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NATIONAL QUALITY FORUM



STROKE
PREVENTION
AND
MANAGEMENT



National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

A CONSENSUS REPORT

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National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care: A Consensus Report

Foreword

IN THE UNITED STATES, stroke is the third leading cause of death, and it is a leading cause of severe long-term disability. More than 700,000 people will have a stroke this year, and, of these, 200,000 will be recurrent strokes. Including both direct and indirect costs, the estimated cost of stroke was almost \$62.7 billion in 2007.

The provision of high-quality inpatient stroke care is one of the most critical services a hospital can provide, reflecting the efficiency of the hospital and its ability to coordinate care provided within its walls as well as with outside providers. The National Quality Forum (NQF) has endorsed many measures applicable to stroke patients along the continuum of patient care, but there has been a gap in NQF-endorsed[®] consensus standards with regard to inpatient stroke care and rehabilitation. This report presents consensus standards for inpatient stroke care that will help stakeholders close that gap.

NQF thanks the members of the Stroke Prevention and Management Across the Continuum of Care Steering Committee and NQF Members for their commendable work in developing this measure set that will help prevent strokes and improve the quality of care for stroke patients.



Janet M. Corrigan, PhD, MBA
President and Chief Executive Officer

The mission of the National Quality Forum is to improve the quality of American healthcare by setting national priorities and goals for performance improvement, endorsing national consensus standards for measuring and publicly reporting on performance, and promoting the attainment of national goals through education and outreach programs.

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National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care: A Consensus Report

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National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care: A Consensus Report

Executive Summary

MORE THAN 700,000 PEOPLE will have a stroke this year; of these, 200,000 will be recurrent strokes. This report presents 17 new NQF-endorsed[®] voluntary consensus standards that aim to make care more patient centered, prevent reoccurring strokes, and improve quality across a stroke episode, including acute care, postacute follow-up, rehabilitation, and postrehabilitation. A measure of acute stroke mortality also was endorsed.

The provision of high-quality inpatient stroke care is one of the most critical services a hospital can provide. The quality of hospital inpatient stroke care is more than just a function of the specific clinical services provided in the hospital. It also reflects the efficiency of the hospital and its ability to coordinate timely care provided within its walls as well as with outside providers. Moreover, although giving effective feedback to providers is important to improve quality, NQF-endorsed consensus standards for inpatient stroke care will provide stakeholders with a robust picture of the quality of stroke care delivered in the United States.

Measures were developed by the Agency for Healthcare Research and Quality, the American Speech-Language-Hearing Association, the American Stroke Association, the Centers for Disease Control and Prevention, and The Joint Commission.

- Deep vein thrombosis (DVT) prophylaxis
- Discharged on antithrombotic therapy
- Patients with atrial fibrillation receiving anticoagulation therapy
- Thrombolytic therapy administered
- Antithrombotic therapy by end of hospital day two
- Discharged on statin medication
- Stroke education
- Assessed for rehabilitation
- Functional communication measure: writing
- Functional communication measure: swallowing

- Functional communication measure: spoken language expression
- Functional communication measure: spoken language comprehension
- Functional communication measure: reading
- Functional communication measure: motor speech
- Functional communication measure: memory
- Functional communication measure: attention
- Acute stroke mortality rate

National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care: A Consensus Report

Background

STROKE IS THE THIRD LEADING cause of death in the United States and a leading cause of severe long-term disability. More than 700,000 people will have a stroke this year; of these, 200,000 will be recurrent strokes.¹ Among all strokes, 87 percent are ischemic, and the remainder are intracranial or subarachnoid hemorrhage.² The estimated direct and indirect cost of stroke alone for 2007 was \$62.7 billion.³ According to the Centers for Disease Control and Prevention, nearly three-quarters of all strokes occur in people over 65, and each decade after age 55, the risk of having a stroke more than doubles. In addition, "stroke death rates are higher for African Americans than for whites, even at younger ages."⁴

The quality of care provided to stroke patients has been a key concern reflected in many recent initiatives, including the "Get With The Guidelines" program initiated by the American Heart Association and the American Stroke Association. The program helps ensure quality improvement of acute stroke treatment and ischemic stroke prevention.⁵ The National Quality Forum (NQF) has endorsed many measures that are applicable to stroke patients along the continuum of care, including measures related to primary and secondary prevention through management of risk factors, clinician-level measures for management of acute stroke, and measures for nursing homes and home health organizations for postacute care. A significant gap in the NQF-endorsed[®] consensus standards has been inpatient stroke care and rehabilitation.

The provision of high-quality inpatient stroke care is one of the most critical services a hospital can provide. The quality of hospital inpatient stroke care is more than just a function of the specific clinical services provided in the hospital. It also reflects the efficiency of the hospital and its ability to coordinate timely care provided within its walls as well as with outside providers. Moreover, although effective feedback to providers is important to improve quality, NQF-endorsed consensus standards for inpatient stroke care will provide stakeholders with a robust picture of the quality of stroke care delivered in the United States.

