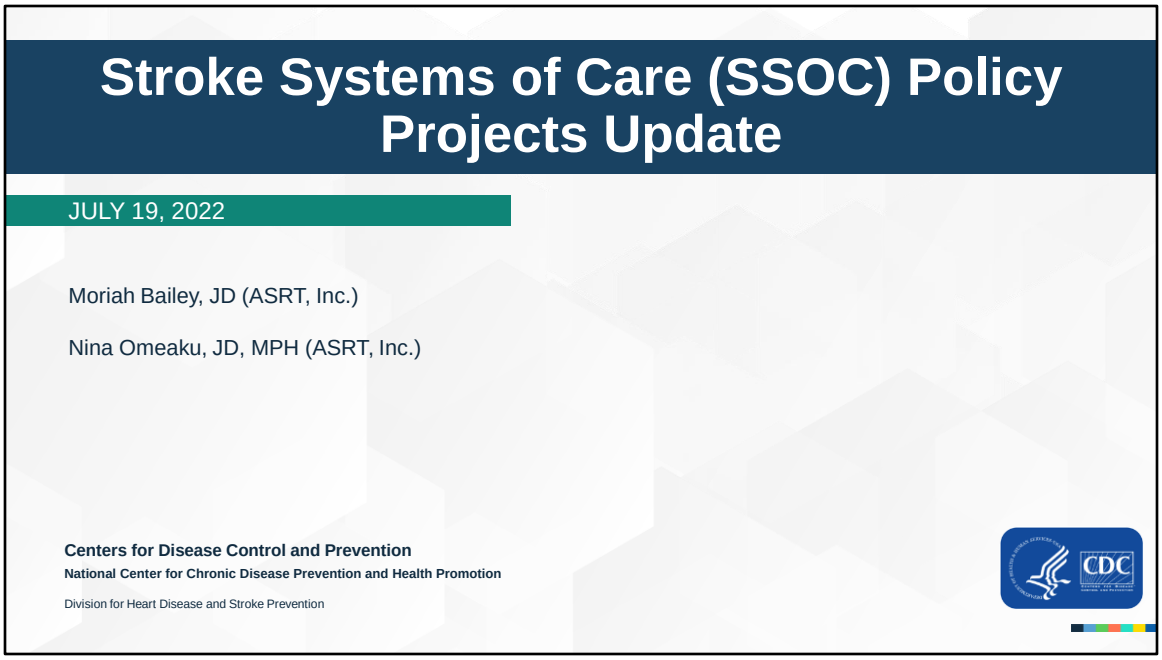


MODERATOR:
Welcome to today's Coffee Break presented by the Applied Research and Translation Team in the Division for Heart Disease and Stroke Prevention at the Centers for Disease Control and Prevention.

We are fortunate to have Moriah Bailey and Nina Omeaku as today's presenters. Moriah and Nina both work as Public Health Policy Analysts for ASRT Inc., with the Applied Research and Translation team. My name is Cindy Huang. I am an ORISE Policy Research and Health Communications Fellow within the Applied Research and Evaluation Branch, and I will be acting as today's moderator.

## Before we begin…

- All phones have been placed in SILENT mode.
- Any issues or questions?
  - Use Q & A box on your screen
  - Email AREBheartinfo@cdc.gov

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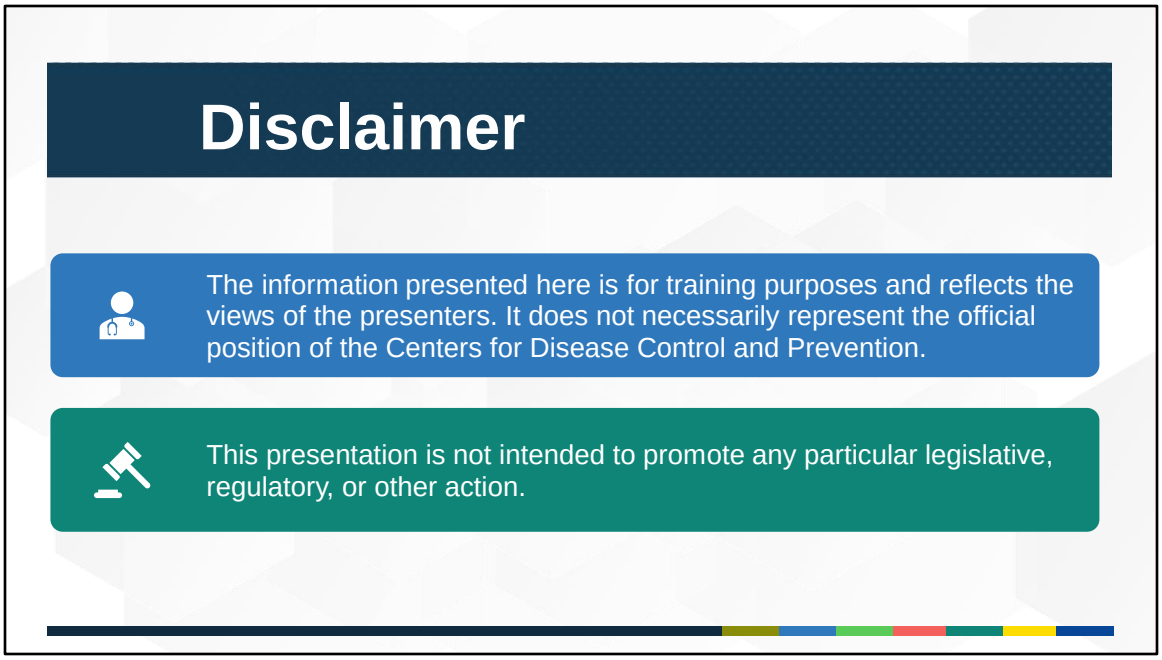
MODERATOR:

