Virginia Stroke Registry Progress Update
April 21, 2023

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Virginia Stroke Registry Overview and Purpose

- Mandated by our General Assembly for CSC, TSC, PSC+ and PSC facilities
  - Others are encouraged to participate
- Required Element of Participation for the Coverdell Grant

- Outcomes
  - Track and Monitor Clinical Measures to Improve Data Infrastructure Across Stroke Systems of Care
  - Link Pre-Hospital, Hospital, and Post-hospital follow up data

- Hosted by the Office of EMS by ESO
  - Will allow reporting of data for ALL hospitals in Virginia without cost
  - Will be done in 2 Phases

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Virginia Stroke Registry Phases

Phase 1: VDH Stroke Repository.

- Data submissions to the CDC utilizing the Coverdell data set
- February 2024 Submission from 43% of all Virginia Hospitals
- 36 out of 46 possible Participating Hospitals —78%

Phase 2: Virginia Stroke Registry (Spring 2024).

- An expanded data set beyond the required Coverdell elements and adds on a full data entry and reporting product suite.
- Will be open to All Hospitals in Commonwealth at no extra cost

Phase 1: Coverdell Layer Submissions

June 2022 Submission

-5 Hospitals participated

-5,000+ records submitted

October 2022

-33 Hospitals participated

-15,390 records submitted

February 2023

-36 Hospitals

-15,640 records submitted

To participate:

- Hospitals must activate their GWTG Coverdell Layer

- 46 hospitals currently use GWTG

- 43 have signed the letter of agreement to add the Coverdell layer – 93%

- Data harvested 3x/yr and sent to VDH to submit

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Phase 2: Building the Virginia Stroke Registry

- Multiple Stake Holder Meetings to develop Data Points
  - Virtually and In-Person
  - OFHS, OEMS, Stroke Experts, Acute Rehab, and ESO collaboration
  - Data Dictionary and Data Menus are Complete

- Additional Measures decided based upon current Clinical Practice Guidelines and Evidence-Based Practice
  - Added Additional EMS, Advanced Care, Special Populations and Post-Discharge Measures
- Will capture required reporting elements of the major certifying stroke bodies

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Coverdell CDC versus VA Future Registry Elements

Area of Care	Category	2021 CDC Elements	Additional Future VDH 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, Living Status, Primary Language, Network of Relationships, Caregiver Status, Blood type, Current PCP
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 Rational, Teleneurology metrics, Glasgow Coma Scale, Alcohol screen, Pregnancy screen, Drug Screen

Coverdell CDC versus VA Future Registry Elements

Area of Care	Category	2021 CDC Elements	Future VDH Data Elements
Acute Care	Admission	Dysphagia screening, VTE prophylaxis, Complications of Stroke therapy, Active bacterial or viral infection at admission or during hospitalization, Principal discharge ICD-10-CM diagnosis, Clinical diagnosis related to stroke that was responsible for admission, smoking counseling, stroke education, assessment for rehabilitation	Observational patients, depression screening, in-patient Code Strokes, Patient Consults, Vitals to include blood pressure, pulse, respiration, ventilator status, Procedures performed, all current medications, Tracking Multiple elements over course of stay
Acute Care	Discharge	Discharge disposition, Functional status at discharge, antihypertensive treatment at discharge, Lipid treatment at discharge, Atrial fibrillation medication at discharge, Antithrombotics at discharge	Impediments to discharge, Discharge Order Date/Time, referral to stroke support group, Referrals, Case Management
Acute Care	Thrombolytic Therapy	Stroke Thrombolytic date/time given, Thrombolytic used, Mobile Stroke Unit, Off-label usage, documented reasons for delay in thrombolytics	Rationale for delays greater than 60,45 and 30 minutes, Exclusion criteria, hemorrhagic transformation, complications of thrombolytics

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Coverdell CDC versus VA Future Registry Elements

Area of Care	Category	2021 CDC Elements	Future VDH Data Elements
Advance Care	Advanced Care - Hemorrhagic Stroke	CT imaging results positive for ICH	ICH score, Hunt Hess Scale and modified Fisher Scale for subarachnoid hemorrhages, Procoagulant reversal agent initiation, Nimodipine—can trend over time
Acute Care	Advanced Care - Thrombectomy	IA or MER performed, date/time performed, any complications	Angiography metrics, Thrombectomy first pass time, TICI score, complications from thrombectomy
Acute Care	Special Groups	Did not address	Pediatrics, Risk factors to include sickle cell, arteriopathy, migraine, seizure, trauma, tumor/neoplasm, psychogenic, Any Stroke work-up metrics

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Coverdell CDC versus VA Future Registry Elements

Area of Care	Category	2021 CDC Elements	Future VDH Data Elements
Post-Hospital and/or Rehabilitation	Post-Discharge Follow Up	Did not address	Patient status, Post-stroke complications, Falls since discharge, Healthcare provider follow up, Recent emergency room visits, Functional Status post-discharge
Post-Hospital and/or Rehabilitation	Patient health	Did not address	Medication cessation, Tobacco usage, Wheelchair usage, Blood pressure monitoring, Return to work, Caregiver status post stroke, Mental health questionnaire, Exercise routine, Stroke support group referral

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Registry Next Steps

- Phase 1:
  - Encourage Last 3 hospitals to sign the Coverdell Layer
  - Submit Data in June 2023

- Phase 2:
  - May 2-3 in Richmond--On-Site Meeting with OFHS, OEMS, Specific Stakeholders, and ESO to work on Stroke Registry Logic
  - Engaging more stakeholders as the Build progresses
  - Requesting for Beta-Testers in Winter 2023

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Questions on Virginia Stroke Registry Update??

For further questions, please contact:

Stroke@vdh.virginia.gov

Allie Sedon (Stroke Epidemiologist)

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Patrick Wiggins (Stroke Prevention Supervisor)

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Coverdell Re-Abstraction Process & Results

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Purpose

Re-abstraction of patient medical records or charts assists in the assessment of data coding quality and completeness.

