

THE IMPACT OF IMPLEMENTATION OF A STATEWIDE STROKE SYSTEM OF CARE



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DISCLOSURES

- *Nothing to Disclose*



STROKE BACKGROUND

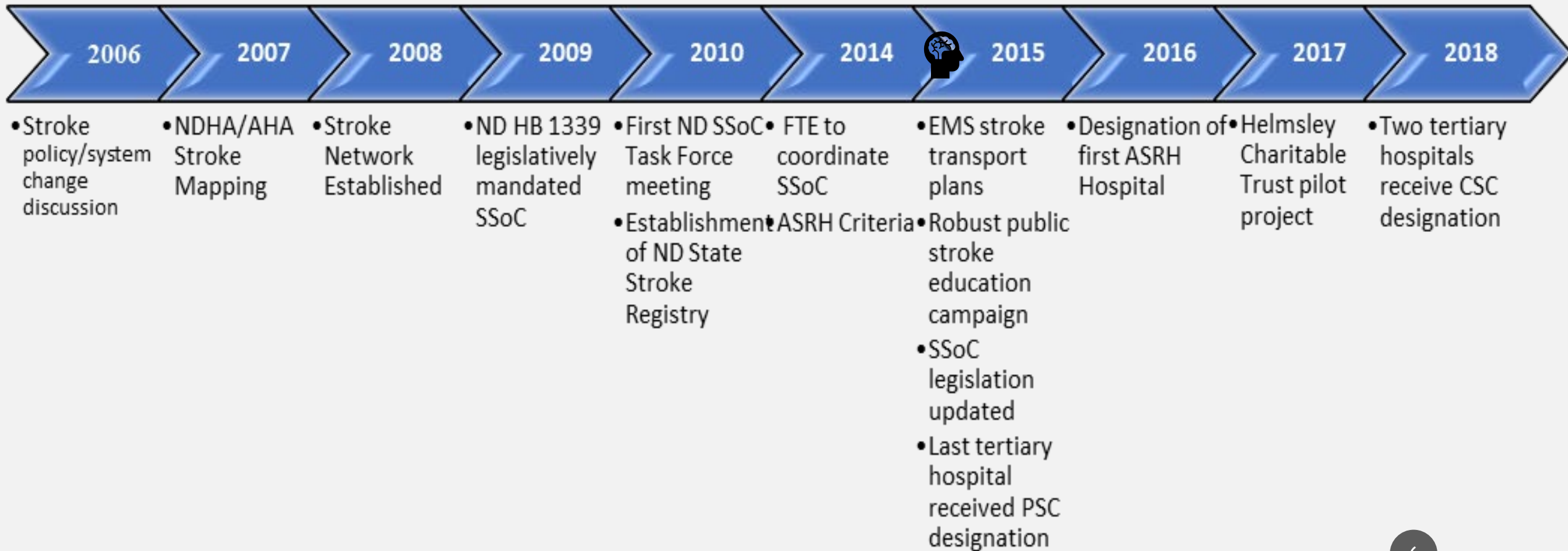
- 5th leading cause of death in the U.S. (Viriani et al., 2020)
- A leading cause of long-term disability in the U.S. (Viriani et al., 2020)
- Estimated that between the years 2015 and 2035, total direct medical stroke related costs are expected to increase from \$36.7 billion to \$94.3 billion (Viriani et al., 2020)
- Time is Brain
- Stroke Treatments
 - Tissue plasminogen activator (t-PA)
 - Endovascular thrombectomy



STROKE SYSTEM OF CARE (SSOC)

- *AHA Recommendations for the Establishment of Stroke Systems of Care (2005)*
- Encourage communication and collaboration among providers and facilities across the continuum.
- Focus on prevention, recognition, treatment, and rehabilitation of the patient
- Brain Attack Coalition stroke designation guidance

NORTH DAKOTA SSoC



STUDY PURPOSE & AIMS

| | |
|----------------|---|
| Purpose | Evaluate the outcomes of implementation of a statewide SSoC |
| Aim 1 | Examine how implementation of a statewide SSoC impact patient outcomes including mortality, morbidity, and discharge disposition. |
| Aim 2 | Examine how implementation of a SSoC impacts total charges of patient care. |

CONCEPTUAL MODEL
DONABEDIAN
QUALITY OF CARE
FRAMEWORK

Structure



Process



Outcome

Structure: comprises the elements of the setting in which care occurs including resources and structures available.

