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May 15, 2024

MEMORANDUM

TO: The Honorable Glenn Youngkin
Governor, Commonwealth of Virginia

The Honorable L. Louise Lucas
Chair, Senate Finance and Appropriations Committee

The Honorable Luke E. Torian
Chair, House Appropriations Committee

FROM: Karen Shelton, MD
State Health Commissioner

SUBJECT: Stroke Care Quality Improvement

This report is submitted in compliance with the Virginia Acts of the Assembly – § 32.1-111.15:1, which states:

> *The Department shall report to the Governor and the General Assembly annually on July 1 on stroke care improvement initiatives undertaken in accordance with this section.*

Should you have any questions or need additional information, please feel free to contact me at (804) 864-7002.

KS/AJ
Enclosure

Pc: The Honorable John Littel, Secretary of Health and Human Resources

STROKE CARE QUALITY IMPROVEMENT

REPORT TO THE GOVERNOR AND THE GENERAL ASSEMBLY

2023

VIRGINIA DEPARTMENT OF HEALTH

PREFACE

The Virginia Department of Health (VDH) is the Code-mandated agency responsible for stroke care improvement initiatives within the Commonwealth. These initiatives shall include stroke care data and information collection, information and data sharing, application of evidence-based treatment guidelines, and continuous quality improvement. VDH shall report to the Governor and the General Assembly annually on July 1.

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TABLE OF CONTENTS

Preface ..... **i**
Virginia Stroke care quality improvement advisory group i
Table of Contents ..... **iv**
Executive Summary ..... **v**
Recommendations v
Introduction **1**
Stroke care Quality Improvement Mandate 1
Virginia Stroke care quality improvement advisory group Activities 1
July 15, 2022 Meeting *1*
October 14, 2022 Meeting *1*
January 13, 2023 Meeting *1*
April 21, 2023 Meeting *2*
Report Outline 2
Stroke Burden **3**
Legislative Requirements **7**
Recommendations **14**
Appendix A –Code of Virginia § 32.1-111.15.1 ..... **16**
Appendix B – Acronyms and Abbreviations **17**
Appendix C – Table 1. The complete Virginia Cities and counties stroke mortaltiy age-adjusted rates, 2016-2020 and 2017-2021 Comparison **18**
Appendix D – Levels of Stroke Care Certifications **22**
Appendix F – Meeting Minutes **25**
Appendix G – References **33**

EXECUTIVE SUMMARY

The Virginia Department of Health (VDH) is the Code-mandated agency responsible for stroke care improvement initiatives within the Commonwealth. These initiatives shall include stroke care data and information collection, information and data sharing, application of evidence-based treatment guidelines, and continuous quality improvement. VDH shall implement systems to collect data and information related to stroke care and develop a process for continuous quality improvement for the delivery of stroke care provided by the statewide system for stroke response and treatment. VDH shall report to the Governor and the General Assembly annually on July 1.

RECOMMENDATIONS

1. Non-certified stroke centers should contribute to the Virginia Stroke Registry as well as to those free-standing emergency departments and post-acute discharge facilities, such as inpatient rehabilitation facilities and skilled nursing facilities.
2. Additional measures should be added to the Virginia Stroke Registry to include special populations such as pregnancy and sickle cell, as well as collection of measures regarding advanced stroke therapies such as thrombectomy and aneurysm repair.
3. The Virginia Stroke Registry should include the collection of "Z" codes (ICD-10 codes for social determinants of health) in order to address disparities of care across Virginia.
4. The Virginia Stroke Registry should make every effort to allow for the collection of data measures and patient outcomes to facilitate the ongoing certification of stroke centers by the three stroke certifying bodies used in Virginia.
5. The Virginia Stroke Registry should be interoperable with additional Virginia data sources, such as the Virginia Vital Events Statistics Program, to comprehensively describe stroke burden and gaps in stroke care along the full continuum of care.
6. The Virginia Hospital and Healthcare Association Collaborative should continue to engage the non-certified stroke hospitals and guide them towards stroke certification, participation in the Virginia Stroke Registry, and quality improvement.
7. Get With The Guidelines participating hospitals should activate the Coverdell layer to submit to Phase 1 of the VDH Stroke Registry.
8. VDH should continue to work on development of Phase 2 of the Virginia Stroke Registry.
9. Hospitals should continue to use Unite Us, or any statewide referral platform, to alleviate the burden on hospital stroke coordinators and care managers of connecting patients to necessary services post-discharge.
10. General Funds should be provided to sustain a statewide referral system for hospitals and community-based organizations annually, with consideration of Community Health Workers as frontline public health workers at the core of the referral system.
11. VDH should release the Virginia Hospital Acute Stroke Survey annually to all stroke hospitals, with updated questions to reflect current trends and process improvement outcomes for stroke care.
12. VDH should release the Virginia EMS Stroke Inventory Surveys annually, with questions targeted to the appropriate recipients to encourage greater EMS response and involvement.

13. VDH should update the EMS Stroke Triage Plan's protocols to address pre-alerting up to 24 hours to better address those patients who might be a candidate for mechanical thrombectomy.
14. VDH should investigate the barriers for EMS agencies that are transporting suspected stroke patients to non-certified stroke centers or out of state facilities.

INTRODUCTION

STROKE CARE QUALITY IMPROVEMENT MANDATE

Effective January 1, 2019, the Code of Virginia § 32.1-111.15:1 (2018) requires the Virginia Department of Health (VDH) to implement systems for stroke data collection and information sharing, apply evidence-based guidelines for community-based follow-up care, and implement a continuous process for stroke care quality improvement initiatives in collaboration with hospitals and emergency medical services (EMS) agencies. The purpose of this report to the Virginia General Assembly is to provide updates on the progress towards the implementation of data-driven action steps and building statewide capacity pursuant to § 32.1-111.15:1.

VIRGINIA STROKE CARE QUALITY IMPROVEMENT ADVISORY GROUP ACTIVITIES

VDH convened the Virginia Stroke Care Quality Improvement (VSCQI) Advisory Group to provide guidance on fulfilling these requirements.

JULY 15, 2022 MEETING

The Virginia Hospital and Healthcare Association (VHHA) provided an overview of the VHHA Stroke Collaborative. Participating members of the collaborative are the non-stroke certified hospitals, and one Acute Stroke Ready hospital. Hospital collaborative survey results were shared. Z-codes, ICD-10 codes for social determinants of health, were captured for participating hospitals. Advisory Group Members discussed the need to capture specific metrics and to identify the specific barriers to improving those metrics, including how to improve efficiencies in the stroke systems of care. A discussion took place about cost-benefit of stroke certification; consensus was in favor of stroke certification in rural areas to increase local capacity to make at-location diagnostics. VDH proposed a special session to review results of the hospital and EMS stroke inventory survey and the Virginia Stroke Registry data submissions.

Public comment was provided at this meeting.

OCTOBER 14, 2022 MEETING

The advisory group discussed developing the Virginia Stroke Quality Improvement Process and reports for hospitals.

Public comment was provided at this meeting.

JANUARY 13, 2023 MEETING

The advisory group reviewed a printed Coverdell stroke hospital tour sheet and provided feedback. VDH shared for discussion the Centers for Disease Control and Prevention reabstraction guidance for hospitals to participate in the Coverdell Inter-rater Reliability (IRR).

No public comment was provided at this meeting.

APRIL 21, 2023 MEETING

The goal of the meeting was to talk about the data reabstraction process as a quality improvement initiative under the stroke legislation. VDH presented the results of the reabstraction pilot project. Hospitals shared their perspectives in participating in the pilot project.

No public comment was provided at this meeting.

REPORT OUTLINE

The remainder of this report will provide a brief description of the current stroke burden in Virginia, followed by the activities performed to implement the legislative requirements. A summary of the resulting recommendations concludes the report.

STROKE BURDEN

Stroke is the fifth leading cause of death in the United States, and the fifth leading cause of death in Virginia. Virginia is one of 11 states in the Stroke Belt, a region of southeastern states recognized for its high incidence of stroke and prevalence of cardiometabolic conditions, including hypertension, diabetes, hyperlipidemia, and obesity. These chronic conditions contribute to cerebrovascular disease, which is a risk factor for the development of a stroke. Stroke occurs when the blood vessels that carry oxygen and nutrients to the brain are blocked, either by a clot or by a blood vessel bursting. When this happens, the part of the brain affected cannot receive oxygen or nutrients and damage occurs to that portion of the brain. Acute ischemic strokes (AIS), caused by the blockage of the blood vessel, comprise approximately 87% of all strokes; whereas a hemorrhagic stroke, caused by a blood vessel bursting, is less common and comprises about 13% of all strokes. There are two main types of hemorrhagic strokes, intracerebral hemorrhage (ICH) due to a blood vessel bursting and subarachnoid hemorrhage (SAH) due to the rupture of an aneurysm. A transient ischemic attack (TIA), sometimes referred to as a "mini-stroke," occurs by a temporary blockage of a vessel in the brain in which no brain damage occurs but is a warning sign of a potential future stroke.