Before we begin, there are some housekeeping items. If you are having issues with audio or with seeing the presentation, then please message us using the chat box or send us an email at AREBheartinfo@cdc.gov. Since this is a training series on applied research and evaluation, we hope you will complete the poll at the end of the presentation and provide us with your feedback.




MODERATOR:

The information presented here is for training purposes and reflects the views of the presenters. It does not necessarily represent the official position of the Centers for Disease Control and Prevention. This presentation is not intended to promote any particular legislative, regulatory, or other action.

So, without further delay. Let's get started. **Moriah,** the floor is yours.

SSOC Policy Surveillance

SSOC Policy Implementation Study

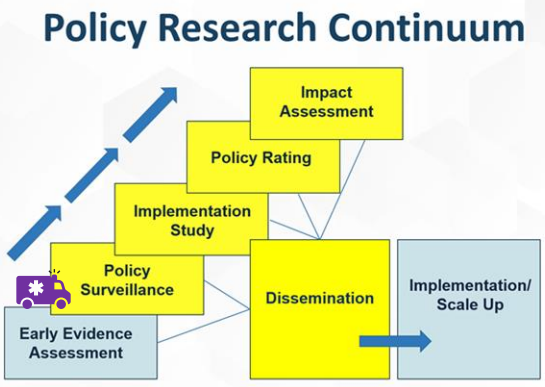
SSOC Policy Impact Study

Translation Products

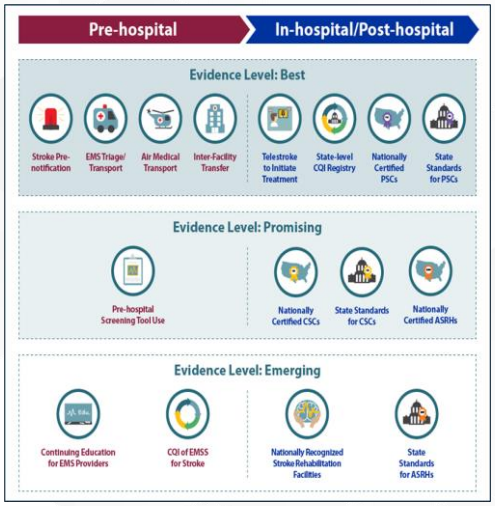
Q/A

Thanks, Cindy! In today's Coffee Break, we will provide an update on the Applied Research and Translation Team's SSOC work by walking through our surveillance, implementation, and impact studies. We will also discuss upcoming translation products from these studies.

## SSOC Policy Surveillance




We'll begin by discussing our policy surveillance study, which focused on the emergency medical services (EMS) prehospital and the in-hospital aspects of the stroke continuum of care.