Process: involves the actions and activities occurring while giving and receiving care

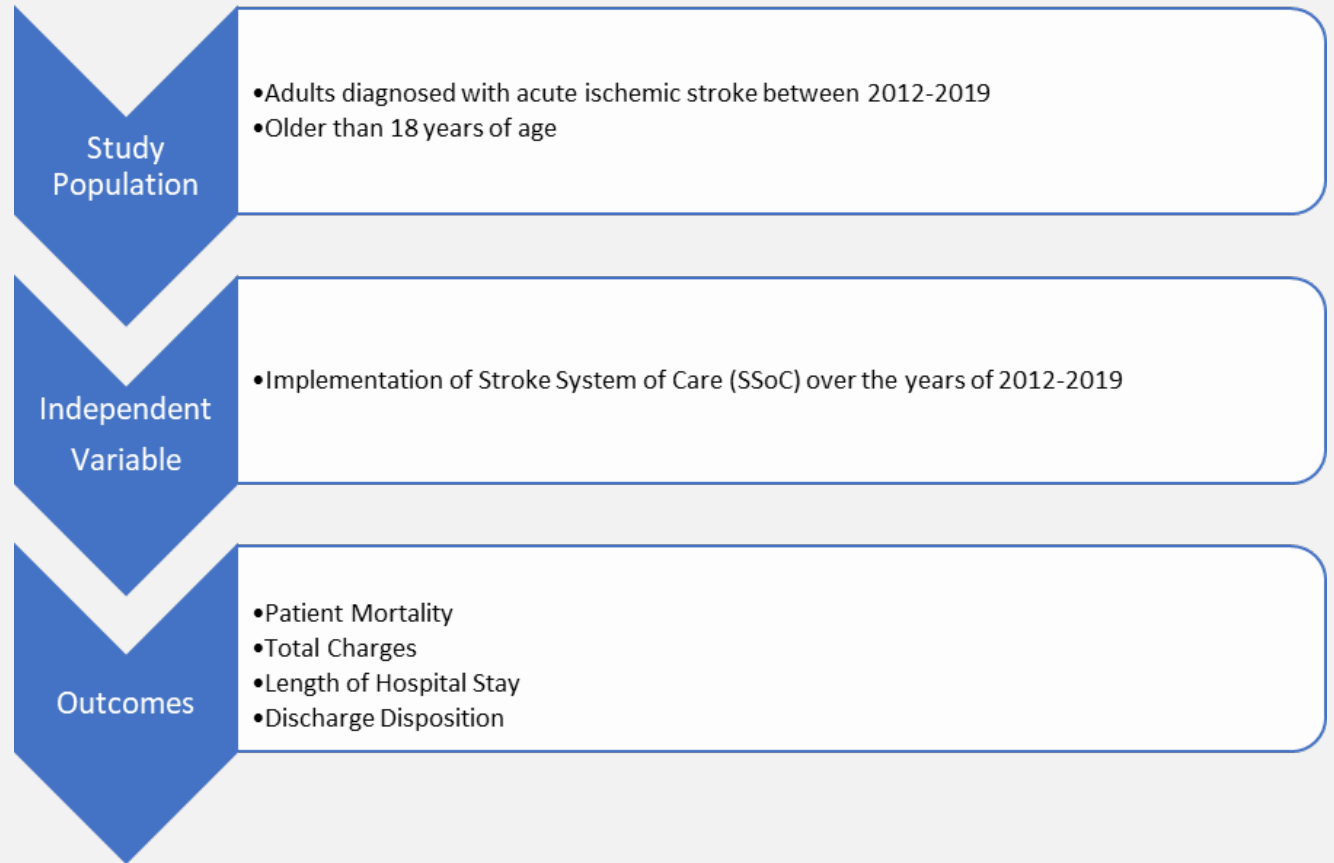
Outcomes: the results of care on the patient or population's health related to healthcare.