Since 2020, there has been an increase in stroke mortality rates across the United States. The Centers for Disease Control and Prevention (CDC) reports the stroke mortality rate as 39 per 100,000 for 2018-2020, an increase from 38.2 per 100,000 for both 2017-2019 and 2016-2018 (Stroke Mortality by State, 2023). Research has identified two factors which may contribute to this increase: the effects of the COVID-19 pandemic and the health of the next generation. From 2019 to 2020, Non-Hispanic Blacks experienced the greatest increase in risk-associated mortality rates (Sidney et. al, 2022). The COVID-19 pandemic contributed to this increase as patients missed routine appointments and avoided emergency departments due to the fear of COVID-19 exposure. Hospital overcrowding and short staffing due to COVID-19 caused long waits and limited appointment time slots. Additionally, US adult obesity rates increased and worsened as the pandemic continued (Restrepo, 2022). Social distancing led to adults adapting a more sedentary lifestyle while increasing alcohol and cigarette use. An increase in obesity also increases risk of chronic disease onset, such as heart disease and stroke. Rutgers University performed an analysis of epidemiologic trends in stroke mortality and found that the later a patient is born, starting around 1960, there is a higher risk of fatal ischemic stroke at any age (Cande et. al., 2022). In addition, the Journal of Urgent Care Medicine reported 44% of Millennials (person born between 1981-1996) already have one chronic health condition (Blachford, 2022). The Rutgers University analysis suggested the most likely conditions for this population are obesity and diabetes – especially after the onset of COVID-19 pandemic sedentary habits.

The number of stroke deaths among Virginians increased by 7.3% in 2021 as compared to 2019. Stroke death rates have steadily increased since 2016, when the age-adjusted stroke death rates per 100,000 population were at their lowest in decades (Vital Event Statistics Program, 2023). As shown in Figure 1, the age-adjusted stroke death rates per 100,000 population steadily increased from 37.4 in 2017 to 40.1 in 2021.

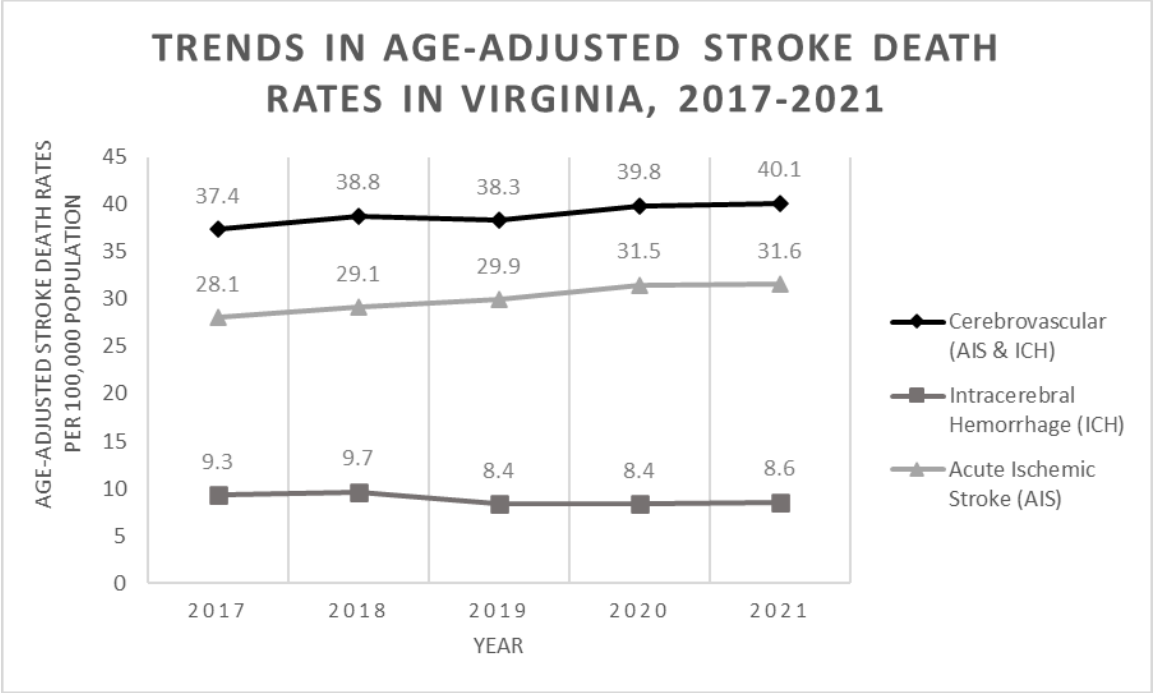

Figure 1. Trends in Age-Adjusted Stroke Death Rates in Virginia, 2017-2021. ICD-10 Codes I60-I69 (Cerebrovascular), I60-I62 (Intracerebral Hemorrhage (ICH)), I63-I69 (Acute Ischemic Stroke (AIS)). Data Source: Inpatient discharge dataset from Virginia Health Information accessed on March 2023.

Stroke death can occur at any age; however, advanced age is the strongest predictor of death from stroke in Virginia, increasing with each progressively older age group. In Figure 2, the 45-54 age group had an age-specific death rate per 100,000 population of 1.5, followed by 2.8 for ages 55-64, 5.6 for ages 65-74, 12.2 for ages 75-84, and 16.7 for ages 85 and older (Vital Event Statistics Program, 2023).

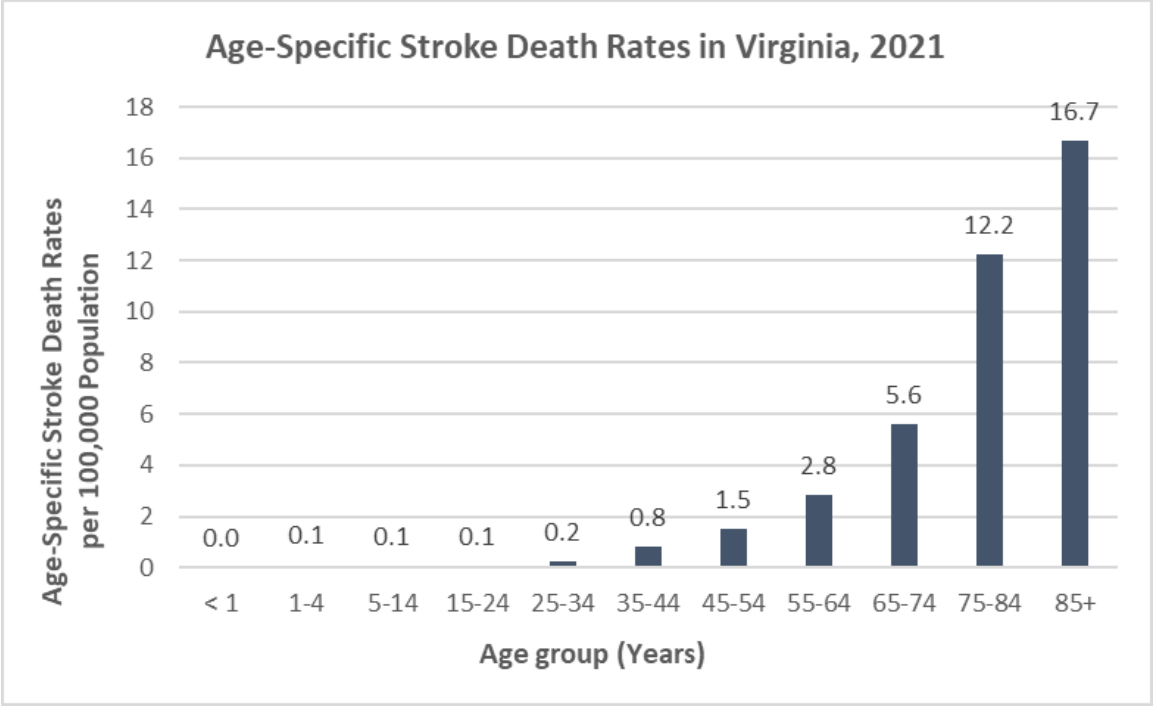

Figure 2. Age-Specific Stroke Death Rates in Virginia, 2021. ICD-10 Codes I60-I69 (Cerebrovascular), I60-I62 (Intracerebral Hemorrhage (ICH)), I63-I69 (Acute Ischemic Stroke (AIS)). Data Source: Inpatient discharge dataset from Virginia Health Information accessed on March 2023.

In Figure 3, advanced age was the strongest predictor in age-specific stroke hospitalization rates per 100,000 population. The Virginia Health Information Inpatient Database reveals ages 75 and older with the highest stroke hospitalization rate at 1,550.02, compared to 695.53 for ages 65-74, and decreasing further to 379.62 for ages 55-64 (VHI Inpatient Discharge Database, 2023).

