Southeast Regional Pilot Acute Stroke System Plan

North-Southeast and South-Southeast Subregions

The Office of Emergency Medical Services

Southeast Regional Advisory Council

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Stroke Plan

Background

Stroke is the fourth leading cause of death in the United States. Over 143,579 people die each year from stroke in the United States.

Stroke is the leading cause of serious, long-term disability in the United States.

- Each year about 795,000 people suffer a stroke. About 600,000 of these are first attacks, and 185,000 are recurrent attacks. (The Internet Stroke Center, *Stroke Statistics*, n.d., <http://www.strokecenter.org/patients/stats.htm>, accessed on August 9, 2011.)

- Nearly three-quarters of all strokes occur in people over the age of 65. The risk of having a stroke more than doubles each decade after the age of 55. However, in the southeastern United States the occurrence of stroke at significantly younger ages is not unusual.

- Strokes can—and do—occur at ANY age. Nearly one quarter of strokes occur in people under the age of 65.

- Stroke death rates are higher for African Americans than for whites, even at younger ages.

- On average, every 40 seconds someone in the United States has a stroke.

- Stroke is more common in women than in men.

- Of all strokes, 87 percent are ischemic, ten percent are intracerebral hemorrhage, and three percent are subarachnoid hemorrhage.

- Stroke accounted for about one of every 17 deaths in the United States in 2005. Stroke mortality for 2005 was 143,579 (56,586 males, 86,993 females).

- From 1995-2005, the stroke death rate fell 29.7 percent and the actual number of stroke deaths declined 13.5 percent.

- The risk of ischemic stroke in current smokers is about double that of nonsmokers after adjustment for other risk factors.

- Atrial fibrillation is an independent risk factor for stroke, increasing risk about five-fold.

- High blood pressure is an important risk factor for stroke.

Stroke has a major impact on a person's life and can lead to long-term disability necessitating long-term care. The wide range of disabilities faced by stroke survivors predisposes them to variable dependence on their caregivers in order to lead a more normal life--leading to stroke being considered a family illness. Services for stroke, however, fail to recognize the need of caregivers and this may lead to significant deterioration in caregivers' health and quality of life. The sudden loss of ability following stroke stresses the family of stroke survivors.

Stroke is the fourth leading cause of death and a leading cause of disability. The situation may get worse with aging baby boomers entering their at-risk years. (For more information on stroke: http://www.adph.org/cvh/assets/2010_HeartDiseaseStroke_Alabama_Burden.pdf)

In 1995, tissue plasminogen activator (tPA, Activase®) became the first and only approved treatment for acute ischemic stroke (AIS). Because tPA has to be administered within the first few hours of AIS onset, delivering this treatment to patients who qualify within the established time limits is challenging (http://www.strokeassociation.org/STROKEORG/Professionals/Target-Stroke_UCM_314495_SubHomePage.jsp). To overcome this problem, development of a statewide plan to route these stroke patients to the closest facility that can make this treatment available to eligible patient as rapidly as possible is of paramount importance. While thrombolytic therapy of ischemic stroke with tPA has been the impetus for care changes, it was recognized from the outset that the successful treatment of any type of stroke will require rapid response to all stroke types. Specifically:

- *Prehospital emergency response systems* must train personnel to correctly identify potential candidates for treatment and work closely with hospital emergency departments to transport these patients rapidly to appropriate designated stroke centers.

- *Emergency departments* must have specialized protocols in place for identifying candidates for therapy and treating those that require therapy within a narrow therapeutic time window.

- *Hospitals* must develop comprehensive acute stroke plans that define the specialized roles of physicians, nursing staff, diagnostic units, stroke teams, and other treatment services such as pharmacy and rehabilitation.

- All *health care systems* involved in managing eligible patients should be carefully integrated to take full advantage of effective stroke treatment due to the wide diversity of health care that exists. In Alabama, rural settings may have minimal access to specialized care and urban settings may have a high volume of emergency patients.

- *Public education* is critically important in ensuring that all of the efforts cited above are successful. The public must learn that a brain attack (stroke) is a medical emergency, that treatment is now available for some stroke patients, and that this treatment is only effective when given within a few hours of the onset of symptoms.

This Southeast Regional Pilot Acute Stroke System Plan (SRPASS) relies heavily on published reviews by the American Heart Association/American Stroke Association and criteria developed by The Joint Commission (TJC) for Stroke Center Certification.

Prehospital Emergency Medical Care Systems:

- Emergency Medical Service Personnel (EMSP) must be trained to treat stroke as a time-dependent, urgent medical emergency.

- A chain of recovery that begins with the identification (either by the patient or an onlooker) of a possible stroke in progress and ends with a rehabilitation plan should be established in every community in Alabama.

- New educational initiatives should be developed and implemented for all medical personnel in the chain of recovery including 911 communication personnel, EMSP, and air medical transport personnel.

Emergency Department:

- AIS patients should be classified as quickly as possible to identify those eligible for tPA therapy. Patients deemed eligible for tPA therapy will undergo a different rapid categorization to establish what treatment they should receive.

- Response systems including optimal time frames should be established, maintained, and monitored 24-hours a day in all emergency departments. The goal should be to (a) perform an initial patient evaluation within ten minutes of arrival in the emergency department, (b) notify the stroke team within ten minutes of arrival, (c) initiate a CT scan within 25 minutes of arrival, (d) interpret the CT scan within 45 minutes of arrival, (e) initiate systemic tPA treatment within 60 minutes of arrival in all eligible patients within 4.5 hours of symptom onset, and (f) movement of the patient to an inpatient setting within three hours of arrival.

- All emergency departments designated as a stroke ready hospital should have tPA in stock and available for use at all times. If an occasion should occur when tPA is not in stock and available, emergency departments designated as stroke ready hospitals should have the ability to communicate their status to the medical community in order for stroke patients to be routed to a hospital that is prepared to administer tPA when appropriate.

- For acute stroke patients who are candidates for tPA therapy, anti-hypertensive treatment should be provided to ensure the pre-tPA systolic blood pressure is less than 180 mm Hg and/or diastolic pressure is less than 105 mm Hg.

- Once tPA is given, vital signs should be monitored as follows: take reading every 15 minutes for the first two hours; then every 30 minutes for the next six hours; then once each hour for the next 16 hours. Blood pressure should be carefully monitored and promptly treated with intravenous and antihypertensive agents to maintain arterial pressures less than 180/105 mm Hg throughout the treatment and post-treatment periods.

Acute Hospital Care:

- Patients who meet the tPA treatment criteria should have access to stroke expertise within 15 minutes of hospital arrival and neurosurgical expertise within two hours of hospital arrival, other timeframe recommendations are outlined under "Emergency Department." Hospitals that do not have stroke expertise available in their emergency departments must demonstrate established relationships with either a local or on-call physician with experience in stroke diagnosis and treatment (for the purposes of this document, a physician with experience in diagnosing and treating stroke [as defined in Appendix H] as a licensed physician who is board certified or board-eligible [BC/BE] in emergency medicine or neurology[1] through the American Board of Medical Specialties, or who is BC/BE in another specialty, but has a minimum of eight hours[2] of continuing medical education [CME] related to stroke annually) or, if no local physician meets these criteria, consult by telemedicine[3] with a neurologist who is on-call 24-hours a day to aid the emergency department with timely decision making on all stroke patients potentially eligible for stroke treatment.

- Health professional training programs should be modified to include guidelines for acute stroke care and specialty-specific continuing medical education related to treating acute stroke.

Health Care Systems:

- Creating an efficient primary designated stroke center acute care delivery system should start with identifying committed prehospital and hospital leaders who will act as "champions." The task of these champions will be to develop and sustain a SRPASS plan for managing stroke patients through the various phases of care. Champions should understand the current components of care, decide on necessary modifications, and implement these modifications. These champions will be added to the Stroke Subcommittee of the Regional Advisory Council (RAC).

- All components of the stroke care delivery system should be integrated functionally, financially, and legally so they work together seamlessly.

- Key indicators for intended outcomes of acute stroke care are identified in this SRPASS plan.