This project included hospitals who submitted data through Virginia's current Coverdell Stroke project.

Process

01

Extract records

Using the October 2022 Coverdell data submision

02

Randomize

Using Excel

03

Distribute Survey

Load required elements into a REDCap survey and distribute to participants

04

Collect & Analyze Results

1. Sate level report
2. Individual hospital reports
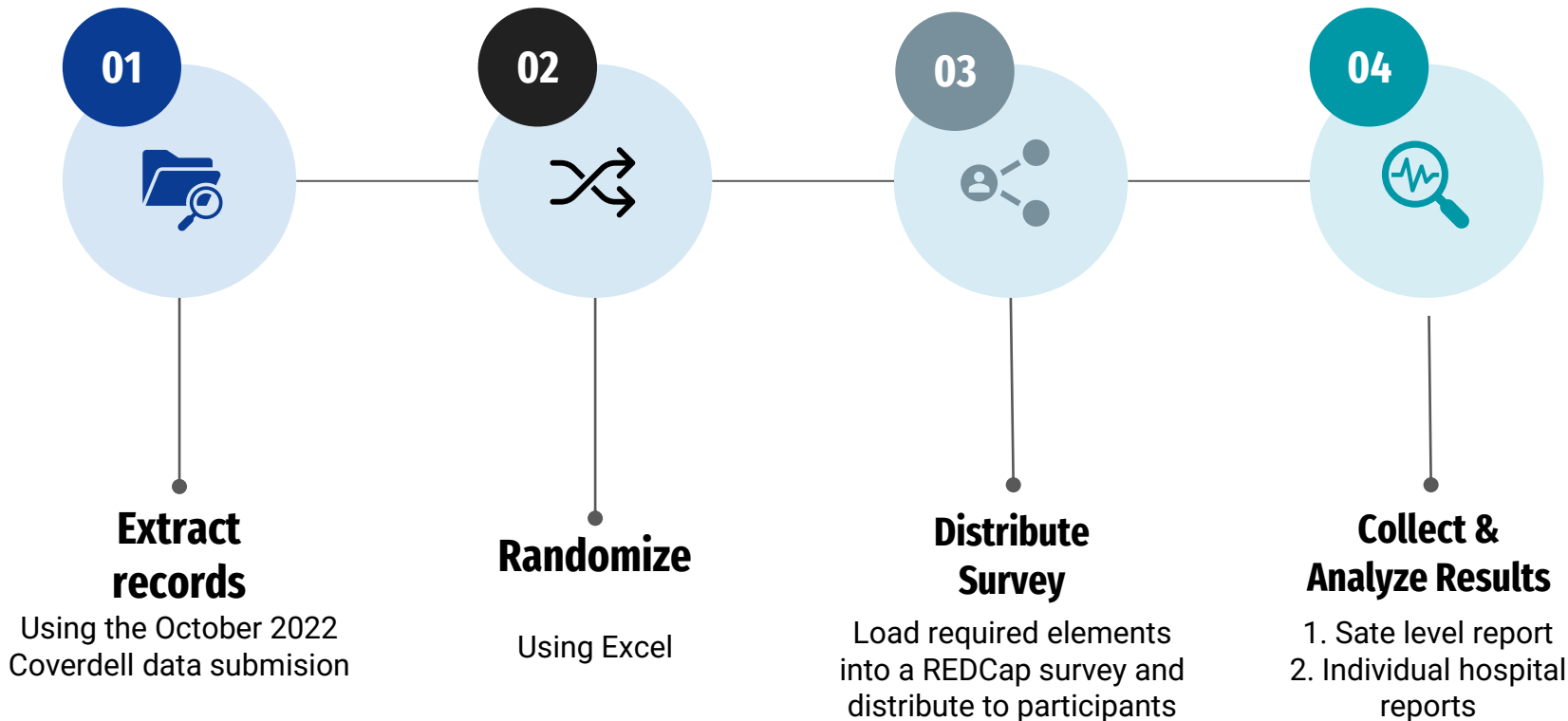
Number of records for Re-Abstraction

Based on the number of records submitted in the October 2022 Coverdell submission

1 to 100	101 to 200	200+
5 re-abstractions	7 re-abstractions	10 re-abstractions
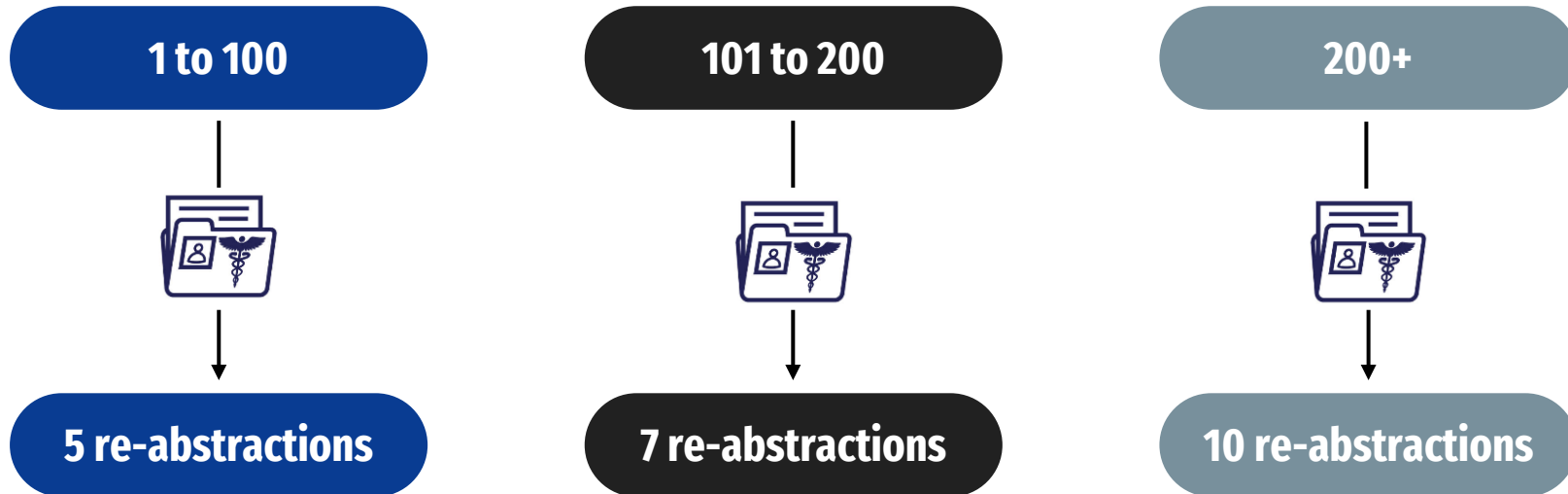
Data Elements Collected