Strategic Directions for NQF

NQF's mission includes three parts: 1) setting national priorities and goals for performance improvement; 2) endorsing national consensus standards for measuring and publicly reporting on performance; and 3) promoting the attainment of national goals through education and outreach programs. As greater numbers of quality measures are developed and brought to NQF for consideration, NQF must assist stakeholders in measuring "what makes a difference" and addressing what is important to achieve the best outcomes for patients and populations. An updated Measurement Framework promotes shared accountability and measurement across episodes of care with a focus on outcomes and patient engagement in decisionmaking, coupled with measures of the healthcare process and cost/resource use. For more information, see www.qualityforum.org.

Several strategic issues have been identified to guide the consideration of candidate consensus standards:

DRIVE TOWARD HIGH PERFORMANCE. Over time, the bar of performance expectations should be raised to encourage the achievement of higher levels of system performance.

EMPHASIZE COMPOSITE MEASURES. Composite measures provide much-needed summary information pertaining to multiple dimensions of performance and are more comprehensible to patients and consumers.

MOVE TOWARD OUTCOME MEASUREMENT. Outcome measures provide information of keen interest to consumers and purchasers, and, when coupled with healthcare process measures, they provide useful and actionable information to providers. Outcome measures also focus attention on much-needed system-level improvements, because achieving the best patient outcomes often requires carefully designed care processes, teamwork, and coordinated action on the part of many providers.

FOCUS ON DISPARITIES IN ALL THAT WE DO. Some of the greatest performance gaps relate to care of minority populations. Particular attention should be focused on the most relevant race/ethnicity/language/socioeconomic strata to identify relevant measures for reporting.

NQF's Consensus Development Process

Evaluating Potential Stroke Consensus Standards

NQF's goal was to identify and endorse measures that address the clinical, system, and care coordination aspects involved in effective stroke care across the continuum of care. This would lead to a comprehensive set of measures that include outcomes, as well as process measures with a documented relationship to outcomes. Special emphasis was placed on the ability of a hospital to effectively coordinate care within its walls, including the emergency department, as well as with outside providers, including ambulatory care and skilled nursing facilities. Potential consensus standards

addressed a broad range of areas, including stroke risk assessment and prevention strategies, atrial fibrillation management, recognition of early warning symptoms and timeliness of prehospital care, emergency department interventions, acute hospital care, postacute care, rehabilitation, and ambulatory care. Harmonization of similar measures, particularly across settings, is a priority.

Candidate standards were solicited through an open “Call for Measures” in March 2008 and were actively sought by NQF staff through literature reviews and a search of the National Quality Measures Clearinghouse. A total of 18 measures ultimately were identified and evaluated by the Stroke Prevention and Management Across the Continuum of Care Steering Committee for appropriateness as voluntary consensus standards for accountability and public reporting. The Steering Committee evaluated the candidate standards using the standardized criteria of importance, scientific acceptability, usability, and feasibility (see www.qualityforum.org).

Relationship to Other NQF-Endorsed Consensus Standards

This report does not represent the entire scope of NQF work relevant to the quality of stroke care. NQF has endorsed clinician-level consensus standards for stroke care through its National Voluntary Consensus Standards for Hospital Care: Specialty Clinician Performance Measures project, and through its National Voluntary Consensus Standards for Clinicians: Additional Performance Measures 2008

project. NQF also has endorsed many other stroke-related measures regarding the prevention and treatment of cardiac-related conditions that are precursors to stroke. Some of the endorsed measures for nursing home and home health patients also would be relevant to postacute stroke care. Additionally, more global measures, such as hospital CAHPS®, medication reconciliation, and measures for care transitions, would be appropriate for stroke patients.

The full constellation of consensus standards, along with those presented in this report, provide a growing number of NQF-endorsed voluntary consensus standards that directly and indirectly reflect the importance of measuring and improving quality of care. Organizations that adopt these consensus standards will promote the development of safer and higher-quality care for patients throughout the nation.

National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

Overview of the Endorsed Measures

This report presents 17 measures that evaluate the performance of stroke care (Table 1). They were recommended by the Steering Committee after reviewing them against the standard criteria for voluntary consensus standards appropriate for accountability and public reporting.

Table 1: National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

Measures were developed by The Joint Commission, the Agency for Healthcare Research and Quality (AHRQ), the American Speech-Language-Hearing Association (ASHA), the American Stroke Association, and the Centers for Disease Control and Prevention.

MEASURE TITLE	MEASURE ID ^a	MEASURE DESCRIPTION AND REVIEW NUMBER ^b	LEVEL OF ANALYSIS	IP OWNER ^c
Deep vein thrombosis (DVT) prophylaxis	0434	Patients with an ischemic stroke or a hemorrhagic stroke and who are nonambulatory should start receiving DVT prophylaxis by end of hospital day two (STR-001-08)	Facility	JC
Discharged on antithrombotic therapy	0435	Patients with an ischemic stroke prescribed antithrombotic therapy at discharge (STR-002-08)	Facility	JC
Patients with atrial fibrillation receiving anticoagulation therapy	0436	Patients with an ischemic stroke with atrial fibrillation discharged on anticoagulation therapy (STR-003-08)	Facility	JC
Thrombolytic therapy administered	0437	Acute ischemic stroke patients who arrive at the hospital within 120 minutes (2 hours) of time last known well and for whom IV t-PA was initiated at this hospital within 180 minutes (3 hours) of time last known well (STR-004-08)	Facility	JC
Antithrombotic therapy by end of hospital day two	0438	Patients with ischemic stroke who receive antithrombotic therapy by the end of hospital day two (STR-005-08)	Facility	JC

more

*Time-limited endorsement.

