

THE FLORIDA STROKE REGISTRY

ANNUAL REPORT 2019-20

UNIVERSITY
OF MIAMI



UNIVERSITY OF MIAMI MILLER
SCHOOL OF MEDICINE

DEPARTMENT OF NEUROLOGY | MIAMI, FLORIDA

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EXECUTIVE SUMMARY

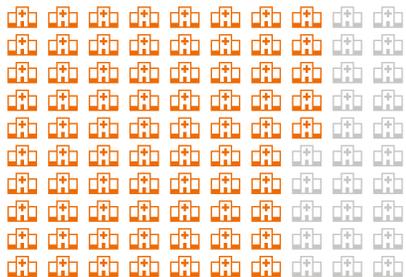
The Florida Stroke Registry (FSR) was established to **IMPROVE THE QUALITY OF STROKE CARE STATEWIDE**. The following 2019-2020 End of Year Report includes updates on standard services as well as the Florida Stroke Registry's response to the COVID-19 pandemic which emerged as a public health crisis in March 2020. As Florida stroke centers and academic medical centers began to implement measures to address the spread of COVID-19, the Florida Stroke Registry quickly mobilized as a well-positioned resource to its 121 participating Florida stroke centers.

Through its various communication modes and access to its multidisciplinary health professional network, the Florida Stroke Registry compiled, documented, and developed informational resources specifically related to stroke and COVID-19, tackling uncharted clinical territory.

As the pandemic continues beyond the fiscal year, and as its impact seeps into all levels of the health community (patients, caregivers, healthcare professionals, and healthcare systems) the value of the Florida Stroke Registry is more relevant than ever as a source of statewide data that may reveal and address changes in health disparities and quality of care.

2019-2020 FLORIDA STROKE REGISTRY HIGHLIGHTS

SUCCESSFUL recruitment of Florida stroke centers with **75% statewide representation**



ONGOING improvement of stroke performance and reductions in disparities

Acute Stroke Treatment Among FSR participating hospitals in Florida	2010	2019
IV Thrombolytic Use (overall)	7%	14%
IV Thrombolytic Use (patients arriving \leq 3.5 hrs. & treated \leq 4.5 hrs. of stroke onset)	69%	91%
Door to Needle in 60 min.	19%	91%
Door to Needle in 45 min.	6%	69%
Defect Free Care (overall quality of care)	61%	93%

NEW educational material & interactive resources including COVID-19 support



INTRODUCTION

The Florida Stroke Registry's mission is:

- 1) to improve the quality of stroke care throughout Florida and for all Florida citizens by tracking and measuring hospital acute stroke performance metrics
- 2) to effectively use registry data to develop evidence-based interventions and initiatives focused on the delivery of high-quality stroke care

In its original iteration, the Florida Stroke Registry began as a National Institute of Health-funded program in 2013 focused on reducing health disparities in stroke treatments and outcomes across Florida. The state of Florida recognized the value of these efforts for its citizens by establishing the legislation "Section 395.30381, Florida Statutes (F.S.)" on July 1, 2017. Today in 2020 and in light of the current national social and health crisis, the Florida Stroke Registry's mission is strengthened along with its commitment to contribute purposefully to assure health equity for all Floridians.

Routinely, the Florida Stroke Registry collects stroke data from Florida stroke centers participating in the American Heart Association's (AHA) Get With the Guidelines Stroke (GWTG-S) Tool. These data not only allow for the quantification of stroke types and demographics (i.e., geographic, race, ethnicity, sex, age, etc.), but also provide the foundation for the Florida Stroke Registry evidence-based, quality of care program. Through the robust and living data set, the Florida Stroke Registry facilitates initiatives to improve the delivery of stroke care while reducing inefficiencies and advancing health care effectiveness in all phases of stroke care. The Florida Stroke Registry works towards **benefiting Florida by developing and informing initiatives/ interventions that improve the quality of life** and the **delivery of stroke treatment** for people who have suffered a stroke, and **improve resource utilization** across the state as related to EMS services and acute stroke care services.

Along with working towards these improvements, and in the midst of the ongoing public health crisis, the Florida Stroke Registry has also demonstrated its agility and ability to quickly respond to the needs of its stakeholders. Quickly developed and disseminated new **COVID-19**/stroke-related programs were designed to specifically address issues directed at hospitals, health care providers, or Florida residents. Not surprisingly, one of the greatest and immediate resources from the Florida Stroke Registry has been its communication platforms for health professionals. The online forums allow instant contact to inquire, share, or inform on **COVID-19** and stroke related topics. As a result, the Florida Stroke Registry stakeholders were able to conduct short discussions on current topics (i.e., availability of PPE; protocol for stroke patients diagnosed with **COVID-19**; the marked drop in stroke admissions shortly after the pandemic escalated; patients' reluctance to utilize hospital services due to fears of risks of **COVID-19** transmission; the use of stroke treatments on **COVID-19** positive stroke patients, etc.). These communications and interactions have not only strengthened the collaborative nature between the Florida Stroke Registry health professionals, but also have provided a rich foundation for research that will not only improve stroke care, but also inform other emergency response events.

As we continue to traverse this era of the **COVID-19** pandemic, communication, and the ability to network (online) is critical. **The Florida Stroke Registry is well positioned to not only provide the platform for communication between stakeholders, but also well equipped to explore and address pertinent questions and answers related to research, education, clinical practice, patient care, prevention, transition-of-care, and policy.** The following report will provide an overview of efforts accomplished by the Florida Stroke Registry during fiscal year 2019-2020.

PROBLEM STATEMENT

Stroke is the fifth leading cause of death and one of the top causes of preventable long-term adult disability in the United States. According to the American Heart Association, cardiovascular disease (CVD) is the leading cause of death, and a major predictor of stroke incidence. Worldwide, stroke is the 2nd cause of death and adult permanent disability, with a 25% lifetime risk of stroke after age 25. Furthermore, CVD accounts for nearly 18 million deaths annually, and is predicted to be responsible for over 22 million deaths by 2030. Together, direct costs of CVD and stroke exceeded \$200 billion between 2014 and 2015.

In Florida, rates of hospitalization due to stroke over the past 10 years continue to slowly trend downward, while crude death rates for stroke continue to rise (Florida Department of Health's FL Health Charts). As reported last year, Florida continues to lead the US in increasing stroke mortality, and South Florida specifically is a 'hot-spot' for increasing rates. Although stroke commonly occurs in people older than 60, stroke is more frequently affecting people at younger ages, particularly young Hispanic adults with preventable risk factors. There is additional evidence that Caribbean Hispanic adults are at a higher risk of stroke, a concern particularly relevant to Florida given state demographic data (mean population age of 42, a large Caribbean Hispanic community, and an ever-growing aging population). Together, the evidence underscores the continued need for a statewide stroke initiative like the Florida Stroke Registry which facilitates the development of stroke education (i.e. prevention, treatment, rehabilitation), and improvement of the quality of stroke care for all Florida citizens.

Compounding the state's serious stroke statistics, are indirect and direct effects resulting from the coronavirus pandemic. Preliminary observational data has suggested a link between COVID-19 and stroke among people younger than 50. Additionally, other emerging evidence suggests that **COVID-19** may be associated with coagulopathies that increase risk of stroke. Despite this phenomenon, our team at University of Miami/Jackson Memorial Hospital and our colleagues at Tampa General Hospital have observed that stroke admissions in March and April, 2020 declined compared to this time last year, suggesting that stroke patients may be delaying or abstaining from seeking care due to concerns regarding **COVID-19**. These intersecting concerns can only be addressed if we understand the full landscape of both coronavirus and cerebrovascular disease. As a result, the need for robust epidemiological tools to track disease incidence and outcomes is more important than ever. As super user account holders in the AHA's GWTG-S tool, the Florida Stroke Registry not only has access to stroke data but also to new **COVID-19** measures recently added through updated GWTG-S modules. Additionally, the Florida Stroke Registry has access to the AHA **COVID-19** Cardiovascular Registry, a separate registry which includes all possible diseases including stroke. These data are yet to be fully explored since the majority of the data reflecting the time period of the pandemic will not be available until after the end of this fiscal year in July 2020.

As the Florida Stroke Registry pursues its aims to identify gaps or improvements in disparities and the quality of care statewide, the registry continues to seek full representation of all Florida stroke center. Since our last report, the Florida Stroke Registry has increased from 50% to 73% representation of all eligible Florida Agency for Health Care Administration (AHCA) stroke centers. It is only through complete state-wide hospital representation that the state system of stroke care can be accurately reviewed to ensure optimum outcomes, determine which populations are well-or under-served, and to measure a representative data set of the quality of care and safety.

OVERVIEW OF THE FSR

The University of Miami Florida Stroke Registry team is composed of members of the Departments of Neurology and Public Health Sciences at the University of Miami Miller School of Medicine. The core group is composed of Neurologists, Neuroscientist, Biostatisticians, and Epidemiologists, and is led by Project Director Dr. Ralph L Sacco, Chairman of Neurology, Olemberg Family Chair in Neurological Disorders, Miller Professor of Neurology, Epidemiology, and Human Genetics at the Miller School of Medicine, Senior Associate Dean for Clinical and Translational Science, University of Miami, and Chief of Neurology Services at Jackson Memorial Hospital. Along with the Biostatistical and Educational Core Directors Dr. Tatjana Rundek and Dr. Jose G. Romano, respectively, Dr. Sacco has led the team in the creation, development, and implementation of goals and initiatives for over 8 years since the initiation of the registry as an NIH funded project.

During this reported year, the registry increased staff members with support specialists, Sarah Roberts and Marti Flothmann. Supervised by Dr. Carolina M. Gutierrez and overseen by Dr. Sacco, the addition of support specialists has been instrumental for the delivery of timely, standard programmatic services as well as the implementation of rapidly developed non-conventional **COVID-19** related initiatives. The new **COVID-19** programs were guided in design and development by the FSR clinicians involved in the Education and Training Core led by Dr. Romano. Through their first-hand experiences, the Education and Training Core clinicians provided insight on the immediate needs and focus for **COVID-19**/stroke related messaging and education (initiatives detailed in [Sections B and C](#) “Strategies and Accomplishments”). Analyses of the **COVID-19**/stroke data will not be available until the next fiscal year (July 2020) due to routine time-lags in data refreshing. Meanwhile, the Biostatistics/Data Core led by Dr. Rundek provides ongoing analysis with the statewide stroke data set. The core's expertise in data linkage of large and distinct datasets (i.e., CMS, EMSTARS) has developed a preliminary plan to link the forthcoming Agency for Health Care Administration (AHCA) and Florida Department of Health (DOH) vital statistics data (detailed in [Section A.4](#) “Strategies and Accomplishments”). Our team is completed with the valuable input from the FSR consultant, Mary Robichaux, who as past AHA Vice President in the South East Region brings ten years of historical knowledge and experience with the GWTG-S tool and stroke data. Table 1 lists current members of the Florida Stroke Registry (FSR) University of Miami Team.

Table 1 Florida Stroke Registry University of Miami Team

Ralph L. Sacco, MD MS Project Director	Tatjana Rundek, MD PhD Biostatistics Director	Jose G. Romano, MD Education and Training Director
Carolina M. Gutierrez, PhD Research and Advocacy Director	Chuanhui Dong, PhD Biostatistician	Negar Asdaghi, MD
Sarah Roberts, MPH Research Support Specialist	Hannah Gardener, ScD Epidemiologist	Sebastian Koch, MD
Marti Flothmann Research Coordinator	Kefeng Wang, MS Data analyst	Erika Marulanda-Londoño, MD
Mary Robichaux Consultant	Antonio Bustillo, MSPH Data analyst	

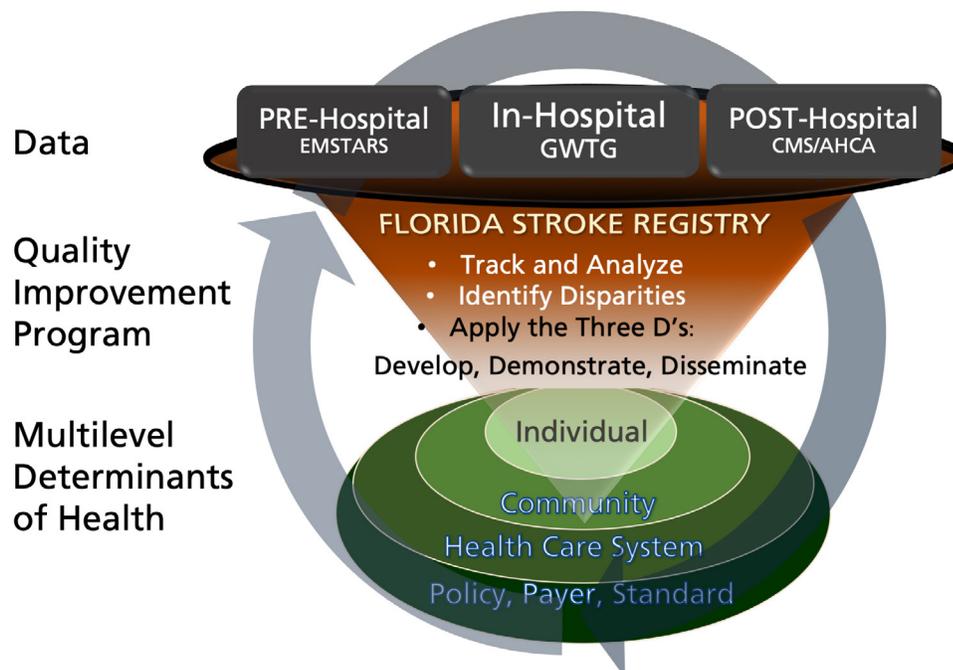
OVERVIEW OF THE FSR

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Working in conjunction with the DOH and the AHA/American Stroke Association (ASA), the FSR involves multiple stakeholders across the state of Florida that are represented on a number of committees detailed in the sections below ([Section B4-7 “Communication and Engagement”](#)). Because our stakeholders include clinicians, researchers, academics, industry, patients, and caregivers we actively seek to engage the many leaders in stroke care as envoys of our initiatives, thereby broadly disseminating FSR initiatives across the state of Florida.

The Florida Stroke Registry is a quality improvement program which tracks, measures, and analyzes data to identify gaps or improvements in stroke care. Originally, the FSR focused predominantly on in-hospital acute stroke performance metrics (i.e., standardized data that is pertinent to establishing a stroke centers level of certification which indicates a hospital's capacity to provide care for their stroke patients; represented in Figure 1 (center box- “in-Hospital”). Resulting analyses from the standardized in-hospital, GWTG-S datasets continue to be used by the FSR to develop, demonstrate, and disseminate initiatives and interventions (detailed in [Section “A. STRATEGY: Tracking and Measuring Data”](#)). This reported year, the **FSR has seen its potential to impact and inform the entire stroke health system of care** through increased partnerships and access to data reflecting all phases of stroke care. Illustrated in Figure 1, the FSR Conceptual Model includes Data buckets representing “PRE” and “POST” hospital stroke care (black left box- “PRE-Hospital” and black right box- “POST-Hospital”). At the “PRE” hospital setting, this year's successful recruitment of new participating counties in the FSR Regional Dashboard initiative (which informs EMS transportation policy) has increased the FSR's reach to new stakeholders like EMS and paramedics. At the “POST” hospital phase, access to AHCA and DOH vital statistics data provides the FSR a perspective on stroke long-term health outcomes data that has not been readily available in the GWTG-S data set. Although FSR pre and post phase of stroke care initiatives are still under development, this reported year has provided the FSR a foundation to solidify partnerships, establish the FSR's role (as a Quality Improvement Program), and refine analytic protocol allowing the FSR to efficiently utilize datasets which effectively impact the Multilevel of Determinants of Health.