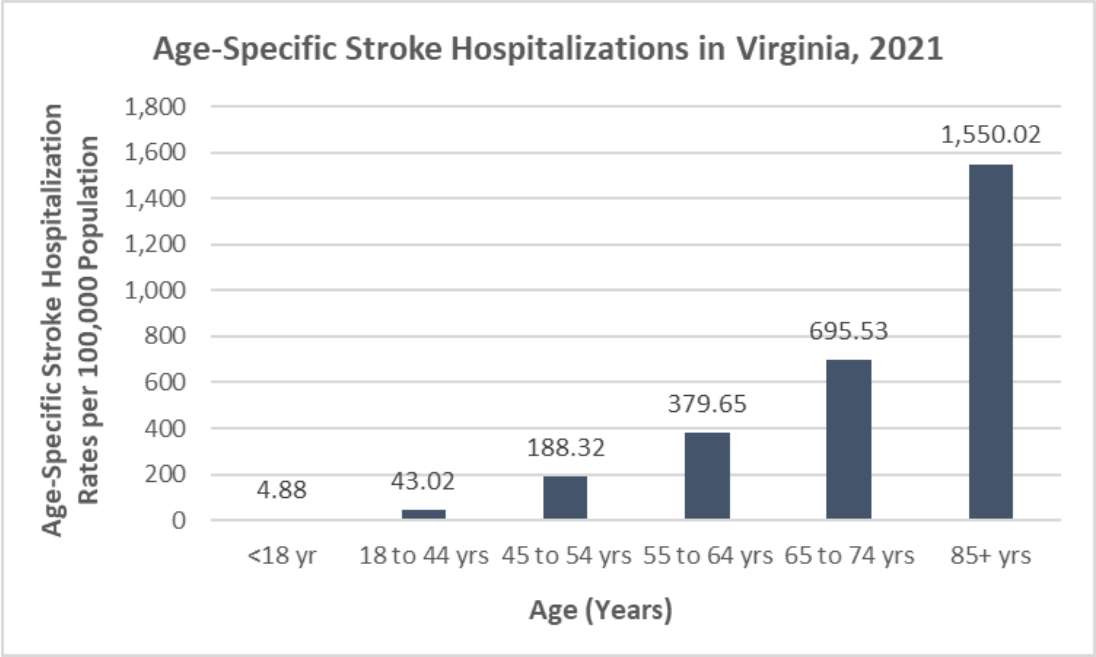

Figure 3. Age-Specific Stroke Hospitalization Rates Per 100,000 Population in Virginia, 2021. ICD-10 Codes I60-I62 (Intracerebral Hemorrhage (ICH)), I63-I69 (Acute Ischemic Stroke (AIS)), G45 (Transient Ischemic Attack (TIA)), I60-I69 and G45 (All Stroke/TIA). Data Source: Inpatient discharge dataset from Virginia Health Information accessed on March 2023.

In addition to the stroke death and hospitalization disparities in age, the data also indicate geographic stroke death and hospitalization rate disparities across the Commonwealth of Virginia. As shown in Table 1, 2017-2021 stroke mortality data were compared with the 2016-2020 priority localities to show the 10 cities or counties with the highest age-adjusted stroke mortality rate. A table with age-adjusted stroke mortality rates for all cities and counties in Virginia can be found in Appendix C.

Table 1. Virginia Cities and Counties by Stroke Mortality Age-Adjusted Rates per 100,000 population, 2016-2020 and 2017-2021 Comparison.

Region	Locality	Stroke Mortality 2016-2020	Stroke Mortality 2017-2021	Stroke Mortality Change (+ / -)
Eastern	Franklin City	96.93	103.89	6.96
Southwest	Martinsville City	94.42	101.08	6.66
Southwest	Galax City	82.64	79.03	-3.61
Southwest	Norton City	62.21	71.37	9.16
Southwest	Radford City	62.29	70.77	8.48
Southwest	Lynchburg City	64.97	66.91	1.94
Central	Greensville County	63.43	60.72	-2.71
Central	Mecklenburg County	60.28	60	-0.28
Northern	Falls Church City	49.07	59.7	10.63
Central	Petersburg City	65.1	59.67	-5.43

LEGISLATIVE REQUIREMENTS

As of February 2023, there are a total of 70 certified stroke centers in Virginia, consisting of 10 Comprehensive Stroke Centers, two Thrombectomy-Capable Stroke Centers, 39 Primary Stroke Centers, eight (8) Acute Stroke Ready facilities, and 11 stroke rehabilitation certified facilities. Virginia hospitals utilize three stroke-certifying agencies: The Joint Commission (TJC), Det Norske Veritas (DNV), and Accreditation Commission for Health Care (ACHC), with the majority (67%) utilizing TJC. A table with the levels of stroke certification and the capabilities of each can be found in Appendix D.

Implement Systems to Collect Data and Information about Stroke Care

In June 2021, VDH began implementation of the CDC Paul Coverdell National Acute Stoke Program (PCNASP) grant, which requires state recipients to implement a statewide stroke registry, collect and monitor stroke care data as defined by CDC's stroke data elements, and submit de-identified aggregate data to CDC's nationally recognized data set platform with confidentiality standards. The VDH and Virginia Stroke Care Quality Improvement (VSCQI) Advisory Group have adopted the CDC stroke data elements for the Virginia Stroke Registry. The Data Elements (DE) manual includes information about technical specifications for the DE variables included in each of the categories, guidance for their submission, and conventions for processing the data. Specifications for each DE include variable name, prompt, format, source of data, denominator population, acceptable values, description, and use for data analysis. Variables are reported for each patient. The CDC PCNASP administrative requirement contains four DE variables that are necessary for analytical utility, data quality, and program fidelity. These are State FIPS (Federal Information Processing Standard), unique patient identifier, residential zip code, and unique hospital identifier.

In anticipation of the Spring 2024 full launch of the Virginia Stroke Registry, VDH has added pre-, acute- and post-hospital and pediatric data elements, in addition to the CDC-defined stroke data elements, to help drive VDH's initiative of providing adequate care for all stroke patients throughout and after their stroke event. Examples of newly added elements are outlined in Table 2.

Table 2. The Current CDC Paul Coverdell Acute Stroke Data Elements and the Future VDH Stroke Registry Additional Elements.

	Category	2021 CDC Elements	Future Virginia Stroke Registry Data Elements
Pre-Hospital	**EMS**	EMS arrival at site, EMS departure from site, Patient Age, Patient gender, Stroke screen performed, Glucose level	Patient Disposition, Rationale for destination decision, Type of service requested, Rationale for any on-scene delays
Acute Care	**Patient Demographics**	Age, Gender, Race, Ethnicity, Insurance Status	Preferred pronouns, Ethnicity, Living Status, Primary Language, Network of Relationships, Caregiver Status, Blood type

Acute Care	**Emergency Department**	Method of arrival, Date and time of hospital arrival, Hospital admission status, Comfort measures, Medications taken prior to admission, Medical history, Telestroke, Imaging, Patient's Last Known Well, First discovery of stroke-like symptoms, National Institute of Health (NIH) Stroke Scale	Code Stroke tracking measures to include Door to Doctor, Door to CT, Door to Lab, Activation level, Patient disposition, Transfer Rationale, Teleneurology metrics, Glasgow Coma Scale, Alcohol screen, Pregnancy screen, Drug Screen

In June 2022, the VDH submitted de-identified, aggregate stroke care data to the Secure Access Management Site (SAMS), CDC's nationally recognized data set platform with confidentiality standards with the participation of 5 hospitals: Centra Lynchburg Hospital, Inova Alexandria Hospital, Inova Fairfax Hospital, Riverside Regional Hospital and the University of Virginia Hospital. Three other facilities, Chesapeake Regional Medical Center, Virginia Commonwealth University Hospital and Bon Secours St. Mary's Hospital, were able to submit their data to the VDH Stroke Registry platform in June. For the October 2022 data submission, VDH successfully received and submitted data from 33 hospitals: nine Comprehensive Stroke Centers, one Thrombectomy-Capable Center, 22 Primary Stroke Centers, one non-stroke certified hospital. A total of 15,390 patient records were submitted in the October 2022 data submission. The February 2023 data submission increased to include three additional Primary Stroke Centers participating with a total of 15,640 patient records submitted. Work is underway to add at least seven more hospitals for the June 2023 submission. If successful, 93% of all hospitals would be participating in the registry.

Facilitate Data Sharing and Collaboration

In May 2022, VDH announced the launch of the first-ever Virginia Stroke Registry in a partnership with ESO (Emergency Services Organization), the leading data and software company serving EMS, fire departments, hospitals, state and federal agencies. The Virginia Stroke Registry will provide the Commonwealth a greater picture of Virginia's stroke burden, highlight successes in stroke care, and allow the VDH to assist hospitals towards better allocation of resources to raise stroke awareness and improve patient outcomes for all Virginians. VDH selected ESO as the vendor for the trauma registry for hospitals and EMS agencies in 2021. The ESO Health Data Exchange, a bi-directional data exchange platform, will allow EMS and hospitals to share time-sensitive patient data electronically and translate information automatically from any prehospital electronic patient care report (ePCR) system to any hospital electronic medical record (EMR) system. This overlay of hospital and EMS data will allow VDH to share outcome reports with hospital and EMS partners and is the basis for a similar platform for the Virginia Stroke Registry.