Public Education:

- Behavioral change is achievable, as demonstrated by many past public education successes. But change occurs slowly, so those implementing public education campaigns must be persistent and patient.

- Big, comprehensive programs that employ many communications vehicles are the most effective.

- Motivation to change occurs when the public perceives that the benefits of change exceed the cost of change. The messages about seeking prompt health care after a stroke must be simple, clear, and repeated often.

- We must understand our audience, which is comprised of many subgroups with different backgrounds and different methods of learning. Messages must be tailored to these various groups.

Goal:

The primary goal of the SRPASS plan is:

To develop a stroke emergency care system that, when fully implemented, will result in 100 percent tPA administration to all eligible patients and a minimum of ten percent administration to all ischemic stroke patients, as well as decreased stroke mortality and disability in the 18 counties of the Southeast Emergency Medical Services (EMS) region, which includes Autauga, Barbour, Bullock, Butler, Coffee, Covington, Crenshaw, Dale, Elmore, Geneva, Henry, Houston, Lee, Lowndes, Macon, Montgomery, Pike, and Russell Counties, and complies with or exceeds all Alabama Department of Public Health (ADPH) and Office of Emergency Medical Services (OEMS) requirements.

In order to accomplish this goal, the SRPASS Committee identified a number of specific processes deemed essential. These are:

1. The ability to rapidly and accurately identify acute stroke patients.
2. Patients who have sustained or are likely to sustain a stroke should be brought to a hospital that has a stroke treatment program in place (i.e., a designated stroke center) which is capable of providing immediate and comprehensive assessment, resuscitation, definitive care, administration of tPA, and coordinated transfer of select patients to comprehensive stroke centers for further endovascular or neurosurgical interventions, plus establishing rehabilitation access when needed during the first phase of implementation.
3. There should be continuous and effective region-wide coordination of prehospital and stroke care resources, so that stroke patients will be expeditiously transported to the closest available designated acute stroke center, so their care can be provided in a

manner that is both rapid and evidence-based, while establishing and maintaining continuity.

4. Hospitals that can provide *primary* stroke center services consistent with all regulations specified by The Joint Commission (TJC) and Comprehensive Stroke Center tertiary services representing the highest level of acute stroke care will be identified with appropriate routing and triaging standards.

5. The program should provide all hospitals in the region the opportunity to participate in an inclusive system and to receive stroke patients if they are willing to meet the system and operational criteria, as established by this SRPASS plan.

6. The system should have an ongoing and effective quality assurance (QA) program, to assure continuing appropriate function in providing the highly specialized care necessary for the management of stroke. This program will include evaluation of prehospital management, hospital management, and overall system function. A standard prehospital data set and hospital data set will be required of all system participants, allowing uniform system evaluation to document the effectiveness of the function of the SRPASS. It is suggested that the hospital data set utilize all *Get with the Guidelines* recommendations as shown in Appendix E.

7. Hospitals will maintain a 95 percent submission rate of stroke patient care reports (PCRs) forwarded to the Alabama Trauma Communications Center (ATCC) for distribution to Regional Stroke QA Committees for review. Each report will be reviewed for tPA administration compliance on a monthly basis for the first six months and quarterly thereafter. All PCRs which fall below the tPA administration benchmark will be forwarded to the State Stroke QA Committee for review and follow-up.

8. For those hospitals that choose not to participate as a stroke ready hospital "time to patient transfer" for any stroke patients brought to the emergency department must be established; it is recommended that the stroke patient be en route to a stroke ready hospital within 30 minutes of the time of entry into the stroke referring hospital. To facilitate this, stroke referring hospitals will be able to enter stroke patients into the stroke system via the ATCC.

Southeast Regional Pilot Acute Stroke System Overview:

The SRPASS plan attempts to meet the goals set forth in the previous section. A system is a group of individual components brought together to function in a unified manner to achieve a specific end result. In this case, the end result is improvement in stroke survival and outcomes in the Southeast Region. The components to some degree have separate and individual identities and functions; however, there should be an understanding, a desire, and willingness to work together in a unified effort to reach the end result. A voluntary pilot system requires a uniquely strong commitment to care for stroke patients. The SRPASS is established by the authority of the State Board of Health as established in Chapter 11D of the Code of Alabama of 1975, as amended, May 2012. The SRPASS is overseen by the STHSAC as well as the SRPASS committee. The SRPASS is constituted by the hospitals and prehospital care providers operating in the Southeast Region. Patients cared for under this plan will be selected based upon primary triage criteria (system entry criteria) included in the SRPASS plan. If patients meet

the primary triage criteria for system entry, the system function protocols and specialized stroke care resources, at the designated stroke hospitals, will be implemented for their care. Patients who do not meet the primary triage protocols for entry into the system will not be SRPASS patients and any reference to SRPASS patients in this document does not pertain to this group of patients.

Systems require oversight of project concept, overall responsibility, developmental aspects, implementation, and evaluation of continuing activities. Such an entity is commonly referred to as a lead body and, in this program, the proposed lead body is the Southeast RAC. This body will be expanded to include the appropriate stroke care clinicians to create a stroke subcommittee. The authority of this body is derived from specific activity goals and plans approved by ADPH, OEMS Executive Board, STHSAC, and the State Board of Health.

The SRPASS involves the organization of already existing resources into a program providing comprehensive care for stroke patients through all phases of their management. The two basic patient management components of this system are prehospital providers and individual hospital organizations (i.e., designated stroke hospitals).

Once a stroke patient is entered into the system, the closest system hospital (i.e. designated stroke center) with available resources matching the level of need can then be selected as the appropriate destination for that patient using the SRPASS plan criteria and protocols. Hospitals participating in this system and receiving stroke patients will have organized response systems including: (1) equipment and facilities, (2) trained and committed personnel, (3) organized management protocols, and (4) the ability to provide treatment with systemic tPA by a physician who is experienced in diagnosing and treating stroke[1]. A physician with experience in diagnosing and treating stroke is defined as a licensed physician who is board-certified or board-eligible (BC/BE) in emergency medicine or neurology through the American Board of Medical Specialties, or who is BC/BE in another specialty, but has a minimum of eight hours of stroke related continuing medical education (CME) annually (see Appendix H). This physician may be available on-all. If there is no local physician who meets these criteria, consult with a neurologist may be obtained through telemedicine[3] support (see Appendix H).

A regional stroke database will be established which will allow generation of overall knowledge of the magnitude and scope of stroke in the Southeast Region and determination of teaching and training needs in stroke care. This stroke database will be used in conjunction with other prehospital services and hospital evaluations in a continuous QA program to evaluate stroke care, document appropriateness and quality, and implement improvements. The Stroke Subcommittee of the RAC recommends a specific Stroke Quality Assurance Committee (SQAC) to actually establish and oversee the program during its continuing function. The committees will be directly responsible to the lead agency. They will make recommendations regarding SRPASS to the lead agency for action. The Regional Quality Assurance Committees (RQAC) will specifically review the continuing function of the SRPASS and prepare routine reports regarding system function and the QA review summaries for the lead agency.

Finally, it is important to emphasize that stroke is a neurological disease. The ED plays a critical role in stroke management, but neurological and neurosurgical care are pivotal services in determining the survival and recovery of stroke patients. Neurological leadership of hospital stroke programs is, therefore, essential in order for hospitals to participate in the SRPASS. This leadership role must be clearly defined within the hospital stroke plan along with specific appropriate authority to carry out that leadership role. Evidence of continuing leadership should be demonstrated through the neurologist's participation in SRPASS activities and through individual hospital QA programs. In the absence of staff or on-site neurology[1] (see Appendix H), participating stroke centers should establish and demonstrate the ability to work with neurologists on-call at other institutions (Memorandum of Understanding [MOU]) or by consult with a neurologist by telemedicine[3] (see Appendix H).

Components and Organization:

The SRPASS is comprised of a number of separate components which are organized and work together as a system. The individual components and elements which make-up the system will be described in this section.

I. **Prehospital Component**

EMS units are an integral part of the SRPASS. However, their organization will not be changed by the SRPASS. Conversely, changes in the make-up of EMS units will not affect the functional status of the SRPASS.