Figure 1. Florida Stroke Registry Conceptual Model



OVERVIEW OF THE FSR

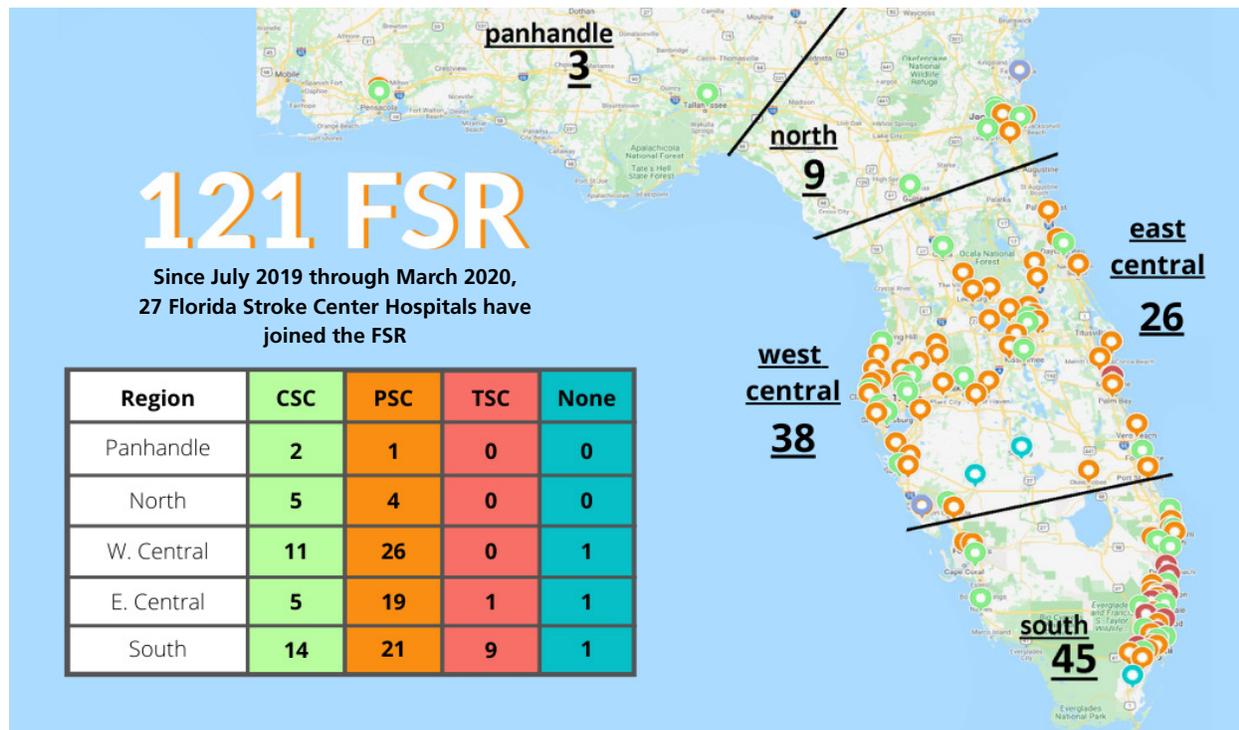
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Florida legislation states that all Florida stroke centers should participate in the Florida Stroke Registry. The FSR currently consists of 121 participating Florida stroke centers of the qualifying 162 Florida stroke centers listed on the AHCA website.

This year, our recruitment efforts focused primarily on direct follow-up with hospitals already receiving the required documentation to join the FSR but pending signature for completion. The University of Miami Florida Stroke Registry (UM FSR) team rigorously established and maintained contact with the hospitals, the AHA, and IQVIA (the data warehouse for the GWTG-S data) as anyone of these entities may have been the source of the required final signature. Through these efforts, 27 additional Florida stroke centers were added to the FSR from July 2019 through March 2020. At the initiation of the **COVID-19** pandemic policies, in March 2020, normal recruitment activities were halted due to hospitals being restricted from participating in non-essential research activities (including administrative processing). The map below (Figure 2) illustrates FSR participating hospitals, their distribution statewide, and their associated stroke center type (37 green = Comprehensive Stroke Center; 71 orange = Primary Stroke Center; 10 red = Thrombolytic Stroke Center; 3 blue = hospitals which are in process of obtaining certification).

The Florida Stroke Registry regularly documents certification type as a hospital characteristic used in aggregate data analysis. This fiscal year, an increased number of FSR stroke centers are nationally certified as they comply with 2019 stroke legislation mandating all stroke centers acknowledged by AHCA and listed at the AHCA website should be nationally certified by July 2021.

Figure 2. Florida Stroke Registry Hospital Participation Map



STRATEGIES AND ACCOMPLISHMENTS

A basic but major function of the Florida Stroke Registry is the collection of stroke data. As mentioned earlier, these data not only allow for the quantification of stroke types and demographics (i.e., geographic, race, ethnicity, sex, age, etc.), but also provide the foundation for the Florida Stroke Registry evidence-based, quality of care program. The following strategies are applied to assure that data collected is used purposefully and ultimately to help improve stroke care for all Floridians. Below we detail three applied strategies and updates from this fiscal year.

A. STRATEGY: TRACKING AND MEASURING DATA

As an end result of tracking and measuring data submitted throughout the year, the FSR has developed different initiatives that provide a visualization of the data. The Annual Statewide Dashboards, Annual Hospital Disparities Dashboards, and Regional Dashboards are targeted to different audiences and provide different perspectives on the quality of stroke care performance. These dashboards serve as useful, dynamic tools for the end user, and as examples of the registry's capability to inform a variety of target audiences and different phases of stroke care.

1) Annual Statewide Dashboards

At the most global level of information, the statewide reports graphically display aggregate annual Florida (FSR GWTG-S hospitals) data in comparison to performance data from hospitals nationally. Publicly accessible at the website (www.floridastrokecollaboration.org), the dashboards are also formatted to provide an overview of FSR stroke hospital performance by race/ethnicity and sex across 14 acute stroke measures. Figure 3 below provides overview infographic of the Statewide Annual Dashboard strategy. The 2019 Statewide Dashboard will be the third of its kind, and when comparing across the years, the 2019 dashboards show that Florida continues to provide excellent overall performance in time metrics considered most relevant in determining the quality of acute stroke care ([Appendix 1- List of 14 Statewide Dashboards Measures](#); Appendix 2 displays larger images of the 2019 Annual Statewide Dashboards. For full size images [see the FSR website](#).

Figure 3. Florida Stroke Registry Statewide Dashboard - Strategy



- Available in July
- Aggregate reports
- Stratified by
 1. GWTG-S national vs Florida Hospitals
 2. Race/Ethnicity
 3. Sex

14 ACUTE HOSPITAL STROKE MEASURES AND OUTCOMES

- 1) IV thrombolysis administered arriving to the hospital w/n 2hrs of symptom onset and receiving treatment by 3hrs of symptom onset
- 2) IV thrombolysis administered arriving to the hospital w/n 3.5hrs of symptom onset and receiving treatment by 4.5hrs of symptom onset
- 3) Door to needle time within 60 mins
- 4) Door to needle time within 45 mins
- 5) Door to CT within 25 mins overall
- 6) Antithrombotic therapy
- 7) Deep Venous Thrombosis prophylaxis
- 8) Antithrombotic therapy
- 9) Anticoagulation therapy for atrial fibrillation/flutter
- 10) Statin medication
- 11) Counselling or medication for smoking cessation
- 12) Defect Free Care
- 13) Modified Rankin Score at discharge(0-2)
- 14) Modified Rankin Score at discharge(3-6)

STRATEGIES AND ACCOMPLISHMENTS

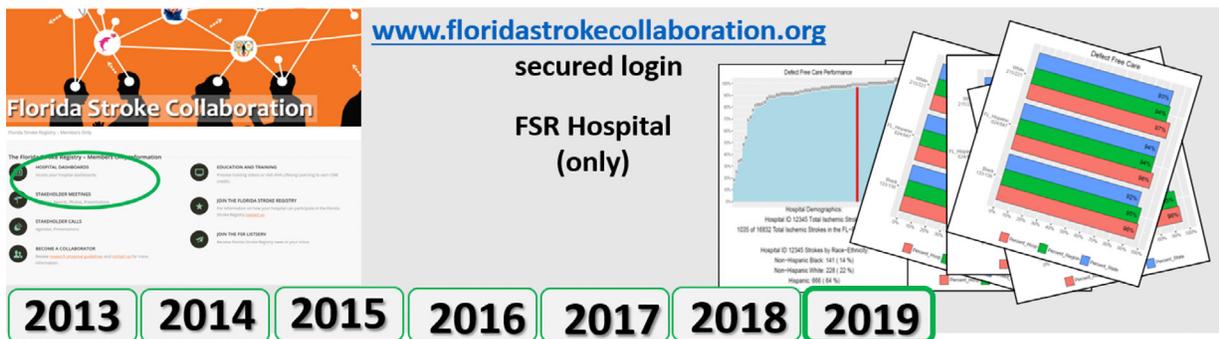
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2) Annual Hospital Disparities Dashboards

Developed under National Institute of Health and Stroke Prevention Intervention Research Program cooperative grant (NIH/NINDS U54 NS081763), the Annual Hospital Disparities Dashboards are hospital-specific and are a self-monitoring tool to track and measure 17 acute stroke care performance measures displayed by race/ethnicity and sex to reduce inequities in the delivery of stroke care (Figure 4 below provides an overview graphic of the Annual Hospital Disparities Dashboard strategy - Appendix 3 List of 17 Annual Hospital Disparities Dashboards Measures).

The Dashboards have been disseminated yearly to participating FSR hospitals since 2013. Only FSR hospitals may access and view their respective dashboards through the secured login at the Florida Stroke Collaboration website. The utility of the Annual Hospital Disparities Dashboard extends beyond a self-monitoring and quality improvement tool as hospitals have reported using the Dashboards as visual aids at community outreach meetings and for explaining to patients and family members stroke risk, outcomes, and prevention in relation to race/ethnicity or sex. We are proud to know that our FSR hospital dashboards have enlightened hospitals to disparities in acute stroke care previously not recognized and that this intervention has helped hospitals seek opportunities to reduce these disparities in stroke care. The FSR strongly encourages hospitals to submit complete data on all acute stroke hospitalizations in order to ensure an accurate reflection of the hospital's performance.

Figure 4. Florida Stroke Registry Annual Hospital Disparities Dashboard - Strategy



- Available in July
- Hospital-Specific Reports
- Stratified by
 1. Race/Ethnicity
 2. Sex

17 ACUTE HOSPITAL STROKE MEASURES AND OUTCOMES

- 1) IV thrombolysis administered arriving to the hospital w/n 2hrs of symptom onset and receiving treatment by 3hrs of symptom onset
- 2) IV thrombolysis administered arriving to the hospital w/n 3.5hrs of symptom onset and receiving treatment by 4.5hrs of symptom onset
- 3) Door to needle time within 60 mins
- 4) Door to needle time within 45 mins
- 5) Door to CT within 25 mins overall
- 6) Antithrombotic therapy
- 7) Deep Venous Thrombosis prophylaxis
- 8) Antithrombotic therapy
- 9) Anticoagulation therapy for atrial fibrillation/flutter
- 10) Statin medication
- 11) Counselling or medication for smoking cessation
- 12) Defect Free Care
- 13) Modified Rankin Score at discharge(0-2)
- 14) Modified Rankin Score at discharge(3-6)
- 15) Ambulatory Status at discharge
- 16) In-hospital mortality
- 17) Discharge Disposition

STRATEGIES AND ACCOMPLISHMENTS

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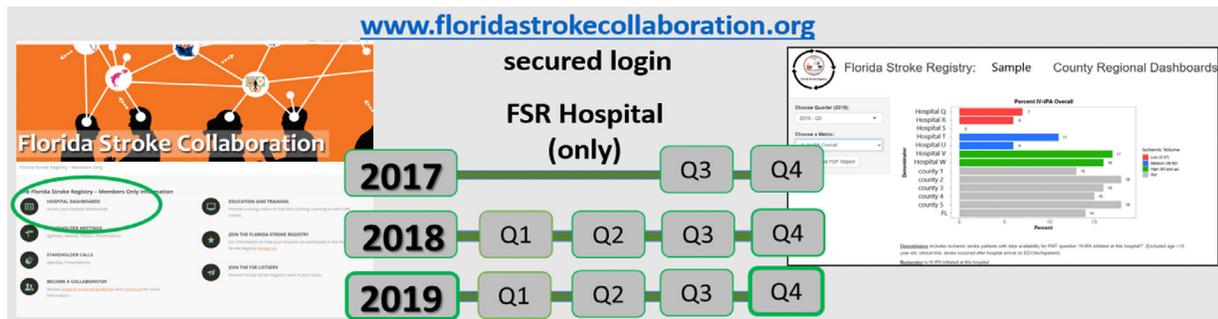
3) Regional Dashboards

In 2016, a grassroots effort involving multiple FSR Stakeholders (Broward and Palm Beach County EMS Medical Directors, stroke directors and neuro-interventionalists representing local hospitals, and the FSR team at the University of Miami), led to the development of a powerful and informative tool, the Regional Dashboard. Fully implemented on November 2018, the FSR has since produced Quarterly Regional Dashboards, which offer a snapshot of hospital performance measures related to treatment with IV thrombolysis and/or endovascular surgery.

These dashboards are only available to participating FSR hospitals within participating counties through a secure login at the Florida Stroke Collaboration website (Figure 5 below provides an overview infographic of the Regional Dashboard strategy). The county-specific hospital performance measures are blinded and displayed side-by-side to compare surrounding hospitals within the same county.

A composite overview of the entire year is also provided with the Annual Regional Dashboard. ([Appendix 4 List of 16 Regional Dashboards Reperfusion Treatment/Outcome Measures](#)).

Figure 5. Florida Stroke Registry Regional Dashboard - Strategy



- Available Annually in (July) and Quarterly
- Hospital-Specific Reports
- County-Specific Reports
- Initiative to strengthen collaboration between hospitals and EMS

16 ACUTE HOSPITAL STROKE MEASURES AND OUTCOMES

Intravenous Tissue Plasminogen Activator (IV thrombolysis) Performance Measures

- 1) % IV thrombolysis overall
- 2) Median Door to Needle among those receiving IV thrombolysis
- 3) % IV thrombolysis Arrive at 3.5hrs and treat at 4.5hrs
- 4) % mRS 0-2 at Discharge among those receiving IV thrombolysis
- 5) % mRS 0-2 at 90 Days among those receiving IV thrombolysis
- 6) % Symptomatic intracerebral hemorrhage after IV thrombolysis treatment
- 7) % EVT among those Arriving in 24hrs
- 8) % EVT among those Arriving in 6hrs
- 9) Median Door to Groin Time among those receiving EVT (transfer included)