The Virginia Stroke Registry will be completed in two phases, with Phase 1 lasting from June 2021 to Spring 2024. Phase 1 targets 13 comprehensive stroke or thrombectomy-capable hospitals for the initial data submissions to the CDC before rolling out submission to over 46 Virginia hospitals that were encouraged by VDH to activate the Coverdell layer in the GWTG (Get With The Guidelines) Stroke Database, a stroke registry product from AHA/ASA. Phase 2, expected to launch in Spring 2024, will be a standalone data entry registry that will allow all hospitals to participate regardless of certification status or prior stroke registry usage. At full launch, the EMS layer of stroke data will overlay with hospitals' stroke data. This will allow the patient record to link between EMS and hospitals from pre-hospital to post-hospital, enabling VDH, EMS, and hospitals to track a patient's journey throughout the continuum of stroke care. Participating hospitals and EMS agencies will have access to their own data and the ability for designated users to analyze their own data within the stroke registry platform, in addition to receiving a full annual report from VDH. When the Virginia Stroke Registry is fully launched in Spring 2024, a regular dissemination schedule of quarterly reports will be established.

The Virginia Stroke Collaborative, an effort to convene non-stroke certified hospitals to improve stroke care, led by Virginia Hospital and Healthcare Association (VHHA) with the support of the VDH, provides another route to enable data sharing and collection. Thirteen hospitals that currently hold no stroke certification were invited to join the collaborative, and eight hospitals participated in 2022. Survey results collected from this group indicated that 87% of the participants have more responsibilities than stroke care, may be over multiple campuses, and participate in no registry to collect stroke data. All of the participating hospitals were interested in becoming stroke certified.

Apply Guidelines for Transitioning Patients to Community-Based Follow-up Care

The VDH 2022 Hospital Stroke Inventory Survey reached 88% of all hospitals and FSEDs in Virginia. Of the 93 respondents, 66 (71%) respondents do not have a patient referral tracking systems to support transitions of care for stroke patients. Furthermore, 41 (44%) respondents reported they are attempting to make post-discharge phone calls to stroke patients and/or their families; however, more than half (21, 51%) report they are reaching less than 25% of their patients. Hospital stroke programs lack the necessary tools and resources to apply guidelines for transitioning patients to community-based follow-up care. Currently, attempts by stroke coordinators to reach patients post-discharge have not been widely successful.

As described in the 2022 Stroke General Assembly Report, *RD139 - Data-Driven Action Steps and Statewide Capacity Building Pursuant to Stroke Care Quality Improvement in Virginia,* VDH expanded upon the nascent partnership with Unite Us, a statewide referral platform and network, to provide hospitals with a post-discharge referral tool and process for referring stroke patients to community-based resources and follow-up care. VDH and Unite Us provided webinar trainings, conducted surveys, hosted live feedback sessions at the VSCQI Advisory Group meetings with stroke coordinators, and assigned 20 licenses to the Unite Us Insights Dashboard developed for hospitals' stroke programs.

Establishing a stroke-specific post-discharge referral pathway in Unite Us presented three challenges. The first challenge involved appropriate assignment of Unite Us licenses to hospital staff. The initial group of stroke coordinators, identified by VDH, were correctly assigned Unite Us Insights Dashboard licenses to monitor post-discharge referral activity among stroke patients; however, they were additionally assigned Unite Us user licenses by default through Unite Us. For stroke coordinators to monitor data within the Unite Us Insights Dashboard, hospital staff with the user licenses must first document the referrals. Stroke Coordinators typically do not make post-discharge referrals, therefore the additional user licenses needed to be assigned to hospital staff responsible for making referrals to community-based care and resources, including but not limited to social workers, care managers, and patient navigators. In hospitals already participating in the Unite Us referral system, this did not present a challenge because user licenses were already assigned to social workers, care managers and patient navigators. The challenge was identified in 8 hospitals who were newly onboarded to Unite Us. The VDH, VHHA, and Unite Us have begun identifying the appropriate hospital staff for reassignment of Unite Us user licenses so that post-discharge referral through Unite Us can be documented in the Unite Us Insights Dashboard. .

Secondly, clinical patient data from the hospital and social care data from Unite Us were not matched to determine which stroke patients were also referred to community-based care and resources. VDH, VHHA, and Unite Us have begun exploring ways to integrate the social care data in Unite Us with hospital electronic medical records for health systems to monitor and track post-discharge transitions of care. In 2022-2023, VDH and VHHA provided 11 health systems with full EHR (electronic health record) integration in Unite Us. Health systems with full EHR integration have the Unite Us platform accessible within the EHR and do not need to access an external webpage to use Unite Us. Full EHR integration is a key preliminary step towards matching clinical patient data with their social care data from Unite Us. Table 3 below shows the health systems in Virginia, Unite Us utilization status, integration versus web application configuration type, and the number of active users.

Table 3. Health System Unite Us Status, Integration, and Active Users as of March 1, 2023.

Hospital / Health System	Unite Us Status	EHR Integration or Web Application	# Active Unite Us Users
Augusta Health	Live	Web App	42
Ballad Health	Live	Integration	213
Bath Community	Live	Web App	3
Bon Secours	Live	Web App	71
Carilion	Live	Web App first, then Integration	0 (Live March 7)
Centra Health	Live	Integration	42
CHKD	Live	Integration	399
Inova	Implementation	Integration	0 (Live April 3)
LifePoint / Sovah Health	Live	Web App	17
Mary Washington	Live	Integration	70
Riverside	Contracting	Integration	-

Sentara	Live	Integration	175
Sheltering Arms	Live	Integration	7
UVA Health	Live	Integration	18
Valley Health	Implementation	Web App	0 (Date TBD)
VCU Health	Live	Web App	271
Virginia Hospital Center	Implementation	Integration	0 (Live April 4)

*Note: Live status indicates Unite Us is fully operational in the hospital / health system. Implementation status indicates a contract is in place and Unite Us is scheduled to be live. Contracting status indicates the hospital and Unite Us are in contract negotiations.

Lastly, it was determined that a stroke-specific post-discharge referral pathway could miss the opportunity to identify and refer patients at high risk for stroke who were not seen by a stroke coordinator. Patients may have co-morbidities, including but not limited to stroke risk factors such as hypertension, hyperlipidemia, and diabetes. VDH, VHHA, and Unite Us therefore expanded the post-discharge referral model from a stroke-specific transitions of care model to a comprehensive transitions of care model within the hospital and health system settings, providing the opportunity for collaboration and coordination within hospital departments beyond neurology and those involved in stroke care.

This comprehensive model places a Community Health Worker (CHW) at the core of the post-discharge transitions of care to engage, screen, and refer patients to needed care and resources. The American Public Health Association (2022) provides the following definition of a CHW: “A community health worker is a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the worker to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery.” Within the hospital setting, a CHW is integrated into a multidisciplinary team of providers, nurses, care managers, and social workers who identify, monitor, and refer patients post-discharge using Unite Us. Rather than limit the model to stroke, Unite Us and VHHA expanded its use across the hospital and health system for greater impact of reduced readmissions, adherence to medication regimen, and better management of stroke risk factors.

The utilization of Unite Us in this comprehensive model is advantageous for multiple reasons. First, health systems can have access to a unified, statewide network of clinical and community resources through Unite Us. It is often beyond the physical capacity of stroke coordinators and care managers to assess and refer patients to needed resources outside of stroke care. Further complicating this is that most stroke coordinators’ knowledge of local resources and services is typically limited to the immediate service area of the hospital and not extended to the area from which a patient may be transported from for stroke care, including where the patient resides. Secondly, the patient will be assisted by dedicated CHWs, who are employed by hospitals and in community-based settings and who are knowledgeable of local resources and services.

The success and impact of this comprehensive approach is evident. To date, 118 CHWs have been hired in 15 hospitals across Virginia. Across 133 localities, Unite Us has integrated over

1,045 partners into the Unite Us referral network with 2,222 active programs, 68% of which are open to referrals. Since December 2022, over 20,600 clients have been served and 24,800 referrals sent. Food assistance and housing/shelter needs accounted for 25% of the total case volume among participating hospitals in 2022, followed by individual and family support, transportation, mental/behavioral health, physical health, and income support. Throughout 2022, the acceptance rates of referrals increased from 38.9% in January 2022 to 57.1% in December 2022.

Establish a Process for Continuous Quality Improvement

The VSCQI Advisory Group has established a process for continuous quality improvement for hospitals and EMS. The VDH Stroke Registry epidemiologist, funded through the CDC PCNASP grant, analyzes the quantitative and qualitative data from the Virginia Stroke Registry and the hospital and EMS inventory surveys to create tailored reports. These reports inform hospitals and EMS about their stroke care data and outcomes, and identify opportunities for implementing quality improvement, increasing capacity, and changing stroke protocols.