All EMSP need to have a basic knowledge and awareness of SRPASS elements and system function. This specifically refers to the entry criteria and communications. If they are unclear about entry criteria or system function this information can be easily obtained on a 24-hour a day basis from the ATCC so that they can then apply the SRPASS protocols in field care situations.

II. **Hospital Component**

Hospitals will be able to participate in this system on a voluntary basis. Guidelines have been developed by the Stroke Subcommittee of the RAC and are presented in Appendix A, B, and C. Each stroke center will be able to determine whether they are "on-line" (green) or "off-line" (red). The participating hospitals (i.e., designated stroke hospitals) will be able to go on-line and off-line at will.

Each hospital must have a physician primarily responsible for oversight of the SRPASS. These responsibilities include:

1. Working with administration to maintain the resources necessary to be a designated stroke hospital.

2. Assuring call schedules that provide physician availability 24-hours a day are prepared on a monthly basis.
3. Establishment and maintenance of basic stroke care protocols for the hospital.
4. Oversight responsibility for the Hospital Stroke Quality Assurance Program (HSQA) per plan guidelines, and participation in the SRPASS administrative and QA activities as per the SRPASS plan, including data collection and reporting to the Southeast region.

Participation in the SRPASS is accomplished by doing the following:

1. The decision to participate must be made jointly by both hospital administration and medical staff, with the commitment of human and physical resources.
2. An application is obtained from OEMS, completed and returned, documenting the hospital's desire to participate.
3. An on-site orientation meeting at each applying facility is to be held to review the system design, function, and requirements to assure that there is a full and complete understanding on the part of the hospital and medical staff. This meeting must be attended by a minimum of the physician leader of the stroke program in that hospital, the Medical Director of the ED, and the Hospital Administrator.
4. The OEMS staff and designated stroke hospital on-site team will review the on-site inspection report to document compliance with requirements and knowledge of system design and function and provide a report to the RAC.
5. The RAC will make a recommendation regarding hospital participation as a designated stroke hospital in the system to the Statewide Trauma and Health System Advisory Council (STHSAC). If approved, the hospital will become part of the system by executing an MOU with ADPH documenting their willingness to actively participate in the SRPASS.

Hospitals, therefore, should elect whether or not to participate in this system based upon their individual ability to meet the guidelines for a designated stroke hospital, the desire of the medical staff to participate and support this program, and the willingness of the hospital administration to support the SRPASS.

For the purpose of this pilot program, ADPH will automatically accept hospitals that are nationally certified by TJC as a Primary Stroke Center (PSC) as a Level II PSC or a Comprehensive Stroke Center (CSC) as a Level I CSC. In addition, PSCs and CSCs that are not nationally certified are encouraged by ADPH to seek TJC certification, when standards are available, within 12 to 24 months after receiving Alabama Stroke Center designation. An on-site initial orientation meeting will be performed at each hospital regardless of the status of any external stroke care certification.

III. Communications Component

Communications are critical to the function of the SRPASS. Communications provide: (1) essential knowledge of the overall status of prehospital stroke activities and hospital resource availability on a continuous basis, (2) access to system organization and function protocols, whenever such information is requested by prehospital personnel of hospital based personnel, (3) a link between the field and designated stroke hospitals for the rapid exchange of information resulting in efficient prehospital care provision and hospital being able to best prepare for stroke patient arrival, and (4) a collection of uniform system-wide data for both QA activities and development of a regional database. Providing all of these functions to the entire system on a continuous basis requires a central communications facility with constant communications capabilities to all prehospital units and participating hospitals, plus the ability to immediately and directly link the prehospital providers to the designated stroke hospitals. This central communications will be the existing ATCC. This decision was made because of an already existing funded infrastructure which may be readily utilized.

The ATCC is staffed 24-hours a day by personnel who will be provided with specific in-depth knowledge of SRPASS design, function, and protocols. It will be the primary responsibility of the ATCC to coordinate SRPASS activities by maintaining and providing information whenever needed on field status and hospital status so that this data can be used by the prehospital and hospital personnel in providing care to patients meeting system entry criteria. The ATCC, a part of SRPASS, will be managed by the Birmingham Regional Emergency Medical Services System (BREMSS), and oversight of the day-to-day operations of the ATCC is the responsibility of the BREMSS Executive Director. The ATCC will operate through system operations protocols. The ATCC will make no primary decisions, but will provide information about patient management and destination as per pre-established protocol for system function. The ATCC will serve as a resource for such protocol information to EMSP that may not be familiar with the protocols or the ATCC may simply provide the coordination of prehospital and hospital resource utilization for stroke management. Therefore, the general functions of the ATCC are:

1. Assigns unique system I.D. number for each patient meeting system entry criteria for tracking throughout the system.
2. Collects brief patient information.
3. Provides information on system entry criteria based on preset protocols as requested by EMSP, when it is not clear if a patient meets stroke entry criteria.
4. Maintains knowledge of the functional status of all system hospitals at all times.
5. Maintains knowledge of the activity status in the prehospital setting at all times.
6. Coordinates patient destination, when patient meets system entry criteria, based on preset protocols as to the closest currently operational regional designated stroke hospital.
7. Coordinates resources for optimal utilization using pre-established protocols for system function, when there are multiple simultaneous events in the region.

8. Establishes automatic communication link between EMS provider and receiving facility.
9. Records and enters prehospital data for SRPASS database.

An Emergency Resources Display (ERD) is also part of the communications component. The ERD provides each participating hospital and the Alabama Stroke Communications Center with continuous real-time functional status display of all designated stroke hospitals. The ERD is a simple computer system with terminals at each participating facility and the ATCC. This system will provide a display grid listing each individual hospital that indicates the current availability or non-availability of primary resource components and the current availability or non-availability of individual components in each hospital. Each system hospital will maintain the status notation of the primary stroke resources in that hospital and, therefore, their overall stroke activity level. The designated stroke hospitals will be able to change their resource availability status level at any time. A record of stroke hospital activity status for the entire system will be maintained through the ERD at the ATCC. Any change in hospital status as made by hospital personnel at its own display terminal will be automatically communicated to the central system monitoring station at the ATCC. The ATCC maintains a consolidated system-wide display status indicating the individual resource availability at the designated stroke hospitals and their overall functional status at any given time. This consolidated information table will be transmitted back to hospitals. The system is maintained by computers with automatic polling and display refresh. The consolidated status display would be similar to the following example:

Trauma/Stroke Emergency Resources Display																		
	Level																	
Hospital	**T**	**S**	**C**	**ED-T**	**ED**	**ANES**	**OR**	**X-RAY**	**TICU**	**TS**	**OS**	**NS**	**CT**	**SICU**	**NEURO**	**CCU**	**CARD**	**Clab**
A	1	1																
B	3	2																
C	3	2																
D	2	1																
E	1	2																
F	2	3																

Numbers are color-coded: Green for available, yellow for resource unavailable (but still accepting some patients), red for not available.
Hospital abbreviations are automatically color-coded for on-line status: Green for active, yellow for resource unavailable (but still accepting some patients), red for inactive, based on individual resource availability in the hospital at that time.

The equipment for the ERD will consist of a color video monitor, a computer, and a modem connected to a dedicated line which does not enter the facility through the switchboard. The software will allow simple keystroke changes of resource status by designated stroke hospital personnel. This change will be transmitted to the central system monitoring station at the ATCC with the information being immediately updated on all resource display monitors in the system. The central monitor station automatically polls the individual monitor stations in the system. If there is an isolated failure at a

hospital resource display that was not caused by a total system fault, that hospital will be blacked out and the ATCC will call to request information directly. The system integrity is not dependent upon any single stations operation.

Maintenance of adequate and prompt communications is essential to function of the SRPASS. In all instances stroke survival or maximum outcome potential can only be achieved with efficient and rapid movement of the patient through the system of prehospital assessment and treatment, transport, and hospital resuscitation, evaluation, and definitive care. Communication throughout the system is vital to this activity occurring in an efficient and complete manner. Knowledge of the system-wide prehospital stroke activities and the current (and possibly changing) status of the functional capabilities of the various hospitals in the system are important at all times, as it is possible multiple stroke activities are occurring simultaneously. Communication allows differential system resource utilization, when there are multiple stroke activities ongoing simultaneously. The key to system function is full knowledge of ongoing activities in all parts of the SRPASS at all times.