Endovascular (EVT) Performance Measures

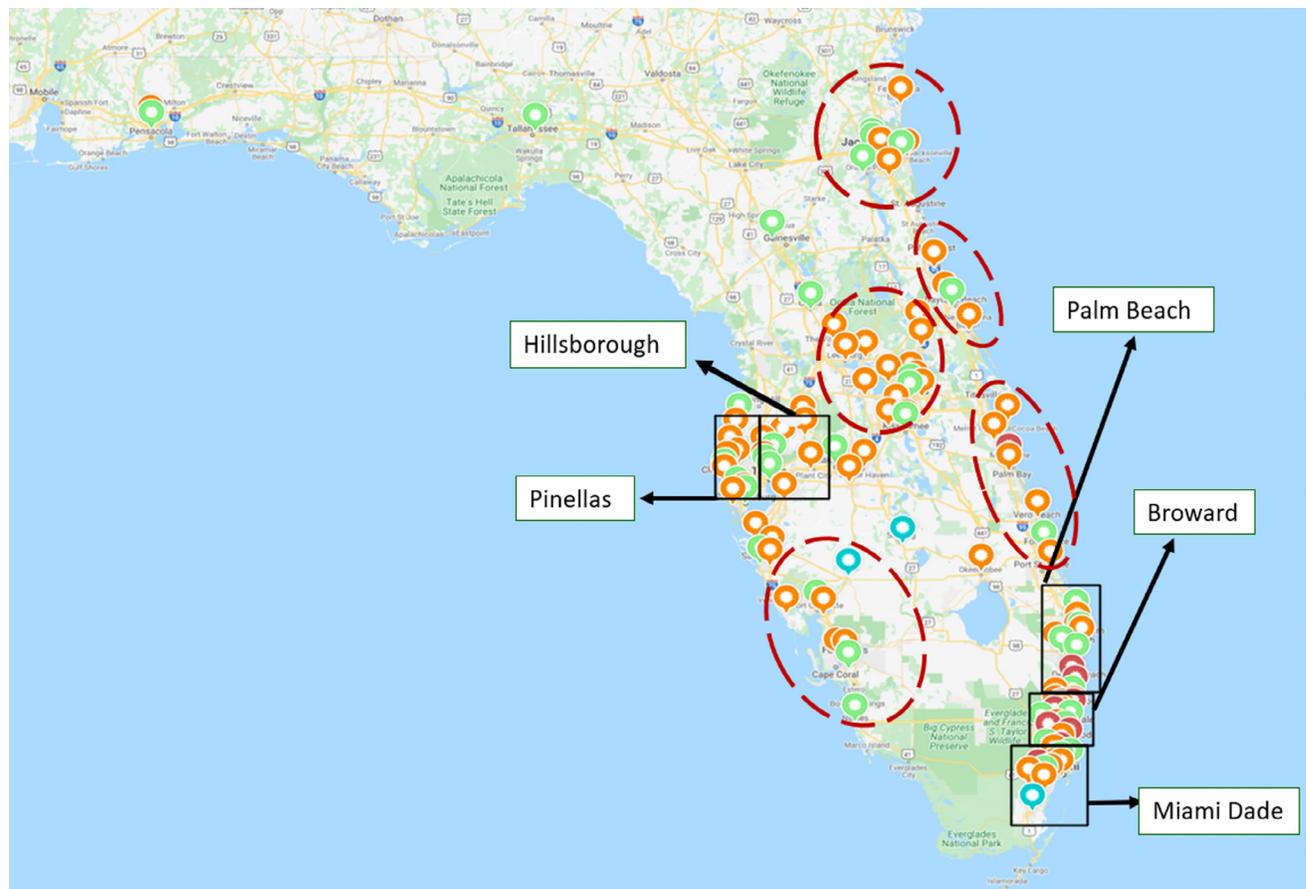
- 10) Median Door to Groin Time among those arriving within 6hrs and receiving EVT
- 11) Median Door to Groin Time among non-transfer patients arriving within 6hrs and receiving EVT
- 12) Median Door to Groin Time among those arriving between 6-24hrs and receiving EVT
- 13) Median Door to Groin Time among non-transfer patients arriving between 6-24hrs and receiving EVT
- 14) % mRS 0-2 at Discharge among those receiving EVT
- 15) % mRS 0-2 at 0 Days among those receiving EVT
- 16) % Symptomatic intracerebral hemorrhage after IA thrombolysis or MER treatment

STRATEGIES AND ACCOMPLISHMENTS

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This year, we have disseminated quarterly data and a 2019 Annual Regional Dashboard to the original county participants, Broward, Palm Beach, as well as three new counties, Miami Dade County, Pinellas, and Hillsborough County (Figure 6, white boxes). These recruitment efforts begin to address our proposed milestone from last year; to add more counties to the initiative. By providing the online platform allowing participants a view of (blinded) county-specific hospital data, the Regional Dashboard initiative offers counties the opportunity to strengthen and better coordinate their local stroke system of care. In an effort to expand statewide the benefits of the FSR tool which assists in improving and refining stroke patient transportation policies, the FSR will continue to encourage other counties and/or defined regions (Figure 6 red dashed circles) to participate in the Regional Dashboard initiative.

Figure 6. Florida Stroke Registry Regional Dashboard Participating Countries and Target Counties



STRATEGIES AND ACCOMPLISHMENTS

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Other milestone accomplishments related to the FSR Regional Dashboards involved the improved and enhanced visualization of the reperfusion measures represented in the dashboards.

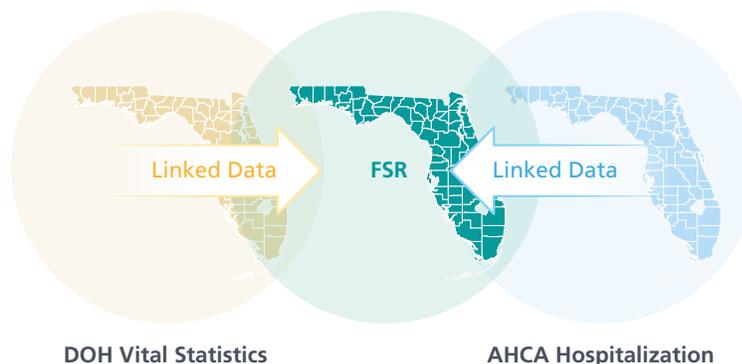
We have increased the dashboards utility by adding new functions for data visualization, which allow the viewer to choose individual or multiple quarters of data for comparison. The additional functions also provide hospitals options to view different comparisons of their hospitals data results (e.g., performance measures by hospital; hospital performance measure trends; hospitals by performance measure; hospitals by counties/surrounding regions by performance measure. Visit the [“About the FSR” section in the FSR website](#), to view a sample of the Regional Dashboards). We will continue to refine data visualization by adding functions based on continued feedback from the hospitals participating in the Regional Dashboard initiative.

To this end, we have piloted a **Florida Stroke Registry Survey: Dashboard Utility & Effectiveness (one of our Service Deliverables in the fiscal year)**. The survey was disseminated on May 11, 2020 via our listserv with basic completion instructions and a link to the REDCap survey (Appendix 5 Dashboard Survey). The survey contained three separate sections related to each of the dashboard types (as described above). All sections contained questions regarding awareness, use, quantity of use, and feedback on the dashboards. We stopped the survey one month later on June 11, 2020. Only four responses were collected, and it is very likely the low response rate is due to the timeframe in which the survey was disseminated. The beginning of May was still a time when most hospitals were prioritizing their focus on **COVID-19** related operations. Despite the very few responses, three were related to the Regional Dashboards. Two were fully complimentary and the third provided the recommendation to revise terminology to reflect new guidelines (which we have updated due to this recommendation). Further, we have reported the limited findings to our hospital collaborators during the FSR Coordinator Call held on June 18, 2020 (detailed below under B. Community Outreach, 6. Stakeholder/Coordinator Calls). Through the piloted survey, the FSR team has gathered information for better implementation and plans to disseminate a revised version of the survey in the next fiscal year (details described in Section “Next Steps”).

4) Data Linkage: AHCA and DOH Vital Statistics Data

While The FSR is comprehensive in its capture of acute-care stroke metrics for participating hospitals, the GWTG-S modules are not robust for tracking or measuring other phases of care (i.e., EMS data or long-term patient outcomes). Through the DOH, the FSR has submitted a formal application to obtain AHCA’s inpatient, ambulatory, and emergency department data, as well as the DOH mortality data. Linking the FSR data set with these valuable statewide datasets enhances immensely the value of each and increases the knowledge gained from evidence-based results that will inform and improve the health of Floridians (Figure 7).

Figure 7. Florida Stroke Registry data will be propensity matched to state data



STRATEGIES AND ACCOMPLISHMENTS

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In preparation of the receipt of AHCA and DOH data and in compliance with FSR services provided this fiscal year, the Biostatistics and Data Management Core has developed a linking methodology plan to match the datasets.

The probabilistic plan involves matching the individual admissions from the FSR to the state databases by identifying unique combinations of identifiers, including hospital identification number, admission and discharge dates, date of birth, and sex. We first aim for an exact match for ischemic stroke code and hospital ID plus state, sex, admission/discharge date (+/- 1 day), age (+/- 1 year), and ZIP code. Following the identification of these perfect matches we will proceed with an iterative process to identify reasonable matches between the two databases. We see if there are potential matches that meet these criteria other than the ischemic stroke code. Next we see if there are potential matches that do not share the exact same hospital ID but match on ischemic stroke code, state, sex, zip code, admission/discharge date (+/- 2 days), and age (+/- 1 year). Lastly, we identify mismatches for ischemic stroke code and hospital ID but are matched for state, sex, admission/discharge date (+/- 2 days), and age (+/- 1 year).

Upon receipt of the state data and successful matching of datasets, an initial analysis planned by the FSR is to review long-term stroke outcomes and transitions of care. Analyses will address reasons for readmission to hospital and disparities in the post-hospital phase of care. This analysis will become more valuable with the incorporation of the new GWTG-S **COVID-19** measures. Through the FSR's ability to match datasets (i.e., CMS data, publicly available social determinants of health data, EMS data, and the AHA's **COVID-19** Cardiovascular Registry data set), big data is harnessed to provide needed insight to the current public health crisis. The FSR looks forward to the initial opportunity to incorporate AHCA and DOH data into its future analyses.

B. STRATEGY: COMMUNICATION AND ENGAGEMENT

To establish an all-encompassing Community Outreach Strategy, the FSR developed a Communication Plan which was approved by the Department of Health last year. The Communications Plan was developed to maintain contact with FSR participating hospitals and stakeholders, as well as to separately ensure contact with AHCA stroke centers not currently participating in the FSR. The Communication Plan includes: a Communication Log (a monthly log of communications between UM FSR and all stakeholders as well as non-FSR hospitals; submitted to DOH in every monthly report) and an Outreach Plan that maps strategies to engage stakeholders: **1) maintaining a website; 2) listserv; 3) developing and regularly disseminating an FSR newsletter; 4) holding regular Executive Committee Meetings/Calls; 5) Advisory Committee Calls; 6) Stakeholder/Coordinator Calls; and 7) hosting a yearly in-person meeting including all committees and participating FSR hospitals).**

The multifaceted community outreach strategy has ensured that FSR messaging, education, internal and external best practices reach the FSR professional community, and that new/ongoing FSR stakeholder concerns reach the FSR team. These vehicles of communication have been particularly effective with the immediate deployment of information and resources during the COVID-19 pandemic such as the educational video series, "FSR at the Front Lines" (detailed in Section C.4 "Strategies and Accomplishments"). Below are brief updates on each of these partnership/collaborative strategies.

STRATEGIES AND ACCOMPLISHMENTS

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1) Florida Stroke Registry Website (Florida Stroke Collaboration)

The Florida Stroke Registry website - <https://floridastrokecollaboration.org/> has been updated to include a **home page that is open source** and available to the general public and includes an Announcements section, FSR Newsletter, a link to the **COVID-19** resource video series “FSR At The Front Lines”, link to the “About the FSR, an events calendar, and a link to general information about other (NIH funded) projects which use FSR data and enhance the Registry’s mission to improve the quality of stroke care and address disparities in care. The open-resource landing page also provide links to the DOH and **COVID-19** updates, as well as links to the AHA/ASA.

In addition, the FSR continues to develop a website platform that will better inform stakeholders and the general public about FSR hospitals. **Though our collaboration with SCAN360 (operated out of the University of Miami Department of Public Health Sciences), we have begun to address another one of our milestones, to develop an interactive map of FSR participating hospitals, their characteristics, as well as that of their surrounding hospital catchment areas.** The interactive FSR hospital map will include updated and publicly accessible hospital information such as address, number of licensed beds, hospital national accreditation and/or AHCA certification, and proportion of stroke cases by race/ethnicity and sex. The tool will visually orient new FSR hospitals and currently active FSR hospitals on the extent of statewide stroke center collaboration in the registry. The tool will also keep stakeholders and the general public informed of any demographic or hospital characteristic updates related to geocoded FSR hospitals.

The current website site continues to contain a **secured log-in for FSR hospitals members** where individual hospital dashboards and other members-only material (Annual Hospital Disparities Dashboards, Regional Dashboards, archives of previous Stakeholder meetings, conference presentations, and Listserv material) is archived and accessible only to the FSR members. The secured log-in site currently holds 403 accounts representing members from the 121 participating FSR hospitals and the UM FSR team. A notable improvement made to the secured section of the website is the updated Dashboard format featuring a streamlined design presenting the different types of dashboards in a table, with available reports listed by year. This update received positive feedback from users. Figure 8 illustrates the landing pages of the open-source section and the secured log-in section of the FSR website.

Figure 8. Florida Stroke Registry Website Landing Pages



STRATEGIES AND ACCOMPLISHMENTS

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Improved website activity-tracking methods were integrated into the website in early June 2020, allowing the FSR team to gain additional insight into website user behavior. For the month of June 2020, the website saw 138 users, who collectively visited the site 185 times. The majority of users (67.1%) found the website through a direct link to one of the FSR pages; an additional 20.7% of visitors reached the site by organically searching for the Florida Stroke Registry via Google or another search engine, and the remaining users were directed to the website via social media (LinkedIn, Twitter) or an external site (e.g. the University of Miami Department of Neurology website). The most frequently viewed pages were the landing page, and the FSR At The Front Lines video archives.

2) Florida Stroke Registry Listserv

The FSR listserv continues to function as a convenient method to communicate with FSR stakeholders. In November 2019, we worked with UM Information Technology services to migrate the old “FL-PR-CReSD” listserv to the more appropriately titled FSR listserv. Currently 288 stakeholders (FSR hospital representatives, AHA, DOH, and FSR Advisory Committee members) are subscribed to the listserv. All members receive messages from the FSR team and may send notices; all emails sent to the listserv are moderated by FSR UM staff (i.e. each message must be individually approved before its release to the listserv) to assess appropriateness and reduce side conversation or ‘clutter’ from being sent to the group. The listserv continues to be an effective form of rapid communication and will be one of the vehicles to inform our members on updates at the website.

The listserv provides an easily accessible way for hospitals to ask questions, inform others about activities and share best practices, and spark dialogue about emerging phenomena in the field of stroke care (e.g. observations related to stroke and **COVID-19**). Conversations have also addressed clinical practices (e.g. recommendations for frequency and method of neurological exams) as well as quality improvement topics (e.g. data abstraction/submission logistics and updates, such as the AHA **COVID-19** registry), and upcoming local and national/international events. We are hopeful that overall, the listserv has at the very least planted seeds in stakeholders’ minds regarding research and programming opportunities related to improving stroke care in the state of Florida and beyond.

3) Florida Stroke Registry Twitter account (@FLStrokeReg)

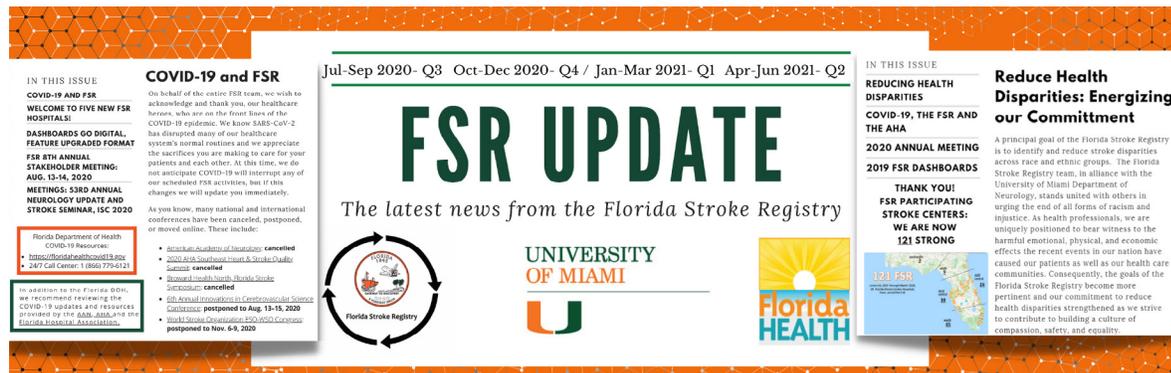
In this fiscal year, the FSR has expanded its reach via Twitter (@FLStrokeReg), which has provided an additional avenue for engaging with colleagues in stroke research, staying apprised of upcoming events and current news in neurology, and disseminating information about the FSR e.g. newsletters, meeting and webinar invitations, etc. The account presently has 122 followers, and during our most active month of 2020 thus far (April), the account garnered 13,000 impressions. In the month of June alone our interactions via Twitter have earned 1,200 impressions, and the account’s profile visits, mentions, and follower count have all significantly increased within the past 28 days (compared to May 2020).

STRATEGIES AND ACCOMPLISHMENTS

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4) Florida Stroke Registry Newsletter

The newsletter is regularly produced and provides brief reports on the FSR and related topics. The newsletter is archived in the website and available for public access. We will enhance the utility of the newsletter by increasing opportunities for FSR stakeholders to submit information or short communications, provide the AHA an opportunity to inform hospitals about important updates to GWTG, share hospital success stories, and inform hospitals about relevant publications and practices to improve stroke care. **This year, we have released two issues: Q1 (Jan-Mar 2020) and Q2 (Apr-Jun 2020).** Both have been disseminated to the listserv and published to/archived at the FSR website.