1. Age
2. Gender
3. Race and Ethnicity
4. Date of Arrival at Hospital
5. Time of Arrival at Hospital
6. Date of Hospital Admission
7. Was telestroke consultation performed?
8. Was brain imaging performed at your hospital after arrival as part of the initial evaluation for this episode of care or this event?
9. Date and Time brain imaging first initiated at your hospital
10. Last known well date and time
11. Was NIH Stroke Scale score performed as part of the initial evaluation of the patient?
12. If performed, what is the first NIH Stroke Scale total score recorded by hospital personnel?
13. Was IV thrombolytic initiated for this patient at this hospital?

14. What (date) and (time) was IV thrombolytic initiated for this patient at this hospital?
15. What date was the patient discharged from hospital?
16. Principal discharge ICD-10-CM code
17. Clinical diagnosis related to stroke that was ultimately responsible for this admission
18. Discharge disposition
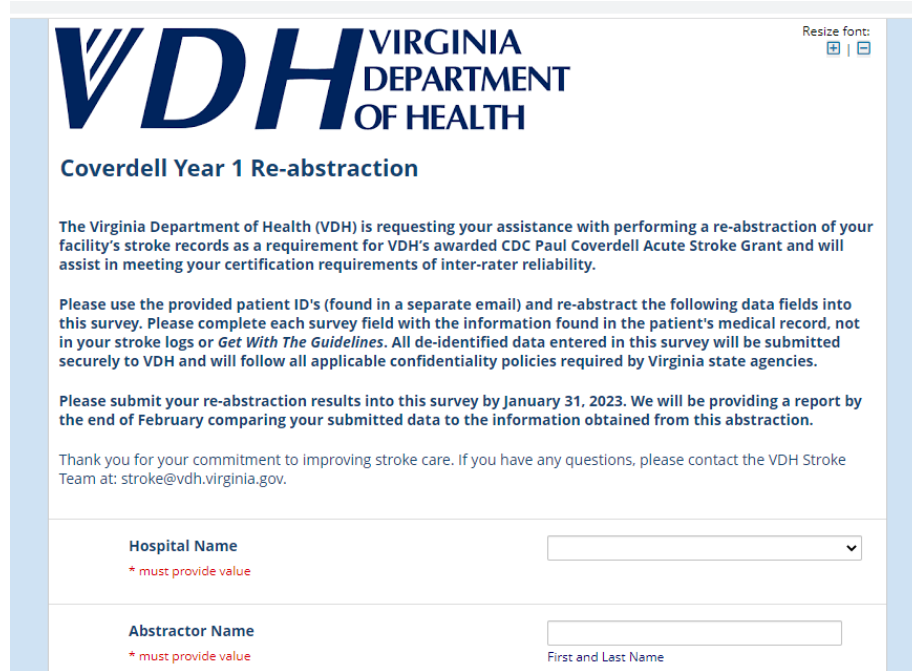
Re-Abstraction Survey

Distributed online survey on January 18, 2023 with a targeted completion date of January 31, 2023.

Deadline was extended to February 3, 2023 due to Get With The Guidelines (GWTG) downtime.

Requested: 33 hospitals

Received: 27 hospitals // 240 total records

Participants

Hospitals who submitted records between October 2021 – June 2022

Bon Secours Memorial Regional
Bon Secours Rappahannock
Bon Secours Richmond
Bon Secours St. Francis
Bon Secours St. Mary's
Centra Lynchburg
Community Memorial
Inova Alexandria
Inova Fair Oaks
Inova Fairfax
Mary Washington
Riverside Regional
Riverside Walter Reed
Sentara Care Plex