In January 2023, re-abstraction requests were submitted to 33 hospitals towards the development of interrater reliability as a requirement of the CDC PCNASP grant. A total of 17 hospitals participated in the process, and results from the 17 hospitals were aggregated and submitted to the CDC Coverdell team. Individualized re-abstraction reports were provided to these hospitals in March 2023. The individualized reports compared previously submitted VDH Stroke Registry data to the electronic medical record re-abstraction submitted by the hospitals. The aggregated results showed the following metrics need improvement: hospital admission date, patient last known well date, patient last known well time, IV thrombolytic initiation time, and whether a telestroke consultation took place. Each of these data elements had a matching percent of less than 80%.

The VDH Hospital Acute Stroke Survey was introduced at the April 2022 VSSTF meeting, with a subsequent email invitation sent to all known hospital and free-standing ED (FSED) stroke coordinators and/or representatives. A total of 93 survey responses were obtained, representing 88% of hospitals and FSEDs. Specific survey questions targeted the following areas of stroke care: certification, acute stroke team and acute stroke care, admission and care of stroke patients, EMS protocols and feedback, transitions of care, and stroke quality and performance improvement. Some of the key findings are listed below:

Certification

- 60 (65%) responding facilities are stroke certified. Of the 33 facilities not certified, only eight facilities planned to pursue certification within the next year.

Acute Stroke Team and Acute Stroke Care

- 85 (91%) respondents have the ability to provide thrombolytics to suspected stroke patients.
- 75 (81%) respondents utilize teleneurology services, either via phone, video or both.

EMS Protocols and Feedback

- When pre-notified by EMS of a potential stroke patient, 69 (74%) responded that they call a stroke alert more than 75% of the time.

Transitions of Care

- 66 (71%) respondents do not have a patient referral tracking systems to support transitions of care for stroke patients.
- There were 32 facilities that reported having stroke survivor/caregiver support groups in their area.

Stroke Quality and Performance Improvement

- 66 (71%) respondents have implemented changes to improve stroke care practices and patient care, with 54 (82%) facilities reporting improvements.

Community Education and Resources

- 66 (71%) respondents provide community education on stroke recognition and calling 911.
- Only 35 (38%) of respondents monitor for disparities among patients impacted by stroke or at high risk for a stroke.

In June 2022, a Virginia EMS Stroke Inventory Survey was distributed to 620 EMS agencies via superuser emails provided by the Office of Emergency Medical Services (OEMS). Two hundred fifty-four out of 620 EMS agencies (41%) fully or partially completed the survey, and all 11 EMS Region Councils were represented. Some key findings are listed below:

Stroke Alerts

- There is wide variability in the timing of calling a stroke alert, with only 22% pre-alerting up to the 24 hours of Last Known Well.

Pre-Hospital Assessment Tools

- There is wide variability in the prehospital stroke assessment tools used by 11 EMS councils, potentially leading to confusion among providers and receiving hospitals.

Stroke Patient Destination

- Respondents are choosing to take suspected stroke patients to a certified stroke center over non-certified stroke centers most of the time. Distance is still the primary driver impacting where to take a suspected stroke patient.

Findings from the 2022 Virginia Hospital Acute Stroke survey were presented at the October 2022 VSSTF meeting. Findings from the 2022 Virginia EMS Stroke Inventory Survey were presented at the OEMS Advisory Council Board meeting in February 2023. At this meeting, a motion was made and passed to revise the EMS Stroke Triage Plan (2017) to extend the time window of patient last known well time to 24 hours for EMS responders to pre-alert hospitals.

RECOMMENDATIONS

Upon advisement of the Virginia Stroke Care Quality Improvement Advisory Group, the following are recommendations provided in response to the Code of Virginia § 32.1-111.15:1.

Implement Systems to Collect Data and Information about Stroke Care

1. Non-certified stroke centers should contribute to the Virginia Stroke Registry as well as to those free-standing emergency departments and post-acute discharge facilities, such as inpatient rehabilitation facilities and skilled nursing facilities.
2. Additional measures should be added to the Virginia Stroke Registry to include special populations such as pregnancy and sickle cell, as well as collection of measures regarding advanced stroke therapies such as thrombectomy and aneurysm repair.
3. The Virginia Stroke Registry should include the collection of "Z" codes (ICD-10 codes for social determinants of health) in order to address the disparities of care across Virginia.
4. The Virginia Stroke Registry should make every effort to allow for the collection of data measures and patient outcomes to facilitate the ongoing certification of stroke centers by the three stroke certifying bodies used in Virginia.
5. The Virginia Stroke Registry should be interoperable with additional Virginia data sources, such as the Virginia Vital Events Statistics Program, to comprehensively describe stroke burden and gaps in stroke care along the full continuum of care.

Facilitate Data Sharing and Collaboration

6. The Virginia Hospital and Healthcare Association Collaborative should continue to engage the non-certified stroke hospitals and guide them towards stroke certification, participation in the Virginia Stroke Registry, and quality improvement.
7. Get With The Guidelines participating hospitals should activate the Coverdell layer to submit to Phase 1 of the VDH Stroke Registry.
8. VDH should continue to work on development of Phase 2 of the Virginia Stroke Registry.

Apply Guidelines for Transitioning Patients to Community-Based Follow-up Care

9. Hospitals should continue to use Unite Us, or any statewide referral platform, to alleviate the burden from hospital stroke coordinators and care managers of connecting patients to necessary services post-discharge.

10. General Funds should be provided to sustain a statewide referral system for hospitals and community-based organizations annually, with consideration of Community Health Workers as frontline public health workers at the core of the referral system.

Establish a Process for Continuous Quality Improvement

11. VDH should release the Virginia Hospital Acute Stroke Survey annually to all stroke hospitals, with updated questions to reflect current trends and process improvement outcomes for stroke care.
12. VDH should release the Virginia EMS Stroke Inventory Surveys annually, with questions targeted to the appropriate recipients to encourage greater EMS response and involvement.
13. VDH should update the EMS Stroke Triage Plan's protocols to address pre-alerting up to 24 hours to better address those patients who might be a candidate for mechanical thrombectomy.
14. VDH should investigate the barriers for EMS agencies that are transporting suspected stroke patients to non-certified stroke centers or out of state facilities.

APPENDIX A –CODE OF VIRGINIA § 32.1-111.15.1

CHAPTER 276

An Act to amend the Code of Virginia by adding in Article 2.1 of Chapter 4 of Title 32.1 a section numbered 32.1-111.15:1, relating to stroke care quality improvement.

[H 1197]
Approved March 9, 2018

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding in Article 2.1 of Chapter 4 of Title 32.1 a section numbered 32.1-111.15:1 as follows:

§ 32.1-111.15:1. Department responsible for stroke care quality improvement; sharing of data and information.

A. The Department shall be responsible for stroke care quality improvement initiatives in the Commonwealth. Such initiatives shall include:

1. Implementing systems to collect data and information about stroke care in the Commonwealth in accordance with subsection B;

2. Facilitating information and data sharing and collaboration among hospitals and health care providers to improve the quality of stroke care in the Commonwealth;

3. Requiring the application of evidence-based treatment guidelines for transitioning patients to community-based follow-up care following acute treatment for stroke; and

4. Establishing a process for continuous quality improvement for the delivery of stroke care by the statewide system for stroke response and treatment in accordance with subsection C.

B. The Department shall implement systems to collect data and information related to stroke care (i) that are nationally recognized data set platforms with confidentiality standards approved by the Centers for Medicare and Medicaid Services or consistent with the Get With The Guidelines-Stroke registry platform from hospitals designated as comprehensive stroke centers, primary stroke centers, or acute stroke-ready hospitals and emergency medical services agencies in the Commonwealth and (ii) from every primary stroke center with supplementary levels of stroke care distinction in the Commonwealth. Every hospital designated as a comprehensive stroke center, primary stroke center, or primary stroke center with supplementary levels of stroke care distinction shall report data and information described in clauses (i) and (ii) to the Department. The Department shall take steps to encourage hospitals designated as acute stroke-ready hospitals and emergency medical services agencies to report data and information described in clause (i) to the Department.

C. The Department shall develop a process for continuous quality improvement for the delivery of stroke care provided by the statewide system for stroke response and treatment, which shall include:

1. Collection and analysis of data related to stroke care in the Commonwealth;

2. Identification of potential interventions to improve stroke care in specific geographic areas of the Commonwealth; and

3. Development of recommendations for improvement of stroke care throughout the Commonwealth.

D. The Department shall make information contained in the systems established pursuant to subsection B and data and information collected pursuant to subsection C available to licensed hospitals and the Virginia Stroke Systems Task Force, and, upon request, to emergency medical services agencies, regional emergency medical services councils, the State Emergency Medical Services Advisory Board, and other entities engaged in the delivery of emergency medical services in the Commonwealth to facilitate the evaluation and improvement of stroke care in the Commonwealth.