5) FSR Executive Committee

The committee is composed of members from the UM FSR study team and the AHA. The committee meets every other week to discuss overall programmatic processes, internal operations, prioritization of research analyses, updates and developments on initiatives/interventions, and funding opportunities related to the Stroke Registry. The committee met eighteen times in this reporting period. Please see this link to view meeting agenda/summary and [Appendix 6 the list of committee members.](#)

6) FSR Advisory Committee

The committee is composed of members of the UM FSR study team, the AHA, and regional representatives from the major stroke centers and medical schools in Florida, and the FL DOH FSR project manager. The roles and responsibilities of this committee are to oversee the Florida Stroke Registry, review data outputs from the registry, devise programs to address gaps and disparities, serve as ambassadors to their individual hospitals and regional stroke working groups, and to improve quality of care on stroke with a specific emphasis on reducing stroke disparities. **The Advisory Committee has met two times by teleconference in the reporting period, January 30, 2020 and again on April 03, 2020 (and once in-person before the 7th Annual FSR Stakeholder Meeting in Tampa, FL- August 6, 2019).** Meeting discussion have focused on the following: Welcoming new committee members; UM's communications with the DOH; future communication with Florida hospitals; the Regional Dashboards; and the comparison of self-attested versus nationally accredited FSR hospitals; the annual meeting and reformatting it to a virtual meeting; new urgencies due to the Coronavirus. Two new committee members were nominated and welcomed. The two new members, Drs. Teresita Casanova and Gerald Job represent Miami Dade County's inclusion into the Regional Dashboards initiative. Current committee members and the agenda/meeting [summaries are listed in the Appendix 7.](#) The Advisory Committee continues to provide valuable clinical insight and regional perspectives on health care that guide and advise the FSR's focus on the needs of Florida's community.

STRATEGIES AND ACCOMPLISHMENTS

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7) FSR Stakeholder/Coordinator Committee

The committee is composed of health care providers (primarily nurses and some medical doctors). Invitations to participate in the calls are provided to representatives from all FSR participating hospitals. **In this reporting period, we hosted one call on June 18, 2020.** The call initiated a series of calls that are planned beyond this fiscal year and as result of the **COVID-19** pandemic travel restrictions (affecting the 2020 Annual FSR Stakeholder Meeting) and the need to share critical information with more frequency. On this first call, we invited 99 stroke coordinators from around the state and representing all 121 participating hospitals. The meeting was held by zoom and throughout the 60-minute call no less than 70 attendees remained on the call (at most were 74) representing approximately half of the FSR participating hospitals. Discussion items included: FSR Updates; **COVID-19** and the impact on the FSR and hospitals; FSR resources (website, newsletter); updates on the reformatted Annual Meeting to a virtual meeting; the 2019 Dashboards and the report on the Dashboard Survey. The zoom platform allowed for polling of attendees on dates for future meetings; use of Twitter and awareness of the Dashboard Survey. Agendas and presentations for each meeting are [provided in the Appendix 8](#) and are posted on the website to provide access for all stakeholders who could not make the call.

8) The Annual Florida Stroke Registry Stakeholder Meeting

In 2019 the meeting was held in Tampa, Florida. The full day meeting was held on August 7, 2019 and consisted of a formal day-long agenda developed with the input of stroke coordinators and the Advisory Committee. The in-person meeting accomplished an attendance of 104 stakeholders from across Florida. During the meeting stakeholders reviewed the latest FSR data, shared best practices, networked, and developed stronger professional relationships. The meeting included formal presentations, working group sessions and an open forum to freely discuss current topics of concern with other health professionals including coordinators, stroke neurologists, neuro-interventionalists, researchers and Stroke Victors and caregivers. During the meeting award ceremony, 25 hospitals were selected (with 3 representatives each) and were provided scholarships to attend a hands-on Advanced Stroke Life Support course through the University of Miami Gordon Center (more details below). The 7th annual meeting was most successful due to the organized panel discussions at the end of every session, lasting approximately 40 minutes. The panel discussions allowed the audience to participate and exchange commentary with the presenters and resulted in great engagement from the attendees. Overwhelmingly positive feedback was returned with the majority of participants greatly enthusiastic to attend the next meeting in 2020 (now to occur in a virtual format). The program agenda for the meeting is [provided in Appendix 9](#).

C. STRATEGY: EDUCATION

The FSR is committed to leveraging both our data and the collective expertise of the FSR team and its stakeholders to educate and inform communities, patients, and fellow stroke professionals. The extensive experience of the research and health professionals whose hospitals participate in the FSR is virtually unparalleled, and has consistently provided insight into real-time, emerging developments in the world of stroke care. Collaborations with EMS, AHA, and other partners have further enhanced our ability to identify and respond to community and health-system needs related to stroke education and awareness. The arrival of the **COVID-19** pandemic further demonstrated the importance of high-quality, time-sensitive dissemination of public health information, and inspired our team to share information and best practices regarding the intersection of stroke and coronavirus.

Below we summarize our progress on educational strategies directed to different end-users across the community.

1. Community Education- Through the FSR Education and Training Core and other FSR (clinicians, stroke coordinators, patient “stroke victors”), the FSR has identified the need to promote and encourage the use of emergency services during the pandemic. As stated earlier, preliminary evidence indicates a decrease in stroke admissions during the pandemic, suggesting the public’s fear of exposure to COVID-19 at hospitals may be delaying their attention to care. As a result, the FSR is developing a campaign related to **COVID-19** emphasizing the need for the use of emergency services during the pandemic, and education on the signs of stroke. The FSR is developing outreach messaging and exploring the application of online, web-based public service announcements. The effort is intended to not only mitigate the impact of **COVID-19** on receiving timely stroke care, but also to address identified disparities in the use of 911.9
2. Health Provider Education- At the 2019 7th Annual FSR Stakeholder Meeting, 25 hospitals were awarded 3 scholarship vouchers apiece to attend Advanced Stroke Life Support (ASLS) training at the University of Miami Gordon Center for Research in Medical Education. A total of 75 scholarships were awarded to FSR stroke coordinators and paramedics. The ASLS training offered at the Gordon Center is a day-long, hands-on skills training intended for EMS, nurses, physicians and other pre-hospital and hospital-based healthcare professionals. It includes simulated patient scenarios in which attendees learn to recognize stroke symptoms and administer a brief neurological evaluation. Throughout the year the FSR team communicated and coordinated with the 25 hospitals to schedule course attendance in Miami.

Three of the local hospitals (in Miami) have taken the course in January at the Gordon Center at the University of Miami. Although several other dates were offered for the course (March and May), very few sites reserved their attendance for ASLS trainings. Because many of the scholarship holders represent hospitals from outside of Miami and throughout the state, many could not commit to the Gordon Center scheduled classes in Miami. As a result, the FSR team and the Gordon Center strategized to facilitate the course attendance and opened a date in August 2020 during the (originally scheduled) 8th Annual FRS Stakeholder Meeting in Orlando, Florida. The new class location and date filled up immediately with 30 participants and another 30 asking that we organize a second concurrent class. The August class in Orlando not only promised to supply the confirmation of over 60 FSR stakeholder to the 8th Annual FSR Stakeholder Meeting, but also improved the agenda of the meeting by

STRATEGIES AND ACCOMPLISHMENTS

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featuring this educational segment. Due to the COVID-19 pandemic, all ASLS classes have been cancelled including the August class in Orlando (the 8th Annual FSR Stakeholder Meeting is now reformatted to be held in a virtual platform). The Gordon Center has since pledged to honor the awarded vouchers when in-person classes resume, and to coordinate with the FSR to hold the course during the next in-person annual meeting.

- Health Provider Education COVID-19/Stroke Information: "FSR at the Front Lines" - This rapidly developed initiative was designed through consultation and guidance from the Advisory Committee and the FSR Education and Training Core. The need for immediate, short, and informational presentations was identified as the best resource on COVID-19 and stroke for FSR stakeholders and potentially the public. On March 30, 2020, the FSR team quickly organized and scheduled the first of a series of zoom recorded video chats between FSR partners currently managing, experiencing, or creating policy for stroke care during the COVID-19 pandemic. The videos are announced through the FSR listserv and Twitter account and archived in the section of the FSR website open to the public. Figure 9 illustrates the current topics aired within the reported period.

Figure 9. Florida Stroke Registry at the Front Lines

FSR At The Front Lines

Florida Stroke Registry at the Front Lines
Protected Code Stroke
 A chat between:
 Victor Del Brutto, MD
 Dept. of Neurology, Stroke Division
 University of Miami Miller School of Medicine
 and
 Selma Ancheta, JM, BSN, RN, BCRN
 Stroke Coordinator
 Quality and Patient Safety

Florida Stroke Registry at the Front Lines
COVID-19 and Stroke Workflow
 A chat between:
 Brian P. Motta, MD
 Neurointerventional Surgeon
 Medical Director, Comprehensive Stroke Centers
 Memorial Neuroscience Institute
 and
 Randy Katz, DO
 Medical Director, Emergency Services
 Memorial Regional Hospital

Florida Stroke Registry at the Front Lines
COVID-19 CVD Registry and Measures
 A chat between:
 Ralph L. Sacco, MD MS
 Program Director for the Florida Stroke Registry
 Professor and Ciesberg Chair of Neurology
 Miller School of Medicine, University of Miami
 and
 Diana Foster, RN, BSN, MBA
 American Heart Association
 Vice President, QSI Southeast

Florida Stroke Registry at the Front Lines
Epidemiology of COVID-19, Stroke and Health Disparities
 A chat between:
 Tabara Ruzick, M.D., Ph.D.
 Professor of Neurology
 Evelyn F. McLaughlin, Chair for Learning and Memory in Aging
 Executive Vice Chair of Research and Faculty Affairs
 and
 Hannah Gardner B.S.D.
 Epidemiologist and Associate Scientist
 Department of Neurology
 University of Miami Miller School of Medicine

Florida Stroke Registry at the Front Lines
COVID-19 and Transitions of Stroke Care
 A chat between:
 Jose G. Romano, MD
 Professor of Neurology
 Chief, Stroke Division
 University of Miami Miller School of Medicine
 and
 Erika Hernandez-Lorenzo, MD
 Assistant Professor, Clinical Neurology
 Stroke Division
 University of Miami Miller School of Medicine

Florida Stroke Registry at the Front Lines
Stroke during COVID-19: "Time is Brain" vs. "Stay at Home"
 A chat between:
 David Z. Rowe, M.D. [Twitter: @DrRowe](#)
 Associate Professor, Vascular Neurology
 University of South Florida College of Medicine
 and
 Neiger Asadgh, M.D., MS, FRCP
 Assistant Professor of Neurology
 University of Miami Miller School of Medicine

FSR RESULTS AND DISCUSSION

2019 Demographics of Stroke in Florida

On April 30, 2020, the UM FSR Biostatistics Core downloaded and collected the final quarter of 2019 stroke center data, thereby completing the entire 2019 data set. Overall, stroke occurrences resulted in a total of 40,706 among cases collected in the FSR (note, because data access through the GWTG-S tool is at the hospital-level and not patient-level, the FSR refers to these data as “cases”). Table 2 displays the **distribution of ALL races experiencing any type of stroke in Florida in 2019** (20 of the stroke cases documented did not indicate race and therefore were not included in the total numbers described in Table 2). The table also demonstrates nominal data among Florida Asians (1.1%), Native American/Alaskan (0.1%), Native Hawaiian/PI (0.1%), and those of undetermined race (UTD); (5.1%). These small datasets will not contribute to meaningful analyses with different stroke performance measures and outcomes. Though the FSR will continue to monitor these race cohorts for future reporting and to fully represent race populations in the state of Florida, the remainder of the report will present results utilizing data from the largest race and ethnic groups in Florida (Figure 10).

Table 2. Distribution of ALL Stroke subtypes by all Races in Florida (2019)

**All Races
(N = 40,686*)**

RACE	All Strokes	Strokes by Race
White	29,785	73.2%
Black	8,252	20.3%
Asian	464	1.1%
Native Am/Alaskan	70	0.2%
Native Hawaiian/PI	26	0.1%
Undetermined Race	2,089	5.1%

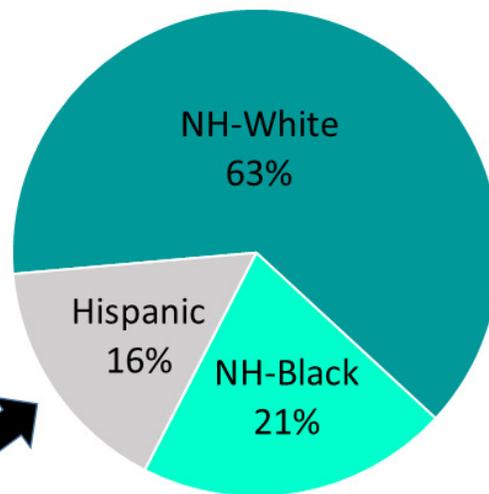
*Note: Total “missingness” (n= 20) is not included. Therefore, the total N for **All Strokes / All Races = 40,686**, less than the reported Overall All Strokes N = 40,706

↓

Hispanic NO	84%
Hispanic YES	16%

Figure 10. Percent distribution of ALL Stroke subtypes by race and ethnicity (2019)

LARGEST Race and Ethnicity
(N = 38,856*)



*Note: Total “missingness” (n= 1909) is not included. Therefore, the total N for **All Strokes Race/Ethnicity = 38,797** is less than the reported Overall All Strokes N = 40,706

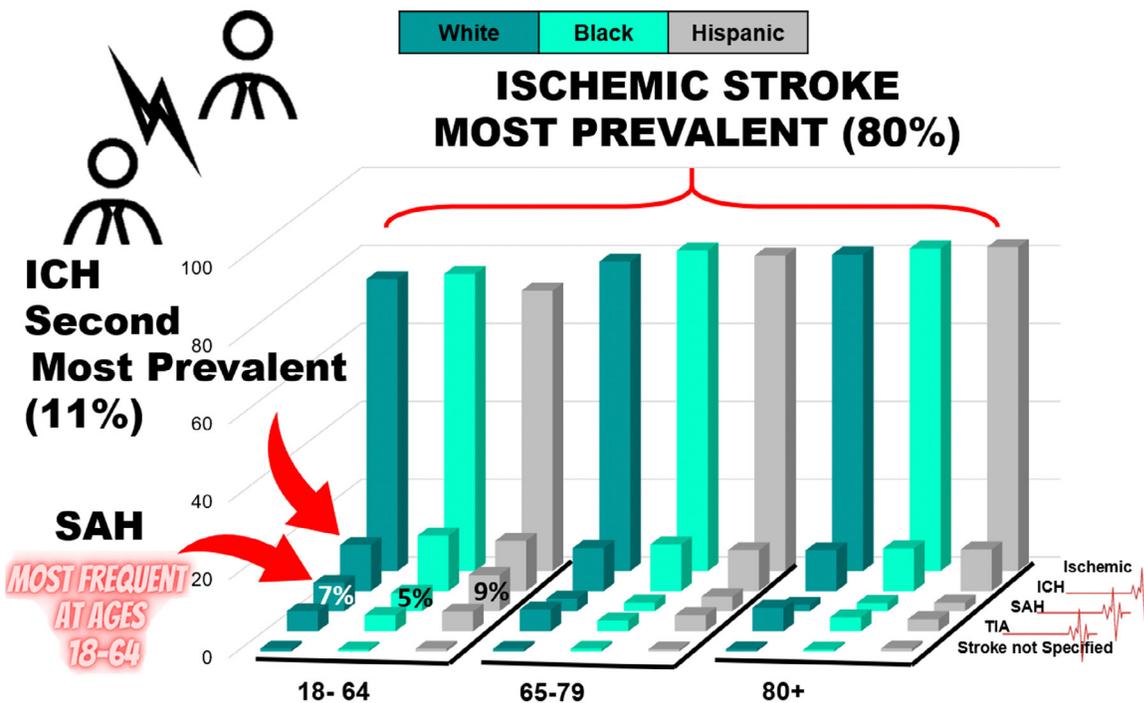
FSR RESULTS AND DISCUSSION

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The Distribution of Stroke Types by Race/Ethnicity and by Age in Florida

For all race/ethnicities, ischemic stroke is most prevalent at ages 80 or greater. However, the opposite is true for hemorrhagic stroke types: intracerebral hemorrhage and subarachnoid hemorrhage occur more frequently at younger ages (18-64). Strokes not otherwise specified are more common among NH-White Floridians at younger ages (18-64); more common among NH-Black Floridians at 65-79 years of age; and are more common among Hispanic Floridians at older ages (80+; Figure 11).