Sentara Halifax
Sentara Leigh
Sentara Martha Jefferson
Sentara Norfolk
Sentara Northern Virginia
Sentara Obici
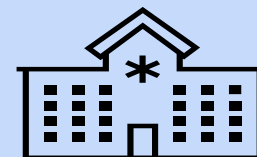Sentara Princess Anne
Sentara Rockingham Memorial
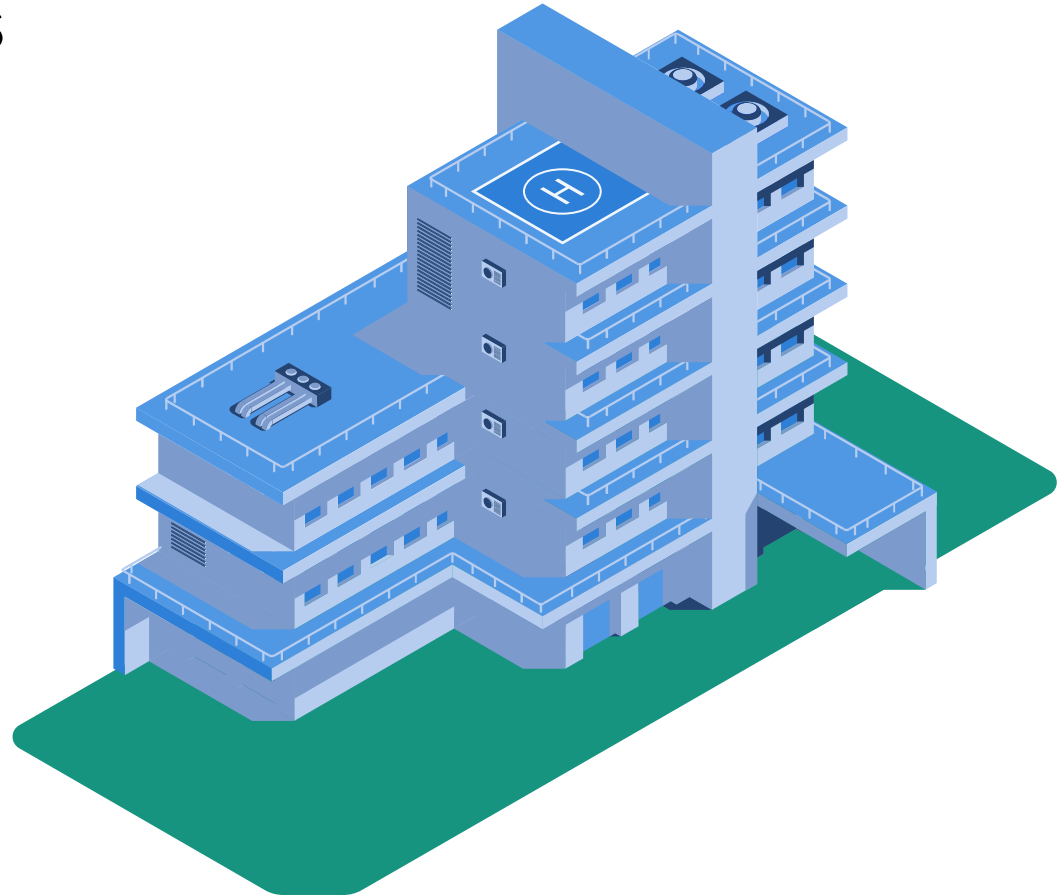Sentara Virginia Beach
Sentara Williamsburg
Southside Regional
UVA Hospital
VCU Health

Hospital Perspectives

Summary Results
Total number of records = 240
Demographics

Age
Number matched: 204
Percent matched: **85%**

Gender
Number matched: 238
Percent matched: 99.2%

Race and Ethnicity
Number matched: 1412
Percent matched: 98.1%

Summary Results
Total number of records = 240

Hospital Arrival & Admission
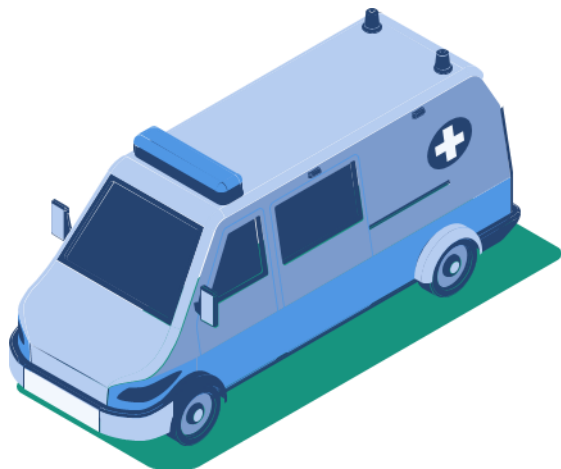
Date of Arrival at Hospital
Number matched: 233
Percent matched: 97.1%

Time of Arrival at Hospital
Number matched: 214
Percent matched: **89.2%**

Date of Hospital Admission
Number matched: 167
Percent matched: **69.6%**

Summary Results

Total number of records = 240

Stroke Elements

Telestroke Consultation

Date of Last Known Well

Time of Last Known Well

Was the NIH Stroke Scale Performed?

NIH Stroke Scale Score

Number matched: 187
Percent matched: **77.9%**

Number matched: 178
Percent matched: **74.2%**

Number matched: 187
Percent matched: **77.9%**

Number matched: 225
Percent matched: 93.8%

Number matched: 199
Percent matched: **82.9%**
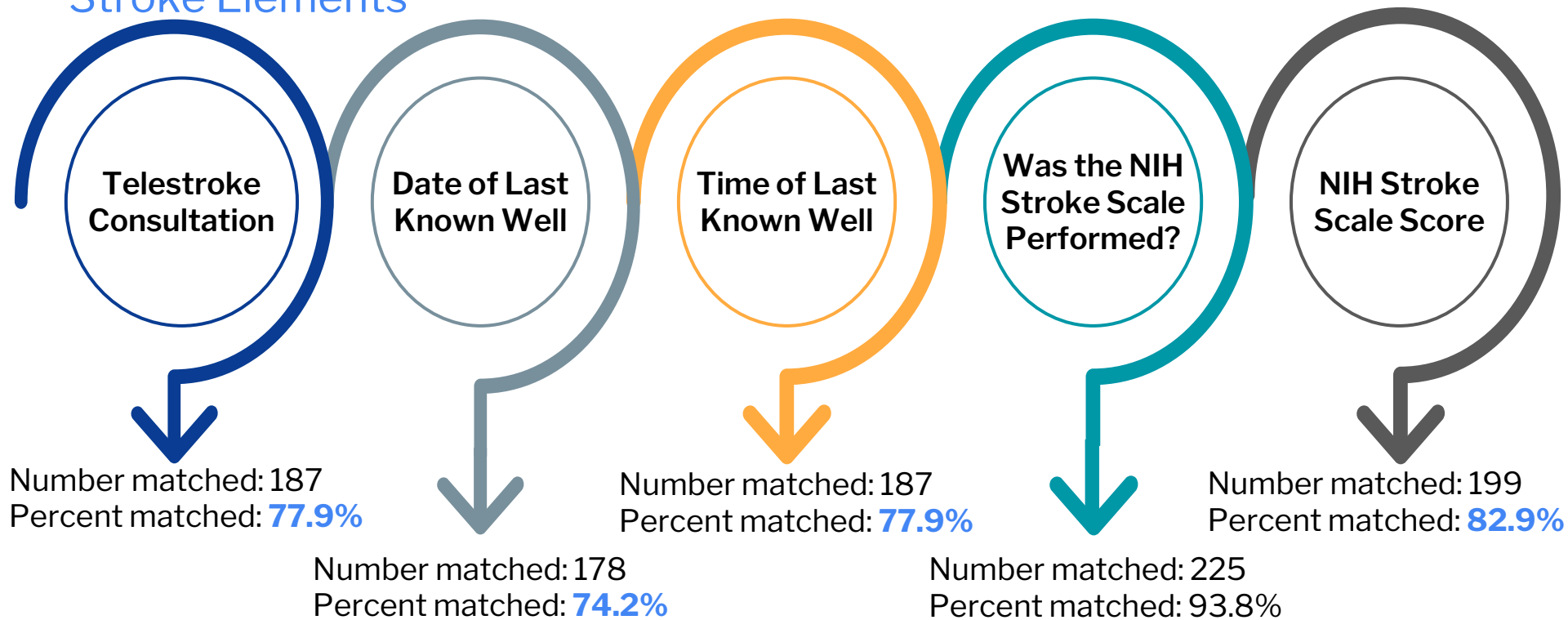
Summary Results
Total number of records = 240
Brain Imaging