RESEARCH QUESTIONS

1. What is the longitudinal trend in **mortality** after a hospital admission adjusting for APR DRG Risk of Mortality and additional variables during the period 2012-2019 for patients with acute ischemic stroke as the state stroke system was implemented?
2. What is the longitudinal trend in **hospital length of stay** for acute ischemic stroke patients discharged alive over time adjusting for APR DRG Severity of Illness score and additional variables from 2012-2019 for acute ischemic stroke patients as the state stroke system was implemented?
3. What is the longitudinal trend in hospital **total charges** adjusting for APR DRG Severity of Illness score and additional variables during the period 2012-2019 for acute ischemic stroke patients as the stroke system was implemented?
4. What is the longitudinal trend in odds of the patient being **discharged to an intermediate or long-term care facility versus discharge to home** adjusting for APR DRG Severity of Illness score and additional variables from 2012-2019 for acute ischemic stroke patients admitted to hospital from home and discharged alive as the state stroke system was implemented?

METHODS

- Quantitative
- Retrospective Secondary Data Analysis
- Healthcare Cost & Utilization Project (HCUP) State Inpatient Database (SID) for North Dakota
- Acute Ischemic Stroke Patients
- 8 Years of data (2012-2019)



ANALYSIS

IBM SPSS Version 26

Sample size (n=7,254)

Descriptive statistics, frequencies, graphic representation of variables completed