E. The Department shall report to the Governor and the General Assembly annually on July 1 on stroke care improvement initiatives undertaken in accordance with this section. Such report shall include a summary report of the data collected pursuant to this section.

F. Nothing in this article shall require or authorize the disclosure of confidential information in violation of state or federal law or regulations, including the Health Insurance Portability and Accountability Act, 42 U.S.C. § 1320d et seq.

2. That the provisions of the first enactment of this act shall become effective on January 1, 2019.

3. That the Department of Health shall convene a group of stakeholders, which shall include representatives of (i) hospital systems, including at least one hospital system with at least six or more stroke centers in the Commonwealth, recommended by the Virginia Hospital and Healthcare Association; (ii) the Virginia Stroke Systems Task Force; and (iii) the American Heart Association/American Stroke Association, to advise on the implementation of the provisions of this act.

APPENDIX B – ACRONYMS AND ABBREVIATIONS

This is a listing of the acronyms and abbreviations appearing throughout the report and its appendices.

ACHC	Accreditation Commission for Health Care
AHA/ASA	American Heart Association/American Stroke Association
AIS	Acute Ischemic Stroke
CDC	Centers for Disease Control and Prevention
CHWs	community health workers
CSC	Comprehensive Stroke Center
DE	Data Elements
DNV	Det Norske Veritas
EHR	electronic health record
EMR	electronic medical record
EMS	Emergency Medical Services
ePCR	electronic patient care report
ESO	Emergency Services Organization
FIPS	Federal Information Processing Standards
GWTG	Get With The Guidelines
ICH	Intracerebral Hemorrhage
JCHC	Joint Commission on Health Care
OEMS	Office of Emergency Medical Services
PCNASP	Paul Coverdell National Acute Stroke Program
PSC	Primary Stroke Center
PSC+	Primary Stroke Center Plus
SAH	Subarachnoid Hemorrhage
SAMS	Secure Access Management Site
SWSTF	Southwest Stroke Task Force
TJC	The Joint Commission
TSC	Thrombectomy Stroke Center
VDH	Virginia Department of Health
VHHA	Virginia Hospital and Healthcare Association
VSCQI	Virginia Stroke Care Quality Improvement
VSCC	Virginia Stroke Coordinator Consortium
VSSTF	Virginia Stroke Systems Task Force

APPENDIX C – TABLE 1. THE COMPLETE VIRGINIA CITIES AND COUNTIES STROKE MORTALTIY AGE-ADJUSTED RATES, 2016-2020 AND 2017-2021 COMPARISON

This table can be compared to the state age-adjusted mortality rate of 38.91 for 2017-2021.

Region	Locality	Stroke Mortality 2016-2020	Stroke Mortality 2017-2021	Stroke Mortality Change (+ / -)
Central	Greensville County	63.43	60.72	-2.71
	Mecklenburg County	60.28	60	-0.28
	Petersburg City	65.1	59.67	-5.43
	Nottoway County	53.97	58.48	4.51
	Charlotte County	52.87	57.63	4.76
	Emporia City	47.47	56.63	9.16
	Halifax County	53.34	56.39	3.05
	Brunswick County	59.53	55.48	-4.05
	Amelia County	45.72	52.29	6.57
	Colonial Heights City	50.51	50.66	0.15
	Lunenburg County	42.16	47.98	5.82
	Hopewell City	44.49	45.78	1.29
	Richmond City	42.23	43.52	1.29
	Dinwiddie County	42.75	43.36	0.61
	Henrico County	42.82	42.2	-0.62
	Sussex County	39.52	42.14	2.62
	Buckingham County	39.28	41.35	2.07
	Chesterfield County	40.22	40.53	0.31
	Hanover County	40.1	40.51	0.41
	Prince Edward County	41.84	39.91	-1.93
	Charles City County	36.8	37.79	0.99
	Surry County	39.08	37.44	-1.64
	Goochland County	36.73	36.35	-0.38
	Cumberland County	37.22	36.16	-1.06
	New Kent County	33.09	35.82	2.73
	Prince George County	36.12	33.27	-2.85
	Powhatan County	29.64	29.75	0.11
Eastern	Franklin City	96.93	103.89	6.96
	Lancaster County	58.78	57.9	-0.88
	Norfolk City	53.09	54.51	1.42
	Accomack County	51.32	53.92	2.6
	Portsmouth City	47.68	49.31	1.63

	Chesapeake City	46.89	48.93	2.04
	Newport News City	45.13	47.55	2.42
	Richmond County	43.43	46.97	3.54
	Southampton County	46.05	46.28	0.23
	Isle of Wight County	40.73	44.79	4.06
	Virginia Beach City	41.62	44.62	3
	Gloucester County	44.67	44.06	-0.61
	Hampton City	42.89	43.84	0.95
	Northampton County	40.34	43.46	3.12
	Suffolk City	41.09	43.33	2.24
	Middlesex County	42.25	40.62	-1.63
	Westmoreland County	44.17	37.89	-6.28
	James City County	33.45	35.81	2.36
	Mathews County	35.87	35.45	-0.42
	York County	32.47	35.21	2.74
	Poquoson City	30.68	32.8	2.12
	Northumberland County	34.25	32.21	-2.04
	Essex County	32.36	31.13	-1.23
	King George County	37	29.57	-7.43
	King and Queen County	27.24	29.21	1.97
	Williamsburg City	31.21	28.6	-2.61
Northern	Falls Church City	49.07	59.7	10.63
	Fairfax City	49.95	48.56	-1.39
	Manassas City	46	48.41	2.41
	Prince William County	34.39	34.34	-0.05
	Alexandria City	26.29	27.43	1.14
	Fairfax County	26.04	25.93	-0.11
	Arlington County	28.15	25.85	-2.3
	Loudoun County	25.43	24.26	-1.17
	Manassas Park City	22.69	20.51	-2.18
Northwest	Lexington City	54.99	51.07	-3.92
	Clarke County	43.75	51	7.25
	King William County	51.49	50.94	-0.55
	Warren County	47.87	50.63	2.76
	Buena Vista City	44.49	48.37	3.88
	Harrisonburg City	47.57	47.98	0.41
	Page County	48.52	46.08	-2.44
	Greene County	36.37	44.82	8.45
	Madison County	47.39	44.65	-2.74
	Winchester City	38.95	41.6	2.65
	Caroline County	39.53	40.58	1.05

	Nelson County	40.7	39.74	-0.96
	Staunton City	41.44	39.33	-2.11
	Highland County	37.51	37.31	-0.2
	Charlottesville City	36.56	36.98	0.42
	Frederick County	37.37	36.67	-0.7
	Culpeper County	32.39	36.21	3.82
	Fauquier County	32.33	35.92	3.59
	Shenandoah County	35.14	35.81	0.67
	Waynesboro City	39.51	34.86	-4.65
	Stafford County	37.28	34.35	-2.93
	Rockingham County	35.03	33.89	-1.14
	Albemarle County	32.08	31.2	-0.88
	Rockbridge County	31.08	30.96	-0.12
	Fluvanna County	31.68	30.55	-1.13
	Spotsylvania County	30.93	30.44	-0.49
	Louisa County	30.62	29.89	-0.73
	Augusta County	30.83	29.86	-0.97
	Orange County	32.25	28.72	-3.53
	Fredericksburg City	30.99	26.41	-4.58
	Bath County	26.89	22.22	-4.67
	Rappahannock County	14.91	19.98	5.07
Southwest	Martinsville City	94.42	101.08	6.66
	Galax City	82.64	79.03	-3.61
	Norton City	62.21	71.37	9.16
	Radford City	62.29	70.77	8.48
	Lynchburg City	64.97	66.91	1.94
	Appomattox County	58.82	53.58	-5.24
	Roanoke City	53.47	52.76	-0.71
	Giles County	44.28	50.6	6.32
	Covington City	64.23	49.69	-14.54
	Danville City	52.85	49.18	-3.67
	Amherst County	47.2	48.82	1.62
	Salem City	51.97	46.71	-5.26
	Henry County	41.3	45.45	4.15
	Bristol City	44.88	45.4	0.52
	Bedford County	43.35	44.15	0.8
	Tazewell County	40.33	43.65	3.32
	Campbell County	39.5	43.28	3.78
	Montgomery County	44.42	42.36	-2.06
	Floyd County	38.11	42.29	4.18
	Wise County	35.64	42.17	6.53