Figure 11. The current state of stroke in Florida in 2019 among the largest race/ethnic groups by age



FSR RESULTS AND DISCUSSION

...CONTINUED

Ischemic Stroke Risk Factors by Sex and Race/Ethnicity in Florida

Comparison of stroke risk factors among men from the largest race/ethnic cohorts in Florida are all statistically different from one another (indicated in the bar graph by the bolded, red numbers), with the exception of median Body Mass Index (BMI; Figure 12).

The infographic below describes the greatest ischemic stroke risk factors observed among non-Hispanic White, non-Hispanic Black, and Hispanic men the FSR in 2019.

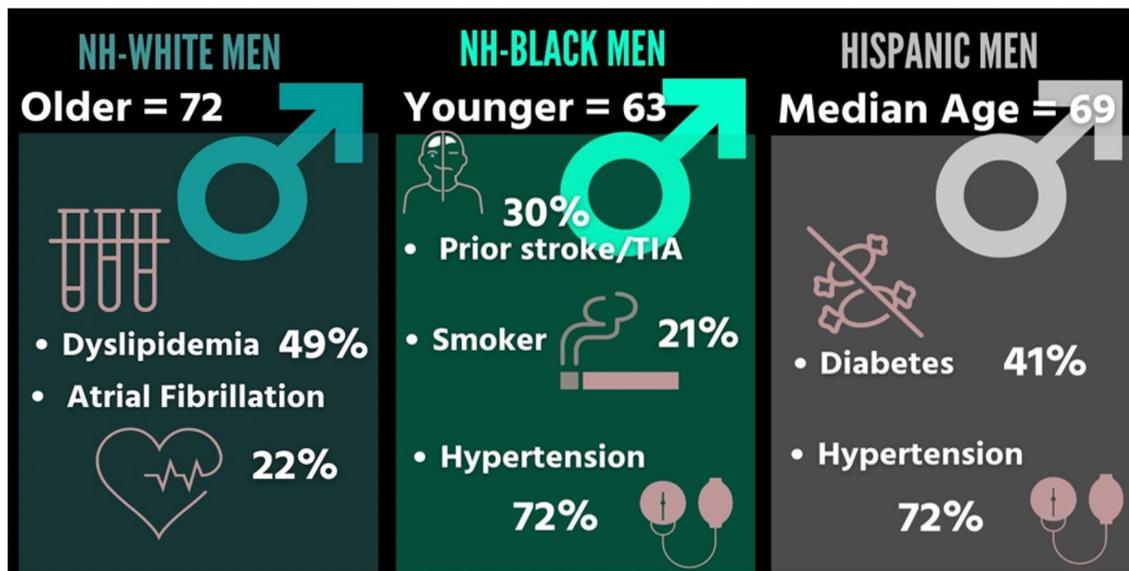
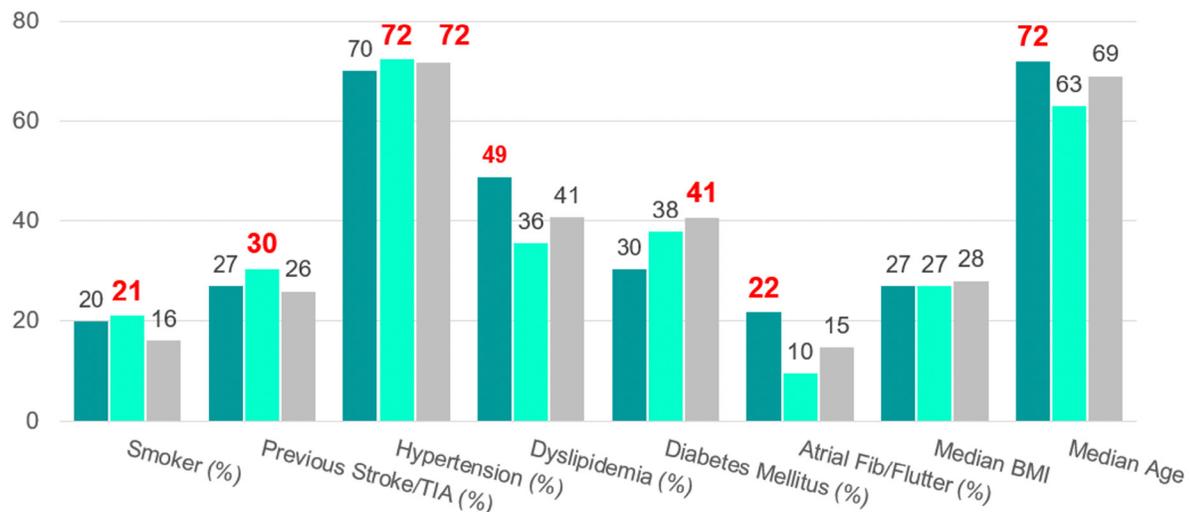


Figure 12



FSR RESULTS AND DISCUSSION

...CONTINUED

Among women in Florida, stroke risk factors stratified by race/ethnicity display statistically significant differences among them (indicated in the bar graph by the bolded, red numbers). Non-Hispanic White women and non-Hispanic Black women have a prevalence for very different risk factors. Except for smoking, Hispanic women tend towards a higher prevalence for multiple risk factors shared with both NH-W and NH-B females (Figure 13).

The infographic below describes the greatest ischemic stroke risk factors observed among non-Hispanic White, non-Hispanic Black, and Hispanic women in the FSR in 2019.

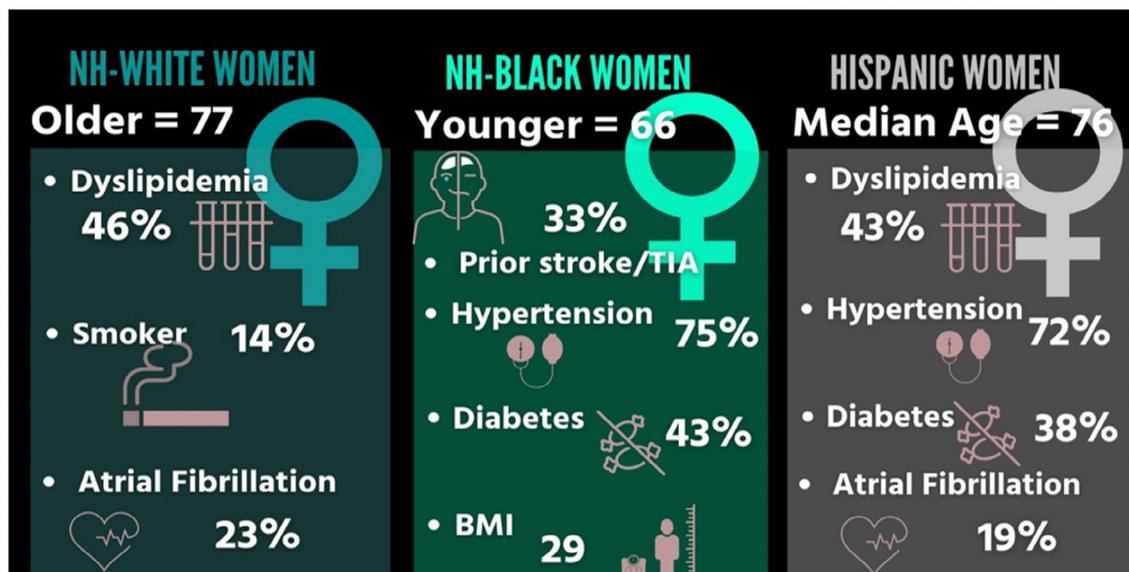
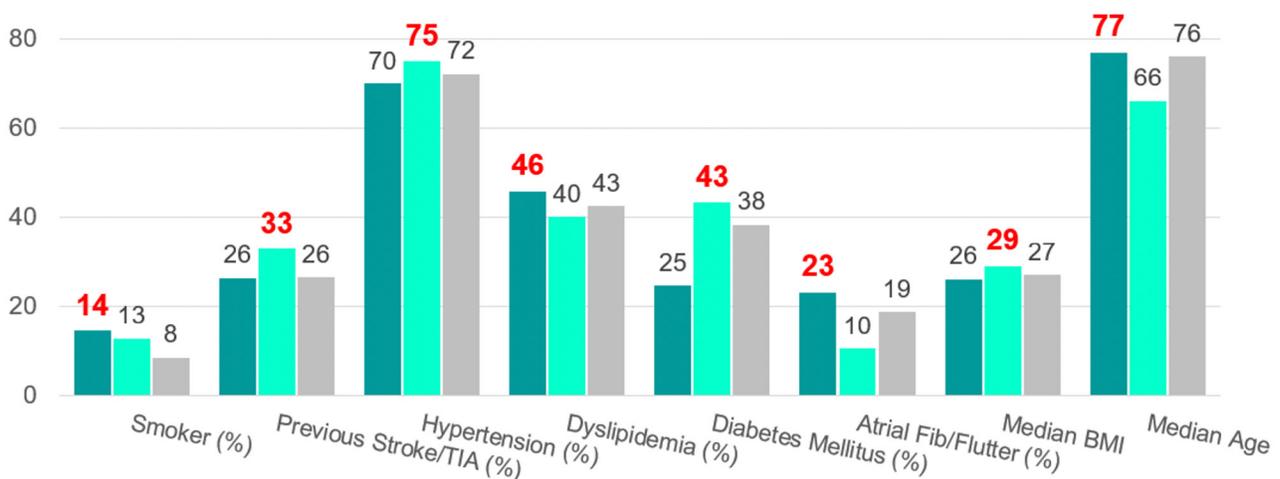


Figure 13



FSR RESULTS AND DISCUSSION

...CONTINUED

These data support the continued need for education and resources that may specifically inform towards the reduction of risk factors by sex and/or race/ethnicity through simple lifestyle modification suggestions. As discussed in the Recommendations section, the FSR will explore mechanisms such as customized public service announcements to effectively provide impactful information to our Florida community.

FSR Participating Hospitals and Improvements in the Quality of Stroke Care.

The most common type of stroke in our Florida community continues to be ischemic for which the FSR has regularly performed analysis on aggregate data related hospital performance measures. Tracking data to identify improvements or decline in the quality of care can be reviewed by comparing measures from year to year. The table below shows a comparison snapshot of quality measures (among ischemic stroke only) reflecting the oldest data set available to the FSR from 2010 and the most recent complete data set in 2019. Overall, comparison of the two years shows significant improvements in 2019 indicating that stroke centers participating in the Florida Stroke Registry are increasingly adhering to stroke care guidelines.

Table 3. FSR participating hospitals show continuous improvement in stroke care

Acute Stroke Treatment Among FSR participating hospitals in Florida	2010	2019
IV Thrombolytic Use (overall)	7%	14%
IV Thrombolytic Use (patients arriving \leq 3.5 hrs. & treated \leq 4.5 hrs. of stroke onset)	69%	91%
Door to Needle in 60 min.	19%	91%
Door to Needle in 45 min.	6%	69%
Defect Free Care (overall quality of care)	61%	93%



FSR RESULTS AND DISCUSSION

...CONTINUED

2019 RACE/ETHNIC STROKE DISPARITIES

The importance of tracking and measuring data within a long-standing registry like the Florida Stroke Registry cannot be better exemplified than by the following descriptions of in-hospital stroke performance measures. Among time to treatment performance measures, in 2019 we begin to see improvement in previously reported disparities. Beginning with aggregate results which reveal a **reduction in disparities for time to brain imaging within 25 minutes of arrival to hospital, such as Door to CT (DTCT)**. Analyses from previous years have indicated disparities among those receiving DTCT within the 25 minutes where NH-Black patients were less likely to receive this treatment when compared to NH-White or Hispanic patients. In 2019 however, the lowest percentage of those receiving DTCT in 25 min was NH-Blacks. *Statistical comparisons among race/ethnic groups were not significantly different* (Figure 14). This is a promising change that will continue to be tracked for continued improvements.

Figure 14 Door to CT in 25 min and Arriving to Hospital in 24 hr.

Figure 14a Percentage by race/ethnicity Figure 14b Comparison by race/ethnicity

Ischemic Only	All with CT Scan	DTCT in 25 min	DTCT in 25 min (Arriving in 24hr; Ischemic Only) Adjusted Odds Ratio (95%)	
			NH-B vs NH-W	H vs NH-W
All	9,333	74%	0.86 (0.76, 1.03)	1.08 (0.84, 1.37)
NH-W	5,906	75%		
NH-B	1,843	72%		
H	1,584	76%		

ADJUSTED FOR: race, sex, age, insurance, smoking status, hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation/flutter, coronary artery disease, peripheral vascular disease, prior stroke history, independent ambulation, arrival mode, arrival NIHSS, teaching hospital, number of bed

Another positive improvement (reversing a gap in care that has persisted over the past 5 years) is the **reduction in disparities among those receiving IV thrombolytics** (Figure 15). Below we show that although the percent of NH-Black patients receiving IV thrombolytic administration within 4.5 hours is lower than NH-W and H patients (Figure 15A), *there is no statistical difference among race/ethnic groups* (Figure 15B). Although it is impossible to speculate on what, if anything, may be driving the reduction in this disparity, these results suggest that the gap between Black and Non-Hispanic White Floridians may finally be closing for this particular stroke metric.

Figure 15 Arrive in 3.5 hr and receive IV thrombolysis in 4.5hr.

Figure 15a Percentage by race/ethnicity Figure 15b Comparison by race/ethnicity

	All Eligible to Receive	Arrived in 3.4/received IVT in 4.5hr	Arrive in 3.5 hr and receive IV Thrombolysis (IVT) in 4.5 hr Adjusted Odds Ratio (95%)	
			NH-B vs NH-W	H vs NH-W
All	3,809	91%	0.84 (0.58, 1.2)	0.95 (0.55, 1.62)
NH-W	2,415	91%		
NH-B	769	89%		
FL-H	625	92%		

ADJUSTED FOR: race, sex, age, insurance, smoking status, hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation/flutter, coronary artery disease, peripheral vascular disease, prior stroke history, independent ambulation, arrival NIHSS, teaching hospital, number of bed

FSR RESULTS AND DISCUSSION

...CONTINUED

This year we report fluctuations in stroke care treatment disparities which until this reported year have been consistent. For example, for the overall treatment of stroke care, defined by Defect Free Care (DFC), **for the first time in several years the 2019 data reveals a lower percent of NH-Black and NH-White patients receiving DFC than Hispanics patients (Figure 16A).** Although these differences are statistically insignificant (Figure 16B), our previous reports have always indicated change in the positive direction reflecting reductions in disparities.