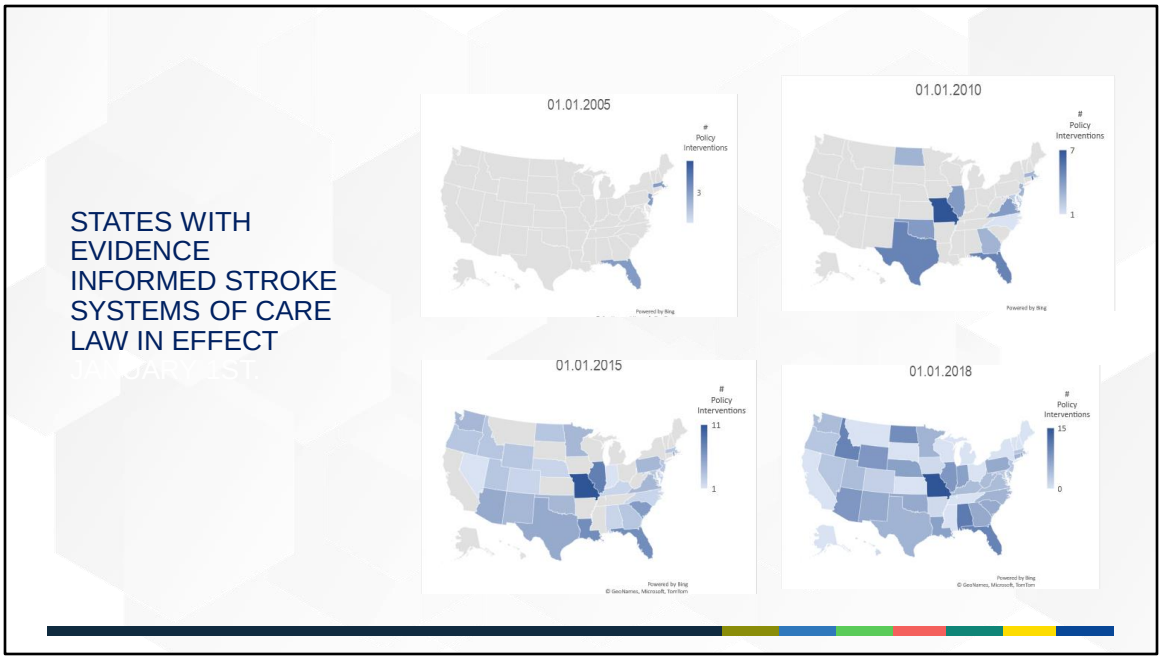

**Stroke policy interventions**

- 15 evidence-informed stroke policy interventions
- 4 implementation policy interventions

**Data collection & analysis**

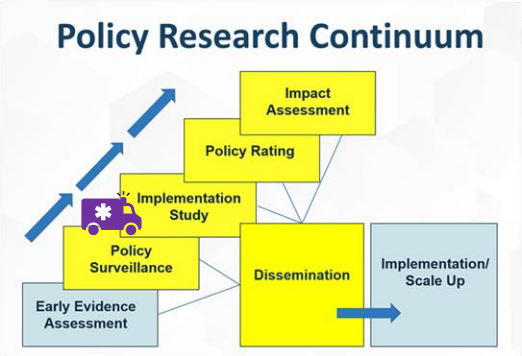
- WestLawNext and state websites
- 50 states and District of Columbia
- Law in effect January 1, 2002-2018
  - Statutes, Agency Regulations, Legislation
  - Prescriptive/permissive

To date, our stroke policy research focuses on the EMS prehospital aspects and the acute/care and in-hospital aspects of the stroke continuum of care. We aligned the strength of the evidence for a set of 15 policy interventions that states had adopted through legislation or rule-making (figure). We applied a rigorous policy surveillance method to conduct a retrospective analysis of state laws using a detailed coding protocol. Two legal analysts used the legal search engine, WestLawNext to retrieve statutes, regulations, session laws and legislation in effect on January 1st, of each year going back to 2002 for the 50 states and the District of Columbia. We also reviewed state websites as needed to ensure we capture the most current law. The analysts code the laws independently and reconcile the results. For most of the policy interventions, we coded the law based on the level of authorization or prescriptiveness – for example if an action was required, required in some circumstances, or authorized. We are currently updating the legal dataset through 2021 with some new variables to include thrombectomy capable stroke center designations, and stroke severity assessment and transport protocols.




Here is an example of our policy surveillance data with some of the temporal and geographic trends in the uptake of state stroke systems of care laws. This series of maps shows the number of evidence informed policy interventions we identified in state law that were in effect on January 1st of 2005, 2010, 2015 and 2018. Please note that the scales used in each map differ slightly. In 2005, there were 3 states with 3 policy interventions in effect. Over time, the number of states with any policies increased and the number of policies in effect per state had also increased.

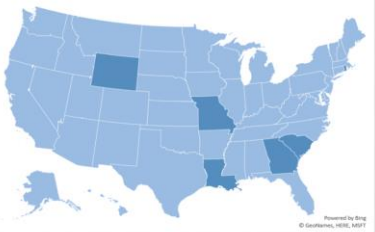
## SSOC Policy Implementation Case Study




Next, I will give an update on the SSOC policy implementation case study.

## SSOC Policy Implementation Study

- **Purpose**: States' experiences developing and implementing prehospital SSOC laws
- **Methods:** Case study of 6 states with enacted SSOC legislation/adopted regulation.
- **Key Findings:**
  - Stroke task forces for statewide & regional collaboration
  - Building and investing in a culture of trust
  - Applying needs-focused education, outreach, and targeted resources to partners
  - Enhancing access to and use of quality improvement data
  - Considering existing infrastructure and technology impacts on implementation



**Near Term Products**

- Manuscript

The purpose of this study was to understand the types of challenges, facilitators and lessons learned from state agencies and organizations involved in the development and/or implementation of the prehospital aspect of the stroke care continuum. This study was commissioned by DHDSP and conducted by the Association for State and Territorial Health Officials (ASTHO) in 2019. The final report was submitted to CDC in 2020.

The six states selected were Georgia, Louisiana, Missouri, S. Carolina, Rhode Island and Wyoming. Each of these states had enacted legislation and/or adopted regulations allowing for the creation of a tiered statewide or regional stroke system of care with 3 or more levels of stroke center certification as well as other prehospital policy interventions. The criteria for state selection also included whether there was a state stroke task force; if the state EMS system was regional or centralized, the use of a stroke registry and EMS data reporting; local autonomy through home-rule; and the urban/rural mix.

The 36 key informants interviewed represented state, regional, and local EMS agencies, public health departments, hospitals, stroke task forces, and other organizations that had been involved with different stages of developing and/or

implementing aspects of the prehospital system of care.

