A report to the 84th Iowa General Assembly in response to
HF 2402 – An Act Relating to the Development of a Plan for a
Stroke Triage System and Registry

An Implementation Plan for an
Iowa Stroke Triage System and Stroke Registry

Submitted by the
Iowa Department of Public Health
in collaboration with the
Iowa Healthcare Collaborative and the
American Heart Association

January 14, 2011
Background
In 2010, the Iowa Legislature passed HF2402, An Act Relating to the Development of a Plan for a Stroke Triage System and Registry, which was enacted by Governor Chet Culver. The legislation requested a report from the Iowa Department of Public Health (IDPH) in cooperation with the Iowa Healthcare Collaborative (IHC) and the American Heart Association (AHA) that would set forth a plan for the implementation of a stroke triage system and registry.

A stroke triage system and registry have long been discussed by various groups such as the AHA-led Iowa Stroke Task Force, and the Iowa Cardiovascular and Stroke Task Force which developed the 2010-2014 Iowa Heart Disease and Stroke State Plan.

The initiation of a stroke triage system and registry would improve transparency of system of stroke care within the State of Iowa and allow the state to collect stroke mortality and morbidity data, assess quality improvement initiatives, and assure suspected stroke patients are transported and/or appropriately transferred to stroke-capable hospitals within critical windows of treatment.

Statement of Need
Time is of an essence in the initial treatment of stroke. Initial treatment for a stroke varies depending on whether it is caused by a blood clot (ischemic) or by bleeding in the brain (hemorrhagic). Before starting treatment, a computed tomography (CT) scan of the head or a magnetic resonance imaging (MRI) is used to diagnose the type of stroke or whether the patient may be eligible to receive Activase, a tissue plasminogen activator (rt-PA), which is the only clot buster approved by the Federal Drug Administration (FDA) for ischemic stroke if given within a three hour timeframe from the patient’s last known well time. Initial treatment focuses on restoring blood flow for an ischemic stroke or controlling bleeding for a hemorrhagic stroke. Permanent damage from a stroke often occurs within the first few hours of the event. The quicker treatment is received, the less damage will likely occur.

In 2009, stroke was the fourth leading cause of death in Iowa, accounting for 1,626 deaths, 6 percent of all deaths. That year, 8,056 persons were hospitalized due to stroke, with a high percentage (35%) being released to long-term care.\(^1\) Of all inpatients hospitalized for stroke in 2009, ischemic stroke was the most common (61%), followed by transient ischemic attack (TIA) (15%), intracerebral hemorrhage (10%), and subarachnoid hemorrhage (8%).

While the number of hospital discharges for stroke is decreasing in Iowa, the average inpatient charge per stroke hospitalization is increasing. The average inpatient charge rose from $10,262 in 2000 to $23,297 in 2009 [Figure 1]. On average, the inpatient charge per stroke hospitalization has increased 10 percent annually during 2000-2009.

\(^1\) Iowa Vital Records Data, 2009.
In 2008, the total inpatient hospital costs for stroke were estimated at $78 million, 11 percent higher than 2007. Out of the total costs, public funding, including Medicare and Medicaid, paid $59 million (76%) [Figure 2].

The need for immediate and quality care is the rationale for establishing a statewide triage and transport system. An integrated system utilizing EMS and hospital capabilities in a rural state will result in the decrease in death and disability associated with acute stroke. A registry would encourage performance improvement in individual and system level components and allow for the tracking and analysis of stroke outcomes. This in turn would lead to improved outcomes for Iowans who suffer stroke events, decrease the risk of recurring events, and lower costs associated with the diagnosis and treatment of those events.

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2 Source: Agency for Healthcare Research and Quality (AHRQ), based on data collected by the Iowa Hospital Association. Total hospital charges were converted to costs using cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare and Medicaid Services (CMS). In general, costs are less than charges. For each hospital, a hospital-wide cost-to-charge ratio is used because detailed charges are not available across all HCUP States.
**Introduction**

The issues and variables are different with the two separate, but related stroke system of care components: stroke triage system and stroke registry. Obviously, the two are related as the stroke registry could track and measure numbers of stroke patients seen by Iowa’s emergency medical services (EMS) and the time from EMS activation to the hospital, medical care provided in transport and transfer from hospital to hospital. A registry could also track diagnosis, hospital performance measures, rehabilitation, discharge, and 30-day mortality data. This report addresses the two components separately.