Figure 16 Defect Free Care

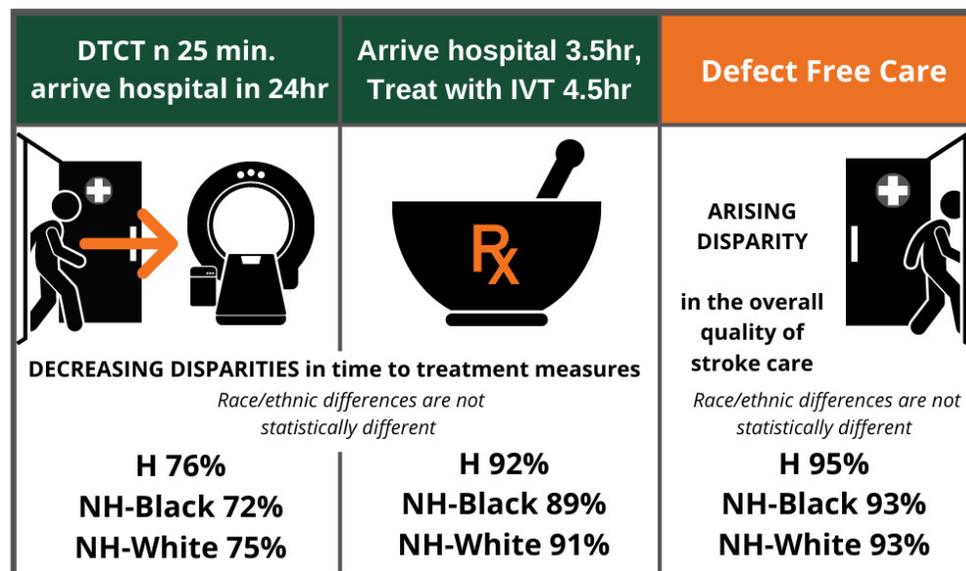
Figure 16a Percentage by race/ethnicity Figure 16b Comparison by race/ethnicity

Ischemic Only	All	DFC	Defect Free Care (ischemic Only) Adjusted Odds Ration (95%)	
			NH-B vs NH-W	H vs NH-W
All	28,345	93%	0.94 (0.84, 1.06)	1.14 (0.96, 1.49)
NH-W	16,637	93%		
NH-B	5,504	93%		
H	4,258	95%		

ADJUSTED FOR: race, sex, age, insurance, smoking status, hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation/flutter, coronary artery disease, peripheral vascular disease, prior stroke history, independent ambulation, arrival mode, arrival NIHSS, teaching hospital, number of bed

We will continue to monitor these fluctuations as they provide an overview of potential changes, mainly positive. It is encouraging to note that we have achieved the beginning of reductions of disparities among in hospital time to treatment measures. As we monitor the progression of these promising changes and improvements in care, we will analyze the causes for the improvements, to inform the development of effective interventions that may address remaining and newly identified disparities in care. Figure 17 provides an overview of the finding reported.

Figure 17 Overview of 2019 data demonstrating improvements and removal of disparities in time treatment measures, and a downward fluctuation in DFC indicating a resurgence of disparities.



Hispanic patients (H)
 Non Hispanic-Black patients (NH-Black)
 Non Hispanic-White patients (NH-White)
 Door to Computed Tomography time (DTCT)
 Intravenous Thrombectomy (IVT)

RECOMMENDATIONS TO IMPROVE STROKE CARE IN FLORIDA

Reducing Race/Ethnic Disparities Through Quality Improvement: As one of the cornerstones of the Florida Stroke Registry, a primary goal is to identify and reduce stroke disparities. In 2019, FSR data indicates reductions in disparities in hospital performance measures, that within the past years continually indicated gaps in the quality of care among race/ethnicities. Though these changes are positive and promising, it is only through continued data tracking that the improvements may be confirmed. Below, are recommendations to improve stroke care in Florida from FSR data-tracking research results developed during this reported year.

Develop best practices towards addressing disparities previously identified disparities in Door to CT time by defining factors preceding brain imaging which may lead to the persistence of disparities (Polineni et al, manuscript under review at JAHA).

Develop best practices towards addressing disparities related to the utilization of anticoagulants for primary and secondary stroke prevention by defining factors associated with lack of anticoagulant use in patients with atrial fibrillation (Sur et al, manuscript in preparation for submission to Stroke).

Develop best practices for addressing disparities related to type and duration of cardiac monitoring performed after cryptogenic stroke to evaluate for atrial fibrillation, by evaluating temporal trends in cardiac monitoring and factors associated with prolonged cardiac monitoring after cryptogenic stroke (Sur et al, manuscript in preparation).

Provide evidence-based results to inform and guide community specific public health education efforts regarding risk factor management to reduce the rate of intracerebral hemorrhage among a diverse population (Bustillo et al, manuscript in preparation).

Establish a process to track stroke center quality of care as related to center certification type (Marulanda-Londono et al. manuscript in preparation for submission to Stroke)

Mitigate the effects of **COVID-19** on systems of stroke care by developing and instituting education, public service announcements, and best practice recommendations. Efforts will focus on messaging for the health provider as well as patients/general community.

Our current report continues to support past FSR recommendations

Improve acute stroke care through the use of quality improvement programs, particularly those programs focusing on racial/ethnic disparities (Sacco et al, 2017, PMC5523741).

Develop best practices towards improving stroke outcomes by reducing the time to treatment at the pre-hospital stage by exploring innovative strategies to improve public education regarding stroke symptoms and immediate 9-1-1 system activation (Gardener et al, 2018, PMID: PMC6483889).

Develop best practices for thrombolysis treatment by identifying eligibility characteristics among one of the most highly variable treatment groups, mild stroke patients, in order to increase the possibility of good stroke outcomes for more patients after reperfusion therapy (Asdaghi et al, 2018, PMID: PMC6646058).

FSR SUCCESS STORIES

In 2019-2020, the FSR can celebrate direct and indirect accomplishments:

PARTICIPATION IN REGISTRY

121 hospitals are participating in the FSR and are actively submitting their stroke data (ranging from 2010 to current) to the FSR. The ongoing participation and partnership has given healthcare providers a clear window in the treatment of stroke across Florida and positions the state of Florida as a national role model in development of the best models of healthcare across the country.

73% of FSR hospitals have national accreditation in stroke care Given the emphasis of Florida legislation on hospitals becoming stroke-certified by a national body, we rank accreditation level according to national certification status. Certifying national bodies include The Joint Commission, Healthcare Facilities Accreditation Program and DNV-GL Healthcare. These organizations provide various levels of certification (Acute Stroke Center, Primary Stroke Center, Thrombectomy Capable Stroke Center, and Comprehensive Stroke Center). FSR participation allows hospitals to meet certification requirements through the reinforcement and encouragement of submission of standardized data.

RECOGNITION OF IMPROVEMENT

8 FSR hospitals have been recognized as leading examples of care delivery with the use of thrombolytics (percent of ischemic stroke patients receiving the treatment), compliance with essential stroke care measures (percent defect-free care), and completion of the modified Rankin Scale (mRS) assessing post-stroke disability. At the 2019 Annual Florida Stroke Registry Stakeholder Meeting, the following FSR hospitals were recognized for improvements accomplished between 2017 and 2018:

Most improved % IV tPA for ischemic stroke patients:

- Tallahassee Memorial Hospital
- North Shore Medical Center
- AdventHealth Palm Coast

Most improved defect-free care:

- BayFront Health Punta Gordon
- Memorial Hospital Pembroke
- AdventHealth Winter Park

Most completeness for mRS at 90 days:

- Baptist Hospital Miami
- Gulf Coast Medical Center
- Baptist Medical Center Jacksonville

INNOVATION IN CARE MODELS

Five counties (Pinellas, Broward, Palm Beach, Miami-Dade and Hillsborough) and their respective FSR hospitals are participating in the FSR Regional Dashboard initiative which facilitates EMS and hospital providers transparency in delivery of care to stroke patients. Of these five counties, two were added in 2019: Miami-Dade and Hillsborough. The FSR strongly supports and encourages active collaboration between the participating FSR hospitals and their EMS directors in order to secure the best stroke care for patients within these counties.

FSR NEXT STEPS

Throughout the past year, the FSR has successfully increased the number of participating hospitals, further diversifying our partnering stakeholders and regional representation. Our expansion has afforded us increased opportunities to identify and address colleagues' and community members' needs with respect to stroke care. The new partnerships and increased data submission exponentially enhance the registry's potential to inform care beyond the acute stroke care phase (i.e., pre-hospital and post-hospital phases of care). As a consequence of the global public health crisis due to **COVID-19** and a refocus on healthcare disparities, the ability of the Florida Stroke Registry to develop, demonstrate, and disseminate information will certainly contribute to improving both **COVID-19** and stroke related care as well as general health inequities in Florida. To accomplish these aims, the FSR's next steps will add to and/or expand current tasks within the three strategic FSR categories detailed below:

A. STRATEGY – TRACKING AND MEASURING DATA

1. Increasing “big data” utilization
 - Test, revise if necessary, and apply the Data Matching plan (presented in Section A.4 Tracking and Measuring Data) utilizing AHCA and DOH state data and CMS data
 - Pre-hospital: Explore newly accessible GWTG-S, EMS data to inform processes used to triage stroke patients
 - In-hospital: Explore new **COVID-19** and stroke related data obtained from the AHA GWTG-S
 - Post-hospital: Increase the ability of FSR to inform long term post-hospital stroke outcomes and transition of care through data linkage with AHCA and DOH
2. Regional Dashboard
 - Continue to improve and enhance visualization of the reperfusion measures represented in the dashboard
 - Expand the benefits of the Regional Dashboards statewide tool by increasing regional participation
 - Expand systematic improvement and transparency in the quality of care by supporting strong, ongoing collaborations between EMS and hospitals.

B. STRATEGY – COMMUNICATIONS AND ENGAGEMENT

1. Increase online stroke care resources available for public viewing on an open-source website through continued collaboration with SCAN360
2. Expand the FSR stakeholder community through relationship-building and incorporation of Community Health Workers

C. STRATEGY – EDUCATION

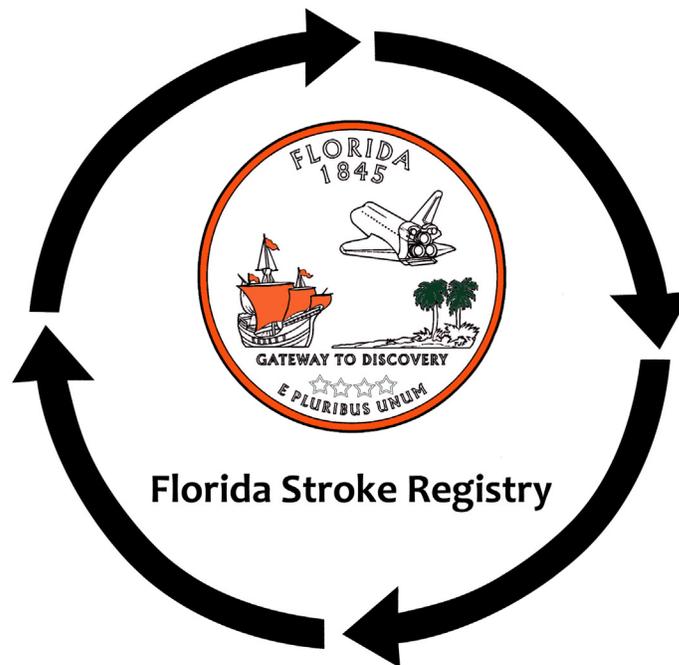
1. Community Education
 - Increase community health literacy regarding the use of emergency services during the **COVID-19** pandemic and regarding stroke signs and symptoms through online Public Service Announcements
 - increasing the FSR as an educational and evidence-based resource on **COVID-19**/stroke
2. Health Provider Education
 - Disseminate the Dashboard Utility & Effectiveness Survey to obtain end-user feedback and to expand the use of the dashboards
 - Develop stroke and **COVID-19** related educational resources for Community Health Workers

FSR NEXT STEPS

...CONTINUED

We continue to be enthusiastic about our role in improving the health of Floridians, and we appreciate the opportunity to maintain and enhance the Florida Stroke Registry under the funding provided by the annual state appropriations and opportunities through the DOH. Increasing the FSR Regional Dashboards, enhancing the linkage to other DOH data, and expanding stroke educational initiatives are some of the activities that we plan to advance. Our FSR data provides ample demonstrations of temporal improvements in acute stroke care among hospitals in the registry. Moreover, our data has provided strong evidence that race disparities can be minimized over time among hospitals that follow the GWTG-Stroke program. Our overarching goal is to promote and ensure the adherence to evidence-based recommendations for stroke care and translate these efforts into better care for all of Florida's citizens.

We look forward to reporting upcoming registry accomplishments, hospital improvements, and overall better health status of our fellow Floridians, all resulting from efforts in the Florida Stroke Registry. In this historic pandemic we are proud of our rapid ability to meet the needs of our stakeholders and look forward to continuing to serve the state.



APPENDIX 1

List of 14 Acute Hospital Stroke Measures and Outcomes: Statewide Annual Dashboards

1. Intravenous Recombinant Tissue Plasminogen Activator (IV thrombolysis) administered to eligible patients who arriving to the hospital within 2 hours of symptom onset and receiving treatment by 3 hours of symptom onset (historical measure soon to be retired)
2. Intravenous Recombinant Tissue Plasminogen Activator (IV thrombolysis) administered to eligible patients arriving to the hospital within 3.5 hours of symptom onset and receiving treatment by 4.5 hours of symptom onset (updated guideline measure)
3. Door to needle time (DTN) within 60 minutes
4. Door to needle time (DTN) within 45 minutes
5. Door to CT (DTCT) within 25 minutes overall and among those arriving by 24 hours
6. Antithrombotic therapy by the end of hospital day 2
7. Deep Venous Thrombosis (DVT) prophylaxis by the end of hospital day 2 for non-ambulatory patients
8. Discharged on antithrombotic therapy
9. Appropriate anticoagulation therapy for atrial fibrillation/flutter
10. Discharged on statin medication for patients with low-density lipoprotein ≥ 100 or taking lipid-lowering agents before admission or with unmeasured low-density lipoprotein in the previous 30 days
11. Counseling or medication for smoking cessation
12. Defect Free Care (DFC), a measure that confirms that a patient has received all of the clinical processes for which he or she is eligible.
13. Modified Rankin Score at discharge (0-2 – range signifies no residual symptom to mild disability)
14. Modified Rankin Score at discharge (3-6 – ranges from moderate and severe disability to expired)

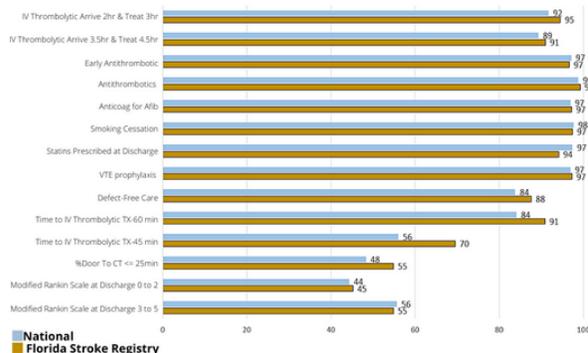
APPENDIX 2

2019 Annual Statewide Dashboards by Nation vs. Florida

This bar graph illustrates the multiple stroke performance measures in which FSR hospitals are performing significantly better than national hospitals.

[View full size version on FSR Website](#)

National Hospitals Compared to FSR Hospitals

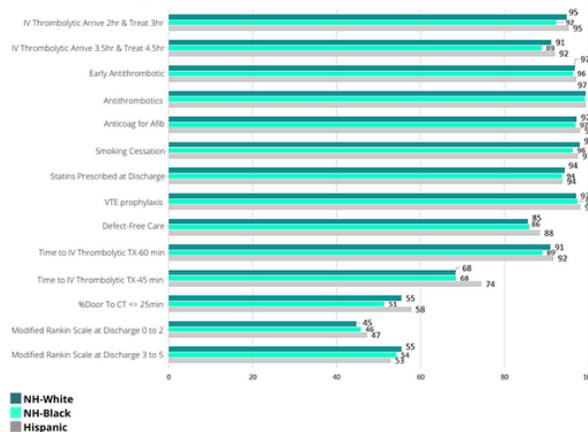


2019 Annual Statewide Dashboards by Race/Ethnicity

This graph illustrates continued differences related to time to treatment and smoking cessation counseling among Florida's largest race/ethnic groups. In contrast, antithrombotic use is similar across race/ethnicity.

[View full size version on FSR Website](#)

FSR Hospitals Aggregate 2019 Data by Race/Ethnicity

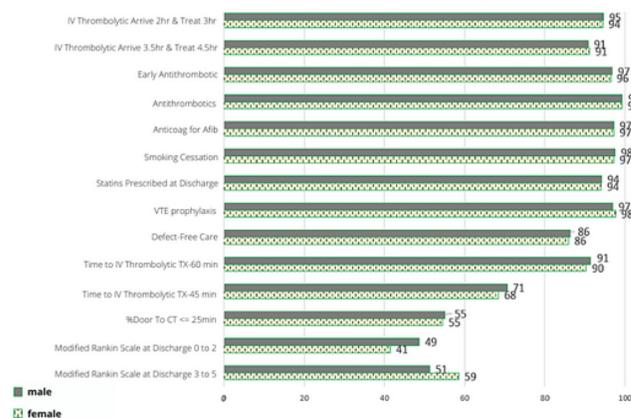


2019 Annual Statewide Dashboards by Sex

The graph shows sex disparities are few. However of note, is the result that shows a greater percent of Florida women compared to men are released from hospital after experiencing a stroke with moderate to severe disability at discharge (mRS 3-6).