	Patrick County	42.32	41.92	-0.4
	Pulaski County	43.39	41.42	-1.97
	Scott County	38.69	40.85	2.16
	Pittsylvania County	39.02	40.78	1.76
	Washington County	39.08	40.78	1.7
	Roanoke County	35.06	40.66	5.6
	Alleghany County	40.75	39.6	-1.15
	Carroll County	37.69	38.58	0.89
	Smyth County	37.31	38.34	1.03
	Botetourt County	36.69	37.98	1.29
	Wythe County	40.61	37.69	-2.92
	Franklin County	33.97	37.08	3.11
	Lee County	33.75	36.89	3.14
	Dickenson County	28.29	35.88	7.59
	Buchanan County	32.71	34.71	2
	Grayson County	27.5	32.89	5.39
	Russell County	32.49	31.6	-0.89
	Craig County	20.33	30.39	10.06
	Bland County	23.2	28.06	4.86

APPENDIX D – LEVELS OF STROKE CARE CERTIFICATIONS

	Acute Stroke Ready	Primary Stroke Center	Thrombectomy-Performing	Comprehensive Stroke Center
Certifying Body	TJC, DNV ACHC: Stroke Ready Hospital	TJC, DNV, ACHC	TJC-Thrombectomy Capable DNV-Primary Stroke Plus ACHC-Thrombectomy Stroke	TJC, DNV, ACHC
What type of facility?	Hospitals or Free- Standing Emergency Departments	Hospitals	Hospitals	Hospitals
Capabilities	Transfers most if not all AIS patients Transfers thrombolytic pts Transfers all ICH, SAH	Keeps most AIS may transfer thrombolytic pts Transfers most ICH Transfers all SAH	Keeps most AIS Keeps Thrombectomy May keep ICH or SAH Transfers to CSC	Keeps all patients Acts as a receiving facility for all patients
Receives from other facilities	No	May receive	Yes, for thrombectomy	Yes, for all
Thrombolytics	Gives	Gives	Gives	Gives
Thrombectomy	Does not do	Approx. 30% do	Does 24/7	Does 24/7
Neurosurgery	Does not do	May have	May have	Must have
Transfers patients	Yes	Yes	Yes	Yes
Teleneurology	Yes	Many have	May have	May have, May provide
Assessment by	ED Dr, NP or PA	ED Dr	ED Dr	ED Dr
Imaging Requirements	CT, Labs 24/7 MRI 24/7 (if used)	CT, labs 24/7, MRI if used CTA, MRA	CT, CTA, CTP MRI, labs, MRA, angiography 24/7	CT, MRI, labs, MRA, angiography 24/7

		Cardiac imaging	Carotid ultrasound Cranial ultrasound (TJC only) TEE as indicated (DNV	Carotid ultrasound Cranial ultrasound TEE, TTE as indicated
Stroke Unit	Not required	Dedicated stroke beds	Dedicated stroke beds Dedicated neuro ICU beds On-site CCU coverage	Dedicated stroke beds Dedicated neuro ICU beds On-site CCU coverage
Research	Not required	Not required	Not required	Required
Reviewed	TJC-every 2 yrs, Call on off years DNV-Annually ACHC-every 3 yrs	TJC-every 2 yrs, Call on off years DNV-Annually ACHC-every 3 yrs	TJC-every 2 yrs, Call on off years DNV-Annually ACHC-every 3 yrs	TJC-every 2 yrs, Call on off years DNV-Annually ACHC-every 3 yrs
Guidelines	Recommendations from Brain Attack Coalition for Acute Stroke Ready Hospitals, 2013	Recommendations from Brain Attack Coalition for Primary Stroke Centers, 2011	No guideline recommended—developed from 2015 Update to 2013 Guidelines	Recommendations from Brain Attack Coalition for Comprehensive Stroke Centers, 2005

TJC=The Joint Commission
DNV=Det Norske Veritas
ACHC=Accreditation Commission for Health Care

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APPENDIX F – MEETING MINUTES

Virginia Stroke Care Quality Improvement Initiative Meeting

Meeting Location: Virginia Hospital & Healthcare Association, 4200 Innslake Drive, Glen Allen, VA 23060 (In-person only).

Meeting Date: July 15, 2022 from 8:40am – 9:30am

Attendance: 13 Advisory Group Members – Patrick Wiggins (VDH), Kathryn Funk (VDH), Chad Aldridge (VSSTF Chair / UVA Health), Melanie Winningham (VSSTF Chair / Sentara Martha Jefferson Hospital), Mandi Zemaiduk (VSCC Co-Chair / Centra), Pankajavalli Ramakrishan (Riverside), Dana Gibler (Riverside), Nicole Duck (Riverside), Carla Gunter (Lifepoint Twin County Regional Healthcare), Donna Layne (Centra), Stacie Stevens (VCU), Kristie Burnette (VHHA), Kelly Cannon (VHHA).
Public Attendance: 3 non-advisory group members - Brandon Robinson (Sevaro), Mary Jobson-Oliver (UVA Health), Jacqueline Hale (Unite Us).

Agenda	Notes
8:40-8:50am Welcome & Introductions Introduction of Advisory Group Members Virginia Stroke Care Quality Improvement Advisory Group Updates Review of Stroke Mortality and Hospitalization Data and Trends	• Patrick Wiggins (VDH) opened the meeting and facilitated introductions of advisory group members and the public in attendance. • Patrick Wiggins (VDH) provided paper copies of updated data maps and a data report for stroke. Wiggins provided a verbal overview of the data in both documents.
8:50-9:25am Virginia Hospital and Healthcare Association (VHHA) Stroke Collaborative Presentation Advisory Group Recommendations: Collaborative Feedback Advisory Group Recommendations: Prioritization of Hospitals for Inclusion in the VHHA Collaborative for Year 2	• Kristie Burnette (VHHA) introduced herself and provided an overview of the VHHA Stroke Collaborative. • Participating members of the collaborative are the non-stroke certified hospitals, and 1 acute stroke ready hospital. • Burnette showed a powerpoint presentation with hospital collaborative survey results. VCU Tappahannock Hospital survey results were not included because they were added to the collaborative after the survey was disseminated. Z-codes, ICD-10 codes for social determinants of health, were captured for participating hospitals and it was found that 4 patients who had a stroke also were non-compliant with medication regimen. • Advisory Group Members representing Riverside, UVA, and Centra discussed the need to capture specific metrics and to identify the specific barriers to improving those metrics,

	including how to improve efficiencies in the stroke systems of care. VDH reminded the group about the Stroke Metrics being collected from the Virginia Stroke Registry. • Recommendation from Carla Gunter (Lifepoint Twin County Regional Healthcare): Go further southwest to engage hospitals (Montgomery County and beyond), many patients are going outside of Virginia for stroke care. • A discussion took place about cost-benefit of stroke certification, consensus was in favor of stroke certification in rural areas to increase local capacity to make at-location diagnostics. A gap analysis and resources are needed to support these hospitals. VDH reminded the group about the Hospital and EMS stroke inventory surveys and results were being analyzed. • VSSTF Co-Chair and Riverside recommended the need to have a neurologist encounter the patients (in-person or virtually) to review the full history of the patient. They also recommended low level steps for the VHHA Stroke Collaborative participating hospitals. • Additional Recommendations: (Gunter) Look at population demographics to understand trends in age, race, sex, etc. (Burnette) expand stroke data maps to include border states to better understand where people are going for stroke care outside of Virginia and visa versa. • Wiggins proposed a special session to review results of the hospital and ems stroke inventory survey and the Virginia Stroke Registry data submissions. Likely in September, before the next VSSTF quarterly meeting in October.
9:25-9:30pm Public Comment	• Sevaro: There a lot of organizations who can help you all. Each hospital is different. Recommendation: Reach out to organizations in this space. Investigate why there is a difference or disparity between the death rates and the hospitalization rates for stroke. • Unite Us: What resources are available in the community to help stroke patients post-discharge? We want to improve efficient to getting to those resources. Unite Us wants to bring all stakeholders together for post-discharge stroke transitions of care.
9:30pm Adjourn	The meeting ended at 9:46 AM. The VDH will convene a special data review meeting in mid-September in location TBD.

