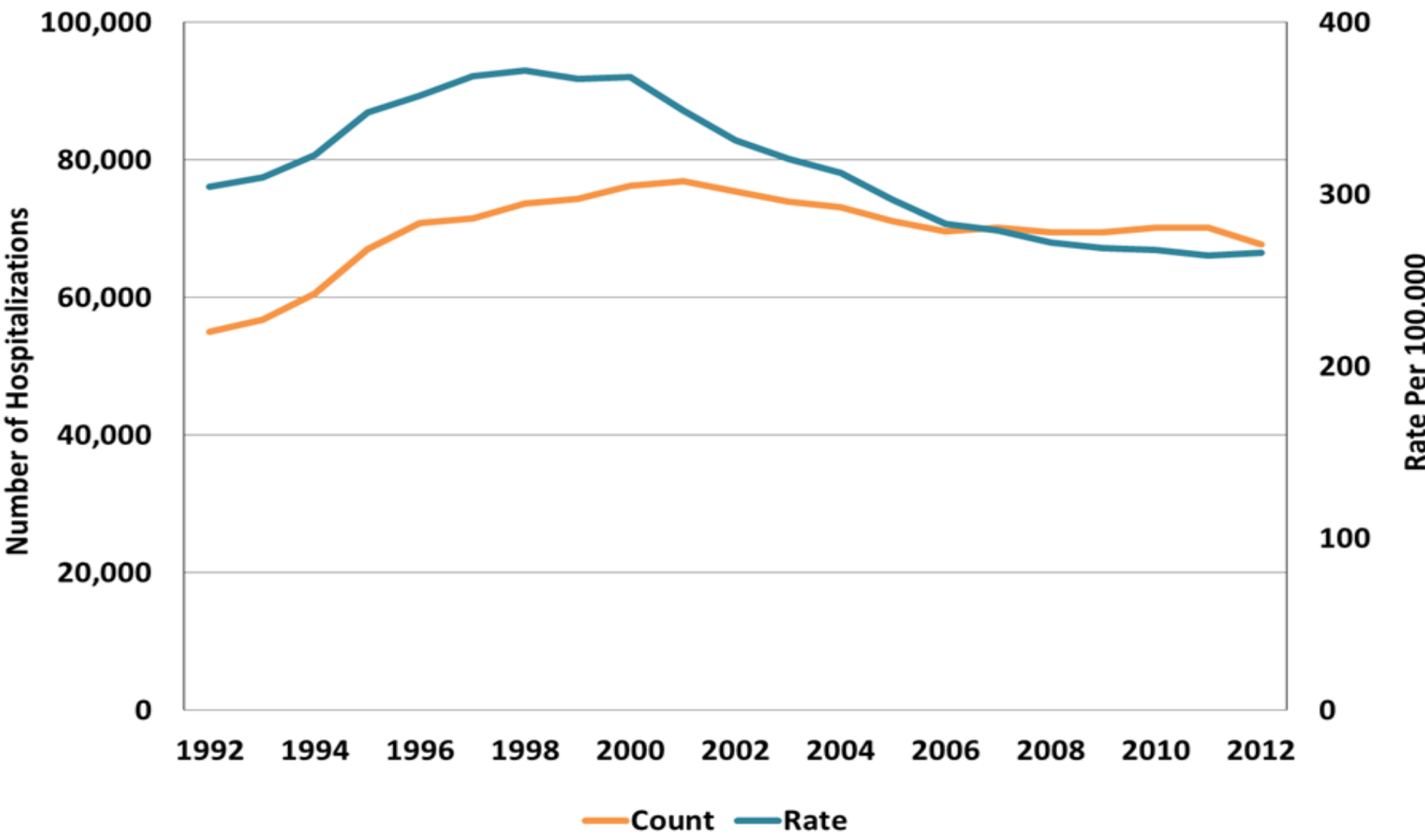
- US Census Bureau
 - ▣ County cartographic boundary files

- FL Legislature's Office of Economic and Demographic Research
 - ▣ Population estimates