^a Upon NQF endorsement, each measure receives a unique NQF measure ID number.

^b Review number.

^c IP owner—intellectual property owner and copyright holder. ALL RIGHTS RESERVED. For the most current specifications and supporting information, please refer to the IP owner:

JC—The Joint Commission (www.jointcommission.org)

ASHA—American Speech-Language Hearing Association (www.asha.org)

AHRQ—Agency for Healthcare Research and Quality (www.ahrq.gov)

Table 1: National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

MEASURE TITLE	MEASURE ID ^a	MEASURE DESCRIPTION AND REVIEW NUMBER ^b	LEVEL OF ANALYSIS	IP OWNER ^c
Discharged on statin medication	0439	Ischemic stroke patients with LDL>100, or LDL not measured, or, who were on cholesterol- reducing therapy prior to hospitalization are discharged on a statin medication (STR-006-08)	Facility	JC
Stroke education	0440	Patients with ischemic or hemorrhagic stroke or their caregivers who were given education or educational materials during the hospital stay addressing all of the following: personal risk factors for stroke, warning signs for stroke, activation of emergency medical system, need for follow-up after discharge, and medications prescribed (STR-008-08)	Facility	JC
Assessed for rehabilitation	0441	Patients with an ischemic stroke or hemorrhagic stroke who were assessed for rehabilitation (STR-010-08)	Facility	JC
Functional communication measure: writing*	0442	The change in functional communication status subsequent to speech-language pathology treatment related to writing (STR-011-08)	Facility Clinician	JC
Functional communication measure: swallowing*	0443	The change in functional communication status subsequent to speech-language pathology treatment of patients who exhibit difficulty in swallowing (STR-012-08)	Facility Clinician	ASHA
Functional communication measure: spoken language expression*	0444	The change in functional communication status subsequent to speech-language pathology treatment related to spoken language expression (STR-013-08)	Facility Clinician	ASHA

more

Table 1: National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

MEASURE TITLE	MEASURE ID ^a	MEASURE DESCRIPTION AND REVIEW NUMBER ^b	LEVEL OF ANALYSIS	IP OWNER ^c
Functional communication measure: spoken language comprehension*	0445	The change in functional communication status subsequent to speech-language pathology treatment related to spoken language comprehension (STR-014-08)	Facility Clinician	ASHA
Functional communication measure: reading*	0446	The change in functional communication status subsequent to speech-language pathology treatment of patients with reading disorders (STR-015-08)	Facility Clinician	ASHA
Functional communication measure: motor speech*	0447	The change in functional communication status subsequent to speech-language pathology treatment of patients who exhibit deficits in speech production (STR-016-08)	Facility Clinician	ASHA
Functional communication measure: memory*	0448	The change in functional communication status subsequent to speech-language pathology treatment of patients with memory deficits (STR-017-08)	Facility Clinician	ASHA
Functional communication measure: attention*	0449	The change in functional communication status subsequent to speech-language pathology treatment of patients who have attention deficits (STR-018-08)	Facility Clinician	ASHA
Acute stroke mortality rate	0467	Percentage of in-hospital deaths for discharges, 18 years and older, with ICD-9-CM principal diagnosis code of stroke (PS-HC-11)	Facility	AHRQ

Endorsed Measures

0434⁶ **Deep vein thrombosis (DVT)** (JC) STR-001-08⁷

This process standard measures the percentage of patients with an ischemic stroke or a hemorrhagic stroke and who are nonambulatory and should start receiving DVT prophylaxis by end of hospital day two. According to The Joint Commission, “patients experiencing a stroke that involves a paretic or paralyzed lower extremity are at increased risk of developing deep vein thrombosis (DVT). One study noted proximal deep vein thrombosis in more than a third of patients with moderately severe stroke. Reported rates of occurrence vary depending on the type of screening used. Prevention of DVT, through the use of prophylactic strategies, in at risk patients is a noted recommendation in numerous clinical practice guidelines. Non-pharmacologic approaches include early mobilization and use of intermittent pneumatic compression stockings. Pharmacologic approaches involve early anticoagulant therapy including the administration of sub-cutaneous unfractionated heparin, low-molecular-weight (LMW) heparins and heparinoids if there are no contraindications. Aspirin alone is not recommended as an agent to prevent DVT.”⁸

0435 **Discharged on antithrombotic therapy** (JC) STR-002-08

This process standard measures the percentage of patients with an ischemic stroke prescribed antithrombotic therapy at discharge. The Joint

Commission noted that “the effectiveness of antithrombotic agents in reducing stroke mortality, stroke-related morbidity and recurrence rates has been studied in several large clinical trials. While the use of these agents for patients with acute ischemic stroke and transient ischemic attacks continues to be the subject of study, substantial evidence is available from completed studies. Data at this time suggest that antithrombotic therapy should be prescribed at discharge following acute ischemic stroke to reduce stroke mortality and morbidity as long as no contraindications exist. For patients with a stroke due to a cardioembolic source (e.g., atrial fibrillation, mechanical heart valve), warfarin is recommended unless contraindicated. Warfarin is not generally recommended for secondary stroke prevention in patients presumed to have a non-cardioembolic stroke. Anticoagulants at doses to prevent deep vein thrombosis are insufficient antithrombotic therapy to prevent recurrent ischemic stroke or TIA.”⁹