ATCC will note the closest stroke hospital for the EMSP from the database.

It is essential to establish radio communications, as soon as possible, in patients meeting system criteria to provide a baseline level of the patient's status. After determination that a patient meets system entry criteria, the highest level EMSP should contact the ATCC at the earliest possible practical time to enter the patient into the system. The reporting EMSP should identify him or herself and provide the following information:

1. Basic patient data-age and sex
2. Entry criteria (FAST stroke scale)
3. Current primary survey status-airway, breathing, circulation, level of consciousness, and vital signs
4. Incident location
5. Estimated time of onset (ETO)
6. Estimated scene departure time
7. Proposed mode of transport (if ground then state transporting unit number)

The ATCC will establish the communications link with the receiving designated stroke hospital and provide them with basic information. The field EMSP will then be able to communicate any additional pertinent data and receive medical control while the hospital is simultaneously activating its stroke response system. The transporting EMSP will maintain contact as appropriate with the receiving designated stroke hospital and provide information updates if changes in the patient's status or transport plan occur. The EMSP are to reconfirm to the designated stroke hospital estimated time of arrival (ETA) once transport has been initiated. If radio failure occurs, direct contact between the EMS unit and their dispatch should be established with relay of information to the ATCC by phone.

IV. Data Quality Assurance Component

This component is an important part of the SRPASS. In virtually any serious stroke emergency, the patient has a very limited ability to meaningfully select prehospital, hospital, and physician care. The efficacy of initial care for these patients may have a pivotal role in determining their outcomes. Therefore, there is a need to evaluate system function to determine continuing effectiveness in management of stroke. This component uses a system-wide stroke database which will provide an overall look at stroke emergencies, care, outcomes, and provide information for use in determining and developing stroke teaching programs, provide information that may potentially be used in stroke studies, and utilize evaluation of system function in the HSQA Program. There are two basic elements of this component. The first is a standard stroke data set that will be used to establish a regional stroke database. The second element is the continuous QA program of the SRPASS. As noted in the Code of Alabama of 1975, Chapter 11D-6 all data collected for the QA program of the SRPASS shall be held confidential pursuant to state and federal laws, rules, and policies.

The stroke QA data set is designed as a small data set and it is intended to fulfill the goals of this component, as stated in the previous paragraph. A unique stroke identification number will allow uniting prehospital and hospital data which will increase usefulness. The data fields are noted in the following list:

1. Incident location
2. Prehospital unit(s)
3. Activity times
4. Receiving hospital
5. Patient and system demographics
6. Prehospital outcome
7. Hospital status/response
8. ED disposition
9. Initial procedures (within the first 24-hours)
10. Hospital confirmation of stroke
11. ETO
12. Stroke type (ischemic or hemorrhagic)
13. If ischemic, was tPA administered
14. Reason tPA was not administered
15. Was patient admitted to hospital
16. Was patient admitted to ICU, floor, or other
17. Final disposition

A more thorough listing of the stroke QA data set is presented in Appendix D.

The second entity in this component is the QA program for SRPASS. This program is necessary to the SRPASS to document continuing function and allows the

implementation of improvements in a system where patients may not have the ability to make their own personal medical care choices and depend on the system for adequacy and completeness of care. This program will be regional with individual entities doing their own QA evaluations and reporting these to a regional office. The appropriateness, quality, and quantity of all activities in the system must be continuously monitored in the areas of prehospital and medical care of patients and overall system function.

The basic QA process involves specific steps to be performed by each individual designated stroke hospital and prehospital provider service. These steps are:

1. Assign a QA Manager to oversee the process in the organization.
2. Develop a written QA Program to evaluate patient care with regard to appropriateness, quality, and quantity, and as a part of that program patient care guidelines should be established for use in the evaluation process. For prehospital provider services, this may be regional hospital protocols. These programs will be reviewed and approved by the Regional QI Committee and lead agency when applying to become a SRPASS participating hospital.
3. A method for QA data collection should be established. For designated stroke hospitals, this should include a morbidity and mortality list.
4. QA evaluations should be undertaken by the individual system participants-EMS provider services or designated stroke hospitals. This first involves the determination of specific audit filters. Mandatory designated stroke hospital audit filters include major complications and deaths. Other appropriate audit filters are also evaluated. For designated stroke hospitals, external outcome comparisons are part of the evaluation process.
5. Determine the presence of QA issues through the data evaluation process.
6. Discuss QA issues at the formal QA conference of each individual system participant-EMS providers or designated stroke hospitals.
7. Develop a corrective action plan. In general, action activities can be placed under the categories of professional resolution or administrative resolution.
8. Re-evaluate to document the results and effectiveness of the corrective action plan. This is commonly called "closing the loop."

Adequate documentation of these activities is essential. In designated stroke hospitals, a multi-disciplinary peer review process must occur. In designated stroke hospital QA programs, both medical care and designated stroke hospital function should be evaluated.

The primary goal of the Regional Quality Assurance Committee (RQAC) is to review the activities of the SRPASS for appropriateness, quality, and quantity of activities. This review is to include system administration and organization activities, prehospital care, and hospital care. The RQAC will document the effectiveness of hospital and EMS service QA through routine reports of QA activities provided by each participating

entity. The RQAC will perform focused review of specific items as determined appropriate, but these reviews will include evaluation of both prehospital and hospital activities. It is expected that most issues will be resolved by developing an action plan in conjunction with various SRPASS entities. A re-evaluation for results is to be undertaken. If it is determined that a change in system configuration or function should occur, a recommendation will be sent to the Stroke Subcommittee of the RAC for evaluation and reported to the lead agency. A more detailed outline of the QA program is available in Appendix F.

<u>Compliance and EMS Protocol:</u>

General function of the SRPASS will follow this scenario:

1. Stroke occurs or warning signs and symptoms are present.
2. Field evaluation is done by EMSP who determines if the patient meets the system criteria, if EMSP is unsure of entry criteria that information may be immediately obtained from the ATCC.
3. Communication is established with the ATCC with brief basic information provided to the ATCC on all stroke patients transported to a hospital.
4. The triage status and the current designated stroke hospital activity status, from the ERD, determine hospital destination.
5. The ATCC will coordinate a communications link to the closest active designated stroke hospital is provided by the ATCC to the field EMSP.
6. Medical control is established with the receiving designated stroke hospital by the communications link; orders are provided as needed.
7. Prehospital care is completed and transport to the designated stroke hospital is initiated.

Specific functions relative to the SRPASS are described in the following sections.

I.   Prehospital System Entry Criteria

The SRPASS system is for patients who have signs and symptoms of stroke, also defined as an acute episode of neurological deficit without any evidence of trauma. If the patient has altered mental status other causes such as hypoxia, hypoperfusion, hypoglycemia, trauma, or overdose should be considered.

1. Does the patient have facial droop (F), arm or leg weakness (A), or difficulty speaking (S)? When was the last (clock) time (T) patient was seen normal? (FAST-see next section). Determination of time of symptom onset is critical, as treatment for stroke can be time dependent.
2. Did the patient have a previous neurological deficit (this will not rule out stroke, but should be noted so that new findings can be assessed against baseline)?

3. Does the patient have stroke risk factors (i.e., hypertension, diabetes, heart disease, smoking, dysrhythmias, hypercholesterolemia, anticoagulation use, transient ischemic attack, or previous stroke)?
4. Has the patient had any recent similar events?
5. Medic Alert tags?