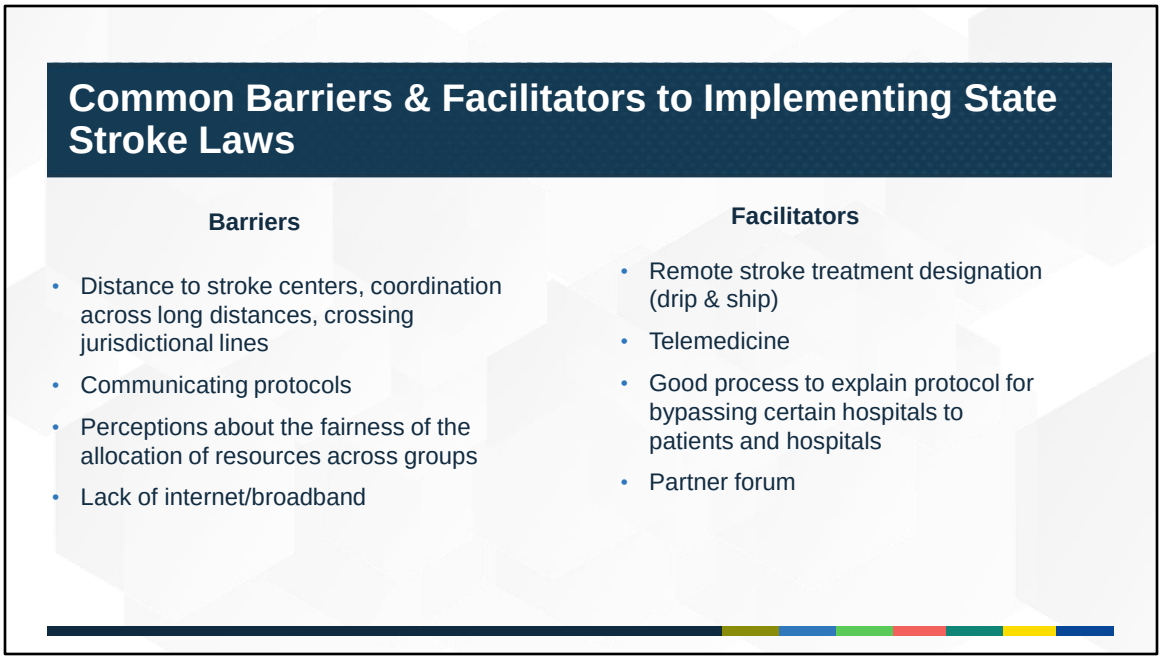
On a very high level, across the states there was consensus on the role of stroke task forces as a means for enhancing collaboration statewide and within regions in the development and implementation of changes to prehospital stroke policies. There was also acknowledgement of the role of state medical directors in the development and enforcement of prehospital stroke protocols.

Quality improvement, data collection, and communication were considered strengths, although many challenges exist. And EMS agency and stroke center outreach, training, education, and communication were important channels for disseminating information about new policies and protocols, particularly to reach populations with limited access to care.

ART staff are currently conducting an in-depth thematic analysis of the interview transcripts and drafting a journal manuscript.

# POLICY IMPLEMENTATION CASE STUDY PRELIMINARY RESULTS

Now let's discuss the results.

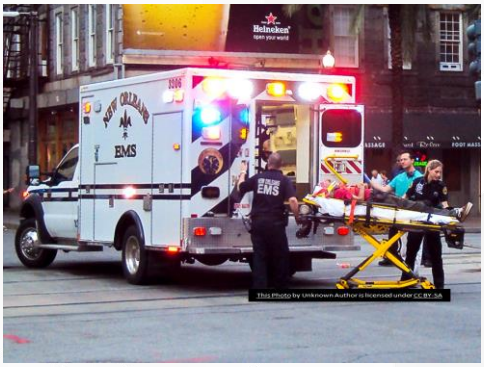



First, we identified common barriers and facilitators to implementation of the state stroke laws. All our interviewees expressed how remote treatment stroke designation has improved availability of care in some states. We also heard that telemedicine for EMS providers is also reportedly taking off, with some agencies putting telemedicine in their ambulances. Overall, they stressed that having a good process in place to explain protocol to EMS, hospitals, and patients was emphasized as an important practice to help all parties understand pre-hospital decisions made by EMS. Finally, the importance of a state level partners forum was reported to help with keeping everyone up-to-date with new protocols and procedures.

Barriers included:
- distance in rural areas to interventional stroke centers,
- communicating protocols in a way that allows patient populations to understand them;
- perceptions about the fairness of the allocation of resources across rural and urban hospitals; and
- lack of internet/broadband access,

## Other Successful Implementation Strategies

- Contracting with medical director to engage pre-hospital and hospital networks
- Sharing data with providers
- Synthesizing of EMS protocol across the state
- Education for EMS providers
- Having multiple dissemination, communication channels