Virginia Stroke Care Quality Improvement Initiative Meeting

Meeting Minutes (APPROVED)

Meeting Location: Riverside College of Health Careers 316 Main St, Newport News, VA 23601 (In-Person Only)

Meeting Date: October 14, 2022 from 8:30am – 9:40am

Attendance: 13 Advisory Group Members – Patrick Wiggins (VDH), Kathryn Funk (VDH), Chad Aldridge (VSSTF Chair / UVA Health), Melanie Winningham (VSSTF Chair / Sentara Martha Jefferson Hospital), Mandi Zemaiduk (VSCC Co-Chair / Centra), Laurie Mayer (VSCC Chair ' Bon Secours), Pankajavalli Ramakrishan (Riverside), Dana Gibler (Riverside), Nicole Duck (Riverside), Donna Layne (Centra), Stacie Stevens (VCU), David Loy (Bon Secours), Wolfgang Leisch (Riverside), Kim Warren (Bon Secours), Sophea Booker (Bon Secours)
Public Attendance: Pat Edwards (Bon Secours)

Agenda	Notes
8:30am-9:40am Welcome and Minutes Approval	• Patrick Wiggins (VDH) opened the meeting and facilitated introductions of advisory group members and the public in attendance. • Meeting Minutes from July 15, 2022 were approved.
9:00-9:40am Takeaways and Developing the Virginia Stroke Quality Improvement Process and Reports for Hospitals	Goal from meeting is to see what was useful and how can we apply to Virginia. MW would like to be able to combine Virginia Statewide and Individual hospital reports. Like the standardized forms of MN and the homogeneity of them PR wanted to know how far retrospective it would be and would we be able to compare apples to apples. She stated that look at information in real-time might lead to smaller data numbers and not a true timeline or representation of care provided. A retrospective look back would be better. CA recommends utilization of a standard way of comparison for hospital reports but also wants the group to look at rehab needs and how the state is doing overall. Can we look at outreach and referrals? MZ would like to look at the bigger picture for our feedback reports such as incorporating grant info (such as ASTHOS), transfers, home health, DME, proper nutrition, etc. Would it be possible to make the report more expansive and not just look at standardized measures? SS like the Arkansas dashboard as it was easy to read

	PW asked the group if they liked the color-coding of Green, Yellow and Red on the Arkansas report and the group agreed that they did and it was easy to understand. KW asked about incorporating telemedicine information such as who responds to TN consults, who takes care of the patient to assist the Teleneurologist and what connection is being used. MW states that the G,Y,R dashboard was visually pleasing, Would recommend including information regarding EMS metrics and timeline KW also recommended including reperfusion information such as TICI score and acceptable results (looking at comprehensive stroke measures and not just primary stroke measures) PW stated that the report goal would be to connect readmissions, deaths and other SDOH which are CMS requirements in 2023 PR recommended looking at poorer resourced facilities and the resources that they need. DL recommended looking at modified Rankin Score mean/median for county and stroke discharges to help see which patients are getting better by demographics. Looking at the regions for specific weaknesses in care and incorporating rehab data if possible. Additionally, look at the LVOs and patients transferred to see if they got better after treatment. CA suggested adding vision, cognitive studies as modified Rankin Score does not capture cognition, perhaps driving/return to work or revocationalized. Looking at other metrics post-discharge. Discussion occurred in group as to what metric/exam might best capture cognitive impairment following a stroke and would this differ by age profile. DL suggested finding a simple metric. KW liked the MN dashboard as it showed how to start a QI project on pg 19, what is a QI project on pg 21,22 and is laid out in an easy to understand format for first time users MW agreed that the MN example is a very clear manual to use.
Public Comment	Pat Edwards suggested giving EMS feedback and finding out what does EMS want.
9:40am Adjourn	The meeting ended at 9:40am.

Key: Melanie Winningham=MW	Mandi Zemaiduk=MZ	Kim Warren=KW
Chad Aldridge= CA	Stacie Stevens=SS	David Loy=DL
Pankaja Ramakrishman=PR	Patrick Wiggins=PW	

Virginia Stroke Care Quality Improvement Advisory Group Meeting

Meeting Location: Medical Society of Virginia Foundation, 2924 Emerywood Pkwy, 2nd floor conference room, Richmond, VA 23294-3746

January 13, 2023 | 8:30am – 9:40am

Meeting Minutes

Agenda	Notes
8:30-8:35am Welcome and Minutes Approval	VDH opened the meeting at 8:30am with introductions and minutes approval.
8:35-9:00am VDH Coverdell Stroke Hospital Tour - Example Itinerary Review	VDH Staff reviewed a printed hospital tour sheet with Advisory Group. Question (VHHA): Who is coming from VDH? Does the team include someone clinical? Answer (VDH): Yes, the Stroke Registry Coordinator has a minimum requirement of RN or equivalent. Mary Washington Feedback from Hospital Tour: It was really helpful. Felt like a survey (certification) but not stressful. Had ED nurse manager, individuals speaking who do the work, EMS coordinator. Question: Would this be useful for hospitals looking to be certified? Answer (Mary Washington): Yes, hospitals are really siloed so this helps connect. Question: Thinking about limited capacity at VDH, could focus on less resourced hospitals and instead duplicate same steps as certification bodies. If mapping to learn about hospitals, could obtain surveys from hospitals. Answer (Mary Washington): I like the idea of the scorecard for efficiency. Answer (VDH): Goal to offer advice based on report card, hospitals underperforming benchmarks. It is not feasible to visit all hospitals given current capacity. UVA: Maybe phase 1 is for VDH to learn from certified hospitals for best practices.

	VCU: For larger hospitals, maybe a focused survey would be better. UVA: Agreed, need to be more focused, larger hospitals can pull out champions to meet in order. VHHA: Phase 1 could be collection, Phase 2 could be dissemination. UVA: Visit a sample of each region and type of hospital. VHHA: Use the VHHA Stroke Collaborative and visit these non-stroke certified hospitals and acute-stroke ready hospitals. VDH: Not mandatory, but it is voluntary on behalf of the hospital. Relationship building and communication is important.
9:00-9:40am CDC Coverdell Inter-rater Reliability (IRR) Reabstraction Guidance - **Virginia Review** **Public Comment**	VDH shared CDC Guidance for hospitals to participate in IRR. -VDH met with different states to see their reabstraction process. Due date is February 13th. VCU: We would like this to be done quarterly. UVA: Where will the comparison come from? --VDH: EHR chart to submission comparison. UVA: How can hospitals reliably say their data is accurate? --Group: It is a requirement of certification. --VDH: This will be a benefit because reabstraction process is typically outsourced, this process can be cost saving. --Group: It is an honor system from hospitals to tell the truth about accuracy of the data. VDH developed a REDCap survey for IRR, shared with group. UVA: Suggestion regarding names to prevent a mismatch between hospital internal IRR and VDH IRR - could combine date and times into 1 measure entry, to make it easier, then separate on the back end.
9:40am Adjourn	Meeting was adjourned at 9:40am

Virginia Stroke Care Quality Improvement Advisory Group Meeting

Meeting Location: Sentara Martha Jefferson Hospital,
595 Martha Jefferson Drive, Charlottesville, VA 23294
(Kessler Conference Room is location on the 1st floor of the Outpatient Care Center)

April 21, 2023 | 8:30am – 9:40am

Meeting Minutes

Attendance: 20 Members attended in person

Agenda	Minutes
8:30-8:35am Welcome and Minutes Approval	Kathryn Funk (VDH) opened the meeting with introductions. Mandi (VSCC Chair) motioned to approve the minutes, and Mary (UVA Health) seconded. Minutes were approved as submitted.
8:35-9:35am Coverdell Hospital Stroke Patient Reabstraction Pilot Overview and Results Hospital Perspectives Lessons Learned VSCQI Recommendations for Future Reabstraction Processes	• Kathryn shared the goal of the meeting was to talk about the data reabstraction process as a quality improvement initiative under the Stroke legislation. • Allison Sedon (VDH) presented on the results of the reabstraction pilot project via PowerPoint. • Process overview – extract records -> randomize -> distribute survey -> collect and analyze results. The number of records for reabstraction were based on patient records submitted. Data elements collected based on CDC recommendations (CDC Paul Coverdell National Acute Stroke Program). Reabstraction survey in RedCap created by VDH – 33 hospitals, 27 hospitals responded for a total of 240 records. • Feedback: Are people looking at date they left ED to unit vs presented to the ED? If a hospital is not using GWTG, some may not use when transfer was written. Age: "At time of encounter" vs date of birth. Some data may have included both outpatient and inpatient data; *Can there be branching logic in REDCap to view only inpatient which could improve matching? In Galax, some TIA patients are "ED holds" patients seen by the hospitalist virtually, could cause mismatch. *It would be helpful to have a data dictionary. Could have a sub-definition tailored to each hospital. Can include an instruction sheet or guide with the REDCap survey. NIH Stroke Scale: some hospitals document differently, some don't have doctors do it. Some hospitals do "first" documented NIH is the

	one to use, some use a hierarchy of expertise. ICD-10: Billing can take a while to update coding. • Hospital Perspectives: RECAp was easy to use. Angella (Sentara) recommends *to hospitals to keep a patient list with an identifier directory to help. UVA uses MRN + admission date. Lessons learned: two places (telestroke) can be documented in GWT, but if telestroke layer is not enabled then it could be mismatched due to no date there for IRR. Branching logic would help. Surprised Coverdell did not include co-morbidities. *VDH will inform CDC. UVA: Many charts were before the stroke coordinator was hired. Do hospitals all have an IRR process? **Recommend more time, specific guidance, aligned with GWTG definitions. INOVA Fairfax: did not receive their feedback report. VDH will include a read receipt when submitting. • VDH Question to group: How frequently should this reabstraction process be done? Group answer: Twice per year and maybe quarterly down the road.
9:35-9:40am Public Comment	No Public Comment
9:40am Adjourn	Meeting Adjourned at 9:40am

APPENDIX G – REFERENCES

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