II. Prehospital Physical Assessment

1. Vital signs
2. Rapid physical exam
Perform FAST stroke scale (Face, Arm, Speech, and Time):

    A. Face: Assess for facial droop (have patient show teeth or smile).
- Normal-both sides of face move equally well
- Abnormal-one side of face droops or does not move as well as the other side

    B. Arm: Assess for arm drift (have patient close eyes and holds both arms straight out, palms up for ten seconds).
- Normal-both arms move the same or both arms do not move
- Abnormal-one arm does not move or one arm drifts down compared with the other

    C. Speech: Assess for abnormal speech (have the patient say "you can't teach an old dog new tricks").
- Normal-patient uses correct words with no slurring
- Abnormal-patient slurs words, uses inappropriate words, does not understand, does not obey commands, or is unable to speak

    D. Time: If any of the above is positive, attempt to determine the time of symptom onset (clock time).

If the patient has an abnormal response to any single component of the FAST stroke scale, and if that abnormal response is acute in nature, then the patient should be entered into the SRPASS system.

    E. EMSP Discretion

        1) If the EMSP is convinced that the patient is likely to have a stroke which is not yet obvious then the patient may be entered into the SRPASS.

        2) EMSP suspicion of stroke may be raised by the following factors (but these situations alone do not constitute reason for SRPASS entry):

a. Symptoms of stroke occurred and disappeared within a few minutes, even if the patient is presently normal.

b. Patient is awake with spontaneous inability to remember or understand what is said or to express himself (expressive or receptive asphasia).

3) EMSP are to immediately inform the ATCC, when a decision is made to enter a patient into the SRPASS using discretion and inform the ATCC of the reason for that decision.

4) It is to be specifically noted in the run report that EMSP discretion is being used to enter a patient into the SRPASS and the reason or basis for that decision is to be written on the prehospital Patient Care Report (PCR).

III. Hospital System Entry Criteria

If the patient with stroke signs or symptoms was not entered into the stroke system by prehospital EMSP or if the patient arrived by private vehicle, any hospital may enter the patient into the system. The SRPASS system is for patients who have an acute episode of neurological deficit without any evidence of trauma. If the patient has altered mental status other causes such as hypoxia, hypoperfusion, hypoglycemia, trauma, or overdose should be considered.

1. Does the patient have facial droop (F), arm or leg weakness (A), or difficulty speaking (S)? When was the last (clock) time (T) patient was seen normal? (FAST-see next section). Determination of time of symptom onset is critical, as treatment for stroke can be time dependent.
2. Did the patient have a previous neurological deficit (this will not rule out stroke, but should be noted so that new findings can be assessed against baseline)?
3. Does the patient have stroke risk factors (i.e., hypertension, diabetes, heart disease, smoking, dysrhythmias, hypercholesterolemia, anticoagulation use, transient ischemic attack, or previous stroke)?
4. Has the patient had any recent similar events?
5. Medic Alert tags?

IV. Hospital Physical Assessment

1. Vital signs
2. Rapid physical exam

Perform FAST stroke scale (Face, Arm, Speech, and Time):

A. Face: Assess for facial droop (have patient show teeth or smile).

- Normal-both sides of face move equally well
- Abnormal-one side of face droops or does not move as well as the other side

B. Arm: Assess for arm drift (have patient close eyes and holds both arms straight out, palms up for ten seconds).
   - Normal-both arms move the same or both arms do not move
   - Abnormal-one arm does not move or one arm drifts down compared with the other

C. Speech: Assess for abnormal speech (have the patient say "you can't teach an old dog new tricks").
   - Normal-patient uses correct words with no slurring
   - Abnormal-patient slurs words, uses inappropriate words, does not understand, does not obey commands, or is unable to speak

D. Time: If any of the above is positive, attempt to determine the time of symptom onset (clock time).

E. Expressive/receptive aphasia or physician diagnosed stroke

If the patient has an abnormal response to any single component of the FAST stroke scale, and if that abnormal response is acute in nature, then the patient should be entered into the SRPASS system. If the hospital entering the patient into the system is not a stroke hospital or is not the appropriate level of stroke hospital for the needs of the patient, the ATCC will arrange transfer to the appropriate hospital.

V.   System Operations

System operations refers to the activities that occur once it is determined a patient meets system entry criteria and communications have been established within the system. These activities include designated stroke hospital destination determination, continuing communications, provision of field care, patient transport, and care of the patient at the designated stroke hospital.

Hospital Destination

Hospital destination will be determined by the closest available designated stroke hospital or patient's choice. Hospital status is traced by the ERD at the ATCC. That equipment is described in the Communications Component and details the status of individual resources in the hospital and, therefore, the activity status of the hospital. A hospital will be either green (active), yellow (service unavailable), or red (inactive) status.

Green status means the hospital has all resources available and may receive stroke patients based on location. Green status requirements involve the following:

1. All levels must have essential resources (which are on the ERD) active and available at the time as pertains to their designated stroke hospital status.
2. A neurologist or a physician with experience and expertise in diagnosing and treating stroke must be actively available at all times. This physician may be available by being on-call, by telemedicine[3], or by an established MOU. For the purposes of this document, a physician with experience in diagnosing and treating stroke is defined as a licensed physician who is board-certified or board-eligible (BC/BE) in emergency medicine or neurology[1] through the American Board of Medical Specialties, or who is BC/BE in another specialty, but has a minimum of eight hours[2] of continuing medical education (CME) related to stroke annually. A telemedicine consultant should be a neurologist or vascular neurologist (see Appendix H).

Red status indicates at least some primary stroke care resources in the hospital are not actively available and the hospital is not ready to receive stroke patients at that time. Red status results when one of the following resources is not available:

1. ED
2. Intensive Care Unit (ICU)
3. CT scan
4. Neurologist or physician with experience and expertise in diagnosing and treating stroke (see definition above).

<u>Hospital Destination Notes</u>:

A. Hospital destination for patients entered into the SRPASS will be the closest appropriate stroke receiving facility based on designated stroke hospital availability.

B. In the event a patient or family member requests transport to a specific facility that does not meet system guidelines, efforts to clarify the established SRPASS will be made with the family. The patient's wishes will, however, ultimately prevail.

C. If the patient is unstable (cannot be effectively ventilated by the EMSP or needs volume replacement, but an IV that is sufficient to provide volume resuscitation cannot be established or maintained) and it is over 40 minutes transport time to a green designated stroke hospital, the patient should be transported to the closest hospital with full time emergency physician coverage as coordinated by the ATCC.

D. In a situation where ATCC notification has occurred and no medical direction is needed, the ATCC will notify the receiving hospital of the patient transport and provide information of condition, estimated arrival time, etc.

1. Prehospital System Activities

   Prehospital care will be carried out following the guidelines of the SRPASS Plan. ADPH and EMS prehospital care protocols will be used for primary guidance in prehospital stroke management. Patients entered into the SRPASS will receive their medical control from the stroke receiving hospital which will be immediately accessible through the communications link between the ATCC and that destination hospital. Any significant patient condition changes are to be communicated directly to medical control at the receiving designated stroke hospital, as those changes may result in updating the orders and altering the destination hospital stroke team activation. Field time should be kept to a relative minimum. Stroke patients are best served by rapid transport to the most appropriate facility.

2. Hospital System Activities

   a. Hospital stroke management is an essential part of any stroke system. This phase of stroke care requires adequate resources (equipment and facilities) and personnel with adequate training and commitment to carry out rapid initial assessment, stabilization, and definitive care including invasive treatment plus critical care and recuperative care as necessary. In addition, rehabilitation services should be initiated as appropriate. Resources necessary to provide care are documented through the designated stroke hospital guidelines.

   b. Once a patient has been assessed and treated acutely, the patient will be cared for at the receiving facility or transferred to the next higher level stroke designated hospital for further care.

VI. **System Compliance, Evaluation, and Action**

This stroke system is designed to provide specialized care to patients with actual or a significant probability of stroke. The system is based on hospital requirements and system function protocols to be designated as a stroke ready hospital. Adherence with the requirements and protocols are essential for proper stroke patient management. Therefore, a specific program for monitoring requirements and function protocols will be a part of the SRPASS. This will be a function of the SRPASS Committee with oversight from OEMS. Reports regarding compliance issues will be made to the regional EMS agency that will follow the plan developed by OEMS and SRPASS. Maintenance of compliance with requirements, guidelines, and system function protocol activities for individual personnel and agencies involved in the SRPASS means:

A. Maintaining component and organizational guidelines as established by the SRPASS plan.

1. Prehospital

   Prehospital entities have the responsibility to assure their individual EMSP have a basic knowledge and awareness of the SRPASS including entry criteria and basic operations.