**Stroke Triage System**

The IDPH Bureau of Emergency Medical Services (EMS) continues to update its statewide protocols relevant to patient care including emergency medical care for stroke and strategies for reperfusion therapy annually. The protocol related to the care for stroke and reperfusion therapy is being updated to become effective during the next release of state protocols in January 2012. The protocol update will incorporate the following statement regarding determination of transport decisions of patients meeting stroke criteria:

If assessment is positive for stroke, and symptom onset can be established within the past 4.5 hours, then determine appropriate destination: a) if transport time to a primary stroke Center is less than 30 minutes, it is recommended that all of these patients be transported directly to the primary stroke center; b) if transport time to a primary stroke center is greater than 30 minutes, then transport to the nearest stroke capable hospital. Consider air transport if it will facilitate the arrival of the acute stroke patient for treatment within 4.5 hours to a primary stroke center or a stroke capable hospital. If transport to a primary stroke center or stroke capable hospital cannot be achieved to arrive within 4.5 hours, then transport to closest appropriate facility. In all instances, those patients requiring immediate hemodynamic or airway stabilization should be transported to the closest appropriate facility.

Currently Iowa’s EMS system lacks a transport decision determination for patients identified as possibly suffering from a stroke. All patients are transported to the closest hospital whether or not that hospital has any stroke treatment specific capabilities. This change in protocol will allow EMS personnel throughout Iowa to triage and transport stroke patients to the hospital with the highest level of stroke care available within 30 minutes travel time (unless contraindicated by the patient/patient’s family) in order to access the most appropriate level of stroke care.

Convened by the AHA in 2006, the Iowa Stroke Task Force recognized the need for improving stroke triage and developed an option for ranking the capacity of each of Iowa’s 118 hospitals. The ranking relates to the level of stroke care each hospital can provide. The new EMS protocols agree with recommendations from the Iowa Stroke Task Force. The proposed levels of stroke care capacity are described on the next pages.
Level 1: **Primary Stroke Centers (PSC)**

In order to qualify as a Primary Stroke Center, a hospital would certify the following:

- Designated primary contact person (ED director/vice president of medical affairs);
- Certification by the Joint Commission or another nationally recognized certifying body;
- Stroke team available 24 hours a day, seven days a week;
- CT scan of the head completed within 20 minutes and formally read within 45 minutes of order, available 24 hours a day, seven days a week;
- Laboratory and electrocardiogram (EKG) available for reading within 45 minutes of ordering, available 24 hours a day, seven days a week;
- Clot dissolving medicine, tissue plasminogen activator (rt-PA), available 24 hours a day, seven days a week;
- Participation in a stroke registry; and
- Other criteria as designated by the certifying body.

There are currently 11 Primary Stroke Center-designated hospitals in Iowa. Those hospitals are recognized as Primary Stroke Centers by the Joint Commission on Hospital Accreditation or other nationally-certified bodies based upon the Brain Attack Coalition (BAC) recommendations and the American Stroke Association, a subsidiary of the American Heart Association, treatment guidelines for the treatment of the acute stroke patient.

There are three-to-five other Iowa hospitals working to obtain required accreditation within the next year.
Level 2: Stroke Capable Hospitals

In order to qualify as a Stroke Capable Hospital, the hospital must certify that it meets the following requirements:

- Designated primary contact person (ED director/vice president of medical affairs);
- CT scan of the head, available for use and analysis within 60 minutes of patient arrival, 24 hours a day, seven days a week;
- Laboratory and electrocardiogram (EKG) available for reading within 60 minutes of ordering, available 24 hours a day, seven days a week;
- Clot dissolving medicine, tissue plasminogen activator (rt-PA), available, 24 hours a day, seven days a week;
- Emergency physician or provider (physician assistant (PA) or nurse practitioner(NP)) available, 24 hours a day, seven days a week; and
- Written policies, procedures, standing acute stroke orders and protocol, and educational requirements.

There are approximately 70 hospitals across Iowa that fit this criteria set. They are often referred to as drip and ship hospitals. There may be a national certifying process in place for this hospital level as early as 2011. The BAC is in the final review stage of the criteria.

Level 3: Triage and Transport (Non Stroke Capable) Hospitals

In order to be considered a Triage and Transport Hospital, the hospital must certify that it meets the following criteria:

- Designated primary contact person; and
- Written policies, procedures, standing orders, protocol, and appropriate educational requirements.

There are approximately 30 of these hospitals. This level of hospital will assess, stabilize (if necessary) and transfer the stroke patient as soon as possible, and not provide treatment.

All of the Iowa Stroke Task Force members support the new triage protocol, and the task force has already begun to implement steps toward the adoption of this three-tiered identification system which could be effective 1/1/2012.

Key partners, the Iowa Healthcare Collaborative and Iowa Hospital Association, will be making the initial steps of communicating this proposed system to all hospitals in Iowa. These organizations will communicate with each of the 118 Iowa hospitals in January 2011 regarding the need to self-identify the hospital’s capacity to treat the acute stroke patient and level of stroke care currently available.
In consideration of border state facilities used by some Iowans; triage plans would incorporate participation by bordering state hospitals which are Primary Stroke Centers.