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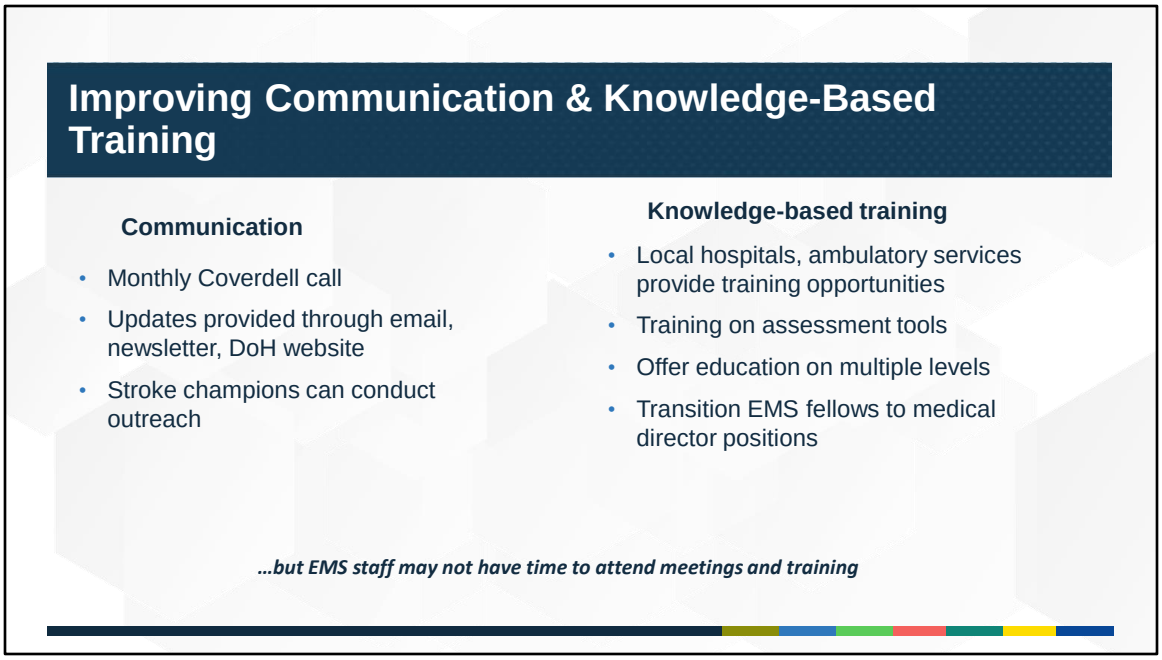
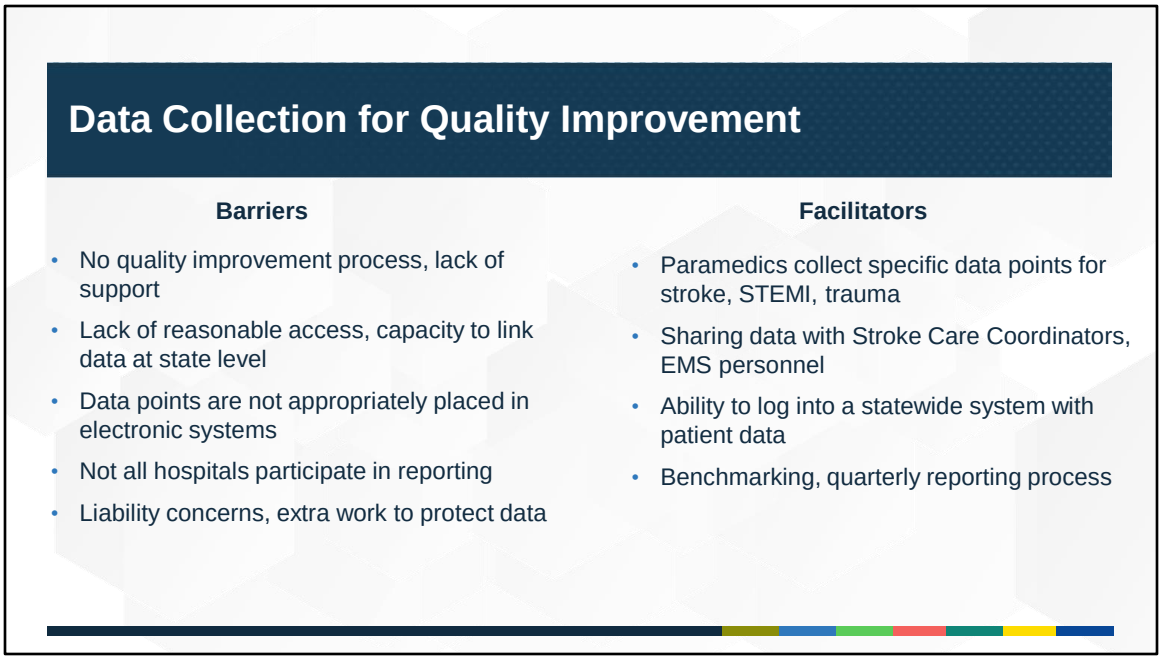
Here we have listed other successful implementation strategies discussed during the interviews. All of the interviewees reiterated the importance of having consistent opportunities to share challenges, solutions, etc. across partners, and making this information easily accessible. Another successful strategy that was mentioned from all interviewees was uniformity in EMS protocols throughout the state.