0436 **Patients with atrial fibrillation receiving anticoagulation therapy** (JC) STR-003-08

This process standard measures the percentage of patients with an ischemic stroke with atrial fibrillation/flutter discharged on anticoagulation therapy. According to The Joint Commission, “nonvalvular atrial fibrillation (NVAF) is a common arrhythmia and an important risk factor for stroke. It is one of several conditions and lifestyle factors that have been identified as risk factors for stroke.” The measure developer noted that “it has been estimated that

over 2 million adults in the United States have NVAf. While the median age of patients with atrial fibrillation is 75 years, the incidence increases with advancing age. For example, The Framingham Heart Study noted a dramatic increase in stroke risk associated with atrial fibrillation with advancing age, from 1.5% for those 50 to 59 years of age to 23.5% for those 80 to 89 years of age. Furthermore, a prior stroke or transient ischemic attack (TIA) are among a limited number of predictors of high stroke risk within the population of patients with atrial fibrillation. Therefore, much emphasis has been placed on identifying methods for preventing recurrent ischemic stroke as well as preventing first stroke. Prevention strategies focus on the modifiable risk factors such as hypertension, smoking, and atrial fibrillation. Analysis of five placebo-controlled clinical trials investigating the efficacy of warfarin in the primary prevention of thromboembolic stroke, found the relative risk of thromboembolic stroke was reduced by 68% for atrial fibrillation patients treated with warfarin. The administration of anticoagulation therapy, unless there are contraindications, is an established effective strategy in preventing recurrent stroke in high stroke risk-atrial fibrillation patients with TIA or prior stroke.”¹⁰

0437 Thrombolytic therapy administered

(JC) STR-004-08

This process standard measures the percentage of acute ischemic stroke patients who arrive at the hospital within 120 minutes (2 hours) of time last known well and for whom IV t-PA was initiated at this hospital within 180 minutes (3 hours) of time last known well.

The Joint Commission noted that “the administration of thrombolytic agents to carefully screened, eligible patients with acute ischemic stroke has been shown to be beneficial in several clinical trials. These included two positive randomized controlled trials in the United States; The National Institute of Neurological Disorders and Stroke (NINDS) Studies, Part I and Part II. Based on the results of these studies, the Food and Drug Administration approved the use of intravenous recombinant tissue plasminogen activator (IV r-TPA or t-PA) for the treatment of acute ischemic stroke when given within 3 hours of stroke symptom onset. A large meta-analysis controlling for factors associated with stroke outcome confirmed the benefit of IV t-PA in patients treated within 3 hours of symptom onset. While controversy still exists among some specialists, the major society practice guidelines developed in the United States all recommend the use of IV t-PA for eligible patients. Physicians with experience and skill in stroke management and the interpretation of CT scans should supervise treatment.”¹¹

0438 Antithrombotic therapy by end of hospital day two

(JC) STR-005-08

This process standard measures the percentage of patients with ischemic stroke who receive antithrombotic therapy by the end of hospital day two. The Joint Commission explained that “the effectiveness of antithrombotic agents in reducing stroke mortality, stroke-related morbidity, and recurrence rates has been studied in several large clinical trials. While the use of these agents for patients with acute ischemic

stroke and transient ischemic attacks continues to be the subject of study, substantial evidence is available from completed studies. Data at this time suggest that antithrombotic therapy should be initiated within 48 hours of symptom onset in acute ischemic stroke patients to reduce stroke mortality and morbidity as long as no contraindications exist. Anticoagulants at doses to prevent deep vein thrombosis are insufficient antithrombotic therapy to prevent recurrent ischemic stroke or TIA.”¹²

0439 Discharged on statin medication

(JC) STR-006-08

This process standard measures the percentage of ischemic stroke patients with LDL >100, or LDL not measured, or who were on cholesterol-reducing therapy prior to hospitalization are discharged on statin medication. According to The Joint Commission, “an elevated serum lipid level has been a well-documented risk factor for coronary artery disease (CAD) and reflects an organ-specific manifestation of atherosclerosis, which is a disease process that can affect the heart and the major and minor branches of the arterial tree. The reduction of LDL cholesterol, through lifestyle modification and drug therapy when appropriate, is recommended for the prevention of myocardial infarction and other major vascular events for patients with CAD (or coronary risk equivalent conditions) according to the National Cholesterol Education Program’s Adult Treatment Panel III (NCEP ATP III) Guidelines. Recently, there has been an increased focus on the detection of patients with these risk factors when they present with other manifestations of atherosclerosis,