[View full size version on FSR Website](#)

FSR Hospitals Aggregate 2019 Data by Sex



APPENDIX 3

List of 17 Acute Stroke Measures and Outcomes: Annual Hospital Disparities Dashboards

1. Intravenous Recombinant Tissue Plasminogen Activator (IV thrombolysis) administered to eligible patients who arriving to the hospital within 2 hours of symptom onset and receiving treatment by 3 hours of symptom onset (historical measure soon to be retired)
2. Intravenous Recombinant Tissue Plasminogen Activator (IV thrombolysis) administered to eligible patients arriving to the hospital within 3.5 hours of symptom onset and receiving treatment by 4.5 hours of symptom onset (updated guideline measure)
3. Door to needle time (DTN) within 60 minutes
4. Door to needle time (DTN) within 45 minutes
5. Door to CT (DTCT) within 25 minutes overall and among those arriving by 6 hours
6. Antithrombotic therapy by the end of hospital day 2
7. Deep Venous Thrombosis (DVT) prophylaxis by the end of hospital day 2 for non-ambulatory patients
8. Discharged on antithrombotic therapy
9. Appropriate anticoagulation therapy for atrial fibrillation/flutter
10. Discharged on statin medication for patients with low-density lipoprotein 100 or taking lipid-lowering agents before admission or with unmeasured low-density lipoprotein in the previous 30 days
11. Counseling or medication for smoking cessation
12. Defect Free Care (DFC), a measure that confirms that a patient has received all of the clinical processes for which he or she is eligible
13. Modified Rankin Score at discharge (0-2 – range signifies no residual symptom to mild disability)
14. Modified Rankin Score at discharge (3-6 – ranges from moderate and severe disability to expired)
15. Ambulatory Status at discharge
16. In-hospital mortality
17. Discharge Disposition

APPENDIX 4

List of 16 Regional Dashboard Reperfusion Treatment/Outcome Measures

Intravenous Tissue Plasminogen Activator (IV thrombolysis) Performance Measures

1. % IV thrombolysis Overall
 2. Median Door to Needle among those receiving IV thrombolysis
 3. % IV thrombolysis Arrive at 3.5 hrs. and treat at 4.5 Hours
 4. % mRS 0-2 at Discharge among those receiving IV thrombolysis
 5. % mRS 0-2 at 90 Days among those receiving IV thrombolysis
 6. % symptomatic intracerebral hemorrhage after IV thrombolysis treatment
- #### Endovascular (EVT) Performance Measures
7. % EVT among those Arriving in 24 Hours
 8. % EVT among those Arriving in 6 Hours
 9. Median Door to Groin Time among those receiving EVT (transfers included)
 10. Median Door to Groin Time among those arriving within 6 hours and receiving EVT
 11. Median Door to Groin Time among non-transfer patients arriving within 6 hours and receiving EVT
 12. Median Door to Groin Time among those arriving between 6-24 hours and receiving EVT
 13. Median Door to Groin Time among non-transfer patients arriving between 6-24 hours and receiving EVT
 14. % mRS 0-2 at Discharge among those receiving EVT
 15. % mRS 0-2 at 90 Days among those receiving EVT
 16. % symptomatic intracerebral hemorrhage after IA thrombolysis or MER treatment

APPENDIX 5

Florida Stroke Registry Survey: Dashboard Utility & Effectiveness in REDCap Forms

Confidential

Page 1

FSR Dashboards Survey

Please complete the survey below.

Thank you!

We appreciate your participation in the Florida Stroke Registry (FSR) and want to know your opinions about the FSR data reports (also known as dashboards).

The FSR produces three main types of dashboards:

Annual Disparity Hospital Dashboards (hospital-specific acute stroke care metrics stratified by race/ethnicity and sex)

Regional Dashboards (hospital-specific IV-tPA and EVT metrics reported by region)

Annual Statewide Dashboards (acute stroke care metrics from aggregated FSR-GWTG hospital data compared to nationwide GWTG hospital data)

Do you have an account at the Florida Stroke Collaboration (FSC) website to access your dashboards? Yes No

Have you ever visited the Florida Stroke Collaboration website? Yes No

Please add your name and contact information to our listserv to begin participating, collaborating, and enjoying the FSR. Someone from our team will be in touch with you confirming your hospital's status in the FSR and we will provide next steps to accessing your hospital's data. For questions or comments, please email us at flstrokeregistry@miami.edu

Thank you for your time! Please return to complete the survey when you have registered for an FSC website account and reviewed your dashboard data.

Reminder: Complete the remainder of the survey only if you have an account with the FSC website, and have reviewed your site's dashboard data.

Please complete these brief questions regarding your role and contact information.

First and last name _____

What is your role/title at your hospital? _____

What is your email address? (institutional emails only, no personal emails please) _____

Please provide your work phone number. _____

APPENDIX 5

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Institution/Hospital (please list ALL sites you are affiliated with):

In what county is your hospital located?

What is your hospital's zip code? (If you are affiliated with more than one site, please refer to your primary hospital).

Please respond to the following questions regarding your awareness, use, and satisfaction with the FSR data Dashboards. If you have not reviewed your current/previous dashboards, please visit the FSC website before completing the remainder of the survey.

The Annual Disparity Hospital Dashboard provides hospital-specific acute stroke care metrics stratified by race/ethnicity and sex, and benchmarked at the state and regional level.

Did your site review the Annual Disparity Hospital Dashboard data?

- No we have never received this type of report
- No but we have received this type of report in the past
- Yes
- Not sure

Which Annual Disparity Hospital Dashboard have you reviewed?

- 2014
- 2015
- 2016
- 2017
- 2018

Overall, I am satisfied with the Annual Disparity Hospital Dashboard:

Strongly disagree Strongly agree

(Place a mark on the scale above)

It is helpful to see my hospital benchmarked against the state and region

Strongly disagree Strongly agree

(Place a mark on the scale above)

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The Annual Disparity Hospital Dashboard:					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
helps my site IDENTIFY health disparities among our patients	<input type="radio"/>				
helps my site ADDRESS health disparities among our patients	<input type="radio"/>				
helps my site improve our STROKE CARE	<input type="radio"/>				
helps my site improve our SYSTEMS OF CARE	<input type="radio"/>				
has positively impacted my hospital's performance	<input type="radio"/>				

I have shared the Annual Disparity Hospital Dashboard with: (mark all that apply)

<input type="checkbox"/> Hospital administrators	<input type="checkbox"/> Medical Director
<input type="checkbox"/> Quality control staff	<input type="checkbox"/> Stroke Coordinator
<input type="checkbox"/> CEO	<input type="checkbox"/> Neuroscience Director
<input type="checkbox"/> Research support staff	<input type="checkbox"/> Community members (e.g. patients, caregivers)
<input type="checkbox"/> Other (please specify)	

Other people/organizations I have shared the Annual Disparity Hospital Dashboards with: _____

The Annual Disparity Hospital Dashboard data has influenced my hospital's policies or practices Yes No

How has the Annual Disparity Hospital Dashboard data influenced your hospital's policies/practices? _____

What other measures would you like to see on the Annual Disparity Hospital Dashboards? _____

This section refers to your experiences with the Regional Dashboards which provide data on IV-tPA and EVT metrics. Regional Dashboards are currently provided for hospitals in Miami-Dade, Broward, Palm Beach, and Pinellas counties.

Did your site review their Regional Dashboard data? No we have never received this type of report No but we have received this type of report in the past Yes Not sure

Which Regional Dashboard has your site reviewed? Mark all that apply. To see if a report is available for your site, please visit the FSC website.

<input type="checkbox"/> Annual Regional (please specify year)
<input type="checkbox"/> Q1 2019
<input type="checkbox"/> We have NEVER received either Dashboard
<input type="checkbox"/> Not sure

APPENDIX 5

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What is the year of the last Annual Regional Dashboard that you reviewed?

Overall, I am satisfied with the Regional Dashboards:

Strongly disagree Strongly agree

 (Place a mark on the scale above)

It is helpful to see the state and nationwide data on the Regional Dashboard:

Strongly disagree Strongly agree

 (Place a mark on the scale above)

Please indicate how much you agree/disagree with the following statements about the Regional Dashboards:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
The Regional Dashboards are easy to navigate	<input type="radio"/>				
The Regional Dashboards are easy to interpret	<input type="radio"/>				
The Regional Dashboards allow me to look at the trends and measures I'm interested in	<input type="radio"/>				
The interactive Q1 2019 Dashboard is a better format than the static PDFs	<input type="radio"/>				

I have shared the Regional Dashboards with: (mark all that apply)

- Hospital administrators
- Quality control staff Medical Director
- CEO Stroke Coordinator
- Neuroscience Director
- Research support staff
- Community members (e.g. patients, caregivers) Other (please specify)

Who else have you shared the Regional Dashboards with?

How often do you share the Regional Dashboards with others?

- Only when requested by our EMS directors
- At regularly scheduled meetings with stakeholders (e.g. other hospitals, general public, government officials, researchers)
- We do not intend to share the regional dashboards
- Other

When have you shared the Regional Dashboards?

APPENDIX 5

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The Regional Dashboards:					
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
help my site IDENTIFY health disparities among our patients	<input type="radio"/>				
help my site ADDRESS health disparities among our patients	<input type="radio"/>				
help my site improve our STROKE CARE	<input type="radio"/>				
help my site improve our SYSTEMS OF CARE	<input type="radio"/>				
have positively impacted my hospital's performance	<input type="radio"/>				

The Regional Dashboards have influenced my hospital's policies or practices Yes No

How have the Regional Dashboards influenced your site's policies or practices?

What other measures would you like to see on the Regional Dashboards?

The following section refers to the Annual Statewide Dashboards. This dashboard type compiles all Florida Stroke Registry data for the year and compares it to national Get With The Guidelines data. The findings are stratified by race/ethnicity and sex. This report is not hospital-specific.

You can find these reports here on the FSC website.

Did your site review their Annual Statewide Dashboard for 2018? No we have never reviewed this type of report No but we reviewed the 2017 report Yes Not sure

Overall, I am satisfied with the Annual Statewide Dashboards:

Strongly disagree Strongly agree

(Place a mark on the scale above)

It is helpful to see aggregated annual state data compared to nationwide statistics

Strongly disagree Strongly agree

(Place a mark on the scale above)

APPENDIX 5

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The Annual Statewide Dashboard:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
helps my site IDENTIFY health disparities among our patients	<input type="radio"/>				
helps my site ADDRESS health disparities among our patients	<input type="radio"/>				
helps my site improve our STROKE CARE	<input type="radio"/>				
helps my site improve our SYSTEMS OF CARE	<input type="radio"/>				
has positively impacted my hospital's performance	<input type="radio"/>				

I have shared the Annual Statewide Dashboard with: (mark all that apply)

- Hospital administrators
- Quality control staff Medical Director
- CEO Stroke Coordinator
- Neuroscience Director
- Research support staff
- Community members (e.g. patients, caregivers) Other (please specify)

Who else have you shared the Annual Statewide Dashboards with?

The Annual Statewide Dashboard data has influenced my hospital's policies or practices Yes No

How has the Annual Statewide Dashboard data influenced your hospital's policies/practices?

What other measures would you like to see on the Annual Statewide Dashboards?

COVID-19 and stroke data:

Has the COVID-19 pandemic affected your site's ability to abstract and submit Get With The Guidelines- Stroke (GWTG-S) data?

- Yes: We have paused abstraction/submission of GWTG-S data
- No: We are still abstracting/submitting GWTG-S data as usual
- Other (please specify)

If you selected 'Other', please explain:

APPENDIX 5

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Thank you for completing the Florida Stroke Registry Dashboard Survey. If you have any additional comments or would like to share more about your experiences with the FSR/the dashboard data, please share below.

Please share any additional comments you have about the FSR dashboards:

Thank you so much for your time! For questions, comments, or to reach out to the FSR team please email us at: flstrokeregistry@miami.edu

APPENDIX 6

Florida Stroke Registry Executive Committee Members

Florida Stroke Registry Executive Committee Members	Institution	City
Ralph Sacco, MD – Chair	UM Miller School of Medicine	Miami
UM FSR Team Members	Institution	City
Antonio Bustillo, MS	UM Miller School of Medicine	Miami
Chuanhui Dong, PhD	UM Miller School of Medicine	Miami
Hannah Gardener, ScD	UM Miller School of Medicine	Miami
Carolina Gutierrez, PhD	UM Miller School of Medicine	Miami
Sarah Roberts, MPH	UM Miller School of Medicine	Miami
Jose Romano, MD	UM Miller School of Medicine	Miami
Mary Robichaux	Consultant	Marietta, GA
Tatjana Rundek, MD, PhD	UM Miller School of Medicine	Miami
Negar Asdaghi, MD	UM Miller School of Medicine	Miami
Sebastian Koch, MD	UM Miller School of Medicine	Miami
Erika Marulanda-Londono, MD	UM Miller School of Medicine	Miami
Sofia Oluwole (MD, PhD student)	UM Miller School of Medicine	Miami
Kefeng Wang, MS	UM Miller School of Medicine	Miami
AHA Members	Institution	City
Jeffery Walker	American Heart Association	Miami
Rhoda Saunders	American Heart Association	Tampa

APPENDIX 7

Florida Stroke Registry Advisory Committee Members and Meeting Agendas/Meeting Notes

Florida Stroke Registry Advisory Committee Members	Institution	City
Ralph L Sacco, MD – Chair	UM Miller School of Medicine	Miami
UM FSR Team Members	Institution	City
Peter Antevy, MD	EMS Med. Director Davie/Coral Springs	Davie
Scott Burgin, MD	University of South Florida/Tampa General	Tampa
Teresita Casanova, MD	JFK and JFK North	Miami Dade
Antonio Gandia, MD	Mount Sinai Medical Center	Miami Beach
Ricardo Hanel, MD, PhD	Baptist Medical Center	Jacksonville
Jonathan Harris, MD	Boca Raton Regional Hospital	Boca Raton
Wayne Hodges, RN, PMD	UF Health Hospital - Jacksonville	Jacksonville
Tara Hylton	Florida Department of Health	Tallahassee
Gerald Job, MD FACEP	Jackson Memorial and MDC Fire Rescue	Miami Dade
Nils Mueller-Kronast, MD	Tenet Regional	Ft. Lauderdale
Brijesh Mehta, MD	Memorial Regional Hospital	Hollywood
Max Mokin, MD, PhD	University of South Florida	Tampa
Terry Neill, MD	Sacred Heart Hospital	Pensacola
Joe Nelson, DO	FL Department of Health	Tallahassee
Paul Pepe, MD, MPH, FACEP	Univ.Texas Southwestern Medical Center	Dallas, TX
David Rose, MD	University of South Florida/Tampa General	Tampa
Charles Sand, MD	St. Joseph's Hospital	Tampa
Kenneth A Schepcke, MD	Palm Beach County Fire Rescue	Palm Beach
Dileep Yavagal, MD	UM Miller School of Medicine	Miami
AHA Members	Institution	City
Bruce Inverso	American Heart Association	St. Petersburg
Julia Mora	American Heart Association	Hollywood
Dianne Foster, VP	American Heart Association	Marietta, GA
Rhoda Saunders	American Heart Association	Jacksonville
Jeffrey Walker	American Heart Association	Hollywood
UM FSR Team Members	Institution	City
Negar Asdaghi, MD	UM Miller School of Medicine	Miami
Antonio Bustillo, MSPH	UM Miller School of Medicine	Miami
Chuanhui Dong, PhD	UM Miller School of Medicine	Miami
Hannah Gardener, ScD	UM Miller School of Medicine	Miami
Carolina M Gutierrez, PhD	UM Miller School of Medicine	Miami
Erika Marulanda-Londono	UM Miller School of Medicine	Miami
Sarah Roberts, MPH	UM Miller School of Medicine	Miami
Jose G Romano, MD	UM Miller School of Medicine	Miami
Mary Robichaux, MPH	Consultant	Marietta, GA
Tatjana Rundek, MD, PhD	UM Miller School of Medicine	Miami

APPENDIX 8

FLORIDA STROKE REGISTRY ADVISORY COMMITTEE AGENDA AND MEETING NOTES JANUARY 30, 10:00 AM – 11:00 AM

1. Welcome

2. Florida Stroke Registry Team Updates

- a Welcome new members
 - Teresita Casanova, MD, Neuroscience and Stroke Director, JFK and JFK North (could not attend call)
 - Gerald Job, MD FACEP, Medical Director MDC Fire Rescue Jackson Memorial Hospital
- b Recognition of Mark Landreth
 - Announced to the group M. Landreth upcoming “sabbatical”; he was instrumental in accomplishing the 2017 and 2019 stroke legislation. Will see him again at our Annual Meeting in Orlando
- c Recognition of Brijesh Mehta
 - Dr. Mehta is one of our FSR champions. He is always promoting our initiatives in particular the Regional Dashboards (as he is part of the initial grassroots efforts to establish these reports). On February 28, the Greater Hollywood Chamber of Commerce will award him 2020 Visionary Award for this work. He will acknowledge the FSR for their part in this honor.