2. Hospital Component

   a) Continue to meet all designated stroke hospital resource requirements for their status.
   b) Maintain a designated physician as the stroke program leader with written responsibilities as indicated in the SRPASS.
   c) On-call coverage by a neurologist or a physician with experience and expertise in diagnosing and treating stroke (see Appendix H) should be established. This can be accomplished through a neurologist[3] telemedicine consultant if necessary.

3. Communications Component

   Each entity is responsible for maintaining communications equipment used in the SRPASS in proper working order.

4. Data/QA Component

   a) Each entity is responsible for maintaining and providing data to the SRPASS as indicated in the SRPASS plan. For prehospital EMS services this means providing data to the Stroke Communications Center which is then placed in the SRPASS database. For hospitals this means maintaining and providing the hospital based information in the stroke QA data set (see Appendix D).
   b) Participating entities need to maintain their individual QA program as specified in the SRPASS plan. They are to provide reports of these activities to the HSQA program on a timely basis.
   c) Active continuing participation in the QA program is expected (all individual personnel from participating organizations must attend at least 75 percent of the regional focused review of individual topics by providing data and participating in the evaluation process).
   d) *Get with the Guidelines* participation or TJC stroke center certification is strongly encouraged.

5. Personnel from prehospital and hospital organizations are to participate in RQAC activities per membership responsibilities. It is expected there will be 75 percent attendance of meetings by members.

B. Maintaining system function as noted in the SRPASS plan.

   1. System entry criteria as specifically defined in the SRPASS plan or currently active protocols are to be used by EMSP to determine patient entry into the SRPASS.
   2. Communications as outlined in the SRPASS plan and currently approved protocols are to be initiated and maintained by EMS units. This involves initiating communications, providing information, and participating in the use of prehospital stroke care activities. This includes patient entry into the system, determination of designated stroke hospital destination, and medical control orders for provision of care using the OEMS approved prehospital care protocols.
   3. System operations are provided by individual entities as per the SRPASS plan including approved protocols.

Failure to comply with contract performance criteria or requirements, guidelines, or adherence to system function protocols, as stated in the most current version of the written SRPASS plan, will result in specific actions to be taken by the RAC. Questions of adherence to guidelines will be generated by system oversight review by the OEMS compliance staff. Issues regarding adherence to guidelines, when brought to the attention of the regional EMS agency, will be directed to the RAC and OEMS for evaluation. The OEMS will evaluate questions of compliance and if a compliance infraction has occurred a report will be forwarded to the RAC.

C. Prehospital component requirements and system function protocols are part of the SRPASS. Deviation from that plan will result in the following actions by the RAC:

   1. First breach of activity guidelines will result in a letter to the prehospital service indicating there has been a breach of activity agreement with an explanation of the situation and an indication of the need for corrective action to be taken. There will be a one-month time period for implementation of the corrective action.
   2. The second breach of agreement will result in another letter to the prehospital service with a copy to the OEMS compliance staff indicating that a second breach has occurred and again allowing a one-month period for corrective action.
   3. A third breach of the same activity will result in a letter to the ADPH and OEMS for evaluation and action.

D. Hospital participation in the system is governed by the MOU between ADPH and each hospital. Deviations from requirements, guidelines, or system function protocols governed by the MOU may result in the following actions by ADPH:

   1. The first breach of any activity agreement will result in a letter indicating that there has been a breach of an activity standard with an explanation and an indication that there is a need for corrective action. A one-month period for corrective action will be allowed.

2. If a second breach of the same activity occurs, a letter will be sent to the responsible entity indicating that a second breach has occurred, with a warning that a third breach in that activity will result in suspension from the SRPASS for a 30-day period of time. A one-month period for corrective action implementation will occur.
3. A third breach of the same activity will result in MOU failure and suspension of that facility from the SRPASS for a period of 30 days as per decision of the OEMS, with the suspension time doubled for subsequent deviations of the same standard.

It will be the duty of the OEMS to carry out these pre-determined actions in cases of violation of requirements, guidelines, or failure of adherence to system function protocols for remediation recommendations.

Level III Acute Stroke Ready Hospital Guidelines

To be recognized as a Level III acute stroke ready hospital, a hospital must have available the following minimum personnel, resources, and plans:

1. Physician Medical Director for stroke services

2. Stroke Coordinator

3. ED availability 24/7

4. CT scan availability 24/7 with final CT reading and report to treating physician done within 45 minutes

5. Professional personnel (physician and nurse) with ability to rapidly triage and evaluate stroke patients to determine appropriateness of tPA therapy

6. Ability, willingness, and documentation of administration of systemic tPA therapy to all eligible patients

    a) Pharmacy with tPA formulary in stock at all times
    b) Stroke treatment protocols in place that define tPA administration

7. Equipment

    a) Airway control and ventilation equipment
    b) Pulse oximetry
    c) End-tidal CO_2 determination
    d) Suction devices
    e) Electrocardiograph
    f) Standard intravenous fluid administration equipment
    g) Sterile sets for percutaneous vascular access (venous & arterial)
    h) Gastric decompression
    i) Drugs necessary for emergency care
    j) X-ray availability
    k) CT availability and interpretation in 45 minutes
    l) Two-way communication with emergency services

8. On-call availability of neurology[1] or, a physician with experience and expertise in diagnosing and treating stroke in person or a neurologist available by telemedicine[3] (see Appendix H).

9. Written plans for care of patients who require higher level stroke care (i.e., post tPA, neurological and neurosurgical care, etc.)

10. Performance improvement and community education participation as described in Appendix F of the SRPASS plan

Level II Primary Stroke Center Hospital Guidelines

To be recognized as a Level II designated acute primary stroke hospital, a hospital must be TJC certified as a Primary Stroke Center or have available the following minimum personnel, resources, and plans:

A. Hospital Organization

    1. Stroke service or equivalent

    2. Stroke Service Director

    3. Stroke Coordinator

    4. Hospital Department/Sections

       a) Neurology[1] or telemedicine[3] system MOU or agreement with neurology or vascular neurology (see Appendix H)
       b) Vascular neurosurgery (or transfer plan)
       c) Emergency medicine

    5. Stroke treatment protocols in place

B. Clinical Capabilities

    1. Specialty availability (means contact made and care plan determined) upon notification of patient need:

       a) Emergency Medicine (ten minutes)
       b) Neurology[1] (see Appendix H) within 15 minutes after notification by emergency physician by hospital plan, or a telemedicine contract with neurology or vascular neurology[1]
       c) Vascular neurosurgery

    2. Consultants availability (on-call):

       a) Internal Medicine
       b) Critical Care
       c) Cardiology
       d) Neuroimaging

C. Facilities and Resources

1. Emergency Department

   a) Personnel
      1) Designated Physician Director
      2) Emergency Medicine Specialists present
      3) Nursing personnel with expertise to provide continuous monitoring to stroke patients until their admission to a hospital unit

   b) Ability, willingness, and documentation of administration of systemic tPA therapy to all eligible patients
      1) Pharmacy with tPA formulary in stock at all times
      2) Stroke treatment protocols in place that define tPA administration
      3) Written plan for higher level care for patients who require it

   c) Equipment
      1) Airway control and ventilation equipment
      2) Pulse oximetry
      3) End-tidal CO2 determination
      4) Suction devices
      5) Electrocardiograph
      6) Standard intravenous fluid administration equipment
      7) Sterile sets for percutaneous vascular access (venous & arterial)
      8) Gastric decompression
      9) Drugs necessary for emergency care
      10) X-ray availability
      11) CT availability and interpretation in 45 minutes
      12) Angiographic suite available
      13) Two-way communication with emergency services
      14) Sterile ventriculostomy tray readily available in facilities with NS coverage

2. Operating suites adequately staffed (within 30 minutes of stroke system alert)

3. Post anesthetic recovery room available

4. ICU-bed for stroke patients

   a) Personnel
      1) Designated Medical Director
      2) Specialists with privileges in critical care, in-house, or immediately available
   b) Appropriate monitoring equipment

5. Neuroimaging special capabilities
    a) In-house radiology technical personnel capable of brain CT imaging
    b) Angiography (at least CTA, MRA)
    c) Neurovascular sonography
    d) Computed tomography (emergent and routine)
    e) Magnetic Resonance Imaging (not time specific)

6. 24-hour neurology[1] (see Appendix H) or 24-hour on-call neurologist or vascular neurologist by telemedicine[3] (see Appendix H).