and assuring that these patients are treated with lipid lowering medication if they meet NCEP ATP III guidelines. While symptomatic carotid artery disease is one of the recognized coronary disease risk equivalents that qualify patients for treatment under ATP III, there was little data until recently about the role of lipid lowering to prevent recurrent stroke or major vascular events in patients who presented with atherosclerotic stroke but did not otherwise qualify for treatment under ATP III. The Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) study examined the effects of statins to lower LDL cholesterol in patients with stroke or TIA of atherosclerotic origin who had no other reason for taking lipid lowering therapy (i.e., they were without prior CAD or risk equivalent conditions), and had a fasting LDL >100 mg/dL. The trial convincingly demonstrated that intensive lipid lowering therapy using statin medication was associated with a dramatic reduction in the rate of recurrent ischemic stroke and major coronary events. The treatment was well tolerated and cost effective. As a result, intensive lipid lowering therapy through use of a statin medication is now recommended for all patients with stroke or TIA of atherosclerotic origin who have an LDL >100 mg/dl (or with LDL <100 mg/dl due to being on lipid lowering therapy prior to admission). Based on these guidelines, all patients with ischemic stroke or TIA should have lipid profile measurement performed within 48 hours of admission unless outpatient results are available from within the past 30 days. A large body of evidence suggests that non-fasting lipid levels drawn in the first 48 hours after a major vascular event are reliable predictors of baseline lipid profiles, but after that time they may

become unreliable. It is recommended that all patients with ischemic stroke or TIA with coronary heart disease or symptomatic atherosclerotic disease who have an LDL ≥ 100 mg/dl (or with LDL < 100 mg/dl due to being on lipid lowering therapy prior to admission) should be treated with a statin. The target goal for cholesterol lowering is an LDL-C level of < 100 mg/dL. An LDL-C < 70 mg/dL is recommended for very high-risk persons with multiple risk factors. For patients with stroke of atherosclerotic origin, intensive lipid lowering therapy with statins should be initiated in those who have an LDL ≥ 100 mg/dl (or with LDL < 100 mg/dl due to being on lipid lowering therapy prior to admission).¹³

0440 **Stroke education**

(JC) STR-008-08

This process standard measures the percentage of patients with ischemic or hemorrhagic stroke or their caregivers who were given education and/or educational materials during the hospital stay addressing **all** of the following: personal risk factors for stroke, warning signs for stroke, activation of emergency medical system, need for follow-up after discharge, and medications prescribed at discharge. According to The Joint Commission, "there are many examples of how patient education programs for specific chronic conditions have increased healthful behaviors, improved health status, and/or decreased health care costs of their participants. Clinical practice guidelines include recommendations for patient and family education during hospitalization as well as information about resources for social support services. Some clinical trials have shown

measurable benefits in patient and caregiver outcomes with the application of education and support strategies. The type of stroke experienced and the resulting outcomes will play a large role in determining not only the course of treatment but also what education will be required. Patient education should include information about the event (e.g., cause, treatment, and risk factors), the role of various medications or strategies, desirable lifestyle modifications to reduce risk or improve outcomes. Family/caregivers will also need guidance in planning effective and realistic care strategies appropriate to the patient's prognosis and potential for rehabilitation."¹⁴

0441 **Assessed for rehabilitation**

(JC) STR-010-08

This process standard measures the percentage of patients with an ischemic stroke or hemorrhagic stroke who were assessed for rehabilitation services. The Joint Commission noted that "each year about 700,000 people experience a new or recurrent stroke, which is the nation's third leading cause of death. Approximately two thirds of these individuals survive and require rehabilitation. Stroke is a leading cause of serious, long-term disability in the United States, with about 4.4 million stroke survivors alive today. Forty percent of stroke patients are left with moderate functional impairment and 15 to 30 percent with severe disability. More than 60% of those who have experienced stroke, serious injury, or a disabling disease have never received rehabilitation. Stroke rehabilitation should begin as soon as the diagnosis of stroke is established and life-threatening problems are

under control. Among the high priorities for stroke are to mobilize the patient and encourage resumption of self-care activities as soon as possible. A considerable body of evidence indicates that better clinical outcomes when patients with stroke are treated in a setting that provides coordinated, multidisciplinary stroke-related evaluation and services. Effective rehabilitation interventions initiated early following stroke can enhance the recovery process and minimize functional disability. The primary goal of rehabilitation is to prevent complications, minimize impairments, and maximize function.”¹⁵

The following measures submitted by ASHA were considered as a group.

0442 Functional communication measure: writing *STR-011-08*

0443 Functional communication measure: swallowing *STR-012-08*

0444 Functional communication measure: spoken language expression *STR-013-08*

0445 Functional communication measure: spoken language comprehension *STR-014-08*

0446 Functional communication measure: reading *STR-015-08*

0447 Functional communication measure: motor speech *STR-016-08*

0448 Functional communication measure: memory *STR-017-08*

0449 Functional communication measure: attention *STR-018-08*

These outcome standards measure the change in rates of functional communication abilities. According to ASHA, “the Functional Communication Measures (FCMs) are a series of seven-point rating scales, ranging from least functional (Level 1) to most functional (Level 7). They have been developed by ASHA to describe the different aspects of a patient’s functional communication and swallowing abilities over the course of speech-language pathology intervention.”¹⁶ Moreover, “these FCMs were designed to describe functional abilities over time from admission to discharge in various speech-language pathology treatment settings. They are not dependent upon administration of any particular formal or informal assessment measures, but are clinical observations provided by the speech-language pathologist of the patient’s communication and/or swallowing abilities addressed by an individualized treatment plan.”¹⁷

0467 Acute stroke mortality rate
(AHRQ) *PS-HC-11*

To prevent brain tissue death, quality treatment for stroke must be timely and efficient. Clinical factors of severity at presentation, including the use of mechanical ventilation on the first day, may vary by hospital and influence mortality. Providers with high mortality rates may wish to examine the case mix for these potentially complicating factors. Furthermore, hospitals with rehabilitation programs may have higher mortality rates. Providers may want to use acute stroke mortality in conjunction with length of stay for their hospitals and for surrounding areas. Because many deaths occur out of the hospital, linkage to death records for patients

after discharge may be an appropriate addition to this indicator. According to AHRQ, the literature shows that only 10 percent to 15 percent of stroke patients die during hospitalization.¹⁸

Measures Not Endorsed

DYSPHAGIA SCREENING (JC) STR-007-08

The Steering Committee acknowledged that although a swallowing assessment for stroke patients is important to prevent aspiration pneumonia, dysphagia screenings currently are not well defined. The Committee believed that the measure should not be endorsed because of the lack of a valid, reliable, and standardized screening process supported by research (including well-designed research that demonstrates complication reduction/avoidance).