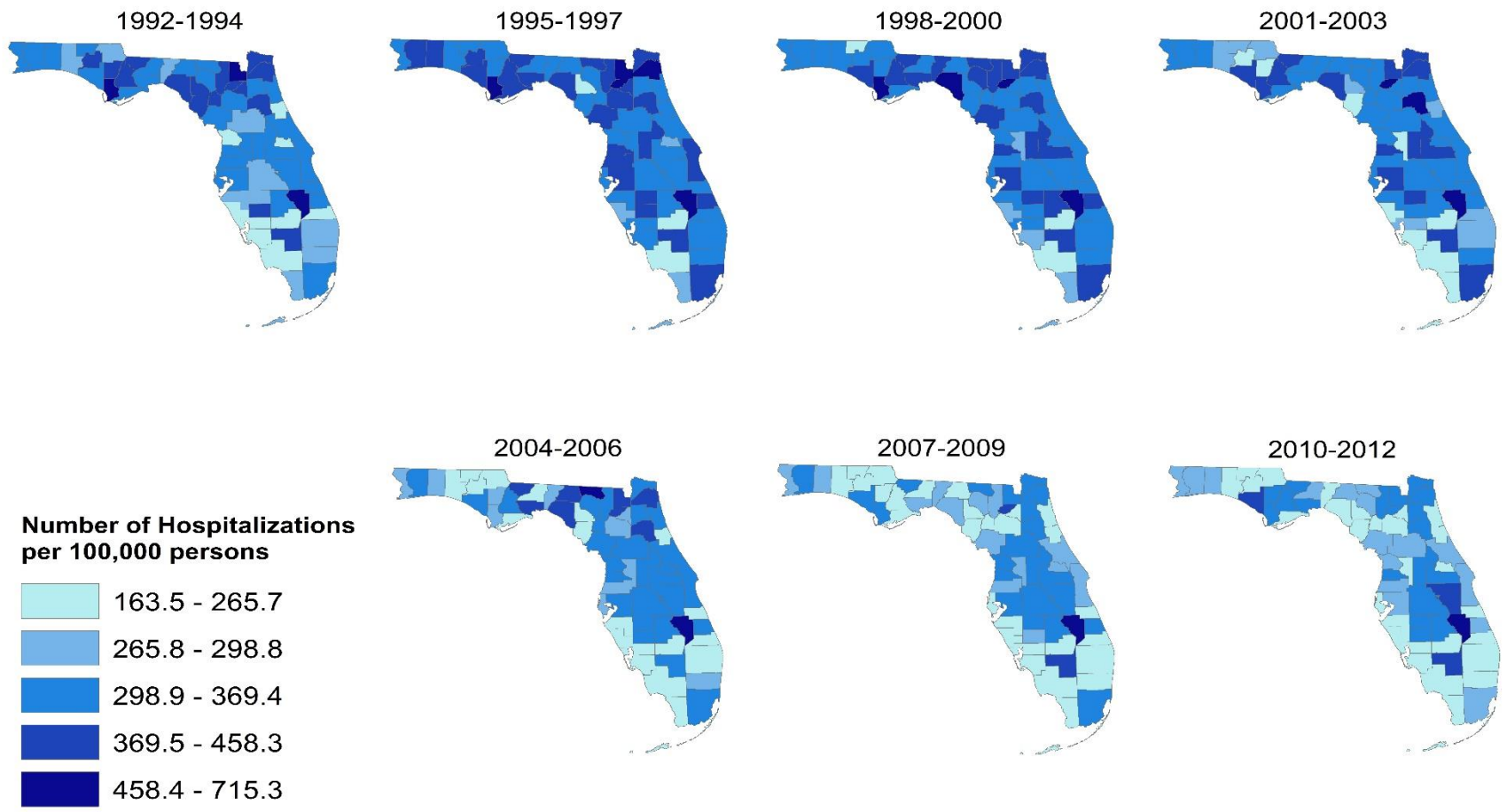


Results: Hospitalizations

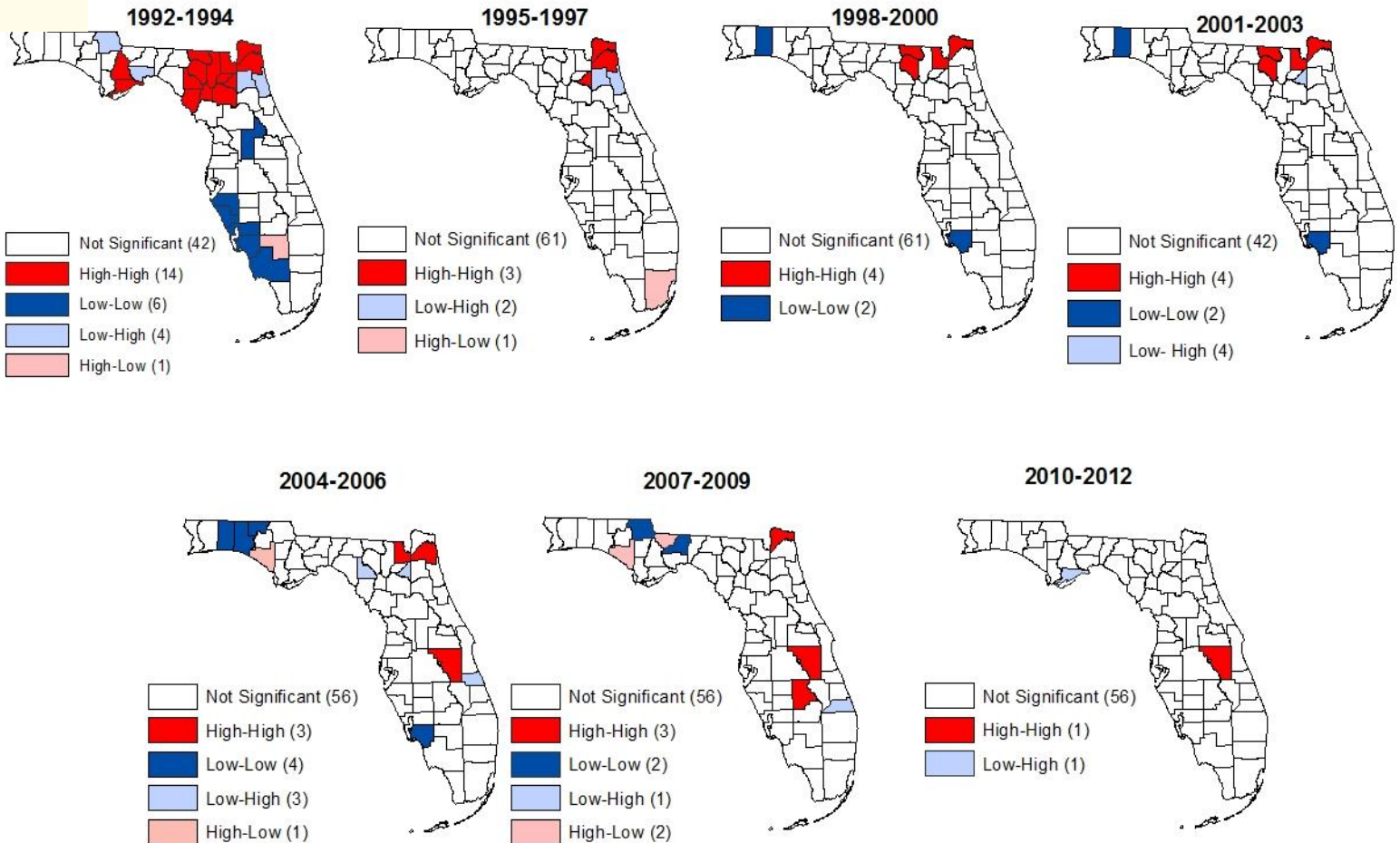
Florida Age-Adjusted Stroke Hospitalization Rates per 100,000 and Counts, 1992-2012