Was brain imaging done?
Number matched: 228
Percent matched: 95%

Date of Brain Imaging at Hospital
Number matched: 221
Percent matched: 92.1%

Time of Brain Imaging at Hospital
Number matched: 204
Percent matched: **85%**
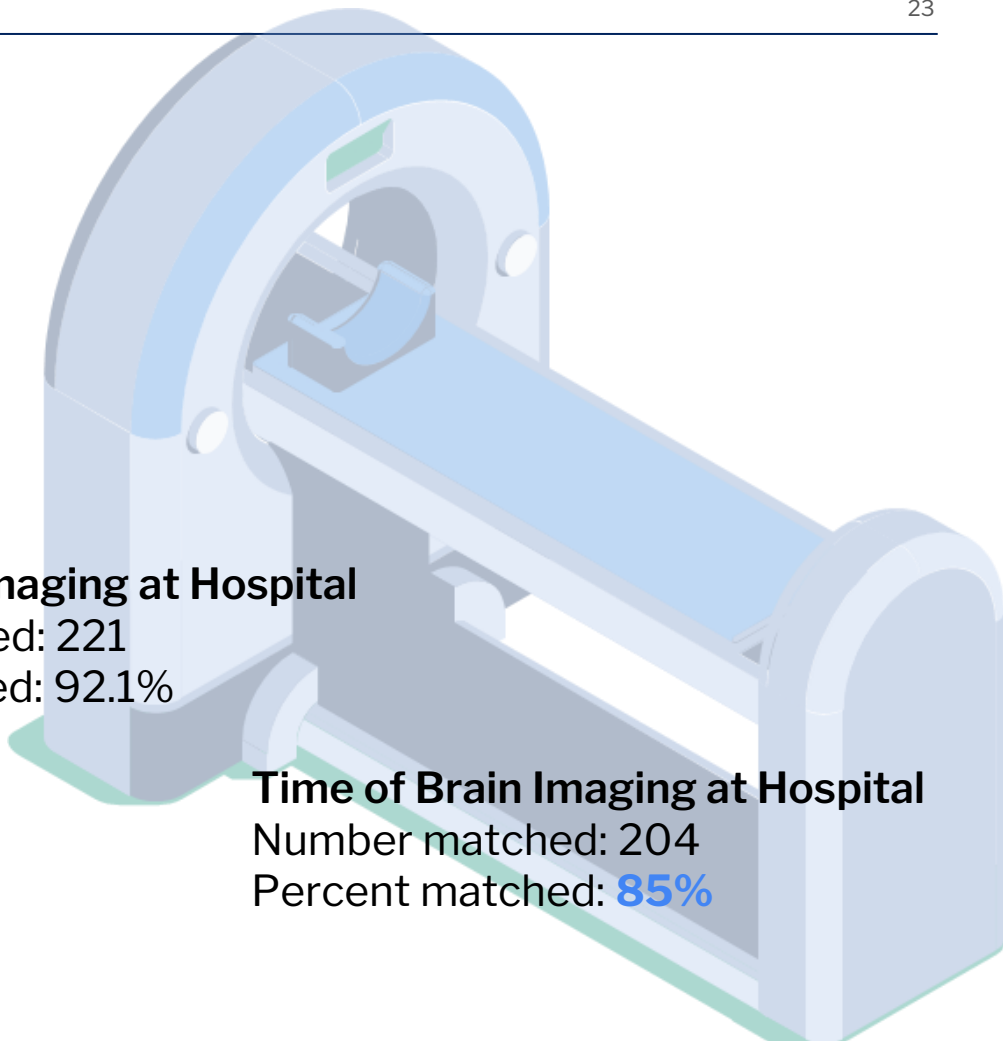
Summary Results

Total number of records = 240

IV Thrombolytic Initiation

Was IV Thrombolytic initiated at hospital?