SMOKING CESSATION/ADVICE/COUNSELING (JC) STR-009-08

The Steering Committee noted that smoking is an independent major risk factor for stroke. The measure developer noted that, based on the performance of heart failure, acute myocardial infarction, and pneumonia measures, there is significant room for improvement in smoking cessation for all patients. The Steering Committee believed that instead of endorsing a plethora of clinical disease-specific smoking cessation measures, the need for a harmonized smoking cessation/counseling measure for all patients that could be stratified for specific disease processes should be emphasized.

Recommendations

The following areas require further investigation and measure development.

DVT Prophylaxis

- Additional research is needed on the optimal timing of therapy and on the use of heparin versus sequential compression devices to determine optimal treatment.

Patients with Atrial Fibrillation Receiving Anticoagulation Therapy

- Additional information is needed on the role of patient compliance and patient refusal.

Thrombolytic Therapy Administered

- A measure should be considered for a door-to-needle “golden hour” time of <60 minutes.
- At the time of this project, the American Academy of Neurology and the American Society of Neuroimaging were developing a measure to look at a door-to-CT reading time of ≤45 minutes as a key step in the process.
- Protocols for emergency department physicians and hospitalists to ensure timely treatment need to be developed.

Discharged on Statin

- The evidence should be reviewed to ascertain whether other cholesterol-reducing medications should be used if statins are contraindicated.
- It would be helpful to consider adding a lipid testing measure or a measure pair with a lipid testing measure.
- Future measures should be considered for nonpharmacological treatments such as diet and exercise.

Assessed for Rehabilitation

- The impact of quality rehabilitation services on outcomes should be investigated further.

Functional Communication Measures


- Combining appropriate measures as composites should be investigated.

Dysphagia Screening

- A valid, reliable, and standardized screening process should be developed that is supported by research (including well-designed research that demonstrates complication reduction/avoidance).
- Further research into the disparate rates of testing among African Americans should be conducted.

Notes

- 1 American Heart Association (AHA)/American Stroke Association (ASA), *Heart Disease and Stroke Statistics, 2007 Update At-a-Glance*, p. 14. Available at www.americanheart.org/downloadable/heart/1166712318459HS_StatsInsideText.pdf. Last accessed July 2009.
- 2 Ibid.
- 3 Ibid., p. 16.
- 4 Centers for Disease Control and Prevention (CDC), Fact Sheets and At-a-Glance Reports, *Stroke Fact Sheet*, Atlanta, GA: CDC/NCCDPHP; 2008. Available at www.cdc.gov/Stroke/stroke_facts.htm#facts. Last accessed July 2009.
- 5 ASA, *Get With The Guidelines—Stroke*. Available at www.strokeassociation.org/presenter.jhtml?identifier=3002728. Last accessed July 2009.
- 6 NQF measure ID number.
- 7 Review number.
- 8 The Joint Commission, *Stroke: Disease-Specific Care Stage II Performance Measures*, p. 5. Available at www.jointcommission.org/NR/rdonlyres/9BB8B4D9-D558-40A1-84E1-D0A56478062D/0/F_Section4_Sep08.pdf. Last accessed July 2009.
- 9 Ibid., p. 9.
- 10 Ibid., p. 13.
- 11 Ibid., p. 17.
- 12 Ibid., p. 21.
- 13 Ibid., p. 25.
- 14 Ibid., p. 32.
- 15 Ibid., p. 41.
- 16 American Speech-Hearing-Language Association (ASHA), *Adults in Health Care Functional Communication Measures (FCMs) Speech-Language Pathology*. Rockville, MD: ASHA; 2003, p. 2. Available at www.asha.org/NR/rdonlyres/2F728976-3DFA-412A-A741-1D4F4521C8C9/0/AdultNOMSFCMs.pdf. Last accessed July 2009.
- 17 Ibid., p. 3.
- 18 Agency for Healthcare Research and Quality National Quality Measures Clearinghouse, *Complete Summary: Acute Stroke: Mortality Rate*. Available at www.qualitymeasures.ahrq.gov/summary/summary.aspx?ss=1&doc_id=12754. Last accessed August 2009.



National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care: A Consensus Report

Appendix A

Specifications of the National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

THE FOLLOWING TABLE PRESENTS the detailed specifications for the National Quality Forum (NQF)-endorsed[®] *National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care*. All information presented has been derived directly from measure sources/developers without modification or alteration (except when the measure developer agreed to such modification during the NQF Consensus Development Process) and is current as of May 1, 2007. All NQF-endorsed voluntary consensus standards are open source, meaning they are fully accessible and disclosed. Measures were developed by the Agency for Healthcare Research and Quality, the American Speech-Language-Hearing Association, the American Stroke Association, the Centers for Disease Control and Prevention, and The Joint Commission.