7. Rehabilitation
    a) Rehabilitation services protocol appropriate for stroke patients (rehabilitation services can improve post-stroke recovery and function, and PSCs should work to develop early patient assessment and initiation of any needed speech, physical, and occupational therapy.)

8. Clinical laboratory services
    a) Standard analyses of blood, urine, etc.
    b) Blood typing and cross-matching
    c) Comprehensive blood bank or access to equivalent facility
    d) Blood gases and pH determinations
    e) Cerebral spinal fluid (CSF) examination capabilities
    f) Comprehensive coagulation testing

D. Continuing Education

At least eight hours[2] of annual program education should be provided for:

1. Staff physicians
2. Nurses
3. Allied health personnel
4. Community physicians

E. Stroke Prevention Program Coordinator

F. Performance Improvement

1. Does hospital track patient outcomes
2. Performs on-going program evaluation
3. Strives for improvement
4. Community outreach/public education (i.e., Power to End Stroke from the American Heart Association).

Level I Comprehensive Stroke Center Guidelines

To be recognized as a Level I comprehensive stroke center, a hospital must be TJC certified or have the minimum personnel, resources, and plans as recommended by the Brain Attack Coalition for Comprehensive Stroke Centers (CSC).

Prehospital and Hospital
Stroke QA Data Set

1. Identification number--provided by the ATCC upon initial contact by prehospital provider (the same number would follow the patient through the system)

2. Location of the incident (city or county--possibly information from a city map grid)

3. Prehospital unit(s) responding

4. Times

   a) Prehospital
      1) Incident
      2) Unit dispatch
      3) Unit scene arrival
      4) Extrication ended (if applicable)
      5) Unit scene departure
      6) Unit hospital arrival

   b) Communication
      1) Initial contact
      2) ATCC contact/link to receiving designated stroke hospital
      3) Additional contacts to ATCC by EMSP

5. Receiving hospital

6. System entry data
   a) Primary entry triage criteria
   b) Co-morbid criteria
   c) EMSP discretion
   d) Patient age
   e) Patient sex
   f) AVPU (alert, voice, pain, unresponsive)
   g) Scene vital signs

7. Prehospital outcome

   a) Loss of vital signs and time
      1) Lived
      2) Expired (time)

8. Hospital readiness

    a) Physician arrival time in ED
        1) ED attending physician
        2) Neurologist
        3) Neurosurgeon
        4) Other: state_____

9. Procedures done within the first 24-hours (includes all procedures performed by initial receiving hospital or receiving hospital if patient is transferred).

10. Hospital has confirmed stroke? If not, explain system entry.

11. ETO

12. Stroke type (ischemic or hemorrhagic)

13. If ischemic, was tPA administered? If not, explain why.

14. Was patient admitted to hospital?

15. Disposition

    a) ED disposition
        1) Disposition time-when patient goes to the initial hospital care location (not just leaving the ED, i.e., to CT scan.)
        2) Disposition location
            a. Discharged-ICU, Stroke Unit, OR, or ward
            b. Admitted
                ▪ Higher level designated stroke hospital
                ▪ Equal level designated stroke hospital
                ▪ Lower level designated stroke hospital
                ▪ Reason:_____
    b) Final hospital disposition/date/location
        1) Home
        2) To rehabilitation center
        3) To another acute care facility
        4) To extended care facility
        5) Expired

Stroke Center QA Data Set
Get with the Guidelines Recommendations

- *IV rt-PA 4.5 hours*--percentage of AIS patients who arrived at the hospital within 270 minutes (4.5 hours) of time last known well and for whom IV tPA was initiated at this hospital within 180 minutes (3 hours) of time last known well.

  - *IV tPA Treatment Rate*--of all ischemic stroke admissions (regardless of whether they meet treatment criteria or not), the percentage treated with IV tPA (denominator=all ischemic stroke admissions; numerator=all tPA treatments).

  - *Symptomatic Intracerebral (sICH) Hemorrhage Rate*--of tPA treated patients, the number of patients that developed a hemorrhagic transformation of the infarct or parenchymal hemorrhage with an associated increase in the NIH Stroke Scale score of four or more points as compared to a baseline pre-tPA treatment NIH Stroke Scale score (denominator=all ischemic stroke patients treated with intravenous tPA; numerator=all patients that developed an sICH).

- *Door-to-IV rt-PA in 60 minutes*--percentage of ischemic stroke patients who received IV tPA at this hospital who are treated within 60 minutes after triage (ED arrival).

- *Door-to-IV rt-PA times*--time from triage (ED arrival) to administration of IV tPA for ischemic stroke patients treated at this hospital.

- *Last known well-to-IV rt-PA times*--time from symptom onset to administration of IV tPA for ischemic stroke patients treated at this hospital.

- *Missing time data*--missing, incomplete, or invalid date/time data for ischemic stroke patients.

- *IV rt-PA contraindicated*--percentage of eligible AIS patients not treated with IV tPA at this hospital who had reasons for not receiving IV tPA.

- *Reasons for no IV rt-PA*--reasons why eligible AIS patients were not treated with IV tPA at this hospital.

Continuous Quality Assurance

A. Quality assurance is a vital part of a stroke system. It is used to document continuing function of the system and evaluation of that function to implement improvements in system function and stroke patient management. In a stroke system, patients have virtually no time to make specific choices regarding acute and critical medical care and, therefore, the system itself has a responsibility to perform evaluation functions to assure that the highest level of care is being provided and that improvements are implemented whenever possible in a timely manner.

B. Such a program will be system-wide. There will be individual agency efforts on the part of all participating organizations in addition to oversight by the RAC QA subcommittee.

C. The appropriateness, quality, and quantity of all activities of the system must be continuously evaluated. Items evaluated are reflected in Appendix D (Prehospital and Hospital QA Dataset).

1. Medical care

2. Prehospital care

3. System function (dispatch activities, scene time, triage process and destination, response level, etc.)

4. The RQAC will report findings to the RAC on a regular basis.

D. Prehospital inter-hospital care

1. Items evaluated:
    a. Patient assessment
    b. Protocol adherence (when applicable)
    c. Procedures initiated/completed
    d. On-scene time
    e. Medical control interaction
    f. Transport mode (ground/air)
    g. Resource availability/needs match
    h. Arrival report
    i. Record/documentation
    j. Inter-facility care/transport

2. Process-primarily performed by EMS organizations

    a. Each organization assigns QA person to oversee process
    b. Guidelines established-regional/authorized
    c. Determine audit filters
    d. Collect data
    e. Evaluate data
    f. Determine QA issues present
    g. Develop corrective action plan
        1) Professional resolution
        2) Administrative resolution
    h. Re-evaluation to document results/effectiveness of corrective action plan

E. Hospital care QA

    1. Medical care

        a. Complications
        b. Blood pressure protocol violations in tPA treated patients
        c. tPA treatment rates in association with sICH rates
        d. Deaths
        e. Outcome review
            1) Internal review
            2) External comparison
        f. Process for medical care QA (performed by each institution)
            1) Establish written care guidelines
            2) Collect data
                a) Stroke date elements
                b) Complications of events list
            3) Data QA evaluation
                a) Establish audit filters (indicators)
                b) Determine presence of potential QA issue
                c) Primary review (permissible)
                d) Multi-disciplinary peer review of QA issue
            4) Corrective action
                a) Professional resolution
                b) Administrative resolution
            5) Re-assess for effectiveness of corrective action
            6) Documentation is essential utilizing QA tracking flow sheet

    2. Designated stroke center function

        a. Designated stroke center operations via audit filter review
            1) Continuous

      2) Intermittent

      3) Focused audit filter review

  b. Specific event evaluation when event problem noted by stroke team member

  c. Medical nursing audit

  d. Utilization review

  e. Divert utilization review

  f. Process same as for Medical Care Review with the addition of some form or method for noting events that occur that need evaluation to try to improve designated stroke center functions.