It would be necessary for Iowa’s hospitals and those of neighboring state border communities to update the self-identification of capacity for treatment on an annual basis. Without designated funding to support this collection, maintenance, and dissemination of information to EMS providers throughout the state on an annual basis, it is unclear at this time what organization would be responsible for that task.

Partners and task force members see the need for extensive education and communication with all Iowa hospitals regarding the triage system and the different stroke care capacity levels. This education will be conducted by participating PSC stroke coordinators throughout 2011. The early discussions of this process have encouraged many hospitals to pursue certification for their hospital or seek a higher level of acute stroke care management at their facility. This increase in total state stroke treatment capacity demonstrates one of the positive influences of initiating such a triage system.

Discussion is still taking place on how to evaluate the system, benchmark individual hospital performance against state and national data and provide for periodic peer audits of participating hospitals through the Iowa Stroke Task Force.
Stroke Registry

The establishment of a stroke registry would allow Iowa to assess the use of best practice guidelines for acute stroke treatment. A registry could provide concurrent data collection on stroke treatment within the hospital setting as well as pre-hospital information such as patient arrival mode and hospital pre-notification. Aggregate analysis can be helpful with future education, securing funding and identifying access to care issues. Using that collected data, Iowa hospitals, IDPH, and key partners like the American Heart Association would be able to measure quality of stroke patient care, and develop performance improvement initiatives as a means of reducing Iowa’s stroke burden.

The major objectives of a stroke registry are to collect quality of care information on acute stroke patients and facilitate the implementation of quality improvements.

A data dictionary and reporting requirements have been developed for EMS, Primary Stroke Centers, Stroke Capable Hospitals, and Triage and Transport Hospitals that include transfer and treatment elements. The dictionary is compatible with national data and quality improvement guidelines. Implementation in Iowa currently has two viable stroke registry options.

Iowa-built Registry Compatible with Paul Coverdell National Acute Stroke Registry

In 2009, IDPH received a supplemental award of federal funding from the CDC to support the design and implementation of a state stroke registry. The registry was developed to be compatible with the Paul Coverdell National Acute Stroke Registry also funded by the CDC. The registry is to serve as a central system to collect, compile, and analyze state stroke data. IDPH contracts with the University of Iowa College of Public Health for the design and testing of the registry system. As of December 2010, the registry’s data elements have been developed along with paper and electronic forms which were piloted during June and July 2010. Outcome report formats are being developed. Developers of the registry implemented a start-up with the Primary Stroke Centers (PSC) on January 1, 2011. The majority of the PSCs have agreed to participate in this voluntary pilot project. While the pilot continues, status of continued federal funding has not been confirmed. Funding is currently available to support the registry development project through June 2011. Multiple year competitive grants for Paul Coverdell funding will not be made available again until 2012, dependent upon the federal budget.

Get with the Guidelines (GWTG)

The AHA operates a voluntary national stroke registry and hospital-based quality improvement program called, Get With the Guidelines (GWTG), which it manages and funds allowing hospitals to participate through a registry fee. GWTG currently has 1,800 hospitals participating nationally with over 1 million stroke patient records. The web-based tool provides clinical decision support at the point of care, as well as benchmarking capabilities for hospital systems, regions, statewide and nationally.
A standard uploader allows the opportunity for data mapping directly from the electronic medical record and could be adapted to input data into the Iowa built stroke registry or vice-versa if needed. It also meets meaningful use and physician quality reporting initiative criteria. Individual hospitals are responsible for their portion of the registry fee. AHA is ultimately responsible for the registry management including training, updating data elements and measures in accordance to current recommended national guidelines at no additional cost to participating hospitals.
Concerns for Registry Adoption and Implementation
There are several areas for concern surrounding the identification and implementation of a single registry for the State of Iowa.

- **Stroke as a Reportable Condition**
  Since the paradigm for stroke triage and care is a system approach with quality indicators of performance, the data collection necessitates uniform data collection and reporting. Similar to other acute conditions, the University of Iowa representatives who understand the utilization of disease registries for surveillance and health services performance are committed to establishing a stroke registry. The registry would include all hospital levels and provide sufficient information to track a patient through transfers from initial EMS activation through discharge from the hospital to rehabilitation/home/death. An essential component to evaluation of the system of care is the ability to link EMS and hospital records and this would be facilitated by collecting personal identifiers. Further study is needed regarding the authorization for collecting personal identifiers. A similar system has been used for the trauma system with reporting requirements by hospital levels. IDPH does not endorse mandatory reporting requirements. Such a requirement would require additional infrastructure to monitor compliance which is not currently available. The Iowa Hospital Association (IHA) does not endorse mandatory reporting due to additional hospital costs associated with the data collection and reporting. The IHA does support voluntary reporting through the Iowa Healthcare Collaborative. However, the Primary Stroke Centers must collect this information as part of certification.