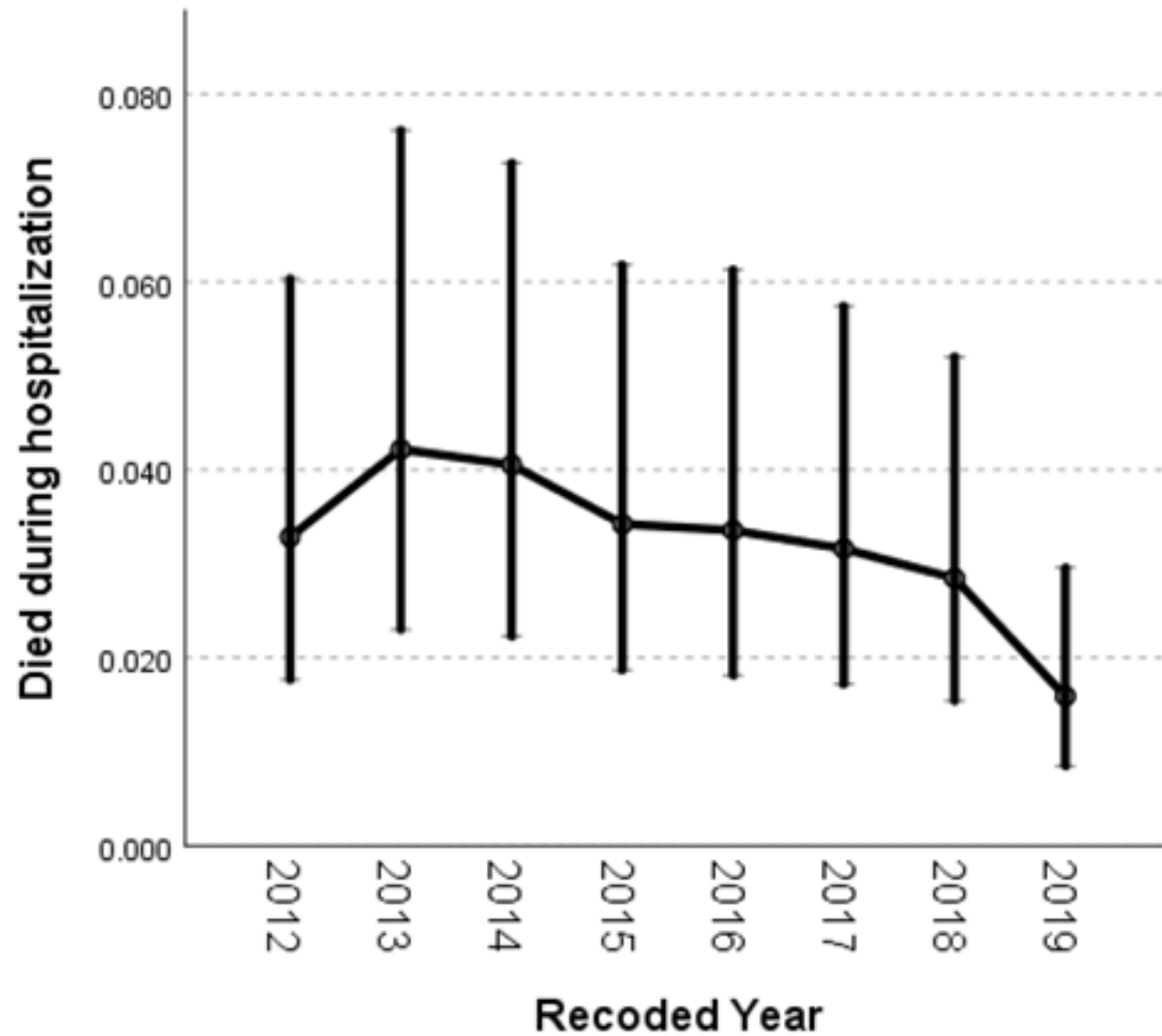
New Variables

Inflation Adjustment for Total Charges

GENERALIZED LINEAR MIXED MODEL

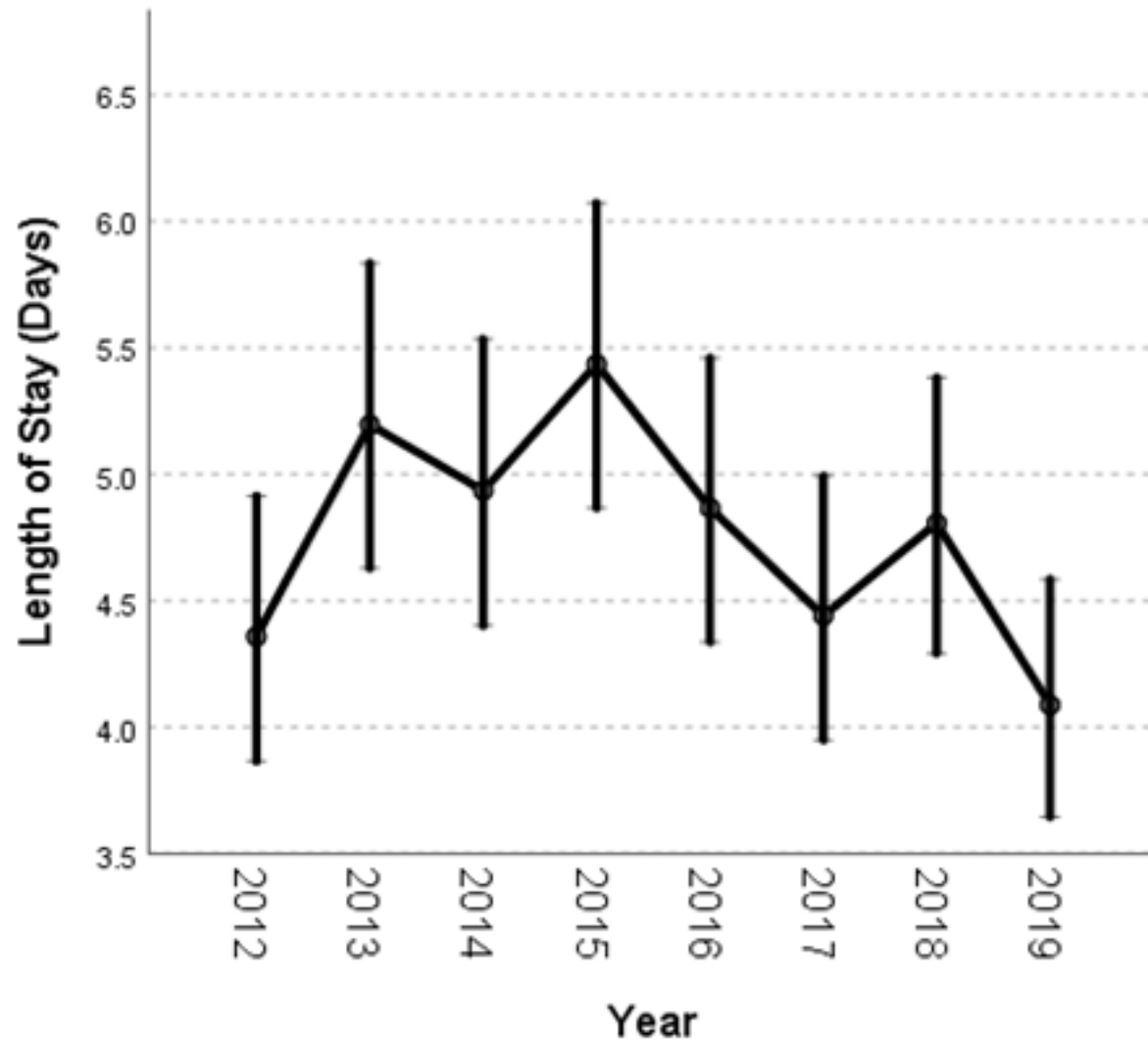
- Risk adjust for confounding variables by inputting them as random or fixed effects
- Hospitals –Random Effect, repeated measures
 - Control for variability between hospitals
- Patient & hospital characteristics- Fixed Effects
- Saturated model
 - Fixed effects not significant removed from model ($p < .001$)
 - Akaike information criterion (AIC) compared