Appendix A – Specifications of the National Voluntary Consensus Standards for Stroke Prevention and Management Across the Continuum of Care

MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Deep vein thrombosis (DVT) prophylaxis	Measure ID #: 0434 Review #: STR-001-08	JC	Non-ambulatory ischemic or hemorrhagic stroke patients who had DVT prophylaxis initiated by end of hospital day two. Numerator codes are a subset of the denominator codes below. Of those listed, codes with DVT prophylaxis initiated by end of hospital day two = “Yes.”	Ischemic or hemorrhagic stroke patients who are non-ambulatory at the end of hospital day 2. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	<ul style="list-style-type: none"> Patients who are discharged prior to end of hospital day 2: Patients receiving comfort measures only by end of hospital day 2 Patients admitted for the performance of elective carotid endarterectomy Patients ambulating by end of hospital day 2 <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Lab Data, Electronic Health/Medical Record, Other

* Time-limited endorsement.

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^a IP owner—intellectual property owner and copyright holder. ALL RIGHTS RESERVED. For the most current specifications and supporting information, please refer to the IP owner:

JC—The Joint Commission (www.jointcommission.org).

ASHA—American Speech-Language Hearing Association (www.asha.org)

AHRQ—Agency for Healthcare Research and Quality (www.ahrq.gov)

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Discharged on antithrombotic therapy	Measure ID #: 0435 Review #: STR-002-08	JC	Number of patients prescribed antithrombotic therapy at hospital discharge. Numerator codes are a subset of the denominator codes below. Of those listed, codes with antithrombotic therapy prescribed at hospital discharge = "Yes."	Number of patients with ischemic stroke. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	<ul style="list-style-type: none"> Patients discharged/transferred to another short term general hospital for inpatient care Patients who expire Patients who left against medical advice Patients discharged to hospice Patients receiving comfort measures only Patients for whom discharge destination cannot be determined or missing Patients admitted for the performance of elective carotid endarterectomy. <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Lab Data, Electronic Health/Medical Record, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Patients with atrial fibrillation receiving anticoagulation therapy	Measure ID #: 0436 Review #: STR-003-08	JC	Patients discharged on anticoagulation therapy. Numerator codes are a subset of the denominator codes below. Of those listed, codes with anticoagulation therapy prescribed at hospital discharge = "Yes."	Patients with a diagnosis of ischemic stroke with documented atrial fibrillation. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	<ul style="list-style-type: none"> Patients discharged/transferred to another short term general hospital for inpatient care Patients who expire Patients who left against medical advice Patients discharged to hospice Patients receiving comfort measures only Patients admitted for the performance of elective carotid endarterectomy <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Lab Data, Electronic Health/Medical Record, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Thrombolytic therapy administered	Measure ID #: 0437 Review #: STR-004-08	JC	The number of patients for whom IV thrombolytic therapy was initiated at this hospital within 3 hours (= 180 minutes) of time last known well. Numerator codes are a subset of the denominator codes below. Of those listed, codes with time of arrival within 2 hours (120 minutes) of time last known well and for whom IV thrombolytic therapy was initiated at this hospital within 3 hours (= 180 minutes) of time last known well = "Yes."	All patients with acute ischemic stroke whose time of arrival is within 2 hours (120 minutes) of time last known well. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	Patients admitted for the performance of elective carotid endarterectomy ■ Time last known well to arrival in the emergency department greater than (>) 2 hours or unknown Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Lab Data, Electronic Health/Medical Record, Other
Antithrombotic therapy by end of hospital day two	Measure ID #: 0438 Review #: STR-005-08	JC	Patients with ischemic stroke who receive antithrombotic therapy by end of hospital day two. Numerator codes are a subset of the denominator codes below. Of those listed, codes with antithrombotic therapy initiated by the end of hospital day two = "Yes."	All patients with ischemic stroke. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	■ Patients discharged before the end of hospital day 2 ■ Patients receiving comfort measures only by end of hospital day 2 ■ Patients admitted for the performance of elective carotid endarterectomy. Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Lab Data, Electronic Health/Medical Record, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Discharged on statin medication	Measure ID #: 0439 Review #: STR-006-08	JC	Patients who were prescribed a statin medication at hospital discharge. Numerator codes are a subset of the denominator codes below. Of those listed, codes with LDL=100 mg/dL, OR LDL not measured, OR who were on cholesterol reducing therapy prior to hospitalization and prescribed a statin medication at hospital discharge = "Yes."	All ischemic stroke patients with an LDL≥100 mg/dL, OR LDL not measured, OR who were on cholesterol reducing therapy prior to hospitalization. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	<ul style="list-style-type: none"> Patients discharged/transferred to another short term general hospital for inpatient care Patients who expired Patients who left against medical advice Patients discharged to hospice Patients receiving comfort measures only Patients admitted for the performance of elective carotid endarterectomy <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Clinical Database, Electronic Pharmacy Data, Electronic Lab Data, Electronic Health/Medical Record, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Stroke education	Measure ID #: 0440 Review #: STR-008-08	JC	<p>Stroke patients with documentation that they or their caregivers were given education or educational material addressing all of the following:</p> <ol style="list-style-type: none"> 1. Personal risk factors for stroke 2. Warning signs for stroke 3. Activation of emergency medical system 4. Need for follow-up after discharge 5. Medications prescribed. <p>Numerator codes are a subset of the denominator codes below. Of those listed, codes who were given education or educational materials during the hospital stay addressing all of the following: personal risk factors for stroke, warning signs for stroke, activation of emergency medical system, need for follow-up after discharge, and medications prescribed = "Yes."</p>	<p>Patients with ischemic stroke or hemorrhagic stroke.</p> <p>433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.</p>	<ul style="list-style-type: none"> ■ Patients who expired ■ Patients discharged against medical advice ■ Patients discharged/transferred to another short term hospital for inpatient care ■ Patients discharged to hospice ■ Patients receiving comfort measures only ■ Patients admitted for the performance of elective carotid endarterectomy <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Lab Data, Electronic Health/Medical Record, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Assessed for rehabilitation	Measure ID #: 0441 Review #: STR-010-08	JC	Patients assessed for or who received rehabilitation services. Numerator codes are a subset of the denominator codes below. Of those listed, codes assessed for or who receive rehabilitation services during the hospital stay = "Yes."	All patients with ischemic stroke, or hemorrhagic stroke. 433.01 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of basilar artery with cerebral infarction; 433.10 Occlusion and stenosis of carotid artery without cerebral infarction; 433.11 Occlusion and stenosis of carotid artery with cerebral infarction; 433.21 Occlusion and stenosis.	<ul style="list-style-type: none"> Patients discharged/transferred to another short-term hospital for inpatient care Patients who expired Patients who left against medical advice Patients discharged to hospice Patients receiving comfort measures only Patients admitted for the performance of elective carotid endarterectomy. <p>Patients with an ICD-9-CM procedure code of 38.12 Elective Carotid Endarterectomy, if medical record documentation indicates that the patient is also being treated for an acute stroke during this hospitalization.</p>	Paper Medical Record, Electronic Claims, Electronic Clinical Registry, Electronic Lab Data, Electronic Health/Medical Record, Other
Functional communication measure: writing*	Measure ID #: 0442 Review #: STR-011-08	JC	Facility's proportion of stroke patients in each risk-adjusted group that make at least one level of progress of the Writing Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that make at least one level of progress on the Writing Functional Communication Measure (FCM).	Patients discharged from speech language pathology services after only one treatment session.	Electronic Health Record, Instrument/Survey, Data Dictionary/Code