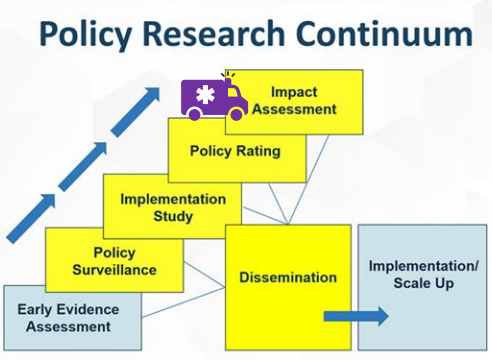

Regarding communication, we found that the monthly CDC Coverdell call was a helpful resource and was credited with getting the state office of EMS on-board with state efforts. The importance of knowledge-based training was also a theme. In one state, conferences throughout state provided opportunities for partners to discuss best practices. And in one state, its state health agency worked with EMS agencies and clinicians to screen tools and develop a training program for those selected tools. However, we do think it's important to note that all of the interviewees mentioned a common barrier to both communication and training, which was that EMS staff often don't have time to attend meetings/trainings due to high work volume and personnel shortages.



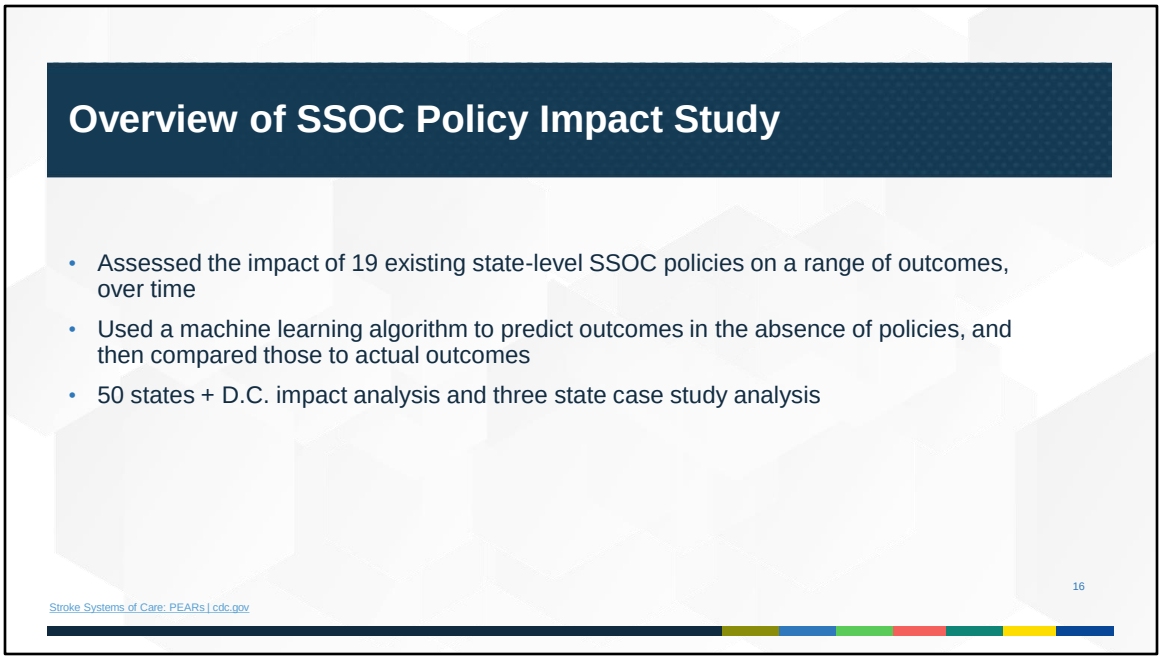

There were also many findings pertaining to stroke data collection. Barriers to data collection in the case study states centered around the extra work required to protect and analyze data; as well as the lack of reasonable access to the data and capacity to link data from different sources. In our study, one state mentioned how they pay for a hospital's subscription to the platform if a hospital chooses to participate in providing data in the state registry. Amongst the interviewees, a key facilitator was having the ability to log into a statewide system to pull and share data on patients with EMS personnel, Stroke Care Coordinators, hospitals, etc.

And now I'll turn it back over to Nina.

## SSOC Policy Impact Study




We kicked off the stroke SSOC policy impact study in January 2020 through a contract with ICF International Inc. This mixed methods study builds on all the earlier work across the policy research continuum and aims to determine the impact of the stroke policies we coded through the retrospective policy surveillance analysis on enhancing stroke systems of care and health outcomes.




OBJECTIVE:

Our objective was to determine whether adopted SSOC policy interventions are associated with improved stroke outcomes by examining pre-hospital and in-hospital policy interventions. Assessed the impact of 19 existing state-level stroke systems of care (SSOC) policies (regulations and/or enacted legislation) on a range of outcomes, over time (from 2012-2018).