Date of IV Thrombolytic

Time of IV Thrombolytic

Number matched: 228
Percent matched: 95%

Number matched: 204
Percent matched: **85%**

Number matched: 185
Percent matched: **77.1%**
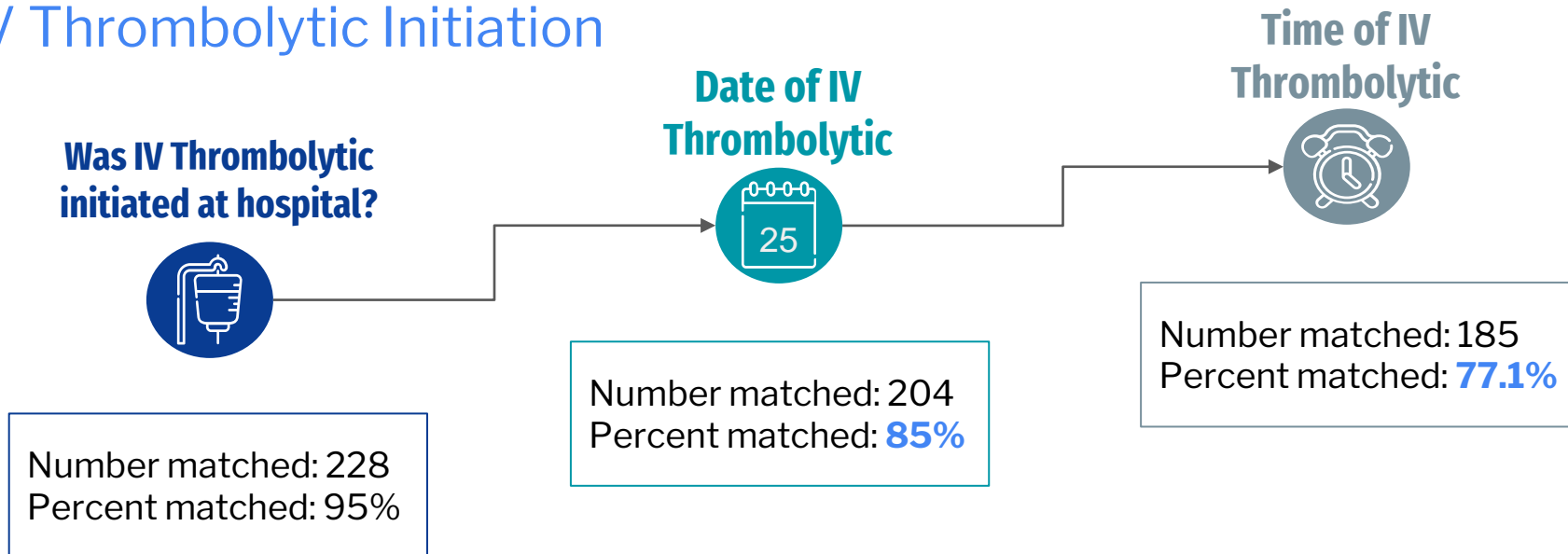
Summary Results
Total number of records = 240
Discharge

Date of Discharge
Number matched: 230
Percent matched: 95.8%

Clinical Diagnosis
Number matched: 1209
Percent matched: **84%**

ICD-10-CM code
Number matched: 199
Percent matched: **83%**

Discharge Disposition
Number matched: 228
Percent matched: 95%

Questions on Hospital Reabstraction Process and Results??

- **For further questions, please contact:**
  - **Stroke@vdh.virginia.gov**

- Allie Sedon (Stroke Epidemiologist)
- Kathryn Funk (Stroke Registry Coordinator)
- Patrick Wiggins (Stroke Prevention Supervisor)

EMS 2022 Survey Results and Presentation to State EMS Advisory Board
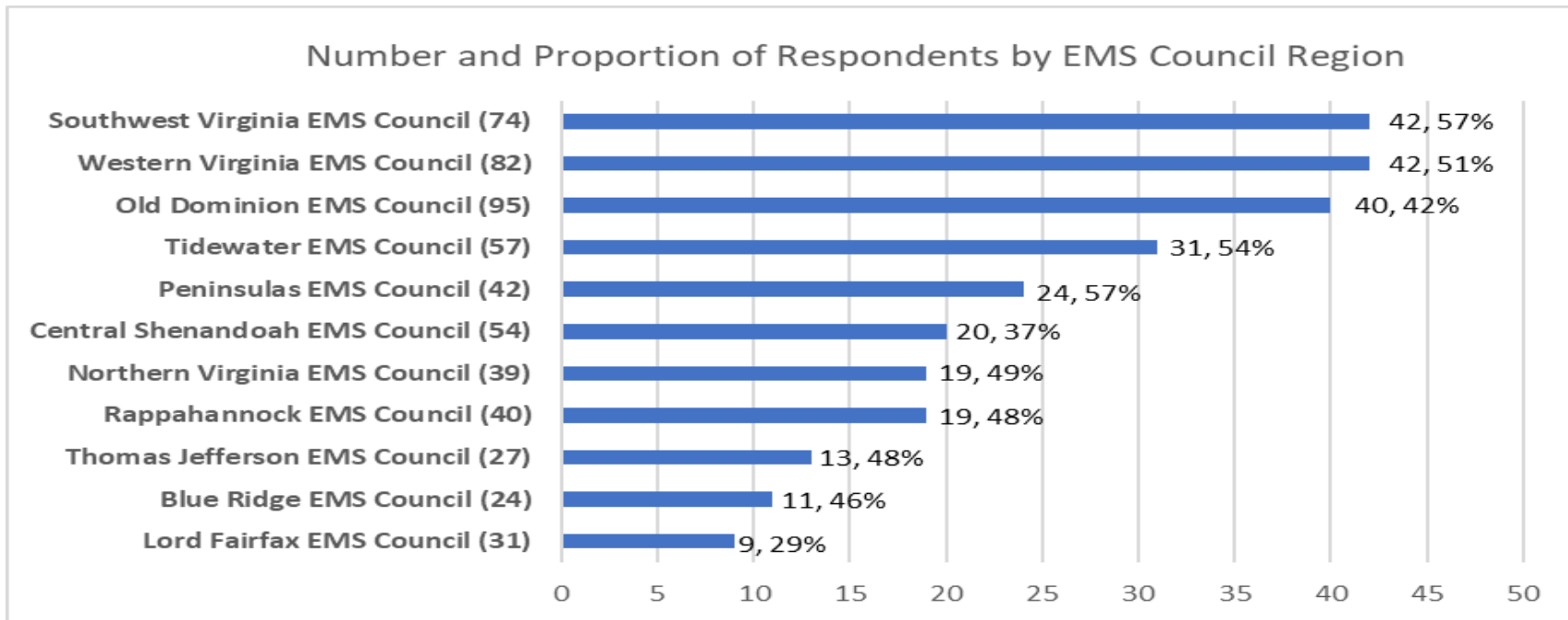# February 3, 2023

Allie and Kathryn

EMS Stroke Survey Background

●In support of the *Code of Virginia* §32.1-111.15:1, the Virginia Department of Health (VDH) collected data and information from EMS agencies through a stroke inventory survey to facilitate the evaluation and improvement of stroke care in Virginia.