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Functional communication measure: swallowing*	Measure ID #: 0443 Review #: STR-012-08	ASHA	Level of functioning on a seven-point scale at the conclusion of the first speech-language pathology treatment session.	Level of functioning on the same seven-point scale at the time of discharge from speech-language pathology services.	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other
Functional communication measure: spoken language expression*	Measure ID #: 0444 Review #: STR-013-08	ASHA	Facility's proportion of stroke patients in each risk-adjusted group that make at least one level of progress on the Spoken Language Expression Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that make at least one level of progress on the Spoken Language Expression Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other
Functional communication measure: spoken language comprehension*	Measure ID #: 0445 Review #: STR-014-08	ASHA	Facility's proportion of stroke patients in each risk-adjusted group that make at least one level of progress on the Spoken Language Comprehension Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that make at least one level of progress on the Spoken Language Comprehension Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other
Functional communication measure: reading*	Measure ID #: 0446 Review #: STR-015-08	ASHA	Facility's proportion of stroke patients in each risk adjusted group that makes at least one level of progress on the Reading Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that makes at least one level of progress on the Reading Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other

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MEASURE TITLE	MEASURE NUMBERS	IP OWNER(S) ^a	NUMERATOR	DENOMINATOR	EXCLUSIONS	DATA SOURCE
Functional communication measure: motor speech*	Measure ID #: 0447 Review #: STR-016-08	ASHA	Facility's proportion of stroke patients in each risk-adjusted group that makes at least one level of progress on the Motor Speech Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that make at least one level of progress on the Motor Speech Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other
Functional communication measure: memory*	Measure ID #: 0448 Review #: STR-017-08	ASHA	Facility's proportion of stroke patients in each risk adjusted group that make at least one level of progress on the Memory Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that make at least one level of progress on the Memory Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record, Standardized clinician survey, Other
Functional communication measure: attention*	Measure ID #: 0449 Review #: STR-018-08	ASHA	Facility's proportion of stroke patients in each risk-adjusted group that makes at least one level of progress on the Attention Functional Communication Measure (FCM).	National proportion of stroke patients in that treatment setting in each risk-adjusted group that makes at least one level of progress on the Attention Functional Communication Measure (FCM).	Patients discharged from speech-language pathology services after only one treatment session.	Electronic Health/Medical Record
Acute stroke mortality rate (IQI 17)	Measure ID #: 0467 Review #: PS-HC-11	AHRQ	Number of in-hospital deaths.	Discharges, age 18 years and older, with ICD-9-CM principal diagnosis code of stroke.	Patients with missing discharge disposition (DISP=missing); transferring to another short-term hospital (DISP=2), with MDC 14 (pregnancy, childbirth, and puerperium) and with MDC 15 (newborns and other neonates).	Electronic Claims

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