- **Interface of Hospital Record Systems and Reporting Systems**
  Hospitals in Iowa utilize different data software systems to maintain their internal stroke data (and other patient data). Fourteen hospitals use GWTG (including seven of the 11 Primary Stroke Centers), others use purchased software programs, and still others have written their own programs. This means that any stroke registry would need to be able to interface with those existing systems and not impose technical or financial hardships to participating hospitals for participation in a registry. The Iowa hospital system in the past has been more willing to initiate new reporting systems when changes were not mandated, but instead perceived as a voluntary and collaborative initiative to measure and improve care and seen as being the “right thing to do”.

- **Service Reimbursement, National Standards and Registry Use**
  There was some movement in 2010 by Centers for Medicaid and Medicare Services (CMS) to base hospital stroke care reimbursement on the national benchmarks for stroke care that have demonstrated improved patient outcomes and reduced Medicare costs when the measures are adhered to by hospitals. One of the required measures would have been participation in an approved registry. Beginning in 2010, hospitals submitting Medicare claims for stroke must let CMS know if they participate in a database registry for stroke care. The rule also identifies stroke care quality measures that hospitals could be required to report for reimbursement beginning in 2012. Registry participation would enable hospitals to comply once CMS regulations become effective.
The Future of Health Reform, Electronic Health Record Capacity and Stroke Data

There is still some uncertainty regarding federal health care system changes and requirements as a response to health care reform. These new changes could have a substantial impact upon what type or design of registry would be best for Iowa.

Iowa has, however, developed a clear plan and approach to promoting the use of electronic health records (EHR) and a statewide health information exchange (HIE). Draft policy has already been developed for the 2011 legislative session relating to health information technology, a statewide health information exchange and the creation of Iowa e-Health, a public and private collaboration to promote health information technology (health IT) to improve care quality, safety and efficiency. The IDPH Office of Health IT will work closely with the e-Health executive committee and advisory council and several volunteer workgroups representing many public and private stakeholder organizations, to ensure the successful planning and implementation of health IT in Iowa. Federal funding over the next four years from the American Recovery and Reinvestment Act will be used to implement and sustain a statewide HIE. The Iowa HIE will provide the hub that connects different EHRs throughout the state, allowing vital patient health information to be securely exchanged between providers. The HIE could be used as a mechanism to help populate a stroke registry, similarly to how it will populate the current immunization and disease surveillance registries.

Iowa Medicaid Enterprise (IME) will administer the federal Medicaid incentives available to eligible providers who adopt, implement, and meaningfully use health IT, including EHRs. IME will begin making payments for the adoption, implementation, and upgrade of health IT in 2011. Meaningful use rules include parameters related to timely treatment of acute stroke patients.

The Health IT Regional Extension Center (REC) will serve at least 1,200 priority primary care providers that practice in individual or small group settings, public and critical access hospitals, community health centers, rural health clinics and in settings that serve the uninsured and underserved. The Iowa REC will assist these providers with EHR vendor selection, implementation and optimization, meaningful use, project management, practice workflow design, health information exchange, and privacy and security best practices.

Financial Support and Sustainability

A voluntary registry cannot be established and maintained as with the triage system. A plan for sustainable funding beyond the current federal funding provided by the CDC through its cooperative agreement with the Iowa Department of Public Health for development of a registry is essential.
Recommendations

**Stroke Triage System:**
- Proceed with the development and implementation of a voluntary Iowa Stroke Triage System to be implemented in January of 2012.
- Continue to work with Primary Stroke Centers, the Iowa Stroke Task Force, the Cardiovascular and Stroke Task Force and other state-wide partners to refine the needs for data collection, and educate hospital administrators and staff, EMS volunteers, statewide healthcare providers and the public about the triage system.

**Stroke Registry:**
- Continue discussion with committed partners regarding options for implementation of a single stroke registry.
- Continue to explore the attributes for a data system/registry that will (1) best align with the triage system, and (2) prove conducive for performance improvement while waiting for further federal guidance regarding the impact of health care reform on developing information technology infrastructure and systems.
- Consider options for sustainability of an Iowa stroke registry and/or stroke-related data collection. Remain alert to any potential funding sources or means for sustainability of the ultimate data system/registry.
- Encourage continual improvement of stroke care at Iowa’s hospitals.
Stakeholder Involvement

The Iowa Department of Public Health Heart Disease and Stroke Prevention Program, the Iowa Healthcare Collaborative, and the American Heart Association worked with the following stakeholders on the development of this plan and report.

- Iowa Cardiovascular and Stroke Task Force;
- Iowa Department of Public Health, Bureau of Emergency Medical Services;
- Iowa Department of Public Health, Office of Health Information Technology;
- Iowa Hospital Association; and
- Iowa Stroke Task Force.