Died during hospitalization by Recoded Year



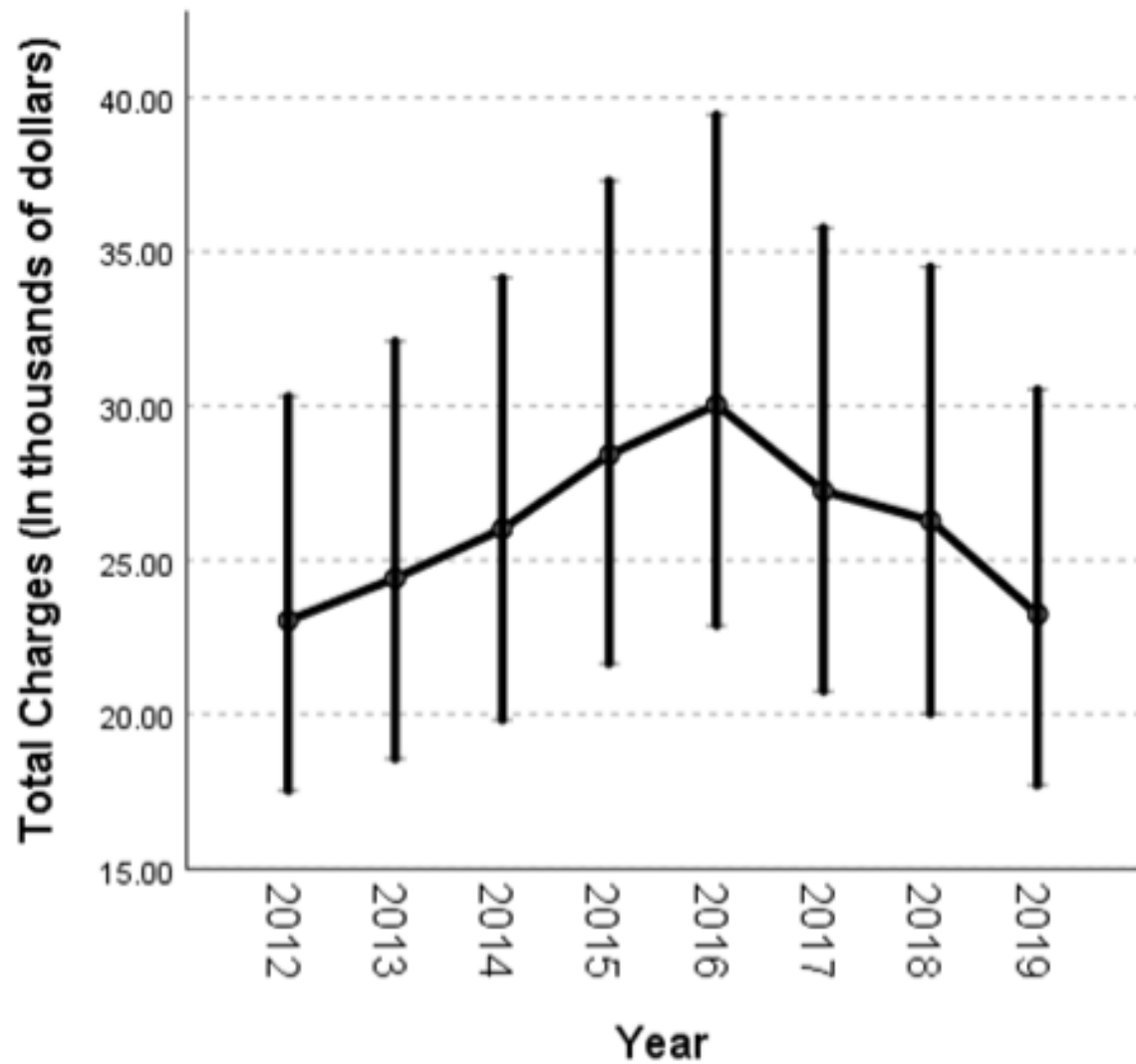
RQI-LONGITUDINAL
TREND IN MORTALITY

Length of Stay Estimated Marginal Means



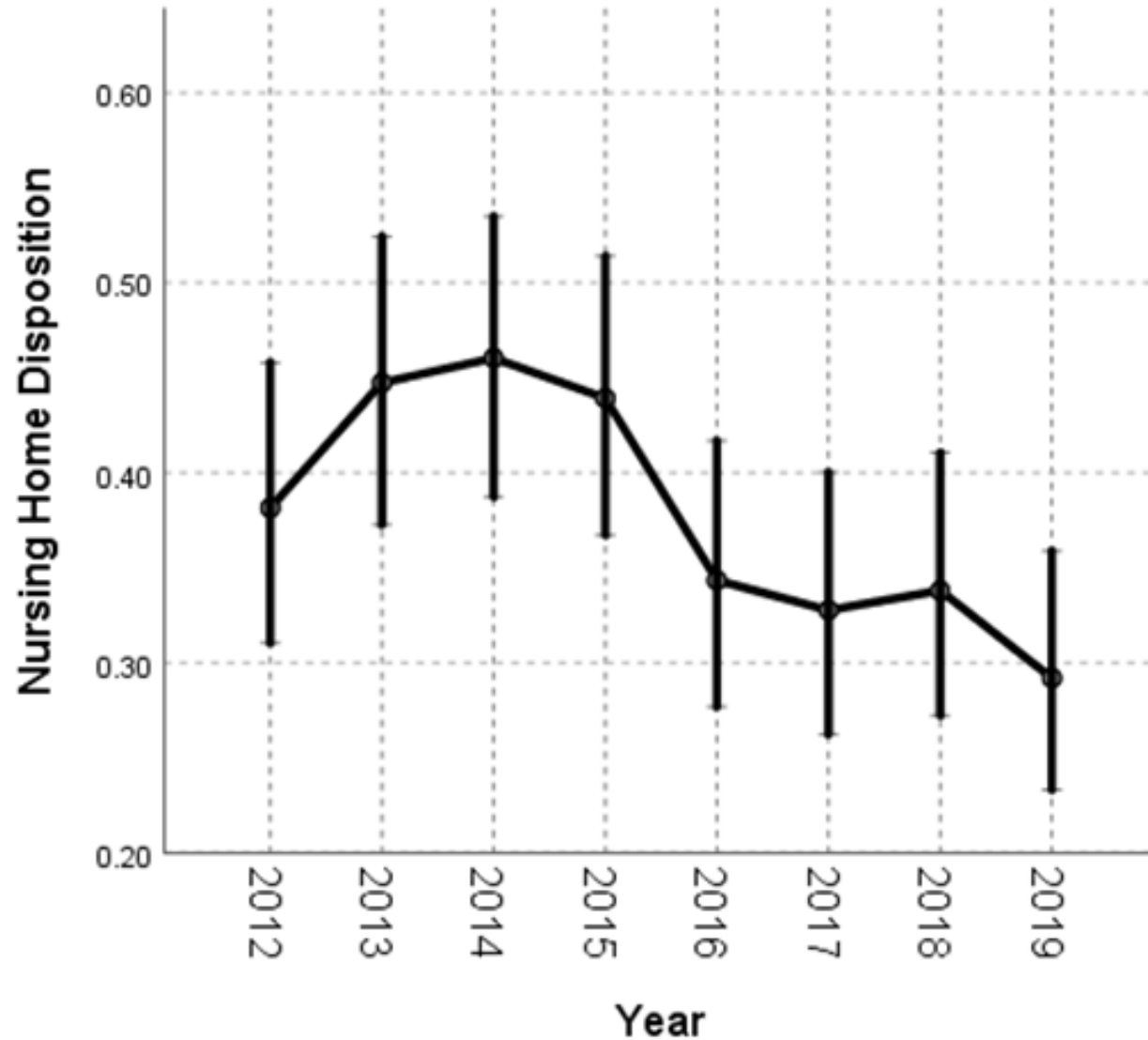
RQ2-LONGITUDINAL
TREND IN LENGTH OF
STAY