Stroke Age-Adjusted Hospitalization Rates, 1992-2012



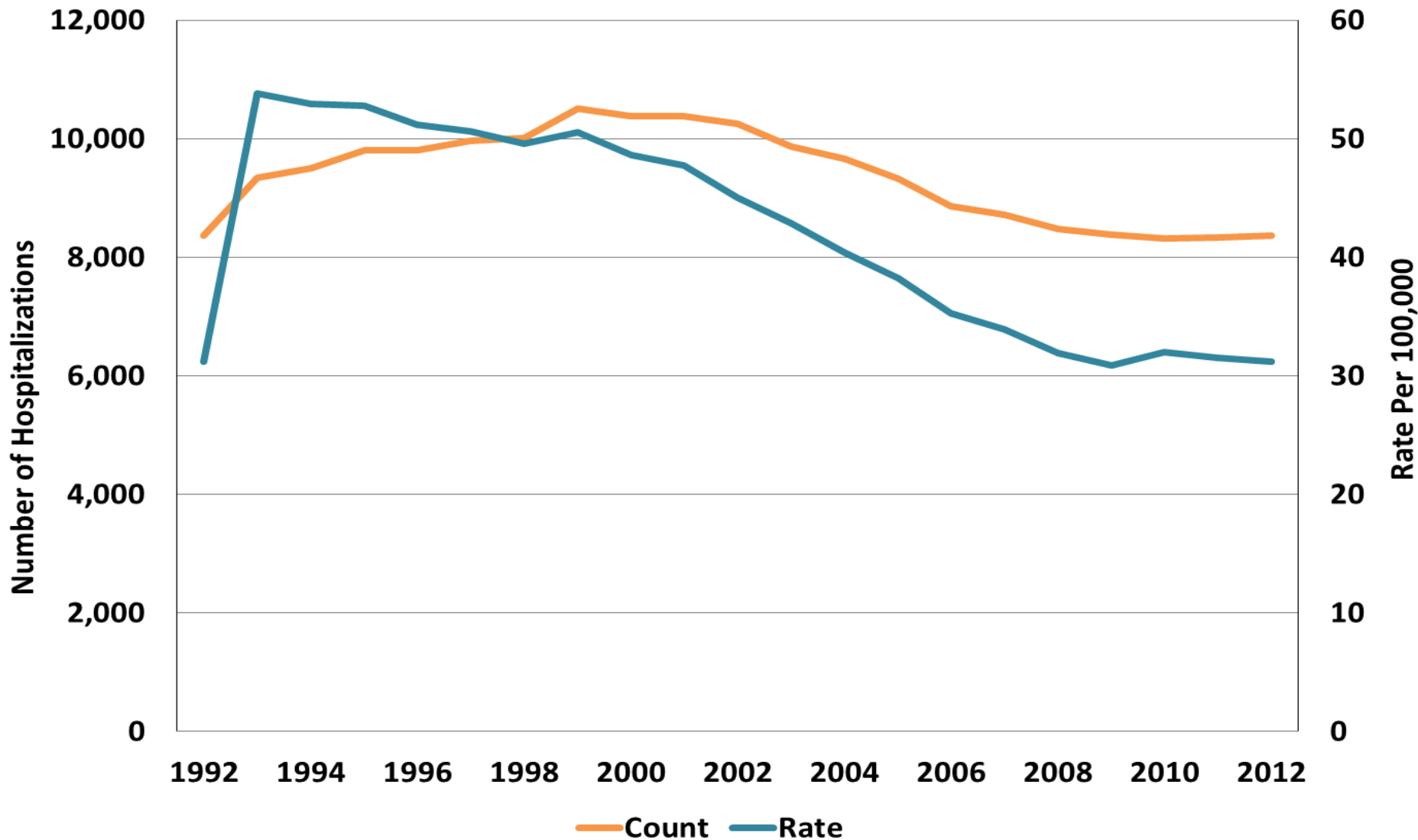
Hospitalization Clusters, 1992-2014





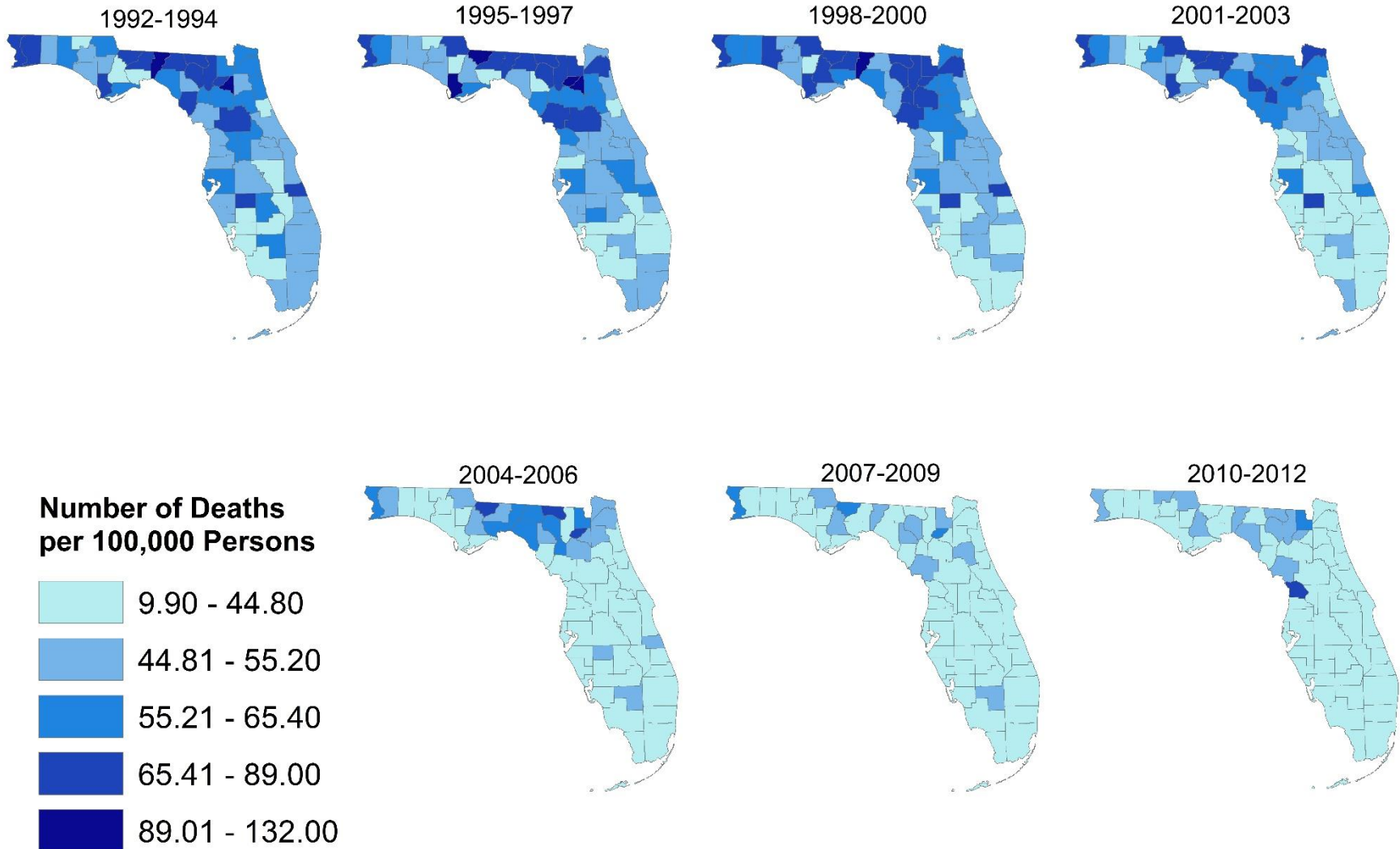
Results: Mortality

Florida Age-Adjusted Stroke Mortality Rates per 100,000 and Counts, 1992-2012

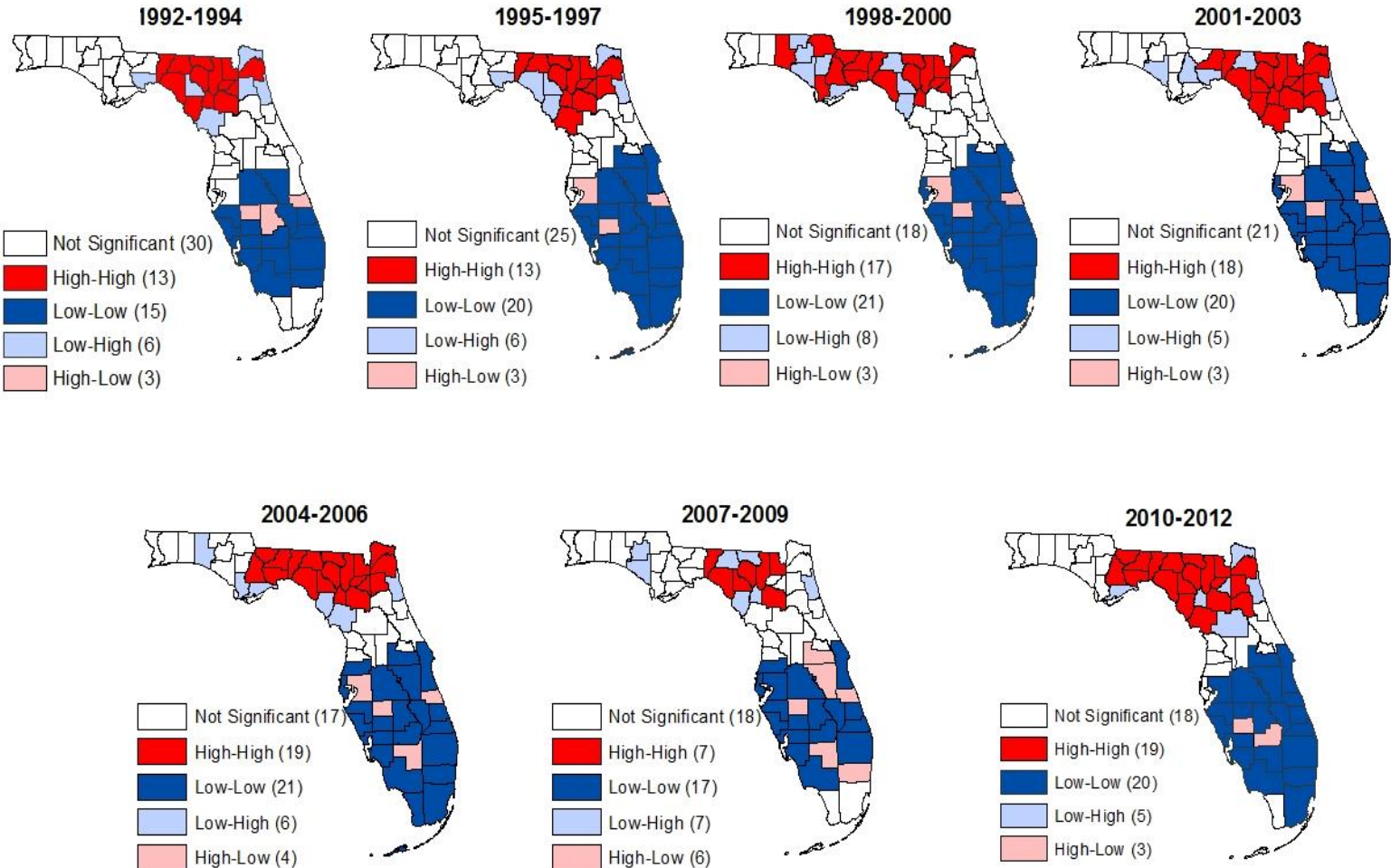


Stroke Age-Adjusted Mortality Rates, 1992-2012

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Mortality Clusters, 1992-2012



Discussion

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Statistically significant high-rate mortality hotspots consistently appeared in the proposed stroke belt region of Florida

Discussion

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- Despite the decrease in stroke mortality rates over the past 20 years, geographic disparities continue to exist
 - Higher rates in the North
 - Lower rates in the South
- These tools need to be added to the epidemiologist's tool box to differentiate significant from non-significant disease clusters

Conclusion

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- Findings from this study are useful for informing public health efforts/policies
- These county-level GIS cluster maps of stroke hospitalizations and mortality rates to:
 - Better understand the burden of stroke
 - Inform data-driven decisions, ultimately leading to interventions aimed at reducing disparities

Health Systems Implications

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- Increase certification (Joint Commission) of Primary and Comprehensive stroke centers in areas with increased disparities to provide a better system of stroke care
- Promote the new certification (2015) of Acute Stroke Ready Hospital in rural and underserved areas in Florida
- Use Telestroke networks in medical deserts to administer timely stroke care to close disparity gaps
- Provide data to inform policy/systems changes to have specific stroke protocols as suggested by the ASA/AHA for EMS providers, Emergency departments and Hospitals statewide

Acknowledgements

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Questions

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