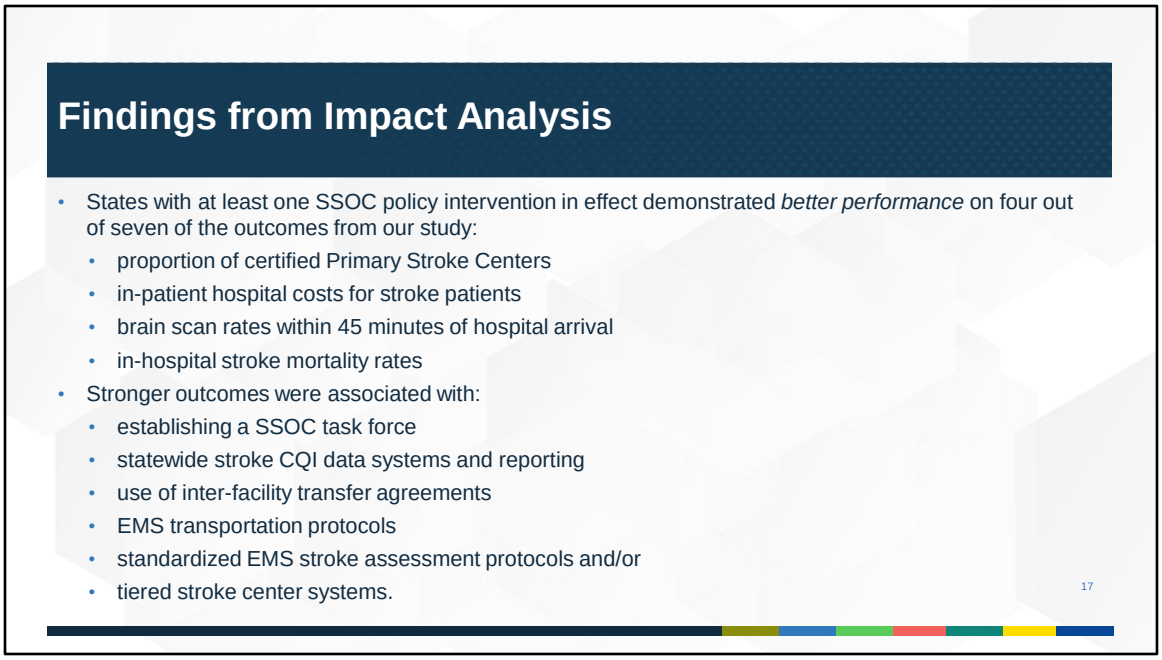
We engaged subject matter experts, internal and external to CDC throughout this study.

METHODS:

- We used a machine learning algorithm to predict outcomes in the absence of policies, and then compared those to actual outcomes observed. Using Bayesian additive regression trees, we compared predicted outcomes (in the absence of policies) to actual outcomes starting 1 year after the first SSOC policy was in effect.
- We interviewed informants knowledgeable about SSOC policies and practices in each state.

- Using data from National Vital Statistics System, we examined patterns of racial and rural/urban health disparities in stroke outcomes at the county level over three time periods.

This was a 50 states + D.C. policy impact analysis and three state (FL, RI, SC) case study analysis



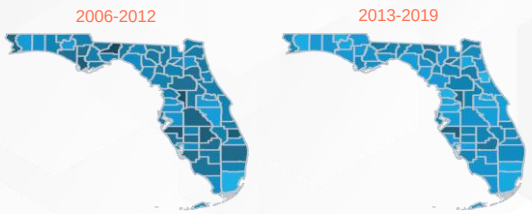

Findings from the impact analysis revealed that states with at least one of these SSOC policy interventions in effect performed better on certain outcomes in our study. Those outcomes included: proportion of certified Primary Stroke Centers, in-patient hospital costs for stroke patients, brain scan rates within 45 minutes of hospital arrival, and in-hospital stroke mortality rates.

Our findings provided evidence of stronger outcomes associated with establishing a SSOC task force, requiring statewide stroke CQI data systems and reporting, and standardizing EMS stroke assessment protocols, among others.

## Findings from Case Study Analysis

- Informants emphasized the importance of:
  - identifying state needs and context
  - securing statewide support
  - educating practitioners about the rationale behind SSOC policies
  - building data systems
- Informants observed that adherence to evidence-based guidelines and quality improvement programs were associated with fewer disparities.

After the start of the Florida Stroke Registry in 2013, Florida has seen reduced racial disparities in stroke mortality rates that state experts have attributed to better directing of resources and targeted performance improvement efforts.

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Informants from our case study analysis emphasized the importance of identifying state needs and context, securing statewide support, educating practitioners about the rationale behind policies, and building data systems. They also observed that adherence to evidence-based guidelines and quality improvement programs were associated with fewer disparities.

## Translation Products

- Evaluation Findings Brief: Centers for Disease Control and Prevention. Strategies for Building and Improving Stroke Systems of Care. Atlanta: U.S. Department of Health and Human Services; 2022. https://www.cdc.gov/dhdsp/docs/SSOC_Evaluation_Brief-508.pdf
- Case Study Findings: Centers for Disease Control and Prevention. Strategies for Building and Improving Stroke Systems of Care. Atlanta: U.S. Department of Health and Human Services; 2022. https://www.cdc.gov/dhdsp/docs/SSOC_Case_Study-508.pdf

STROKE SYSTEMS OF CARE: POLICY RESOURCES | CDC.GOV

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SMEs; State Departments of Public Health with and without Coverdell programs; the American Heart Association and the Brain Attack Coalition; CDC's Coverdell program, & CDC experts in health systems research.