F. Regional system function

  1. Primarily performed by the RAC

  2. Evaluation of overall regional system function

  3. Process
    a. Establish standard
    b. Collect data
    c. Evaluate data-determine audit filters
    d. Devise plan of corrective action for QA issues
    e. Re-evaluate to determine effectiveness of corrective action
    f. Participation in HSQA program

G. HSQA program (staffed by regional EMS agency)

  1. Goals--review entire SRPASS
    a. System administration/organization/activities
    b. Prehospital care
    c. Hospital care

  2. Members

    a. EMS office staff
    b. Prehospital provider representation--the designated QA coordinator for each county (from an EMS organization)
    c. Participating provider representation
      1) Stroke Director
      2) Stroke Coordinator

  3. Process

    a. Brief report of QA activities from each participating county/EMS organization and hospital

b. General system information
c. Focused review of items of major concern/impact including selected cases
d. Develop consensus of issues that represent QA concerns
e. Develop action plan
f. Have re-evaluation process to determine effectiveness of action plan results
g. Complete documentation of all activities including any recommendations for change or action to the OEMS and RAC

4. Regional Hospital Medical Care Review Subcommittee

    a. Members
       1) Stroke Director from each participating designated stroke center
       2) ED Medical Director from each active Stroke Operations Committee
       3) Regional EMS Medical Director
       4) The chairman of this committee will be the chairman of the Stroke Subcommittee of the RAC
    b. Activities are to review the stroke medical care issues including specific death audit review and major complications review as determined by the committee Chairman. Other QA issues will be reviewed as deemed appropriate.
    c. The process used will be the same process as outlined in the QA section of the SRPASS plan.
    d. Reports of a summary nature will be made to the HSQA program. Individual physician medical care issues will initially only be reported to the stroke director of the facility providing care in the situation and be made by personal communication. In general, discussions at the subcommittee will fulfill this notification requirement. If a persistent individual problem trend occurs, this situation will be referred to the appropriate hospital QA committee.

5. All members are expected to attend at least 75 percent of the HSQA program meetings and the Hospital Medical Care Review subcommittee meetings.

Appendix G

Acronyms

ADPH: Alabama Department of Public Health
AIS: Acute Ischemic Stroke
ATCC: Alabama Trauma Communications Center
AF: Atrial Fibrillation
BREMSS: Birmingham Regional Emergency Medical Services System
CME: Continuing Medical Education
EMS: Emergency Medical Services
EMSP: Emergency Medical Services Personnel
ERD: Emergency Resources Display-the computer display of each hospital's resource availability
HSQA: Hospital Stroke Quality Assurance Program
MOU: Memorandum of Understanding
OEMS: Office of Emergency Medical Services
PCR: Patient Care Report
PSC: Primary Stroke Center
QA: Quality Assurance
RQAC: Regional Quality Assurance Committee
RAC: Regional Advisory Council
sICH: Symptomatic Intracerebral Hemorrhage Rate
SQAC: Stroke Quality Assurance Committee
SRPASS: Southeast Regional Pilot Acute Stroke System
STHSAC: State Trauma and Health System Advisory Council
TJC: The Joint Commission
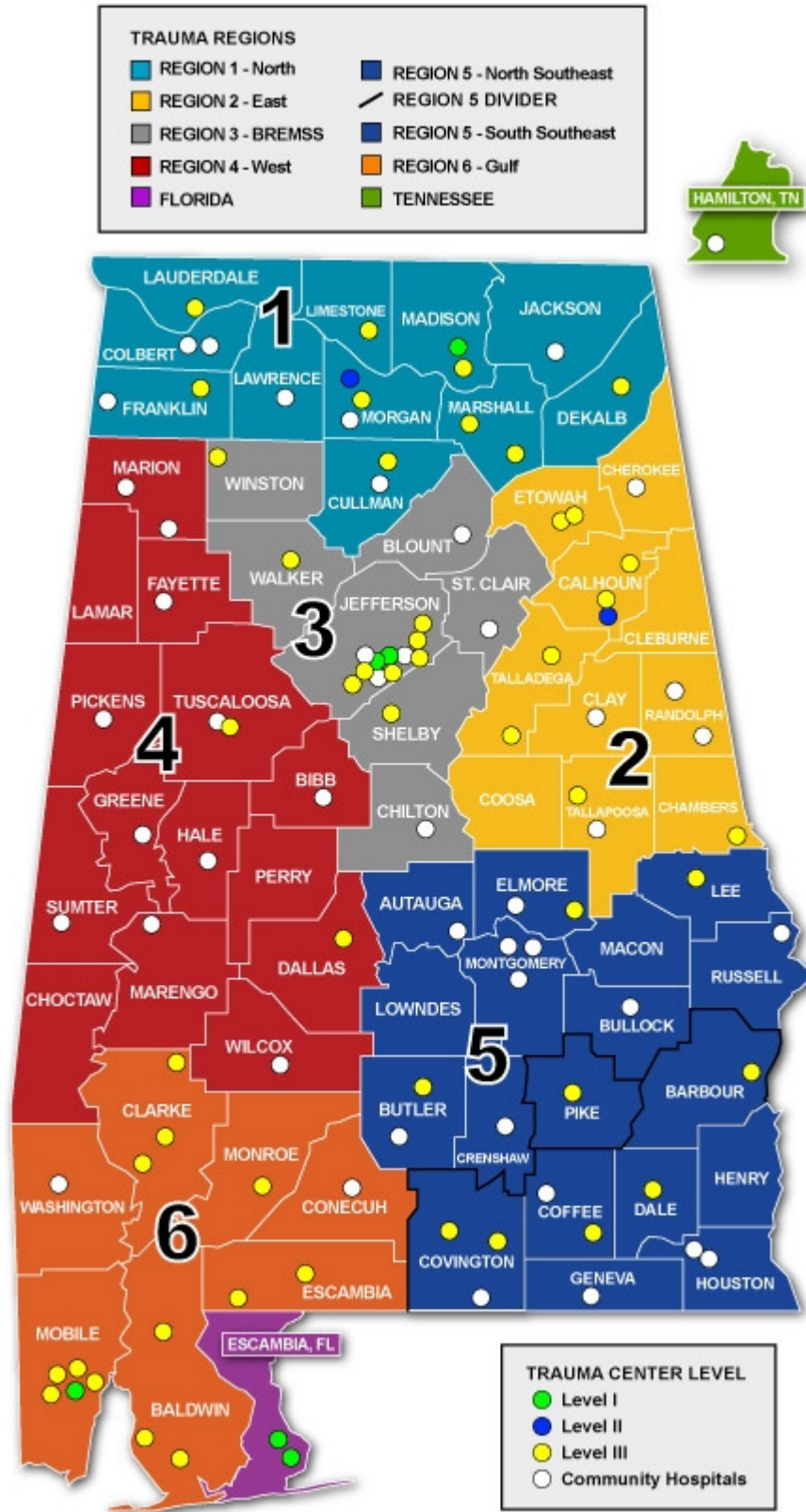**tPA**: Tissue Plasminogen Activator (Activase®)

Notations:

[1]Neurology: A physician with experience in diagnosing and treating stroke is defined as a licensed physician who is board-certified or board-eligible (BC/BE) in emergency medicine or neurology through the American Board of Medical Specialties, or who is BC/BE in another specialty, but has a minimum of eight hours of stroke related continuing medical education (CME) annually.

[2]Eight annual hours of stroke related continuing education: TJC requirement for Primary Stroke Center certification.

[3]Telemedicine: The remote diagnosis and treatment of patients by means of telecommunications technology. A stroke telemedicine consultant should be a licensed neurologist with experience in diagnosing and treating stroke who is BC/BE in neurology or vascular neurology through the American Board of Medical Specialties or the American Osteopathic Association.

Appendix I

ATS Operational Flowchart