3. Florida Stroke Registry Program Updates

- a Florida Department of Health Welcome Tara Hylton
- b Hospital Participation (115 of the 161 Florida stroke centers are now participating)
- c 2020 Deliverables - Dashboard Survey
 - RS- explained to the committee the purpose of the “Survey Dashboard Utility & Effectiveness” and provided the advisory committee the final draft for feedback (while the DOH reviews the document for final approval).

4. 2020 FSR Stakeholder Meeting, Orlando, August 13-14

- CG- provides an update of the site, the meeting format, and planned/ draft agenda/topics
- Committee considers featuring the partnership between EMS and the FSR. Need to continue strategizing how this group of health professionals may be included in the meeting
- Scholarships for the ASLS course will have an opportunity to take the class in August at the meeting. Still developing plans.

APPENDIX 8

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5. Regional Dashboards

- a New Format: Feedback and Next Steps
 - A. Bustillo reviews the new format for the Regional Dashboards.
 - CG- prototype for new functions. 1) Individual hospital by all measures. Request input to determine the best format. 2) create a function to view trends. N. Mueller- will this function work directly with AHA GWTG-S? We can already track our hospitals performance over time. I would be more interested in tracking trends of all hospitals over time. R. Hanel- would be good to track the trends by region as well. RS- with more regions this would make lots of sense. N. Mueller- the strength of Regional Dashboards is to view by regions.
- b County updates (Broward, Palm Beach, MDC, and Pinellas)
 - MDC recently joined and Jerry Job is now a representative member of the Advisory Committee. Still pending feedback from hospitals on the reports. Will provide an update at the next meeting.
 - Pinellas- is going well. Presentations at coalition meetings will review these dashboards.
- c Potential new counties (Tampa Bay area- Hillsborough and Pasco)
 - M. Mokin- Tampa Bay is interested too. We will present the topic and opportunity at a future meeting Feb 18. Will follow up with results of meeting.

6. AHA Stroke Data Manager, Jason Walchok: "GWTG-Stroke PMT: EMS Layer

- " Invited AHA presenters provide an overview of EMS data linkage. Improved functions will be unveiled at the upcoming International Stroke Conference in Feb.

7. Florida Stroke Registry Publications Updates

FLORIDA STROKE REGISTRY ADVISORY COMMITTEE AGENDA AND MEETING NOTES APRIL 10, 2020 | 4:00PM – 5:00PM

1. Minutes 01.30.20

2. COVID-19 and its Impact on the FSR

- a At 120 out of 161 stroke center hospitals in Florida are now part of FSR
- b Currently FSR is pausing on recruiting new hospitals and processing amendments due to effect of **COVID-19** on non-essential research/program operations. Additional delays in securing AHCA data.
- c Dashboards: Q3 data is ready but anticipating delay in Q4 regional and 2019 annual regional data due to **COVID-19**. CMS and AHA policies have extended deadlines for submission of stroke data during **COVID-19**
- d Group approved sending a letter to FSR sites on behalf of FSR and DOH encouraging ongoing submission of stroke quality indicators. Q4 reporting deadline extended to May 15, 2020, most sites have submitted.
- e AHA has introduced new data elements to GWTG-S to capture **COVID-19** data; AHA has also created a new, nationwide **COVID-19** patient data registry (open to all hospitals regardless of participation in GWTG-S)

3. The FSR as a Useful Resource During COVID-19 Pandemic

- a Introducing new initiative, “Florida Stroke
- b Registry at the Front Lines” to share up-to-date information regarding the intersection of stroke care and **COVID-19**; proposed topics include protected code stroke, LVO and ER workflow for stroke patients, AHA **COVID-19** registry, EMS perspectives and DTN metrics
- c Team introduced another initiative, “Florida Stroke Registry Connecting with your Community” about FSR members’ volunteerism/participation in community efforts related to stroke, **COVID-19**, and other topics.
- d Dr. David Rose discussed recent piece published in Tampa Bay Op-Ed with fellow physicians Drs. Clifton Gooch and Scott Burgin re: reduced stroke volume at local hospitals and delay in patient presentation resulting in worse outcomes. Recommends hospitals encourage patients not to delay seeking care.
- e Dr. Negar Asdaghi reports a recent drastic drop in stroke alerts at Jackson Memorial Hospital compared to the same time last year, paired with drop in NIHSS. Door-to-puncture time increased due to donning/doffing of PPE.

4. Regional Dashboard Updates

- a New County added to regional dashboards- Hillsborough
- b New dashboard format is an interactive, virtual format (rather than static PDFs).
- c New metric added to Q3 2019: % IV-tPA arrive in 3.5 hours, treat in 4.5 hours.
- d Future areas to target Jacksonville, Orlando, Tampa Bay, St. Lucie/Volusia—need help from EMS and local stakeholders to determine boundaries of regions and collaborate with pre-hospital stroke care systems

5. 8th Annual FSR Stakeholder Meeting, August 13-14, 2020

- a Advisory Committee dinner: plan to invite EMS Directors from target areas to engage leadership and promote regional dashboards. Will make it a virtual session if meeting is no longer held in-person.
- b Unclear if it will be safe to relax social distancing measures in the next few months and whether doing so will cause an increase in cases. Virtual meeting recommended if it remains unsafe to resume normal or even limited activity.

6. Final thoughts

- a Joint Commission suspending data submission during COVID-19, AHA not suspending data just extending deadlines
- b Important to keep an eye on impact of COVID-19 on thromboembolic/CVD outcomes.

7. Adjourn

APPENDIX 9

Florida Stroke Registry Coordinator Call and Agenda/Meeting Notes FLORIDA STROKE REGISTRY COORDINATOR CALL | AGENDA AND ZOOM POLLING QUESTIONS/ANSWERS JUNE 18 | 11:00AM -NOON

- Welcome
 - Introduction to the FSR
- 121 FSR Participating Hospitals
- **COVID-19** and FSR
 - Impact on FSR Hospitals
 - FSR Initiatives
 - AHA **COVID-19** Data
- 2020 8th Annual Meeting (Virtual)
- Reminder: 2019 Statewide, Hospital, and Regional Dashboards
 - Dashboard Survey
- Next FSR Coordinator Call: July
- Adjourn

ZOOM POLL QUESTIONS

Topic: FSR Stroke Coordinator Call

Time: Jun 18, 2020 11:00 AM Eastern Time (US and Canada)

<https://miami.zoom.us/j/93110637740?pwd=cHg5YTVFSW9yZlJlSLZdKc2RwNUFpQT09>

Meeting ID: 931 1063 7740

Password: 648016

68 participants

Poll #1, Slide #9: COVID-19 and its Impact on FSR Hospitals

Has your site continued to report stroke indicators in a timely fashion? ~36 ppl, 39% responding

- Yes 81%
- No 12%
- Unsure 8%

Poll #2, Slide #9: COVID-19 and its Impact on FSR Hospitals

Did your hospital see a decrease in stroke cases during the first wave of the **COVID-19** pandemic (March, April, May 2020) compared to the same time period last year? ~28 ppl, 39% responding

- No reduction/no change (7%)
- Reduced by less than 10% (14%)
- Reduced 11-25% (46%)
- Reduced more than 25% (29%)
- Increase in stroke cases compared to last year (4%)

APPENDIX 9

Poll #3, Slide #10: "Florida Stroke Registry at the Front Lines"

How many of the FSR at the Front Lines videos have you seen?

- 0 63%
- 1 4%
- 2 7%
- 3 19%
- 4 4%
- 5 0%
- 6 4%

Poll #4, Slide #10: "Florida Stroke Registry at the Front Lines"

Do you like the topics addressed in the Front Lines videos?

- Yes 96% (23 ppl)
- No
- Neutral 4%

Poll #5, Slide #9: Twitter and Listserv

Do you have a Twitter account?

- No 54%
- No but my institution/hospital does 11%
- Yes, for personal use 32%
- Yes, for professional use 4%

Poll #6, Slide #16: 2020 8th Annual Meeting (Virtual)

When are the best times to schedule the call (~2 hours)?

- Thursday 12-2 (71%)
- Thursday 5-7
- Friday 12-2
- Friday 3-5
- Weekend

Poll #7, Slide #21: Dashboard Survey

Did you see the listserv request to fill out the Dashboard Survey?

48 yes/52 no, with 21 responding

- Yes
- No

Poll #8, Slide #21: Dashboard Survey

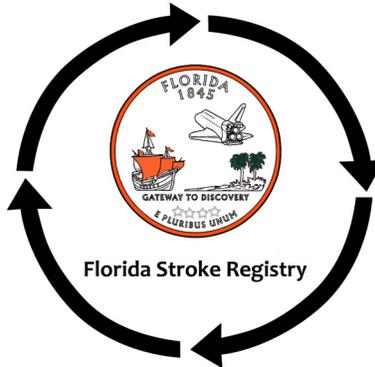
If you did, but did not respond to the Dashboard Survey, please indicate why (the response will be anonymized)?

- The survey was too long 2 of 15
- I've never heard of the "dashboards" 1 of 15
- I'm not on the listserv 3 of 15
- Other 9 of 15

APPENDIX 10

7TH ANNUAL FLORIDA STROKE
REGISTRY STAKEHOLDER MEETING AGENDA, AUGUST 7, 2019

7TH ANNUAL FLORIDA STROKE REGISTRY
STAKEHOLDER MEETING



Wednesday August 7th, 2019
USF CAMLS Education Center
124 South Franklin Street,
Tampa, FL 33602

Organized by

Department of Neurology
University of Miami Leonard M. Miller School of Medicine



UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

Funded by

The Florida Department of Health



APPENDIX 10

FLORIDA STROKE REGISTRY UNIVERSITY OF MIAMI

Ralph L. Sacco, MD MS Director

Carolina Gutierrez, PhD
Research and Advocacy Director

FSR Biostatistics and Data Management

Tatjana Rundek, MD PhD Director

Chuanhui Dong, PhD
Hannah Gardener, ScD
Kefeng Wang, MS
Antonio Bustillo, MPH

FSR Stroke Education and Training

Jose G. Romano, MD Director

Negar Asdaghi, MD
Erika Marulanda-Londoño, MD

Sofia Oluwole, MD PhD ('21,'19)

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Greater Southeast Affiliate

Kathy Fenelon (retired 06.29.19)

Regional Vice President, Quality and Systems
Improvement
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Kay Johnson

Director, Quality and Systems Improvement
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Jeffrey Walker

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ADVISORY COMMITTEE FLORIDA HOSPITAL MEMBERS

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Antonio Gandia, MD Mount Sinai Medical Center, Miami Beach

Ricardo Hanel, MD, PhD Baptist Medical Center, Jacksonville

Jonathan Harris, MD Boca Raton Regional Hospital, Boca Raton

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Dileep Yavagal, MD UM Miller School of Medicine, Miami

and

The Florida Stroke Registry University of Miami Team

7th Annual Florida Stroke Registry Stakeholder Meeting

Wednesday August 7th, 2019

USF CAMLS Education Center

Registration, Breakfast, and Breaks (Auditorium Pre-Function Space)

Conference (Auditorium)

AGENDA

8:00 – 9:00	Registration and Breakfast
9:00 – 9:10	Welcome and Team Introductions Ralph L. Sacco, MD MS
9:10 – 10:50	Session I: Florida Stroke Registry Impact of the on Acute Stroke Care
9:10 – 9:40	Introduction/background – Ralph L. Sacco, MD MS
9:40 – 10:00	Session I: CSC vs AHCA CSC Erika Marulanda-Londono, MD
10:00 – 10:50	Session I Panel: The Future of Certification in the State of Florida Panel Moderator – Ralph L. Sacco, MD MS

PANEL

FSR Advisory Committee Member – Erika Marulanda-Londono, MD
 FSR Advisory Committee Member – Charlie Sand, MD
 AHA Advocacy – Mark Landreth
 JC CSC – Baptist Jacksonville
 Coordinator – Wendy Camp ARNP, RN
 JC TCSC – Florida Medical Center – A Campus of North Shore
 Director – Wilson Cueva, MD
 Coordinator – Peta-Gaye Bowen, RN, BSN, SCRNP
 HFAP CSC – Tampa General/ University of South Florida
 Director – W. Scott Burgin, MD
 Coordinator – Karen Wilson
 DNV CSC – Lee Health
 Director – Lawrence Isaacs, MD
 Coordinator – Cindy Drapal, DNP, RN, NEA-BC
 AHCA CSC – Orlando Regional Medical Center
 Director – Arnaldo Velez, MD
 Coordinator – Jennifer Jones BSN, RN, CNRN

10:50 – 11:05	Break
11:05 – 11:40	Keynote – Florida Department of Health Introduction – Ralph L. Sacco, MD MS Department of Health Melissa Jordan, MS, MPH, Director, Public Health Research, Division of Community of Health Promotion Tara Hylton, MPH, Registries & Surveillance Administrator, Public Health Research, Division of Community of Health Promotion
11:40 – 1:00	Lunch/Awards – (Classroom 2C and 2D) Continue overleaf...

AGENDA

- 1:00 – 2:50** Session II: The Florida Stroke Registry and Engagement with EMS
1:00 – 1:30 Introduction/background – Ralph L. Sacco, MD MS
1:30 – 2:00 Session II: Regional Dashboards Dissemination Process
EMS perspective – Peter Antevy, MD
Hospital perspective – Brijesh Mehta, MD
FSR perspective – Carolina Gutierrez, PhD
2:00 – 2:50 Session II Panel: Regional Dashboards and Transparency
Panel Moderator – Jose G. Romano, MD

PANEL

FSR Advisory Committee Member – Negar Asdaghi, MD
State EMS Director – Ken Scheppke, MD
EMS Medical Director Pinellas – Angus Jameson, MD
Dir. of Neuroscience N. Shore MC – Justin Boise BSN, BA, RN, SCRNI

- 2:50 – 3:05** **Break**

- 3:05 – 4:20** Session III: Transitions of Care
3:05 – 3:25 Introduction/background – Ralph L. Sacco, MD MS
3:25 – 3:40 Session III: First Look – Transitions of Care and Social Determinants of Health
Hannah Gardener, ScD
3:40 – 4:20 Session III Panel: Transitions of Care 2019 and Beyond
Panel Moderator – Tatjana Rundek, MD, PhD

PANEL

FSR Advisory Committee Member – Hannah Gardner, ScD
Vascular Neurologist, UF Shands Gainesville – Alexis Simpkins, MD
Coordinator, Delray Hospital – Mary Varghese, RN, MSN, SCRNI
Chief Manatee County EMS – James Crutchfield
Patient/Caregiver Committee Member- Jose Maldonado

- 4:20 – 4:30** Closing Remarks
Ralph L. Sacco, MD MS

- 4:30** **Meeting Adjourned**

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