Key Evaluation Questions:
- Do states with SSOC laws demonstrate more improved outcomes over time than before they passed laws and compared to states without laws?
- Do states with more comprehensive SSOC laws show stronger outcomes over time than states with less comprehensive SSOC laws?
- Do states with more prescriptive laws show stronger outcomes than states with less prescriptive laws?
- How do state contextual factors affect the outcomes of interest over time?

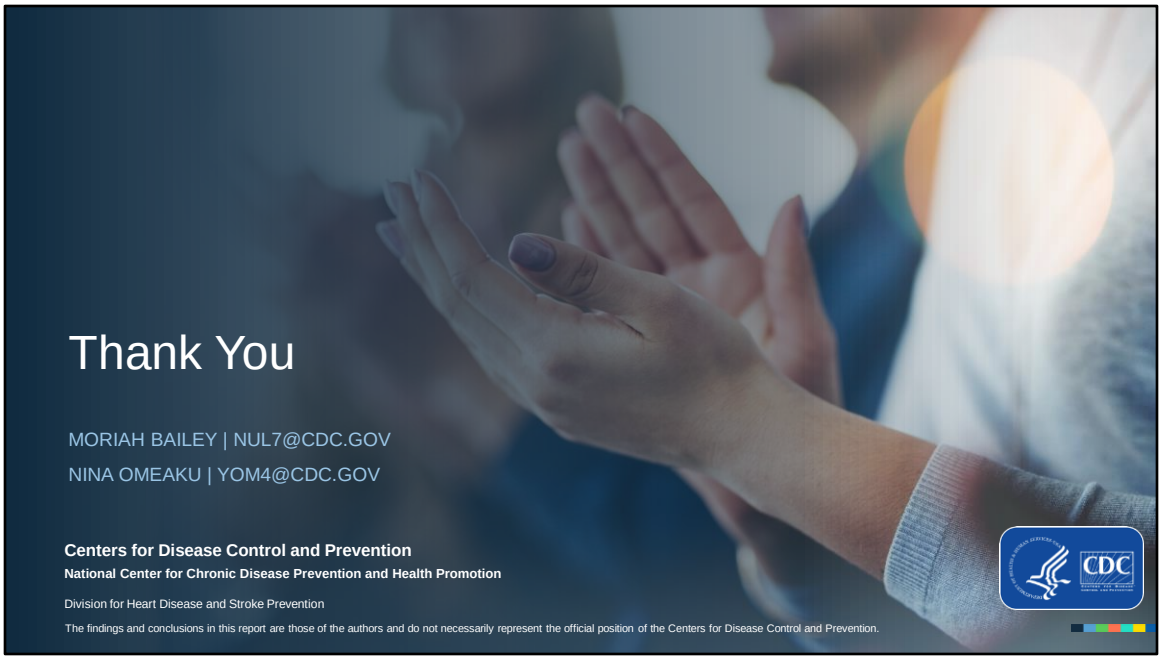
The outcomes of interest include the impact to each state's stroke health care delivery system from a cost, quality and efficiency perspective, as well as the impact on stroke health outcomes.

Near-term Translation Products:
- Evaluation brief (cleared and in production)

- Translation product highlighting mixed method state-specific finding (cleared and in production)
- Manuscript 1: (target journal: *Stroke*, AHA journal): Modeled longitudinal policy data to estimate the impact of state SSOC laws in effect between 2002 and 2018 on seven stroke related outcome measures across 50 states and DC. Study demonstrated that states with one or more state level SSOC policies in effect achieved better stroke outcomes on average than they would have achieved without SSOC policies.(focused on evaluation question #1) (in pre-clearance)
- Manuscript 2: What policy interventions and other factors (e.g., number of policies, prescriptiveness of policies) contributed to better outcomes?
- Conference presentations

# References


- 1. Gilchrist S, Sloan AA, Bhuiya AR, Taylor LN, Shantharam SS, Barbero C, et al. Establishing a baseline: evidence-supported state laws to advance stroke care. J Public Health Manag Pract. 2020;26(Suppl 2, Advancing Legal Epidemiology):S19–S28
- 2. Hahn PR, Murray JS, Carvalho CM. Bayesian regression tree models for causal inference: regularization, confounding, and heterogeneous effects. *Bayesian Anal*. 2020;15(3):965–1056. doi: 10.1214/19-BA1195.




MODERATOR

This concludes today's Coffee Break presentation. At this time, we will take questions from the audience. Please enter your question into the Q/A feature at the bottom of your screen. As we wait for questions from the audience, I'll ask Nina a question to get us started.

Moderator reads question: A participant in the audience might have the following question: "My state hasn't passed legislation to create a stroke system of care, but considering the number of potential types of legislation, were there any particular policy interventions shown to result in stronger positive outcomes?

Answer: When the findings of our studies are released publicly, you will be able to see the precise impact in states that had enacted and put into effect their statutes and/or regulations some or all of the policy interventions we studied. Our findings provided evidence of stronger outcomes associated with establishing a SSOC task force, requiring statewide stroke CQI data systems and reporting, creating EMS transportation protocols, using inter-facility transfer agreements, standardizing EMS stroke assessment protocols, and/or using tiered stroke center systems. We hope that

the information forthcoming can help you best decide the appropriate mix of legislative or regulatory and programmatic approaches to reduce the time to appropriate treatment for stroke patients.