Adjusted Total Charges Estimated Marginal Means



RQ3- LONGITUDINAL
TREND IN TOTAL
CHARGES

Nursing Home Disposition Estimated Marginal Means



RQ4-LONGITUDINAL
TREND IN NURSING HOME
DISPOSITION FOR THOSE
ADMITTED FROM HOME

DISCUSSION

- Structure
 - The North Dakota SSoC developed its structure and framework in the years of 2009 through 2014
 - Stakeholders gathered, rapport was built, and strategic planning and data collection
 - Outcomes did not significantly improve; however, time and planning is necessary to build the critical concrete foundational elements of a SSoC before moving onto the process phase
- Process
 - Systems change is a continuous process
 - Process change efforts ramped up in 2015-which this study uses as time of implementation
- Outcomes
 - Estimated Marginal Means
 - Mortality 3.60% in 2015 to a low of 1.59% in 2019
 - Length of stay for patients discharged alive: 5.44 days in 2015 to 4.09 days in 2019
 - Inflation adjusted total charges: \$28,420 in 2015 to \$23,250 in 2019
 - Acute ischemic stroke patients admitted from home and discharged either to a nursing home or home showed a decrease from 43.93% discharged to a nursing home in 2015 to 29.19% in 2019.

STUDY LIMITATIONS

- Causality cannot be inferred because this study was not a randomized controlled trial
- The data is secondary, so the researcher did not have control over data collection, entry, missing data, or accuracy
- Unable to identify hospitals or correlate outcomes of designated stroke centers, which made it difficult to compare to prior literature.
- Mortality odds were calculated from mortality within the hospital stay.
- Length of stay was calculated by the MN Hospital Association based on the difference between day of admission and day of discharge
- Total charges were not broken down to allow for research into reasons for increased cost

IMPLICATIONS

- Encourage nursing leaders and hospital administration to advocate for and participate in a statewide or regional SSoC.
- Promote the need to become a designated stroke center at the appropriate level
- Update hospital policies and procedures to reflect the expectation standards
- Value of investing in a statewide SSoC by demonstrating that the implementation of such a system was associated with decreased adjusted mortality rates and decreased new nursing home admissions.
- Implementation of a SSoC associated with controlled total charges and length of stay
- Future policy work should consider policies that promote the development of SSoCs and its elements, including public education, EMS transport plans, hospital designation requirements, and training requirements.
- Future policies should encourage development of a committee involving stakeholders from both public and private sector to oversee SSoC development, handle issues, and make decisions.
- State governments should encourage a standardized protocol, which is based off national guidelines to standardize and streamline stroke care.

QUESTIONS

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