●The results of the survey will be used to inform quality improvement initiatives, identify interventions in specific geographic areas of the state, and support appropriate allocation of resources throughout the state.

●In June 2022, an online REDCap survey was distributed to 620 EMS agency superusers via contact information provided by OEMS.

Total Respondents

- 251 out of 620 EMS agencies fully or partially completed the survey; a 40% response rate
- All 11 EMS Council Regions represented

Number and Proportion of Respondents by EMS Council Region

EMS Council Region	Respondents, Percentage
Southwest Virginia EMS Council (74)	42, 57%
Western Virginia EMS Council (82)	42, 51%
Old Dominion EMS Council (95)	40, 42%
Tidewater EMS Council (57)	31, 54%
Peninsulas EMS Council (42)	24, 57%
Central Shenandoah EMS Council (54)	20, 37%
Northern Virginia EMS Council (39)	19, 49%
Rappahannock EMS Council (40)	19, 48%
Thomas Jefferson EMS Council (27)	13, 48%
Blue Ridge EMS Council (24)	11, 46%
Lord Fairfax EMS Council (31)	9, 29%

Pre-Alerting Hospital Time Parameters

- 70% of EMS agencies report providing stroke pre-alert to hospitals within 24 hours of Last Known Well (LKW) of the patient
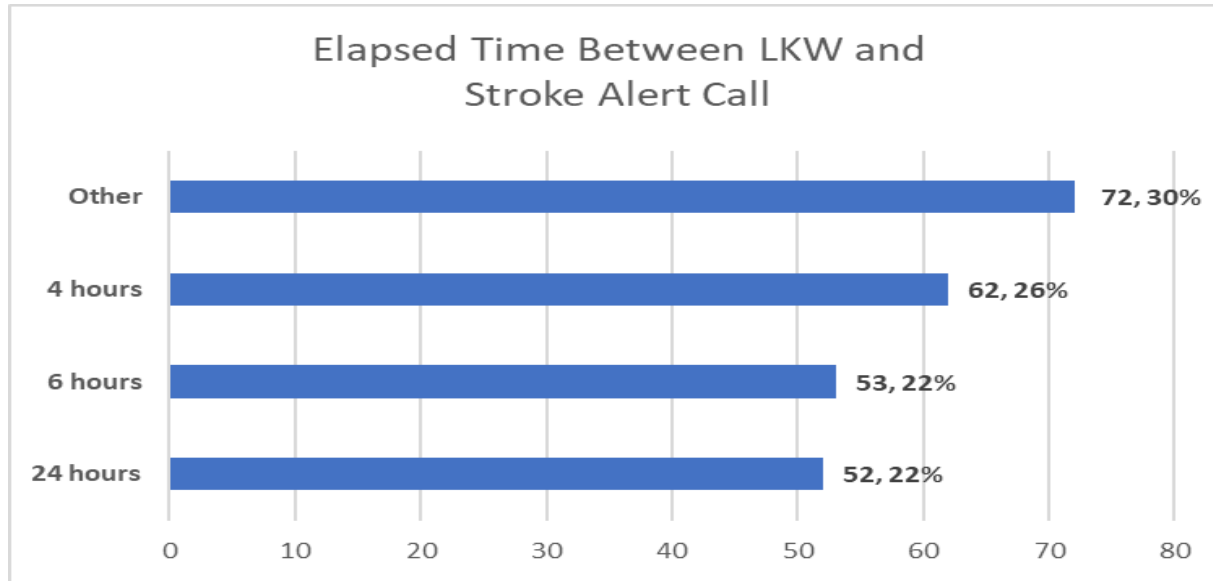
Elapsed Time Between LKW and Stroke Alert Call

Category	Value
Other	72, 30%
4 hours	62, 26%
6 hours	53, 22%
24 hours	52, 22%

Chart 2. Note: This question was answered by 239 respondents.

Recommendation:
Add time parameters to EMS protocols

- 2017 *Virginia OEMS Division of Trauma/Critical Care Prehospital and Inter-hospital State Stroke Triage Plan*[1] does not address time parameters for EMS providers to pre-alert the receiving hospital.

- If a suspected stroke patient is **within 24 hours of LKW time** upon presentation to EMS, **a pre-alert for stroke should be sent** to the receiving hospital, if patients meet certain criteria.
    - Recommendation from the 2019 American Heart Association (AHA)/American Stroke Association (ASA) Stroke Guidelines[2].

- **Approved by EMS Advisory Board at the February 2023 Meeting**

Stroke Recognition Scales

- 98% of agencies reported using stroke recognition scales
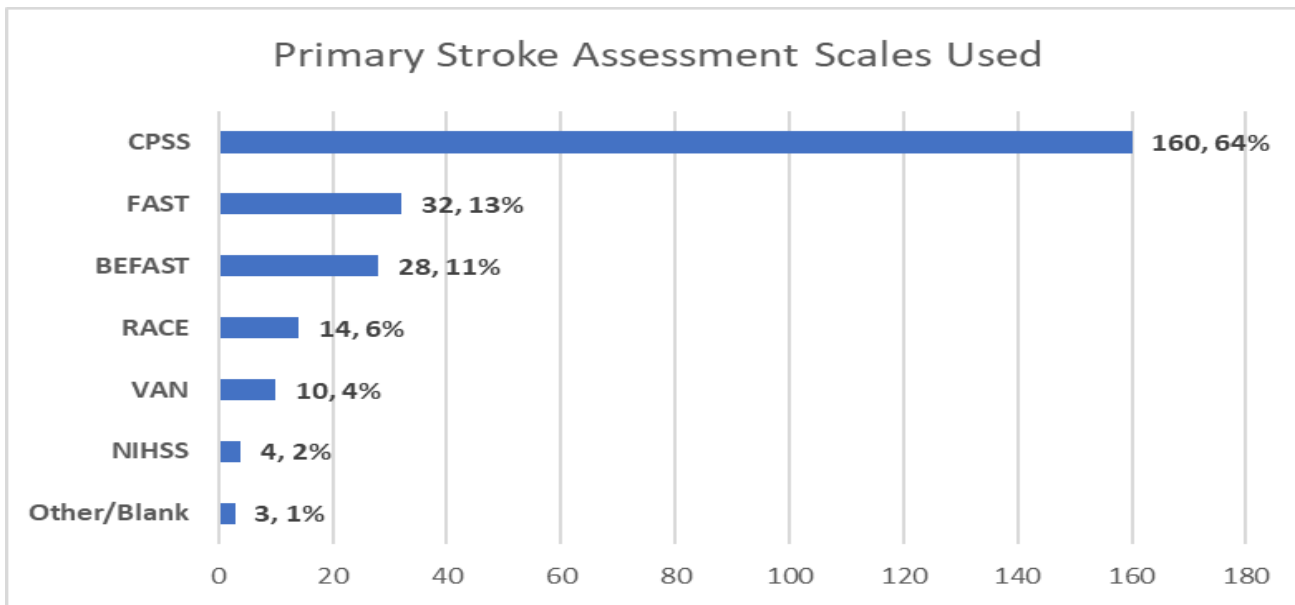- Cincinnati Prehospital Stroke Scale (CPSS) most widely used

Chart 3. Note: Respondents had the ability to select more than one answer.
Total responses = 251.

Recommendation:
Create a statewide list of recommended stroke recognition scales

- This list would allow EMS agencies to choose their preference but have all the information needed to make an informed choice.

- This document should contain information on the **sensitivity, specificity, benefits, and challenges of each recognition scale**.
  - May be valuable to also distinguish the differences between "primary" and "secondary" stroke scales

Lessons Learned from 2022 Inventory Survey

With continued collaboration between VDH Office of EMS (OEMS) and OFHS,

- Future survey versions will be **shorter with more concise questions** in order to **increase response and completion rates.**
- Clearer wording of questions is needed
- Distribute survey to the best-fit EMS agency representative
- Utilize additional data from OEMS prehospital database to supplement survey answers

OFHS will continue to **collaborate with EMS stakeholders** to increase participation in future implementations of the EMS Stroke Inventory Survey.

Next Steps

- OFHS has identified projects to complete with support from OEMS:
  - Identify resources available to EMS agencies to evaluate stroke quality metrics for suspected stroke patients.
  - Raise awareness about the availability of statewide and local resources for EMS agency stroke education.
  - Investigate the barriers for agencies transporting suspected stroke patients to Virginia non-stroke-certified hospitals, or to out-of-state stroke certified hospitals.

- OFHS will disseminate these survey results and recommendations:
  - Share results to Virginia Stroke Systems Task Force (VSSTF), EMS Council Regions, and EMS agencies
  - Included results in the annual Stroke General Assembly report
  - Copy of the report available by emailing Stroke@vdh.virginia.gov
  - Report will be posted to the VDH Stroke Webpage

2023 EMS Stroke Survey

- Planned to be released May 2023.

- OFHS will gather feedback and suggestions from OEMS partners to ensure the quality and effectiveness of questions being asked.

References

1. Virginia Office of Emergency Medical Services. (2017, November 30). Virginia Office of Emergency Medical Services Division of Trauma/Critical Care Prehospital and Inter-hospital State Stroke Triage Plan. Retrieved from VDH.Virginia.gov: https://www.vdh.virginia.gov/content/uploads/sites/23/2018/08/Virginia-Stroke-TriagePlan-July-2018.pdf

2. Powers, W. J., Rabinstein, A. A., Ackerson, T., Adeoye, O. M., Bambakidis, N. C., Becker, K., & Tirschwell, D. L. (2019, October). Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke. Stroke, e344–e418. Retrieved from https://www.ahajournals.org/doi/10.1161/STR.0000000000000211?cookieSet=1

Questions on EMS Survey Results and Presentation to the State EMS Advisory Board??

- **For further questions, please contact:**
    - **Stroke@vdh.virginia.gov**

    - Allie Sedon (Stroke Epidemiologist)
    - Kathryn Funk (Stroke Registry Coordinator)
    - Patrick Wiggins (Stroke Prevention Supervisor)

2023 Hospital Survey Details

- Online survey link (REDCap) will be sent **Monday, April 24**.

- The survey is formatted to accept only **ONE** response per facility.
  - If you oversee more than one facility, please provide one response for **EACH** hospital and **EACH** free-standing ED.

- The survey will need to be completed in one sitting.
  - Due to the number of data-specific questions, there is no ability to 'Save Now & Return Later.'

- Please complete the survey by **MAY 12th**.

Lessons Learned from 2022 Hospital Survey

- Provided a good baseline for Hospital Capabilities
- Not all questions were applicable to every facility
- There were some duplicate surveys which required diligence to validate which was the correct

- 2023 Survey has:
  - Better Branching Logic to tailor to hospital capabilities
    - Example: FSEDs do not admit patients and should not be included for in-patient metrics
  - More Time-Defined Metrics for Acute Care
  - More Questions around Teleneurology

2022 Hospital Survey White Paper

- Completed by OFHS Stroke Staff
- Copies at VSSTF Meeting for review
- Contains Results and Recommendations from the survey
- Available by request at Stroke@vdh.virginia.gov
- Will be posted on the VDH webpage in the future

Questions on 2022 or 2023 Hospital Stroke Inventory Survey??

- **For further questions, please contact:**
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- Allie Sedon (Stroke Epidemiologist)
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